THE UNIVERSITY *of* NORTH CAROLINA *at* CHAPEL HILL

BOARD OF TRUSTEES
COMMERCIALIZATION & ECONOMIC
DEVELOPMENT COMMITTEE
JULY 22, 2015, 2:30PM
HILL BALLROOM SOUTH

OPEN SESSION

FOR INFORMATION ONLY
(No formal action is requested at this time)

1. Strategic Focus for the Committee: Understanding the current
    status of Innovation and Entrepreneurship broadly and more
    specifically Commercialization and Economic Development.
    Consider how to move the University forward in a significant way.
    Lowry Caudill, UNC Board of Trustees

2. Review of Innovation and Entrepreneurship   (Attachment A)
    Judith Cone, Interim Vice Chancellor for Commercialization &   (Attachment B)
    Economic Development

3. Review Status of Research
    Barbara Entwisle, Vice Chancellor for Research

4. Innovation and Entrepreneurship Phase 3 Planning Update
    - Working Groups
    - October 8-9, 2015 Innovation Summit
    Lowry Caudill, UNC Board of Trustees
    Judith Cone, Interim Vice Chancellor for Commercialization &
    Economic Development

5. Conversation on Committee's Strategic Priorities   (Attachment C)
    Lowry Caudill, UNC Board of Trustees   (Attachment D)
                                                                        (Attachment E)

*Some of the business to be conducted is authorized by the N.C. Open Meetings Law to be
conducted in closed session.

INNOVATE CAROLINA

Putting Important Ideas to Use

Advancing Innovation, Entrepreneurship, Commercialization & Economic Development

Board of Trustees
Commercialization & Economic Development Committee
Lowry Caudill, Committee Chair
Judith Cone
Special Assistant to the Chancellor for Innovation & Entrepreneurship
Interim Vice Chancellor for Commercialization & Economic Development

July 22, 2015

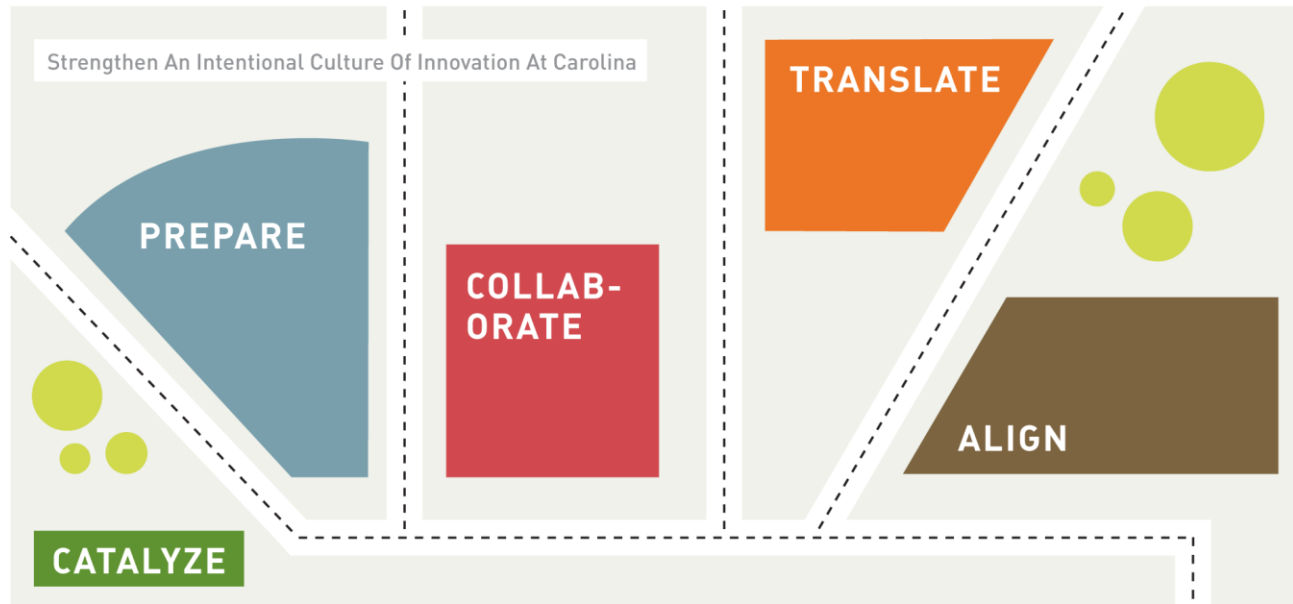THE UNIVERSITY
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History of UNC Chapel Hill Board of Trustees Involvement in Innovation & Entrepreneurship

- 2010 BOT members served on Innovation Circle
  - Result: Innovation Roadmap
- 2013 Innovation & Entrepreneurship Committee formed, Phil Clay, Chair
- 2014 Chair Clay issued memo; University responded (see attachments)
  - Result: New Vice Chancellor for Commercialization & Economic Development Created
- 2015 Commercialization & Economic Development Committee formed

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INNOVATE CAROLINA: ROADMAP

Strengthen An Intentional Culture Of Innovation At Carolina

PREPARE

COLLAB-ORATE

TRANSLATE

ALIGN

CATALYZE

Putting important ideas to use

The Challenges

Health   Water   Poverty   Environment

For a world in need, who can help the majority of global citizens who lack access to fundamental resources?

What is the role of UNC Chapel Hill as a major research university in making the world a better place for all its citizens?

Carolina's To-do List

Committed to helping solve the
world's urgent challenges

- Cure diseases, and get those cures to all the people who need them.
- Find, invent, gain adoption of clean energy solutions.
- Feed seven billion people.
- Inspire and prepare students in our schools.
- Promote widespread prosperity.
- Describe the world, and replace conflict with understanding

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Strategy

Vision

With a special focus on **urgent challenges**, **innovators** and **innovations** launched at Carolina consistently **apply** important ideas for a **better world**.

Mission

Be **the** place where innovators **thrive**.

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of NORTH CAROLINA
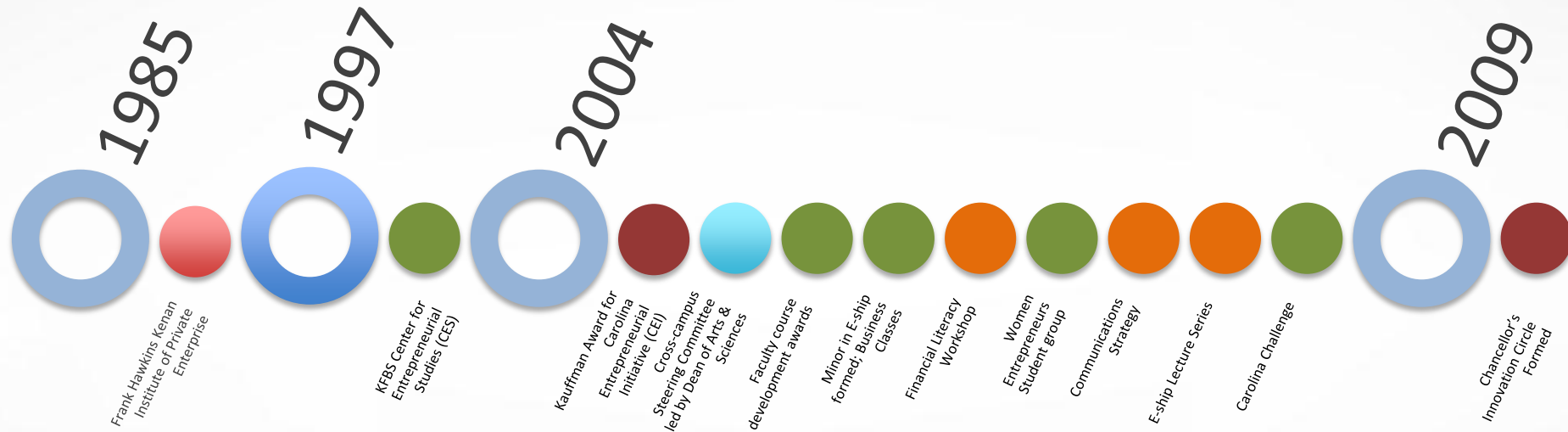*at* CHAPEL HILL

UNC Chapel Hill Recognized as Leader

- Researchers winning awards and serving in leadership roles internationally

- Roadmap and methodologies used by others

- Recognized by the Deshpande Symposium as leading entrepreneurial university, 2015

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Actions & Results

Phase 1 - 1985-2009 - Laying the Foundation

1985 — Frank Hawkins Kenan Institute of Private Enterprise

1997 — KFBS Center for Entrepreneurial Studies (CES)

2004 — Kauffman Award for Carolina Entrepreneurial Initiative (CEI)

Cross-campus Steering Committee led by Dean of Arts & Sciences

Faculty course development awards

Minor in E-ship formed; Business Classes

Financial Literacy Workshop

Women Entrepreneurs Student group

Communications Strategy

E-ship Lecture Series

Carolina Challenge

2009 — Chancellor's Innovation Circle Formed

Legend:
- Communications & Engagement
- Curricular/Co-curricular
- Funding/Governance
- Cross-campus Initiatives

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Phase 2 – 2009-2015 Innovation Roadmap

1/10 Chancellor Holden Thorp Kicks off the Innovation Roadmap Process

1/11 BOT Members involved with Roadmap ONGOING

5/13 BOG Releases 2013-18 Strategic Directions Plan

7/13 BOT Carol Folt Hired; Innovation & Impact Committee Holds 1st mtg

10/13 Carol Folt Installed as 11th Chancellor

2/14 BOG Holds Mtg on Commercialization

5/14 BOT I&I Committee Memo to Leadership

2/14 Chancellor Folt presents on Commercialization to BOG

11/14 Governor's Task Force on Innovation to Jobs

8/14 BOT I&I Committee Leadership Response

3/15 Governor seeks funding for I2J from Legislature

1/15 BOT CRVF Carolina Research Venture Fund $5M+

2/15 Chancellor Folt Creates VC of Commercialization

Timeline

2010 — **2011** — **2012** — **2013** — **2014** — **2015**

1/10 Strategy Group of Faculty, Students, Innovation Circle

10/10 Roadmap Released

1/11 Roadmap Implementation

11/11 Innovation Circle Mtg

10/12 Two-Year Progress Report & Innovation Circle Mtg

11/13 Innovation Circle Mtg

9/13 UNC I&E Network 1st Mtg

11/14 MOU: Kickstart, Kenan Institute, CES, OTD, I&E

DUE 5/15 Four-Year Progress Report

2015 10/? Innovation Summit

BUILDING BLOCKS OF INNOVATION

11/10 Biomedical Engineering & Applied Sciences Targeted

3/13 Task Force Industry Relations

08/13 Task Force Commercialization

4/14 Data Studies Faculty Working Group

7/14 Applied Physical Sciences Dept Approved & $$

2015 Strengthen Computer Sciences and other Data Competencies

1/14 Expert Coaches: EIRS Blackstone Entrepreneurs Network

1/15 CRVF Investment $$

SPACES

3/12 Space CUBE at Campus Y Opens; CS E'rs Lounge

5/13 Space Launch Chapel Hill Opens

6/13 Space CreatorSpace Faculty Working Group

7/13 Space 1789 Venture Lab Opens

7/14 Space Faculty Working Group Presents to Provost

2/14*** Space **Lost Space for Faculty Entrepreneurs**

4/15 Space Start planning Innovation Hubs

2015 Space Opening of CreatorSpace in Murray Hall

UNC's Innovation Ecosystem

talent

climate

support

catalyze

Strengthen an intentional culture of Innovation & Entrepreneurship

collaborate

Cross boundaries to help solve grand challenges; diverse teams, hybrid disciplines

align

UNC rules, policies, and procedures that support I&E

learn

Courses & co-curricular activities to build entrepreneurial capacity

translate

Put important ideas into practical use, guides, mentors, startup services

spaces & tools

On and off campus places and programs for UNC faculty, students, and staff

funding

Grants and seed capital

At-a-glance: Carolina's Innovation & Entrepreneurship Ecosystem

- Curriculum and co-curricular
- Funding for innovation and innovators
- Building blocks for innovation
- Spaces
- Translating research/ideas
- Communications

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Curriculum/co-curricular	Undergraduate	Graduate	Faculty	Staff
EXISTING				
A&S Entrepreneurship Minor	• 250+ students enrolled annually • Econ 325 open to all undergrads • MOOC • Internships • Innovation Scholars	• MOOC	• MOOC	• MOOC
Business School	• 350+ students enrolled annually in concentration • Launching the Venture • Carolina Challenge • Adams Apprenticeship mentoring program • Entrepreneurs Lab	• Graduate student concentration • Launching the Venture • Carolina Challenge	• Launching the Venture • Carolina Challenge	• Launching the Venture • Carolina Challenge
MD/MBA		• Joint Med School/Business School Program		
Faculty Entrepreneurship Bootcamp			• Offered annually to faculty across campus – 25 in 2015	
Program-based workshops	• CUBE, 1789, Launch Chapel Hill: entrepreneurship skills workshops	• CUBE, 1789, Launch Chapel Hill: entrepreneurship skills workshops	• CUBE, 1789, Launch Chapel Hill: entrepreneurship skills workshops	• CUBE, 1789, Launch Chapel Hill: entrepreneurship skills workshops
Entrepreneurship Events	• Global Entrepreneurship Week • CS Hackathons • Startup Weekends • Carolina Create ideation events	• Global Entrepreneurship Week • Startup Weekends	• Global Entrepreneurship Week • Startup Weekends	• Global Entrepreneurship Week • Startup Weekends

Funding for Innovation & Innovators	Undergraduate	Graduate	Faculty	Staff
EXISTING				
Program Funding (grants, operating endowments)	• All programs need funding support	• All programs need funding support	• All programs need funding support	• All programs need funding support
Proof-of-concept grants	• JNO Award		• Carolina KickStart Technology Development Program • OTD Technology Development Program • Gillings (SPH) Innovation Awards • Harvey Award	• Harvey Award
Early-stage funding	• CUBE Social Innovation Incubator Funding • Carolina Challenge Awards	• CUBE Social Innovation Incubator Funding • Carolina Challenge Awards	• Carolina Research Venture Fund • CUBE Social Innovation Incubator Funding • Carolina Challenge Awards	• CUBE Social Innovation Incubator Funding • Carolina Challenge Awards
Seed Funding			• Carolina Research Venture Fund	
Growth Funding			• Carolina Research Venture Fund	

Building Blocks of Innovation	Undergraduate	Graduate	Faculty	Staff
EXISTING				
Biomedical Engineering	• Undergraduate major	• Graduate Program		
Applied Physical Sciences		• Graduate Program under development	• Currently recruiting faculty	
Data Studies	• New undergraduate courses in development	• New graduate courses in development	• Faculty course development grants available	
Computer Science	• Strong program/under resourced	• Strong program/under resourced		

SPACES EXISTING	Undergraduate	Graduate	Faculty	Staff/External
Accelerators-Incubators	• Campus Y CUBE • 1789 • Launch Chapel Hill	• Campus Y CUBE • 1789 • Launch Chapel Hill	• Campus Y CUBE • 1789 • Launch Chapel Hill	• Campus Y CUBE • 1789 • Launch Chapel Hill
Web Labs	• Kenan Labs: Faculty Wet Labs and Office Space 3Ksf, 2 yrs only			• RTP several wet lab spaces • Durham – Carmichael • BioLab
Maker Spaces	• Unit Specific • Planning for central maker space in Murray Hall	• Unit Specific Planning for central maker space in Murray Hall	• Unit Specific Planning for central maker space in Murray Hall	• Unit Specific Planning for central maker space in Murray Hall
Other	• Gardner Hall • Reese News Lab • Kenan Institute Third Floor • Computer Science Entrepreneurs Lounge	• Kenan Institute Third Floor • Computer Science Entrepreneurs Lounge	• Kenan Institute Third Floor • Computer Science Entrepreneurs Lounge	• Kenan Institute Third Floor • Computer Science Entrepreneurs Lounge

Translating ideas/research	Undergraduate	Graduate	Faculty	Staff/External
EXISTING				
Institutional Support	• OCED • Development/ Industry Relations	• OCED • Development/ Industry Relations	• OCED • Development/ Industry Relations	• OCED • Development/ Industry Relationss
Incubator/ accelerator programs	• Launch Chapel Hill • Launching the Venture • CUBE	• Launch Chapel Hill • Launching the Venture • CUBE	• Launch Chapel Hill • Launching the Venture • KickStart Labs • CUBE	• Launch Chapel Hill • Launching the Venture • CUBE
Technology Development			• Carolina KickStart programs • OTD • Kenan Institute Programs • School of Pharmacy Innovation program • SPH Innovation program	
Startup Services	• Incubator/ accelerator programs	• Incubator/ accelerator programs	• Incubator/ accelerator programs • KI Patent Landscape and Market Evaluation • Carolina KickStart startup support • KI Startup support	• Incubator/ accelerator programs
Advanced Growth		• Blackstone Entrepreneurs Network • EIRs	• Blackstone Entrepreneurs Network • EIRs	• Blackstone Entrepreneurs Network • EIRs

Communications	Undergraduate	Graduate	Faculty	Staff/External
EXISTING				
UNC Media/PR	• Coverage of I&E	• Coverage of I&E	• Coverage of I&E	• Coverage of I&E
Campus-wide strategy	• I&E Network (meets monthly)	• I&E Network (meets monthly)	• I&E Network (meets monthly)	• I&E Network (meets monthly)
Comprehensive I&E Website	• Innovate.unc.edu	• Innovate.unc.edu	• Innovate.unc.edu	• Innovate.unc.edu
Social media/blogs	• E-minor blog • Individual programs/events	• Individual programs/events	• Individual programs/events	• Individual programs/events
Online resources	• Innovate.unc.edu GET STARTED	• Innovate.unc.edu GET STARTED	Innovate.unc.edu GET STARTED	• Innovate.unc.edu GET STARTED
Media relations				
Rankings/national PR	• Princeton Review	• Princeton Review	• Princeton Review	• Princeton Review

New Opportunities for Commercialization & Economic Development

- Historically under resourced, under performed.

- New Vice Chancellor of Commercialization & Economic Development est. February 2015.
  - Invest
  - High level strategy
  - Build team
  - Set specific targets
  - Perform. Measure. Adjust.

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Technology Transfer Detailed Findings
SUPPORTING DATA – BENCHMARKING UNIVERSITIES

University	Public/Private	Medical School Present (Y/N)	Enrolled Student Body (2013)	R&D Funding (2013)	Tech Transfer FTEs (2013)	Tech Transfer Licensing FTEs (2013)
Stanford Univ.	Private	Y	15,877	$873,847,286	40	20
Duke Univ.	Private	Y	14,600	$806,048,885	24	9
Univ. Colorado	Public	Y	31,702**	$781,620,015	19	9
UNC-Chapel Hill	**Public**	**Y**	**29,127**	**$777,976,677**	**13**	**6**
Virginia Tech	Public	Y	29,684	$496,169,000	7	3
NC State	Public	N	34.767	$417,468,000	19	9
UVA	Public	Y	21,928	$386,828,000	16	6
Univ. of South Carolina	Public	Y	32,848*	$205,836,000	6	3.5
Wake Forest Univ.	Private	Y	7,142	$200,133,060	11	5
Virginia Commonwealth	Public	Y	31,752	$196,015,000	5	3

UNC is among the best funded universities, but has a relatively small tech transfer staff
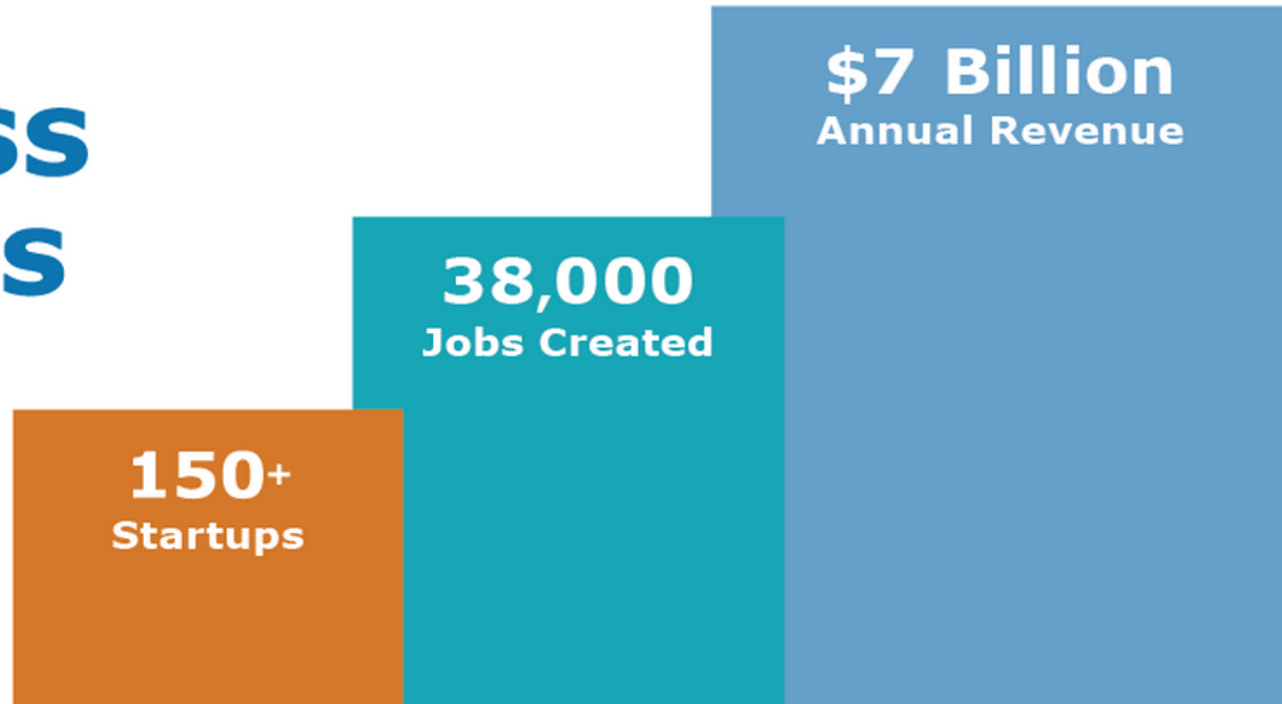
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Phase 3 Planning Timeline

2015 June-August

OCED Strategic Planning and Org Building*

BOT Committee C&ED formed

Phase 3 Planning Committee and Working Groups Formed

Planning Mtg of Working Groups for Fall Summit

Fall Innovation Summit Finalized

Fall Industry & Strategic Partners Meeting

2015 October Launch Phase 3

Chancellor's Innovation Summit

Innovation Roadmap Final Report Released

Launch Phase 3

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*OCED – Office of Commercialization & Economic Development

Learn more – innovate.unc.edu

Innovate@UNC Reports

REPORTS

Strategy, Evaluation, & Impact

INNOVATION ROADMAP, STRATEGIC DIRECTION, 2010 >

PROGRESS REPORT YEAR TWO, EVALUATION AND STRATEGIC DIRECTION, 2012 >

BOT INNOVATION & IMPACT COMMITTEE, CHAIR'S MEMO JUN 2014 >

BOT INNOVATION & IMPACT COMMITTEE ADMINISTRATION RESPONSE MEMO SEP 2014 >

BOT INNOVATION & IMPACT COMMITTEE ADMINISTRATION RESPONSE REPORT SEP 2014 >

Task Forces and Working Groups

COMMERCIALIZATION, TASK FORCE, 2013 >

Jul 15	1 Million Cups RTP
Jul 15	BIG Innovation Grant ($100K) Deadline
Jul 29	1 Million Cups RTP
Aug 4	Carolina KickStart Research to Revenue Workshop
Oct 31	Application Due: 2015 Retail & Health Innovation Challenge

STAY UP TO DATE

🐦 @innovateunc

RT @Carol Folt: TY @Deshpande Foundation for honoring @UNC-Chapel Hill with inaugural award for entrepreneurial university & @Judith Cone for advancing the...

↩ Reply ⇄ Retweet

Innovation & Entrepreneurship

INNOVATE CAROLINA
Putting Important Ideas to Use

Home | About | Impact | **GET STARTED** | Search Our Site [GO]

Cone, UNC Recognized for Excellence in Entrepreneurship

Inside "Game-Changing" UNC Apprenticeship Program >

Ted Zoller Launches Adams Apprenticeship to Pair Students With Alumni Entrepreneur Mentors

SPECIAL FOCUS

WATER IN OUR WORLD
Pan-Campus Theme
2012-2014
MORE INFORMATION >

DATES TO KNOW   **VIEW ALL**

Jul 15 | **1 Million Cups RTP**
Jul 15 | **BIG Innovation Grant ($100K) Deadline**
Jul 29 | **1 Million Cups RTP**
Aug 4 | **Carolina KickStart Research to Revenue Workshop**
Oct 31 | **Application Due: 2015 Retail & Health Innovation Challenge**

IN THE NEWS   **VIEW ALL**

UNC Startup Parion Sciences Receives TBJ Award >

UNC's School Of Journalism And Mass Communication Brings Startup Culture To Newspapers >

Blackstone Entrepreneurs Network Company Stealz Raises $1M >

Bringing Big Data To The Social Sciences >

Commerce Secretary Skvarla's Prescription For A Vibrant Entrepreneurial NC >

STRATEGIC ROADMAP | ENTREPRENEURSHIP | INNOVATORS

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@innovateunc

RT @Carol Folt: TY @Deshpande Foundation for honoring @UNC-Chapel Hill with inaugural award for entrepreneurial university & @Judith Cone for advancing the...

↰ Reply ⇄ Retweet

RT @UNC-Chapel Hill: Great news! #UNC, @Judith Cone receive high honors from @Deshpande Foundation for excellence in entrepreneurship. bit.ly/1cMvC6t

↰ Reply ⇄ Retweet

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INNOVATE @ CAROLINA

IMPORTANT IDEAS FOR A BETTER WORLD

Strengthen An Intentional Culture Of Innovation At Carolina

PREPARE

COLLAB-ORATE

TRANSLATE

ALIGN

CATALYZE
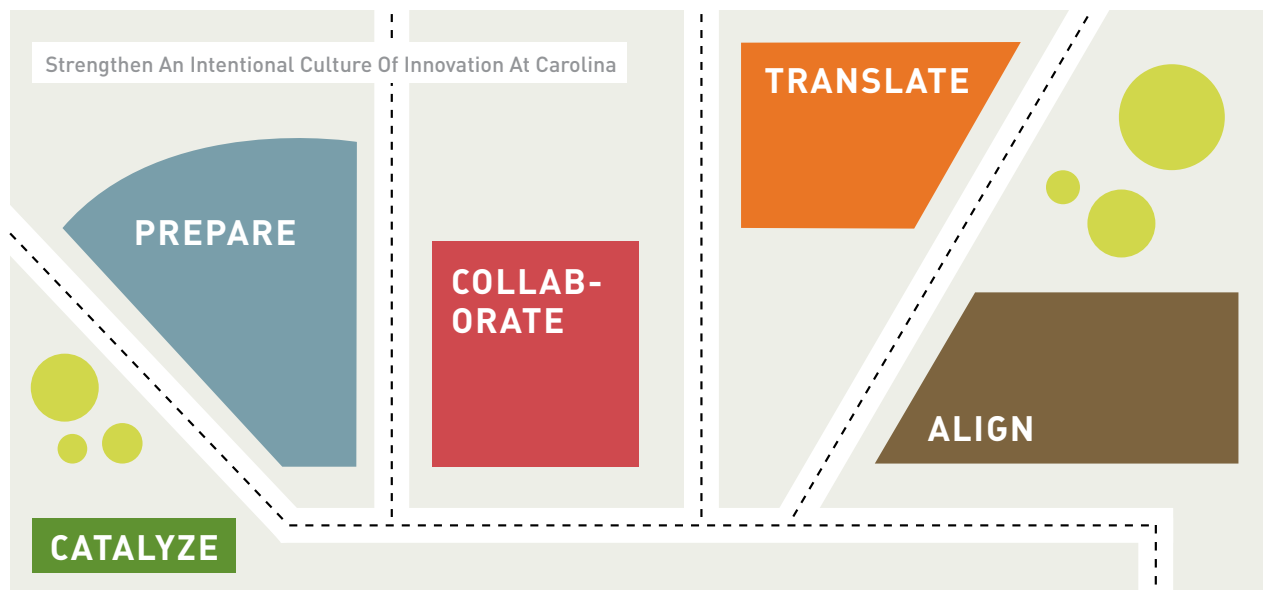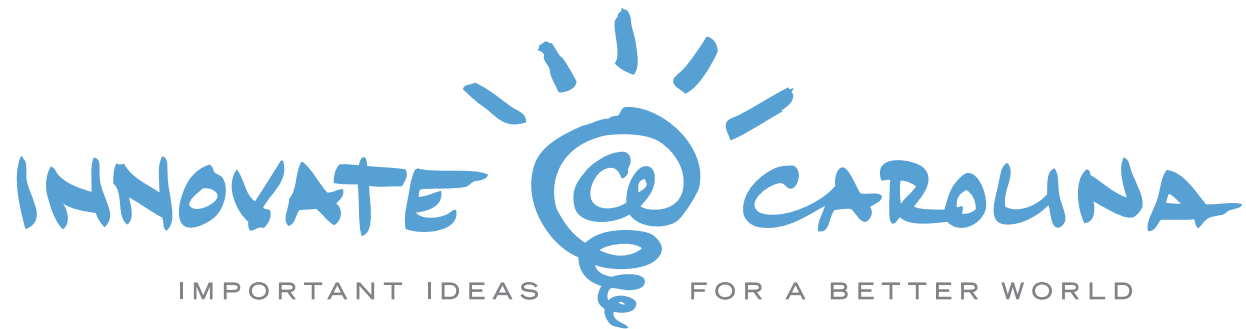
Important ideas
for a better world ▶

A Strategic Roadmap to Accelerate Innovation at The University
of North Carolina at Chapel Hill

Submitted to Chancellor Holden Thorp by the Innovation Circle,
the Faculty Innovation Working Group, and the Student Innovation Team

September 2010
innovate.unc.edu

We have so much work ahead of us. Our to-do list is nothing less than the greatest problems of our time: cure diseases, and get those cures to all the people who need them. Find and invent clean energy. Inspire students in our public schools. Feed seven billion people. Describe the world, and replace conflict with understanding.

— Chancellor Holden Thorp

About the Roadmap

In early 2010, Chancellor Holden Thorp assembled a group of faculty, staff, students, alumni, parents, and friends of the University — many with extensive experience leading innovation in science, business, medicine, media, nonprofits, and academia — to help Carolina investigate what it would take to increase the volume and accelerate the pace at which important ideas created at the University of North Carolina at Chapel Hill (Carolina) are applied for a better world. Our charge was to develop a strategic roadmap that would lay the groundwork to support, develop, and move critically needed new ideas, discoveries, and inventions beyond the campus to have a greater positive impact on our region, state, nation, and the world.

Three groups — the Innovation Circle, the Faculty Innovation Working Group, and the Chancellor's Student Innovation Team — accepted this charge and worked both jointly and independently during an eight-month period to understand the current innovation landscape on campus and to learn from others. Our work included an intensive review of the current state of entrepreneurship and innovation at Carolina, best practice site visits including trips to the Massachusetts Institute of Technology, Stanford University, the University of Florida, and the University of Utah, as well as a meeting in New York City to explore the role of the arts and humanities in creating and translating innovations to wider audiences. The working groups held numerous virtual and on-campus meetings to envision ways to translate Carolina's pool of talent and knowledge into dramatic leaps forward for society. Our groups incorporated extensive input from faculty, staff, and students to develop the recommendations presented in this document.

The University has launched a process to update its Academic Plan, and fortuitously that process ran parallel with the development of this Roadmap. The two groups worked together to ensure that the new Academic Plan currently under development and the Innovation Roadmap would be aligned

and mutually reinforcing. We are grateful to the Provost and members of the Academic Planning Committee for their insight and guidance.

In January 2010, we issued our first report entitled *Innovation and Entrepreneurship at The University of North Carolina at Chapel Hill: Background and Sample of Current Activities*. The report reviewed the then current landscape for innovation and entrepreneurship on campus and compared Carolina to peer institutions on some key indicators. Building on what we learned, the document presented here, *Innovate@Carolina: Important Ideas for a Better World, A Strategic Roadmap to Accelerate Innovation at The University of North Carolina at Chapel Hill* (Roadmap), is a plan for the allocation of energy and resources at a strategic level. As this effort moves forward, it is anticipated that many detailed plans will grow out of the broad strategy. This Roadmap is our collective vision for how Carolina can apply new ideas to dramatically increase our contributions to the well-being of the global community.

On behalf of the three groups, we would like to thank all of those who contributed their time and ideas to this effort.

Submitted by the Core Planning Team:
Lowry Caudill, *Chair of the Innovation Circle*
John Akin, *Chair of the Faculty Innovation Working Group*
Shruti Shah, *Chair of the Chancellor's Student Innovation Team*
Judith Cone, *Special Assistant to the Chancellor for Innovation and Entrepreneurship*
Mark Meares, *Director of Corporate and Foundation Relations*

The University of North Carolina at Chapel Hill

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Section I

Section II

Section III

Section I

The Challenge

In an increasingly interconnected world confronted by complex local and global issues, there are a number of important questions to consider: What are the greatest challenges facing our region, state, nation, and world? What does it take to address them? Who can help the majority of global citizens, including those locally and nationally, who lack access to fundamental resources? What is our role? And more specifically: Who can apply their creativity in powerful ways to inspire and inform people so that they may see the world differently and act more compassionately?

Who can find solutions so that hundreds of millions of people worldwide no longer have to risk their lives to have access to something as simple and precious as clean water? Who can reverse the growing achievement gap of our youth? Who can create viable clean energy alternatives to curb dependence on oil and protect the natural world? Who can help the North Carolina economy grow? Who will launch new enterprises to fuel job creation? Who will help America with its growing competitiveness challenges? Who will help us express and define our human and artistic visions? Who will mentor and develop the intelligent, creative, ethical leaders needed to safeguard our global future?

World Population: 6.8 billion and growing

900 million people do not have access to clean water

75% of all those killed or wounded from war are non-combatants.

Immpact, University of Aberdeen

Carolina's Commitment and Preparation to Meet this Challenge

Around the world, leaders are turning to universities and asking them to assume greater responsibility for developing new ideas and ways to address these and other challenging issues. We need not be asked by others to assume this role, as it is part of who we are at Carolina. The increased expectations from outside the campus, however, do serve as another reminder that we must increase the number of innovations and the speed at which they occur at Carolina. We need to do more, now.

At the core of the University of North Carolina at Chapel Hill's traditions, and central to our future, is a commitment to innovation: put new, important ideas to use for the benefit of society. The founding of the University in 1793 represented an early innovation in education. Carolina was the first public university in the nation, and its emphasis on teaching, research, and service has had a transformative effect on higher education. Further, because of Carolina's commitment to the liberal arts as well as its service to the public, our faculty and students see the world broadly, and think critically and multidimensionally.

Now it is time to build on this legacy and extend our impact even further.

Carolina is both compelled and poised to accelerate and apply innovation and its accompanying entrepreneurial focus in a concerted and deliberate way to grapple with fundamental issues affecting the quality of human life and, in that context, to help solve the world's most pressing problems.

The University's strength comes from fostering creativity and discovery in the classroom, the lab, the stage, the studio, and from inspiring a campuswide culture of inquiry and basic and applied research. Carolina's commitment to a rich liberal arts education and top professional programs equips our faculty and students to assess the current state of knowledge in a discipline, augment that knowledge through rigorous new research, and share the results of this new knowledge in ways that benefit North Carolina, the United States, and the world. From this base of expertise and experimentation, breakthrough approaches are launched.

Like other major research universities, Carolina has a significant brain trust with impressive resources. The University's faculty attracted $803.4 million in research grants and contracts in fiscal 2010 (a more than doubling of annual research funding in a decade). Many of these resources are devoted to multidisciplinary collaborative research. The University has 3,500 distinguished faculty members charged with doing cutting-edge

research and teaching Carolina's more than 28,000 students, who represent some of the nation's most accomplished high school graduates and graduate students.

A partner in promoting innovation across the state, the University is committed to the work of the North Carolina Innovation Council, established in 2009 by Governor Perdue. The council's charge is to foster strategic investments and policies in the growing knowledge and innovation economy. They will coordinate public and private investments; move innovative ideas from the lab to the marketplace more efficiently; and strengthen collaboration among businesses, academia, as well as state and local governments.

Carolina has a five-year history of cross-campus entrepreneurship upon which to build. Launched in 2004 with a grant from the Ewing Marion Kauffman Foundation, the Carolina Entrepreneurship Initiative (CEI) infused a focus on entrepreneurship across the campus. One of the most successful cross-campus entrepreneurship initiatives in the country, the CEI laid the groundwork for collaboration focused on entrepreneurship.

As the knowledge and capacity of Carolina grow, and the local, national, and global challenges mount, it is clear that the world needs Carolina now more than ever. The complexity of issues necessitates interdisciplinary collaboration and problem solving. Carolina is in the unique position to educate future leaders and provide understanding and solutions through the work of its faculty, students and staff. With our considerable assets and advantages, we must move more quickly to put important ideas to use for a better world.

A faculty working group on digital arts and humanities meeting at the Institute for the Arts and Humanities. Photo by Eileen Mignoni.

Our academic mission is to create new knowledge, discover innovative solutions to the world's greatest challenges, educate our outstanding undergraduate and graduate students, and contribute meaningfully to the state, nation, and world. Through scholarship and creative work, our extraordinary faculty shed light on the past, communicate new ideas, and interpret the world. They also take on some of the biggest problems of our time: social and economic disparities, drug addiction, climate change, international conflict, life-threatening diseases, and more.

— Karen Gil, Dean, College of Arts and Sciences

Center for Integrative Chemical Biology and Drug Discovery

UNC-Chapel Hill's Center for Integrative Chemical Biology and Drug Discovery is an innovative joint initiative supported by the Eshelman School of Pharmacy, the Lineberger Comprehensive Cancer Center, the School of Medicine, and the Department of Chemistry in the College of Arts and Sciences that creates dedicated, multidisciplinary project teams with other groups on campus in order to advance targets through the drug discovery and development process. Under the leadership of research professor Stephen Frye, the Drug Discovery Center serves as a bridge between basic science and clinical practice by applying a multidisciplinary product approach to translate basic scientific discovery to a practical application.

Nourish International

This nonprofit organization engaging college students across the nation on issues of global poverty, was founded at Carolina in 2003 by then undergraduate Sindhura Citineni. She experienced early success by sponsoring a regular Hunger Lunch on campus, usually a simple meal of rice and beans that raised money for community-based food and nutrition projects in India. Her team placed second in the Carolina Challenge business competition, providing critical funds to expand the organization's reach and impact. Nourish International now has chapters at 30 universities across the nation and has sent more than 80 students and $100,000 abroad to conduct sustainable development projects in 14 communities.

Our Approach

This Roadmap describes a way to accelerate the number and speed of innovations coming from the University of North Carolina at Chapel Hill. It explains how faculty, students, staff, and the greater Carolina community can translate their ideas into innovations affecting a wide range of issues. We clarified what we mean by innovation, explaining that an innovation is the successful implementation of a novel, valuable idea. In this definition, we emphasize the equal importance of the three elements: Novel – Valuable – Implemented. We refer to innovation as: Important ideas put to use to benefit people and the natural world.

In developing the Roadmap, we looked systematically at the entire campus to find ways to best leverage existing resources and to engage as many participants as possible. We established a vision and mission as well as a set of principles to guide our work.

Vision and Mission

Vision:
With a special focus on urgent challenges, innovators and innovations launched at Carolina consistently translate important ideas for a better world.

Mission:
Continually strengthen an intentional culture of innovation at Carolina guided by entrepreneurial thinking; fueled by talented people, collaborations, and resources; and accelerated by expanded capacity and a sense of urgency.

Guiding Principles

Integrative
This work builds on a commitment to education and inquiry that rewards cooperation, inventiveness, entrepreneurial spirit, scholarly and creative excellence, and dedication to improving the human condition while sustaining the natural world.

Campuswide
Innovation is a campuswide value and pursuit. Bold ideas worth pursuing come from all areas of the campus.

Global
Pressing needs are not limited by geography. In an interconnected world, our University is by necessity and reality a part of the global community.

Urgent
The grand challenges facing the state, nation, and world today will not wait and demand that we address our work with a sense of urgency.

Diverse and Collaborative
Innovation depends on a diversity of points of view, especially in the development of solutions to complex issues. Broader participation by underrepresented groups in our educational and research endeavors can only enhance our innovations. We will promote partnerships among academic disciplines and between the University and external partners to ensure the best outcomes.

Experimental
Innovations evolve from experimentation. We will promote an iterative process of doing-learning-changing. This means we will embrace taking calculated risks and accept the inevitable failures as a necessary ingredient of the innovation process.

Learning from Others
We will learn from the experiences of others and adopt successful programs and practices, modified for our University, whenever feasible.

Incremental and Radical Leaps
We will stimulate both incremental and transformative ideas.

Rigorous
Rigorous measures of success are a standard part of the innovation process. These measures will go beyond our own internal standards and include feedback from a wide range of sources.

Efficient
We will leverage resources by maximizing existing structures and assets of the University whenever possible and promote effective processes with minimal overhead and staffing.

Photo by Chris Carmichael

Strengthening an Intentional Culture of Innovation

Given that it is difficult to predict or orchestrate specific innovations, our recommendations focus on providing a supportive climate for the Carolina community so its members can creatively explore responses to major issues. Such an environment requires that leaders make this a priority and implement the structures, incentives, and resources to accelerate the innovation process. Strengthening a culture of innovation requires clarity and alignment among three key elements:

Values: That which is worth doing.
Resources: Required people, time, money, facilities, and equipment.
Processes: Needed structures, rules, and methods.
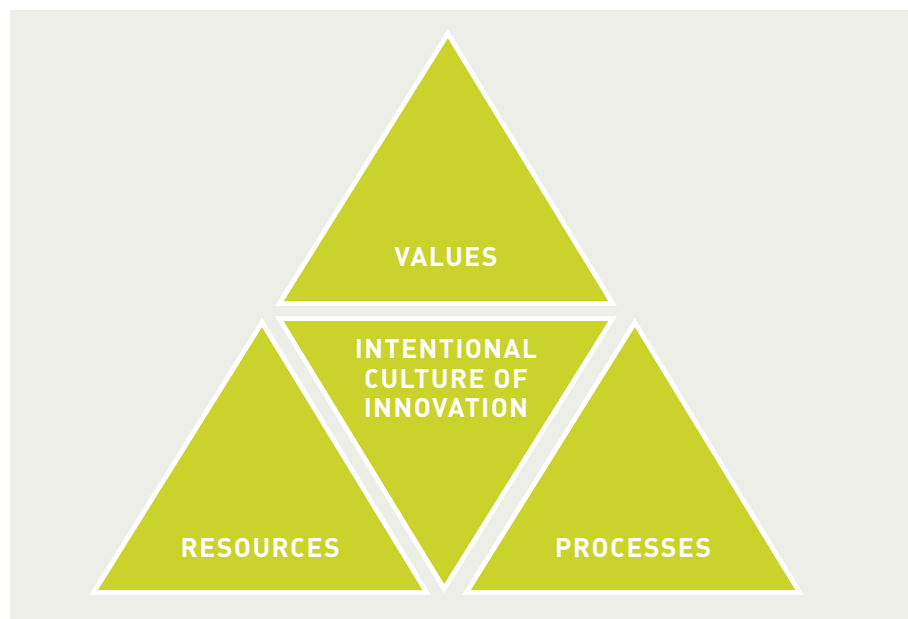
Our values, resources, and processes must be mutually supportive to create and foster a campus culture of innovation. If we are committed to a goal, then we must allocate appropriate resources to avoid undermining our hopes. If we put resources behind our aspirations, then we must remove bureaucracy that impedes success.

Energy Frontier Research Center

In an effort to discover sustainable solutions to the global fossil fuel crisis, chemist Thomas Meyer launched an Energy Frontier Research Center (EFRC) with a $17.5 million grant from the U.S. Department of Energy. The Carolina initiative is devoted to solar fuel. The team will investigate the use of light to split water molecules into hydrogen and oxygen, as well as the use of light and water to reduce carbon dioxide to methane and/ or other hydrocarbon fuels. The EFRC will link more than 20 faculty in departments of chemistry, physics and astronomy, and scientific collaborators at NC State, NC Central, Duke universities, University of Florida, and the Research Triangle Institute. A goal is to translate research results in the EFRC into marketplace products.

Carolina Express License

The Carolina Express License provides startups with needed flexibility by eliminating challenging negotiations for equity between faculty innovators and the University. It sets standard terms and fees which require minimal payment and obligations by UNC-Chapel Hill startups. In doing so, it eases the procedural and legal burdens they face by allowing them to function independently of the University when seeking approvals for sub-license agreements. By emphasizing early stage development and virtually eliminating the need for lengthy negotiations, the Carolina Express License aims to make UNC-Chapel Hill-based startups even more attractive to investors and partners.

Frank Hawkins Kenan Institute of Private Enterprise: Carolina Entrepreneurial Initiative

The Kenan Institute, located at the Kenan-Flagler School of Business, provides a neutral place where business, government, academia, and civil society can collaborate to develop informed, practical and sustainable solutions to the competitive challenges they face. The Institute's Director, Jack Kasarda, was instrumental in procuring a Kauffman Foundation grant for cross-campus entrepreneurship. The Carolina Entrepreneurial Initiative (CEI) was developed to encourage and support programs across campus to teach and support enterprise creation. The CEI was created with the grant from the Ewing Marion Kauffman Foundation to develop and launch entrepreneurship programs for faculty and students across the university over a five-year period. The University's Minor in Entrepreneurship and First Year Seminars (both in the College of Arts and Sciences), graduate certificate program in entrepreneurship, Chancellor's Faculty Boot Camp for Entrepreneurship, the Carolina Challenge Business Plan Competition, and Launching the Venture development program grew out of the CEI.

Photo by Steve Exum, courtesy UNC School of Law.

An innovation culture grows when faculty, staff, and students start with the seeds of ideas, combine them in unusual ways and discover something new and worthwhile. Since innovation places a premium on novelty, on what has not been done or thought before, it is spurred by entrepreneurial thinking. Entrepreneurial thinkers see problems as opportunities, question everything, conduct analyses, take purposeful action, engage partners, try alternative solutions, learn from failures, make meaning, and persevere to reach the goal.

Entrepreneurial thinkers ask:
    What is the need?
    What is the opportunity?
    What is the status quo response?
    Does it have to be this way?
    Is it the best way?
    What might be better ways?
    What can I do?

Encouraging faculty, students, and staff to ask these questions and think entrepreneurially means the University has a responsibility to provide a conducive environment for such explorations. This approach requires that the resources and processes be aligned to support people posing such questions and then taking actions that disrupt the status quo in big and small ways. This foundational commitment is far-reaching and such alignment of values, resources, and processes will ultimately affect Carolina's overall impact. It will be a factor in whether top faculty, students, and staff choose Carolina and stay here. Our Roadmap takes seriously this issue of support, and we address it in our recommendations. It will be the sum of thousands of deliberate actions taken by thousands of faculty, students, staff, and partners directed toward accelerating impact that will make this Roadmap take life.

Results

Imagine what we could do by taking a more intentional and integrated approach to drive innovation across the University. By removing barriers, dedicating resources, encouraging and incentivizing collaboration on campus and beyond, and honoring learning through experimentation, we can more effectively translate ideas into impact.

Imagine what role we might play in fostering, developing, and implementing innovations more quickly and attracting talented faculty and students to extend the potential of important ideas. Imagine what we could do if, as a community, we selected a few of the most challenging issues and explored them in depth. What synergies might be exploited and breakthroughs might occur if innovative and entrepreneurial activities were widely encouraged not just accepted? Imagine the exponential effects if we were, as a campus, more intentional and aligned around these actions.

We can imagine Carolina innovations that promote human understanding in a dramatic way, effectively treat life-threatening diseases, help develop the next great playwrights and authors who through their art change how people see the world, deliver to the developing world simple, affordable basic services, help North Carolina economies thrive so that people have the resources to make choices for themselves, reinvent the way people communicate with one another, and make radical leaps forward in addressing global health issues. We can imagine new ideas created at Carolina that establish new relationships, introduce new values, underwrite different judgments, and transform what seems possible.

This Roadmap will move us toward the following outcomes:

- Ideas and discoveries are leveraged across the University and efficiently disseminated.
- Carolina classrooms, labs, and studios are incubators of discovery that yield innovations that serve the public good.
- Carolina attracts the most talented and innovative faculty and students in the world because of its dedication to discovery, experimentation, and innovation.
- Carolina is recognized globally as one of the most innovative and entrepreneurial universities in the world.
- The world is significantly improved because of Carolina innovations and its entrepreneurially minded faculty, students, and staff.

Now is the time for Carolina to become an even greater disruptive force for good.

Population Center

The Carolina Population Center (CPC) brings together 250 researchers in a collaborative setting focused on research to benefit world populations and respond to societal needs, creating a fertile context for the cross-pollination of ideas and resulting in $47.7 million in research funding in 2009.

Professor Peggy Bentley is leading a study at the Center on Malawi mothers and infants. For more than 20 years, Professor Bentley has blended her background in medical anthropology, nutrition, and public health to examine influences of social and behavioral factors on maternal and child health and nutrition. The study, MaMi: Malawi Mothers and Infants, is of approximately 2,400 HIV-positive mothers and their children in Malawi and examines how inexpensive nutritional supplements might result in improved health of mothers and their infants.
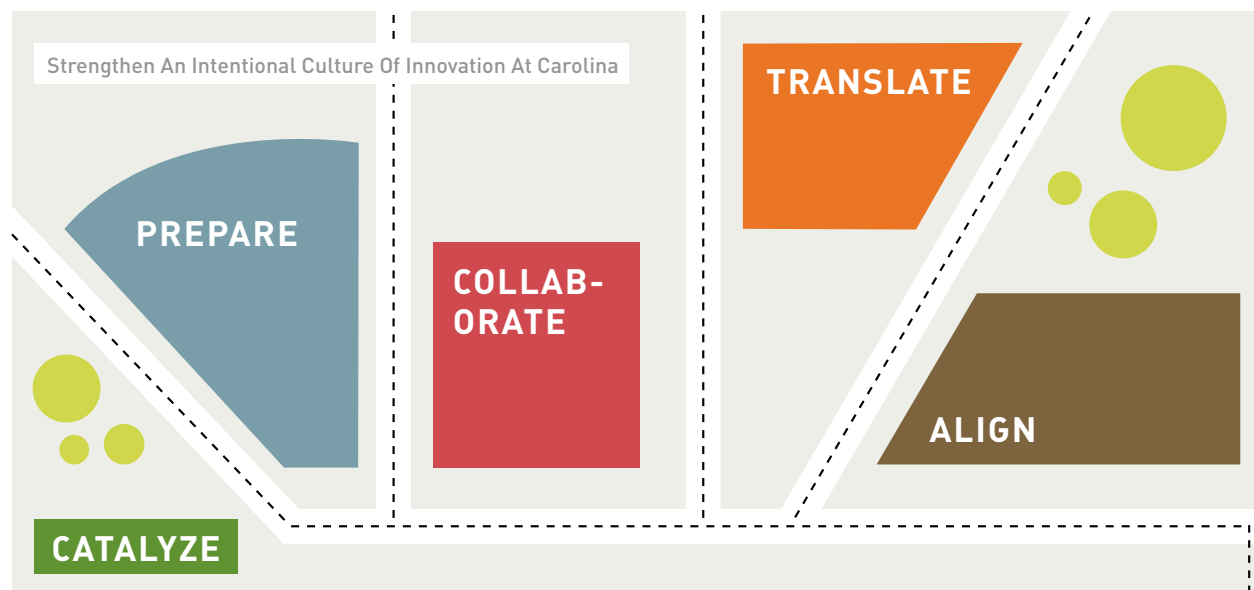
PlayMakers

PlayMakers Repertory Company is the professional theatre in residence at the University of North Carolina at Chapel Hill. The company has been honored by the Drama League of New York as one of the best regional theatres in the country. In addition to its excellence in theatre, the PRC2 series features productions that are a springboard to community dialogue. This series explores socially and politically relevant topics with in-depth audience discussion after each performance led by experts and thinkers from the Triangle's rich intellectual and artistic community. Its education and outreach programs have served over 100,000 area youth since their inception in 1984.

Section II Recommendations

The Innovation Circle, the Faculty Innovation Working Group, and the Student Innovation Team present the following five recommendations designed to foster a vibrant campus of innovators and innovations. Each recommendation describes the current situation and the future desired state, presents goals, and offers specific actions that will help Carolina reach its innovation goals. Five-year resource requirements end each section. The recommendations for the University are to:

Strengthen An Intentional Culture Of Innovation At Carolina

PREPARE

COLLAB-ORATE

TRANSLATE

ALIGN

CATALYZE

Prepare faculty, graduate and undergraduate students, staff, and the broader Carolina community with the knowledge, skills, and connections necessary to translate new ideas into innovations.

Collaborate with diverse groups on campus and beyond to explore issues, options, and creative approaches that may lead to innovations.

Translate important new ideas into innovations that improve society more expediently and at an increased volume.

Align people, incentives, resources, and processes to strengthen an intentional culture of innovation at Carolina.

Catalyze innovation at Carolina by facilitating the work of faculty, staff, and students as they put important ideas to use for a better world.

Important ideas for a better world ▶

Recommendations at a Glance

Recommendation 1: Prepare faculty, graduate and undergraduate students, staff, and the broader Carolina community with the knowledge, skills, and connections necessary to translate new ideas into innovations.

Goal 1.1 Ensure that faculty, students, staff, and the broader Carolina community understand the University's commitment to innovation and the resources available to help them reach their related goals.
    Action 1.1.1 Reach multiple audiences.
    Action 1.1.2 Provide a one-stop gateway to resources on innovation.

Goal 1.2 Build capacity for innovation.
    Action 1.2.1 Provide educational opportunities about innovation.
    Action 1.2.2 Connect faculty, students, and staff to a global network of innovators.
    Action 1.2.3 Create learning and creative spaces.
    Action 1.2.4 Advance research.

Targeted Investments Needed: $42.15 million ($25 million endowment, $17.15 million expendable for a Five-Year Period)

Recommendation 2: Collaborate with diverse groups on campus and beyond to explore issues, options, and creative approaches that may lead to innovations.

Goal 2.1 Enhance robust interdisciplinary collaboration among basic and social scientists, humanistic scholars, and those in hybrid disciplines such as bioengineering and applied sciences to address the great challenges of our times.
    Action 2.1.1 Set as a top scientific priority advancing applied sciences, which connect basic sciences and engineering to promote new areas of discovery.
    Action 2.1.2 Engage collaboratively across basic and social sciences and humanities to address great problems and challenges.
    Action 2.1.3 Remove barriers to interdisciplinary efforts.
    Action 2.1.4 Track collaborations and their impact.

Goal 2.2 Collaborate and coordinate around key themes of local, national, and global significance to mobilize the campus toward new understanding of issues and solutions.
    Action 2.2.1 Create the Key Themes Initiative.

Goal 2.3 Improve industry collaborations and increase industry funding.
    Action 2.3.1 Examine the issues related to industry relations and make recommendations to the provost and chancellor.

Goal 2.4 Extend collaborations with state and regional partners to help North Carolina further develop into a leading competitive, global, entrepreneurial, knowledge and innovation economy.
    Action 2.4.1 Attract high-level business ideas and teams to Research Triangle Park (RTP).
    Action 2.4.2 Attract the capital needed to fuel the entrepreneurial economy in North Carolina.
    Action 2.4.3 Map the RTP entrepreneurial ecosystem to strengthen support for high-potential entrepreneurial firms.
    Action 2.4.4 Leverage existing university labs, equipment, and space.
    Action 2.4.5 Incentivize collaborations among RTP universities and with other partners.

Goal 2.5 Strengthen collaborations with Carolina's strategic international partners.
    Action 2.5.1 Fund research on global innovation needs and remove barriers to working with global partners.

Total Investment Needed: $23.2 million ($17 million endowment, $6.2 million expendable for a Five-Year Period)

Recommendation 3: Translate important new ideas more expediently and at an increased volume into innovations that improve society.

Goal 3.1 Support faculty, students, and staff as they develop understanding of issues and contribute solutions to complex social and environmental problems through social entrepreneurship.
    Action 3.1.1 Further refine and develop an integrated campuswide approach to social entrepreneurship, which includes artistic entrepreneurship.

Goal 3.2 Effectively organize and manage the University's commercialization services to maximize the quality and volume of potentially important innovations for society. Return revenue from these innovations to the University to support this work when possible.

Action 3.2.1 Implement a carefully designed commercialization approach.

Goal 3.3 Measure the impact of innovations and innovators launched at Carolina.

Action 3.3.1 Design and implement a study of the social and economic impact of the University.

Total Investment Needed: $19.975 million ($10 million endowment, $9.975 million expendable for a Five-Year Period)

Recommendation 4: Align people, incentives, resources, and processes to strengthen an intentional culture of innovation at Carolina.

Goal 4.1 Encourage leadership across campus to support and promote innovation in their schools, departments, institutes, and offices.

Action 4.1.1 Create a common understanding of the University's innovation goals and evaluate and reward campus leaders for advancing them.

Goal 4.2 Recruit, retain, and reward faculty, students, and staff who show promise, aptitude, and/or achievement in innovation.

Action 4.2.1 Recruit innovators and future innovators.
Action 4.2.2 Reward activities that contribute to the culture of innovation at Carolina.

Goal 4.3 Align the University's internal methods and processes to foster innovation, especially in working across schools.

Action 4.3.1 Align innovation goals with other strategic initiatives.

Goal 4.4 Provide the necessary funds to support nascent and promising innovations on campus.

Action 4.4.1 Establish the Carolina Innovation Fund.

Total Investment Needed: $36.375 million ($36.2 million endowment, $175,000 expendable for a Five-Year Period)

Recommendation 5: Catalyze innovation at Carolina by facilitating the work of faculty, staff, and students as they put important ideas to use for a better world.

Goal 5.1 Leverage the talents of leaders across campus to prepare, collaborate, translate, and align resources and processes to strengthen the culture of innovation at Carolina.

Action 5.1.1 Create management groups of program leaders and their supporters from across campus to provide integrated leadership and support for the innovation goals.

Goal 5.2 Create the Chancellor's Catalyze Group to facilitate the implementation of this Roadmap.

Action 5.2.1 Leverage history by building on the University's strong track record of innovation.
Action 5.2.2 Coordinate and support campuswide efforts to fully realize the vision and goals laid out in this Roadmap.

Total Investment Needed: $3.3 million (expendable for a Five-Year Period)

Total Investment Needed: $125 Million

($88.2 Million Endowment, $36.8 Million Expendable For A Five-Year Period) ▶

Recommendation 1: Prepare faculty, graduate and undergraduate students, staff, and the broader Carolina community with the knowledge, skills, and connections necessary to translate new ideas into innovations.

GOAL 1.1 Ensure that faculty, students, staff, and the broader Carolina community understand the University's commitment to innovation and the resources available to help them reach their related goals.

In the future, Carolina's commitment to innovation will be well understood and embraced by the campus community. Faculty, students and staff will consider how their work in the classroom, lab, studio and that of the entire research enterprise can advance Carolina's collective positive impact on society. From the moment they are recruited through the day of graduation, students will have the opportunity to consider how their learning applies to innovation and what they can do to actively participate in the process. Faculty, students, and staff will be drawn to the University because of its commitment to innovation and entrepreneurship.

Action 1.1.1 Reach multiple audiences.
- Provide a sustained, coordinated and focused communications strategy to deliver core innovation messages to various constituents inside and outside the University. Work with campus communicators to craft messages, prepare collateral material, and use the University's websites and existing publications to reach key audiences in multiple ways.
- Create a team of speakers drawn from the broader Carolina community who will make presentations about Carolina's approach to accelerating innovation, the implementation of the Innovate@Carolina Roadmap, and the eventual results.

Faculty: Communicate how the University's innovation goals can connect with faculty research and teaching priorities. Encourage innovative faculty to promote understanding of the Innovation Roadmap goals with their colleagues. Integrate the Roadmap with the Academic Plan by working with Academic Plan Steering Committee members, the Chair of the Faculty, and other faculty leaders.

Students: Communicate innovation messages to Carolina's more than 28,000 undergraduate and graduate students to leverage their creative potential toward greater impact.
- Infuse messages about innovation at Carolina throughout the recruiting process.
  + Host a recruitment event for admitted and prospective students who have an interest in entrepreneurship and innovation.
  + Emphasize innovation at Carolina in the application. This emphasis could include a required short-answer question such as 1) What local, national, or global human or environmental world problem do you find most compelling and how would you address that problem during your time at the University? or 2) What does innovation mean to you?
  + Emphasize innovation and entrepreneurship on campus tours for prospective students led by student ambassadors.

- Create online media, social networking tools, and print publications to build awareness and enhance the reach of existing communication resources.
  + Create a student publication devoted to innovation that could take the form of a virtual quarterly magazine released by the proposed Innovation Hub.

Current Status

The relevance and importance of innovation are not often presented in a way that entices faculty and graduate students to become engaged and indeed can sometimes be seen as working against the academic goals of the University. The academic base for innovation and entrepreneurship is limited to the research of a few faculty members, and, in the main, their research has not been broadly communicated to campus audiences.

When someone is interested in learning more about innovation, it is not always clear how to get started, what resources are available, and who can help them. Carolina faculty and students have few central dedicated physical places to engage with each other, and with mentors, or to convene teams around ideas.

There are a number of outstanding entrepreneurship educational programs targeting specific audiences but with limited collaboration among them. Significant gaps remain. Further, there is no longer a management team providing integration, and the main grant that funded these programs has ended.

Photo courtesy of Gillings School of Global Public Health

The University of North Carolina at Chapel Hill

+ Expand the website Rev Up Innovation (www.revupinnovation.com) to reach a broad range of audiences at the University and beyond.

• Engage resident advisors (RAs). As one of the first representatives of Carolina to incoming students, an RA plays a significant role in the development of our first-year students' college careers and can inform them of innovation opportunities.

Staff: Encourage staff to consider how they might a) be innovative in the work of the campus, b) infuse the messages of innovation into their own areas of responsibility, and c) translate their own ideas.

• Encourage administrators and campus leaders to work with their staff members to explain the innovation goals and to solicit their involvement.
• Encourage senior administrators and campus leaders to include the innovation goals in presentations to key audiences.

Others: Discuss with boards, alumni, funders, and partners the importance of innovation and how they might become involved.

• Use opportunities to discuss the innovation strategies at Carolina and to learn from others such as North Carolina State University and Duke University. Continue participation in the UNC General Administration's Innovation and Technology Development Task Force.

Action 1.1.2 Provide a one-stop gateway to resources on innovation at Carolina.
Create a user-friendly central online gateway to innovation and a hotline to help the Carolina community learn more about the resources, courses, programs, and people available to support innovation and the opportunities for involvement.

GOAL 1.2 Build capacity for innovation.

In the future, a broad representation of the Carolina community will gain the knowledge, skills, and connections needed to translate their ideas into greater benefit to society. Faculty, students, and staff, and the greater Carolina community who wish to learn about innovation and entrepreneurship will have easy-to-find, appropriate, and engaging opportunities.

The curriculum will offer classes to help participants develop ideas and apply translation methods (see Recommendation 3: Translate). Participants will understand that calculated risks and inevitable failures are part of learning, that translation best occurs by collaborating with a diverse team, and that skills such as negotiating and communicating are important to the process. They will learn how to translate ideas into impact through persuasion and social and commercial entrepreneurship.

Students will have the chance to be involved in one or two campuswide initiatives that address a single topic of importance that yield new understanding and catalyze incremental and radical innovations. Upon graduation, students involved in these programs will appreciate how innovative thinking can help them analyze situations, assess needs, grasp opportunities, create new approaches, test methods, and measure results. They will have experienced the entrepreneurial process and believe in their ability to apply their skills to new endeavors.

Action 1.2.1 Provide educational opportunities about innovation.
Provide tailored, stimulating, and substantive educational programs, experiences, and connections for students, faculty, and staff interested in innovation and entrepreneurship.

• Strengthen successful existing programs, fill in gaps, measure and evaluate, seek constant improvement, implement changes, and phase out programs when appropriate. Integrate these educational opportunities under the direction of a representative management team of program leaders. These

leaders will serve as connectors across the campus (see Recommendation 5: Catalyze).

+ Build on existing educational programs and strengthen the most promising courses and offerings focused on innovation and entrepreneurship (e.g., The Chancellor's Faculty Boot Camp for Entrepreneurship, the Minor in Entrepreneurship and the First Year Seminars in the College of Arts and Sciences, programs from the Kenan-Flagler Business School and the Kenan Institute for Private Enterprise, the Public Policy Clinic, Campus Y programs, TraCS, and others.)
+ Complete fundraising for the endowment for the Minor in Entrepreneurship and First Year Seminars in the College of Arts and Sciences.
+ Secure funding for effective entrepreneurship programs including those from the Kenan-Flagler Business School's Center for Entrepreneurial Studies and Kenan Institute for Private Enterprise, the Campus Y, the departments of economics and public policy, and others.
+ Expand undergraduate opportunities with the Kenan Institute's Business Accelerator for Sustainable Entrepreneurship (BASE) on and off campus.
+ Examine the Carolina Entrepreneurship Club and consider expanding its reach beyond the business school.
+ Enhance the Carolina Challenge Competition by encouraging more widespread participation and greater collaboration among faculty, students, and staff.
+ Support C-START (Carolina Students Taking Academic Responsibility through Teaching), which enables students to design and teach courses for their peers on innovation and engage with a faculty mentor to learn how to effectively convey information.

• Create new instructional programs and other educational opportunities focused on innovation and entrepreneurship.

+ Create First Year Seminars that engage first-year students on innovative and entrepreneurial approaches to address some of the most pressing challenges of our time. Tie the courses into the *Key Themes Initiative* (see Recommendation 2: Collaborate).
+ Create an innovation subset of the First Year Fellows Program, which connects honor students with opportunities suited to their interests.
+ Consider offering dual-degree programs (where students can graduate with a B.A. and M.A. in four years). Provide courses clustered around a key theme, internships, and targeted study abroad programs. These programs would include content on innovation and entrepreneurship that can generate the kind of learning outcomes and intellectual excitement that will improve the University's ability to attract the very best students (e.g., interdisciplinary, experiential, problem solving, and deeper community engagement).
+ Advocate the offering of an entrepreneurship/innovation-themed Summer Reading Book selection to facilitate discussion and create a culture in which entrepreneurship and innovation are topics considered regularly by a large portion of the student body.
+ Create a Career Services Workshop for Aspiring Entrepreneurs containing material on subjects such as hiring processes.
+ Build capacity for social entrepreneurship so that students are competent in community needs assessment, project planning, fundraising, monitoring and evaluation, finance, and communication.

Alia Khan, a Public Service Scholar who worked with Resource Development International, Bangladesh Rural Advancement Committee, and with the UNC Chapter of Engineers without Borders.

Campus Y

The Campus Y serves as a hub for social innovation on campus. Social innovation refers to new strategies, concepts, ideas, and organizations that meet social needs and extend and strengthen civil society. For more than 100 years, the Campus Y has embedded an entrepreneurial culture into its work. It engages students, faculty, and staff, involves mentors from the campus and community, and provides resources such as media tools to help students build and support new and existing organizations that contribute solutions to social challenges.

The Campus Y convenes teams around ideas and provides capacity-building workshops. It has helped create Student Stores, intramural athletics, the Center for International and Scholar Student Services, APPLES, the writers-in-residence program, Carolina Symposium, SCALE, Nourish International, and the Carolina Micro-finance Initiative, among others.

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Action 1.2.2 Connect faculty, students, and staff to a global network of innovators.
Provide connections to appropriate mentors and experts from around the world with innovation experience and extensive connections.
- Organize a global network of alumni, parents, and friends of the University willing to assist faculty, students, and staff (working title: Carolina Global Innovation Network) in partnership with the Minor in Entrepreneurship in the College of Arts and Sciences, the Kenan-Flagler Business School, the General Alumni Association, Renaissance Computing Institute (RENCI), Office of International Affairs, and others.

Action 1.2.3 Create learning and creative spaces.
Create innovation hubs for students, faculty, and staff that are active learning environments.
- Support the development of a Student Innovation Hub (already under consideration by the Office of the Assistant Vice Chancellor for Student Affairs) to be located in the Student Union's 10,000-square-foot lower level. This would provide a central location, open 24 hours a day, for the Carolina community to engage with students as they explore and launch innovative ideas.
- Consider extending the use of the Institute for the Arts and Humanities (IAH) facilities to include innovation activities and explorations by faculty across the campus.
- Explore the student proposal to create the Carolina Innovation Collaboratory Living-Learning Community designed to foster innovation and entrepreneurial thinking outside the classroom as part of campus housing.

Action 1.2.4 Advance research.
Support research on the topics of innovation and entrepreneurship:
- Expand the community of scholars with expertise in innovation and entrepreneurship by hiring tenured/tenure-track faculty and fixed-term faculty as entrepreneurs-in-residence.
- Support interdisciplinary research that allows faculty to compete for multi-year grants to focus on local, national, and global major challenges and translate findings to benefit society. The winning proposal from the 2010 Chancellor's Faculty Boot Camp for Entrepreneurship developed this idea and will be used as the basis for this action.
- Expand the Center for Global Initiatives Undergraduate Research Circles to provide undergraduate students with the opportunity to pursue their academic passions outside the classroom. Support can be for service-learning projects, speaker series, film screenings, and workshops related to innovation.

Targeted investments needed to prepare faculty, graduate and undergraduate students, staff, and the broader Carolina community with the knowledge, skills, and connections necessary to translate new ideas into innovations.
- Prepare and execute a campuswide communication strategy for the first five years of program, including gateway to innovation resources.
  $1.4 million (expendable) over five years to support an Innovate@Carolina **communication strategy to reach the Carolina community**. Includes support for communication director, online communities, trainings for new students, resident advisors, and other campus stakeholders.
- **Provide Educational Opportunities**
  $25 million (endowment) for teaching and research, which includes expanding the **Minor in Entrepreneurship** ($20M) and other successful programs of the **Carolina Entrepreneurial Initiative** ($4.5M), including

Kaylan Christofferson, 2009 graduate and Public Service Scholar, tutored locally and abroad during her time at Carolina.

Launching the Venture, the Chancellor's Faculty Boot Camp on Entrepreneurship, the Carolina Challenge and First Year Seminars in innovation and entrepreneurship, and others. Create a **Global Innovation Network** (.5M)

- **Create Learning and Creative Spaces**
  $10 million (expendable) to create a **Student Innovation Hub**. This will serve as a physical nexus on campus where students, faculty and staff, and the greater Carolina community can come together to engage in innovation and entrepreneurial efforts.
- **Innovation and Entrepreneurship Research**
  $750,000 (expendable) over five years to support **academic research** on innovation and entrepreneurship by Carolina faculty and students.
  $5 million (expendable) to support competitive **interdisciplinary faculty research grants** that focus on local, national, and global challenges and translate findings to benefit society. (Winning Proposal from the 2010 Chancellor's Faculty Boot Camp on Entrepreneurship).

Total Investment Needed: $42.15 Million ($25 Million Endowment, $17.15 Million Expendable For A Five-Year Period)

Public Service Scholar Mindy Nichamin was able to pursue her interests through innovative Carolina organizations including World Camp for Kids and Globe Med.

Calvin Young, who majored in Computer Science and Business Administration and graduated as a Public Service Scholar.

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Recommendation 2: Collaborate with diverse groups on campus and beyond to explore issues, options, and creative approaches that may lead to innovations.

Current Status

The Carolina community is collaborative, but at times, multidisciplinary collaboration can be difficult due to procedural roadblocks, lack of resources, and/or lack of awareness of others' work. In looking at collaboration overall, there are several issues. First, collaboration at the intersection of disciplines especially in the sciences is key to solving important problems and is often challenging. In the specific area of applied sciences, the lack of an engineering school limits the scope of problems we can adequately address. Second, when those outside the University, such as industry, try to collaborate with Carolina it is not always clear how to approach the University. Some find the barriers to working with us a major disincentive and turn to other universities for collaborative projects. Industry relations is an area that needs to be improved at Carolina, as demonstrated by the relatively low research dollars received from industry as compared to our peer institutions. Third, regional collaborations that lead to innovations need to be strengthened. As part of Research Triangle Park, an area poised as a major hub for innovation globally, we need a more integrated strategy for contributing to its next evolution and benefiting from our proximity to Duke and NC State universities.

The Public Service Scholars Program of the Carolina Center for Public Service encourages students to consider their service in more innovative ways through broadening the traditional concepts of service.

GOAL 2.1 Enhance robust interdisciplinary collaboration among basic and social scientists, humanistic scholars, and those in hybrid disciplines such as bioengineering and applied sciences to address the great challenges of our times.

In the future, collaborations within and beyond the Carolina campus (including with other universities, the private and social sectors, communities, and government) will leverage talent, innovation, and non-traditional partnerships to achieve even greater impact. Those seeking collaborations on campus will find a supportive environment where the rules have been examined and rewritten to smooth the path for interdisciplinary opportunities. Carolina will have highly rated hybrid disciplines such as bioengineering, environmental engineering, and applied sciences all working together with social scientists and humanities scholars on some of the most serious challenges facing society locally, nationally, and globally. This effort is especially important since there is no engineering school at Carolina and complex issues require advanced disciplinary knowledge and the expertise that comes from new disciplines developed by combining multiple fields of study.

Action 2.1.1 Set as a top scientific priority advancing applied sciences, which connect basic sciences and engineering to promote new areas of discovery.

Areas of great need and complexity require expertise that lies at the intersection of disciplines. Maximizing our opportunity to advance applied sciences is critical to the innovation agenda at Carolina. It is imperative that this be structured in a way that catapults the University into new frontiers in science. We must be bold in our approach to be at the forefront of discovery and create and integrate the types of hybrid disciplines required, especially for a university without an engineering school. We need to strengthen teaching and research in the applied sciences so that the University can better address major local, national, and global problems drawing on our expertise in health care, energy, natural resources, technology, and national security.

Action 2.1.2 Engage collaboratively across basic and social sciences and humanities to address great problems and challenges.

Great innovations are built on an understanding of humanistic and cultural values, perceptions and behavioral barriers, including understanding market and policy incentives and barriers as well on technical breakthroughs. Strengthen the involvement of faculty and students and connections across the entire campus (see Action 2.2.1 *Key Themes Initiative*).

Action 2.1.3 Remove barriers to interdisciplinary efforts.

Identify the barriers to interdisciplinary collaboration and prepare a report recommending changes to streamline the process. Present the findings to the chancellor and provost.

Action 2.1.4 Track collaborations and their impact.

Extend the June 2010 Report on Carolina Collaborations (innovate.unc.edu), and create a data collection method for documenting collaborations. Build on the winning proposal from the 2009 Chancellor's Faculty Boot Camp on Entrepreneurship, which recognized this need and explored the feasibility of a central research database for enhancing collaborations. Create a communication strategy to highlight the many collaborations among Carolina and other universities and partners.

GOAL 2.2 Collaborate and coordinate around key themes of local, national, and global significance to mobilize the campus toward new understanding of issues and solutions.

In the future, through the collaborative *Key Themes Initiative* that examines one important topic at a time such as water, poverty, economic disparities, climate change or fossil-fuel scarcity, the Carolina community will stimulate intellectual exchange and discovery across the humanities, fine arts, social and natural sciences, and professional schools. This approach will yield a dramatic positive impact on our community's understanding of the issues it seeks to address, build collaborative bridges between disciplines, produce new collaborative teaching and research, and result in significant innovations.

Action 2.2.1 Create the *Key Themes Initiative*.
The initiative is designed to encourage broad participation by selecting one grand challenge of local, national, or global significance at a time investigated from multiple perspectives, reflecting Carolina's areas of expertise. Provide resources and support to encourage creative and collaborative approaches to addressing a selected topic.

- Convene a representative group of faculty, students, staff, and a *Key Themes* Coordinator (TBD), to plan the *Key Themes Initiative*. Develop a plan for three specialty themes to be explored sequentially via new and established courses and course clusters across a range of disciplines. Integrate this curriculum, where possible, with fine arts programming, student life initiatives, and public activities designed to engage wide community involvement. Provide for undergraduate and graduate research.
- At the end of each theme's cycle, hold a global conference on the topic. Seek collaboration with NC State University's *Emerging Issue Forum*, the Friday Center's *What's the Big Idea* series, and other regional programs.
- Work with the Student Innovation Team as they investigate whether to establish a Kairos Society chapter on campus that unites bright young minds toward solutions to global challenges. Currently, 20 universities have Kairos chapters including Babson College, Duke University, New York University, Massachusetts Institute of Technology, Harvard University, and Princeton University.
- Begin the focus on key themes at orientation. The Carolina Testing & Orientation Program Sessions (C-TOPS) could introduce the *Key Themes Initiative* and begin to engage incoming first-year students around the innovation culture at Carolina.

GOAL 2.3 Improve industry collaborations and increase industry funding.
In the future, Carolina will have strong industry partners, working collaboratively toward mutually beneficial goals. Research dollars will grow significantly in the next five years due to our strategic attention to this opportunity. Industry will view Carolina as a smart, fair, speedy, and service-oriented partner with brilliant researchers working at the cutting edge of their fields.

Action 2.3.1 Examine the issues related to industry relations and make recommendations to the provost and chancellor.
The Innovate@Carolina initial report issued in December 2009 entitled *Innovation and Entrepreneurship at The University of North Carolina: Background and Sample of Current Activities* (http://innovation.unc.edu/wp-content/uploads/2010/01/09-1974-URL-Innovation-Circle-Report-11.pdf) compared the University with its peer institutions on a number of measures. The lowest performance area was in the amount of research dollars received from industry. This is a major opportunity for improvement and ties into the strategic analysis of our research strengths, needs, and opportunities.

Convene a representative team of people, chaired by a member of the Innovation Circle to lead this analysis. Develop a strategic plan and present it to the provost and chancellor.

Innocence Project

The Innocence Project, a non-profit national litigation and public policy organization, is dedicated to exonerating wrongfully convicted people through DNA testing and reforming the criminal justice system to prevent future injustice. As a clinic, law students handle case work while supervised by a team of attorneys and clinic staff. Carolina is a founding member of The Innocence Network, a group of law schools, journalism schools, and public defender offices across the country that assists inmates trying to prove their innocence. They consult with legislators and law enforcement officials on the state, local, and federal level, conduct research and training, produce scholarship and propose a wide range of remedies to prevent wrongful convictions.

Photo by Steve Exum, courtesy UNC School of Law.

University of Chicago Institute of Molecular Engineering

The University of Chicago has endorsed a new academic program in molecular engineering, a hybrid discipline, as a top scientific priority. The University of Chicago received funding from the Pritzker Family to fund this institute, which reports to the provost, and a new scientific complex. The University of Chicago states: "…The University has no preexisting engineering programs and thus is not constrained to follow or copy existing programs at other universities. By combining the deep analytical approach that has historically characterized science at the University of Chicago with problems in engineering, the Institute for Molecular Engineering will be positioned from the start to develop novel engineering tools and approach fundamental problems of societal import from new perspectives."

Theme-Based Collaboration

During the 2010–2011 academic year, the University will host an examination of the American Civil Rights Movement. Classes, seminars, excursions, lectures, and performances will focus on the Freedom Riders, Parchmen Prison, Pauli Murray, and others. This exploration will involve more than six academic departments, the Center for the Study of the American South, the Institute for the Arts and Humanities, Duke University, UNC Press, the Carrboro Board of Aldermen, and the Chapel Hill Town Council.

Carolina Creative Campus

Carolina Creative Campus uses the arts to engage students in campus and community-wide conversations on a specific topic each academic year. Through interdisciplinary collaborations with artists, speakers, academic leaders and key community partners, the program works with partners across campus and in communities to engage in creative dialogues. During the 2007–2008 academic years, members of the campus and local community examined the death penalty from a range of perspectives through more than 25 arts events designed to stimulate critical thought about the issue, including exhibits, plays, and films.

GOAL 2.4 Extend collaborations with state and regional partners to help North Carolina further develop into a leading competitive, global, entrepreneurial, knowledge, and innovation economy.

In the future, the Research Triangle Park (RTP) region will be a leading entrepreneurial engine in the United States. Governments and industry leaders around the world will contact North Carolina leaders when considering significant investments, partnerships, and resource allocation. Entrepreneurs will have the knowledge and skills they need to grow companies and will be connected into a strong network of seasoned business people. The path will be smoothed for them and the needed funding available. The Governor's Innovation Council and other strategic initiatives will have been successful in solidifying North Carolina's economic future.

Action 2.4.1 Attract high-level business ideas and teams to RTP.

RTP and North Carolina have a shortage of fundable, scalable business plans and the accompanying entrepreneurial talent. Universities worldwide are doing more to address this issue for their regions, as are RTP universities (see Recommendation 3: Translate). The reality is that the majority of ideas coming out of universities are too early stage for the venture capital community.

Create the RTP Million Dollar Business Idea Challenge (RTP Challenge) to bring in top business teams and ideas from around the world annually, some of them from universities. Regional colleges and universities would continue to run their own business plan competitions as experiential learning activities, and the winners would be given special attention in the RTP Challenge. Large competitions in other regions engage hundreds of investors, professional service providers, and entrepreneurs who wish to mentor entrepreneurs and get a first look at novel ideas. The MASS Challenge, the Rice Business Plan Competition, and the University of Texas Moot Corp are examples. A combination of $250,000, $100,000, $50,000, and $25,000 prizes would be offered by various organizations totaling a million dollars in cash, products, and services. Duke, NC State, NC Central, and Carolina faculty and students would help with the RTP Challenge and each university would receive $20,000 annually for their own business plan competitions or other entrepreneurship programs.

Action 2.4.2 Attract the capital needed to fuel the entrepreneurial economy in North Carolina.

- Create a bridge between national venture capital and Carolina. Work with Innovation Circle members who are venture capitalists to explore ways the University can contribute to the state's innovation goals.
- Generate financial returns for the University by investing in companies in partnership with the world's best venture capital firms.
- Contribute to a powerful network within North Carolina to identify, access, and nurture compelling entrepreneurs and high-growth opportunities within the state ready for investment.

Action 2.4.3 Map the RTP entrepreneurial ecosystem to strengthen support for high-potential entrepreneurial firms.

Mapping a regional entrepreneurship ecosystem is an important step in assuring that a region has the right mix of resources needed to serve its entrepreneurial community. Mapping begins with identifying the required criteria of a successful ecosystem. Assessment of existing resources against the criteria provides information on what is available, missing, which areas are strengths, and which require attention.

Create a brief high-level map of the needed criteria for an ideal entrepreneurial economy. Researchers such as Porter, Atkinson, Feldman, and others have researched this topic and identified required criteria. Gain agreement from economic development leaders, investors, entrepreneurs, and researchers on the kinds of resources needed

Required Components of an Innovation Economy

In the future, entrepreneurs will have the knowledge and skills they need to grow companies and increase their connections to a strong network of seasoned business people. The path will be smoothed for them and the needed funding available.

Required Components of an Innovation Economy	Carolina's Role
A high concentration of scientists and engineers.	Continue as a leading research university hiring and graduating top scientists and producing intellectual property.
Increased intellectual output in science, engineering, and technology.	Advance applied sciences and have stronger commercialization output (increase patenting activity, licensing, and more viable startups). Collaborate with NC State, Duke, and regional organizations.
Greater R&D investment by industry.	Advance industry collaborations and increase industry funding.
Abundance of fundable business plans and entrepreneurial talent.	Prepare people and translate ideas into innovations. Participate in the RTP Challenge.
A savvy entrepreneurial support community.	Faculty and programs officers contribute to this community. Map the regional entrepreneurship ecosystem and strengthen it.
Investment capital for seed to scale stages, including venture capital from local, national, and global firms.	Review the venture investment section of our overall investment portfolio.
Global partners.	Leverage relationships with the University's strategic international partners and the proposed Carolina Global Innovation Network.
Knowledge-based clusters providing high-tech jobs.	Leverage our areas of strength. Help deliver on the vision, promise, and opportunity for North Carolina as THE Innovation State.

Photo by Chris Carmichael

The CHAT Festival

CHAT (Collaborations: Humanities, Arts & Technology) showcased the array of resources in the Research Triangle Park region in digital arts and humanities. The University of North Carolina at Chapel Hill hosted the festival, coordinated by the Institute for the Arts and Humanities in the College of Arts and Sciences. Robbie Bach, UNC alumnus and former Microsoft executive presented the opening keynote of the CHAT Festival, sharing his views on the future of entertainment and his advice for the industry's most promising creators.

for a region, and post on the Web a simple top-level map using visualization software. The mapping could be a collaborative project between Duke University, NC State, and UNC-Chapel Hill researchers. Once the map is in place, regional partners can assess where they fit into the ecosystem and post their information. This type of mapping and its Web-based visualization method would foster collaboration, policy adjustments, and other changes in RTP since the information would reveal strengths and weaknesses within various organizations, sectors, and the region. It will also reduce redundancies and leverage resources.

Action 2.4.4 Leverage existing university labs, equipment, and space.
Specialty scientific labs and facilities are often needed by high potential companies. In RTP, as an example, the Hamner Institutes provide such services for life science companies, thus leveraging facilities and equipment across multiple teams. Duke, NC State, and Carolina each have sophisticated facilities with state-of-the-art tools, often costing millions of dollars, which are unused at times. The non-peak hours could be leased to a non-university organization that sub-leases facilities and tools to regional scientists. Setting up one organization to negotiate with universities, handle schedules, and provide quality assurance for the universities would make the exchange smooth for the universities and the innovator who needs access. This approach would reduce the costs of providing such dedicated space in the Triangle and bring added revenue to the university. It would insure that scientists have the tools they need to explore potential innovations.

Action 2.4.5 Incentivize collaborations among RTP universities and with other partners.
Establish the Triangle Innovation Fund to provide small competitive awards to support innovation projects that best exemplify successful collaborations among RTP area institutions. To qualify, a collaboration must be innovative and have at least two RTP area universities participating.

GOAL 2.5 Strengthen collaborations with Carolina's strategic international partners.
In the future, Carolina will enhance and leverage the relationships with our emerging roster of close strategic international partners — schools such as National University of Singapore, King's College-London, Tsinghua University, and Universidad San Francisco de Quito, which is instrumental to our Galapagos projects, and other partners. When working on important complex global problems, these strong, complementary institutions offer vital knowledge, resources, and access.

Action 2.5.1 Fund research on global innovation needs and remove barriers to working with global partners.
Work closely with the Office of International Affairs to:
- Encourage and better support appropriate research partnerships with international institutions.
- Smooth the way for foreign personnel to be able to come to campus when they are needed.
- Establish the Global Innovation Fund to provide small competitive awards to support innovation projects that best exemplify successful collaborations between Carolina and global partners.

Targeted investments to collaborate with diverse groups on campus and beyond to explore issues, options, and creative approaches that might lead to innovations.
- **Create Applied Sciences Professorships**
  $15 million (endowment) to create five **Applied Sciences Professorships**. The faculty filling these positions will bring the expertise that lies at the intersection of disciplines. They will help colleagues across campus connect

The Kairos Society
The Kairos Society is an international student-run not-for-profit foundation based in the United States. It started with the belief that the key to improving the world lies in uniting the next generation of leaders to develop globally impactful innovations. To this end, Kairos has built a member base consisting of some of the brightest students from 20 top universities around the world.

Rice University Business Plan Competition
The Rice University Business Plan Competition, widely supported by community leaders, annually awards $1 million in prize money and gifts and engages more than 200 local judges who are professional service provides, entrepreneurs, and investors. Since the competition is open to teams globally, the Chamber of Commerce offers a $250,000 prize to one of the top teams if they relocate to Houston. Specialty prizes are offered such as the Best Life Science Technology Company, the Best Energy/IT/Nano/Aerospace Company, the Dow Sustainability Award, and the NASA Earth/Space Life Science Innovation Award.

the basic sciences with engineering, propelling the University into new areas of discovery and application.

- **Key Themes Initiative**
  $6 million (expendable) to fund grants addressing the **grand challenges of local, national, and global significance**. Every two years for the next six years, the campus will coalesce around a theme that addresses a pressing global priority, such as water quality and its critical role in supporting healthy communities around the world.
- **Triangle Collaboration Fund**
  $1 million (endowment) to fund grants for collaborative innovation projects in the Research Triangle Park region. **$200,000 to map the RTP entrepreneurial ecosystem**.
- **Global Collaboration Fund**
  $1 million (endowment) to fund research and collaboration grants for Carolina faculty and staff work with international partners.

Total Investment Needed: $23.2 million ($17 million endowment, $6.2 million expendable for a Five-Year Period)

Catherine Ekeleme had experiences in the Public Service Scholars program that she said allowed her to grow at the same time she was helping others.

Active in TABLE, 2010 Public Service Scholar Bryan Gaston was able to experience ways to address issues through organizational as well as direct service.

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The University of North Carolina at Chapel Hill

Recommendation 3: Translate important new ideas more expediently and at an increased volume into innovations that improve society.

Current Status

Carolina lags behind its peers in formal commercialization outputs and in industry research dollars received. There are four important groups advancing commercialization working together informally: The Office of Technology Development (OTD), the Office of Sponsored Research, and the Kenan-Flagler Business School (Center for Entrepreneurial Studies and Kenan Institute of Private Enterprise), and the Carolina KickStart program at TraCS at the School of Medicine. A more deliberate approach is needed that incorporates the best thinking on how commercialization can flourish at a major research university. For social entrepreneurship, there are pockets of excellence throughout the University and program leaders are beginning to work together. As with commercialization, a more deliberate approach to integration is needed.

GOAL 3.1 Support faculty, students, and staff as they develop understanding of issues and contribute solutions to complex social and environmental problems through social entrepreneurship.

In the future, social entrepreneurship will flourish resulting in innovations that help address some of the most challenging issues locally, nationally, and globally.

Action 3.1.1 Further refine and develop an integrated campuswide approach to social entrepreneurship, which includes artistic entrepreneurship.

Ideas for social innovation often are based on the knowledge gained in the arts and humanities as well as in a broad-based, problem-focused liberal arts and sciences education. Collaborative processes, including social experiments, also help define issues more clearly.

- Assess existing social entrepreneurship programs and create an integrated strategy for the campus that will create and grow social ventures. Appoint a committee to lead this strategic planning effort to be chaired by a member of the Innovation Circle. Groups to be included are Campus Y, Office of Student Affairs, Office of Diversity and Multicultural Affairs, the Kenan-Flagler Business School Center for Entrepreneurial Studies/Kenan Institute for Private Enterprise, the Public Policy Clinic in the Department of Public Policy, the Urban Investment Strategies Center, BASE, APPLES, the Minor in Entrepreneurship in the College of Arts and Sciences, student representatives, social entrepreneurs, investors, professional service providers, representatives from schools and/or institutes and centers that have faculty, students, and staff who create social ventures or assist those who do, and others as identified.
- Allocate resources to provide rigorous academic foundations for students pursuing social entrepreneurship. Provide more advanced educational opportunities in such topics as measuring performance and outcomes of social ventures, organization-building, creative funding of not-for-profit organizations, and related topics.
- Ensure that student and faculty social entrepreneurs have access to seed funding and a mentor/assistance program with Entrepreneurs-in-Residence, faculty experts and other mentors.

GOAL 3.2 Effectively organize and manage the University's commercialization services to maximize the quality and volume of potentially important innovations for society. Return revenue from these innovations to the University to support this work when possible.

In the future, more innovative ideas will be developed at Carolina and launched efficiently into the commercial sector. Carolina will be recognized as one of the top leaders in technology development and transfer because of the breadth of our innovations and the effectiveness of our leadership, people, strategies, policies, and our resulting impact.

Action 3.2.1 Implement a carefully designed commercialization approach.

Create an integrated strategy for the campus for formal and informal commercialization. Create a plan for commercialization that together forms an optimal formal (IP licensed by OTD) and informal (startups without licenses) commercialization approach.

- Build the plan around the required elements for maximizing resources and output.

Three Methods for Translating Ideas into Impact

New ideas and innovations generated by University faculty, students, and staff are applied to real challenges and issues beyond the campus in three ways.

1. Launch innovators into the world. Graduates armed with technical knowledge, grounded in the liberal arts, and inspired to action by example multiply our impact. At Carolina, we want our students to graduate with the knowledge, tools, and confidence to apply entrepreneurial thinking and action throughout their lives. This renewable asset — intelligent, compassionate graduates prepared with knowledge, skills, and connections — is a powerful ongoing innovation engine.

2. Persuade. Faculty who want their ideas, research, and knowledge to be applied outside the academic setting often use persuasion to influence positive change. Faculty research regularly influences government and corporate policy, advances science and medicine, and through artistic endeavors creates broader understanding and more positive actions.

3. Create social and commercial enterprises. This encompasses the formal technology commercialization progress (university-owned intellectual property) and informal enterprise creation (no university intellectual property). Due to patent tracking, the formal type is officially reported while the informal type can go unpublicized and uncounted. The following examples of student ventures from other universities demonstrate the value of such informally created ventures and of recognizing their potential early in their development: Google, Facebook, Nantucket Nectars, Microsoft, Dell, Teach for America, and kiva.org.

- Create a strategic planning committee to be chaired by a member of the Innovation Circle.
- Clearly define roles and responsibilities, signed off by those responsible for implementing the plan and their supervisors, the provost, and chancellor.
- Include the following units: Office of Technology Development (OTD), Corporate Relations, Office of Sponsored Research, Carolina KickStart at the TraCS Institute, Kenan-Flagler Business School/Center for Entrepreneurial Studies/Kenan Institute for Private Enterprise, student representatives, serial entrepreneurs, investors, professional service providers, representatives from schools and/or institutes and centers who have faculty, students, and staff who commercialize or assist those who do, and others as identified.
- Expand Carolina KickStart to serve the entire campus in partnership with the Center for Entrepreneurial Studies and Office of Technology Development.
- Establish a tracking system across the campus for social and commercial startups and their impact. (See Recommendation 5: Catalyze)
- Incorporate the following required elements for maximizing resources and output:
  + Good ideas, tested for viability and improved through market-relevance testing.
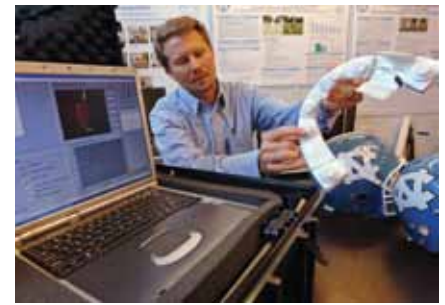
Football Helmets

Kevin Guskiewicz, a Kenan distinguished professor in exercise and sport science, has pioneered a football helmet that measures the impact of concussions and other head injuries on athletes at all levels. His research shows that even seemingly minor head injuries can have a cumulative effect on the long-term health of athletes, and that often football players are sent back into the game too soon after an injury, increasing their chances of having Alzheimer's or other brain diseases later in life. His work is regularly cited by policy-makers, sports officials and major news media as the sports world debates how to address the potential health consequences of athletic competitions from high school and college through the professional level.

Autism

In collaboration with colleagues in the Division of Allied Health and the Carolina Institute for Developmental Disabilities, Professor Steve Reznick of the Department of Psychology has recently received funding from the Autism Speaks Foundation to expand ongoing research on identifying infants who are at risk for an eventual diagnosis of autism spectrum disorder (ASD). This research has implications for our understanding of ASD not only in the laboratory, but also in the interventionist's clinic and the pediatrician's office.

Carolina for Kibera

In 2001, undergraduate Rye Barcott launched Carolina for Kibera (CFK) with Kenyans Tabitha Festo and Salim Mohamed in the Kibera slum of Nairobi, Kenya, where more than 300,000 people live in an area the size of UNC-Chapel Hill's campus. CFK empowers young leaders in Kibera and prevents violence by using an integrated, locally led approach that combines sports and education with high-quality health care provision and business training. Housed at Carolina's Center for Global Initiatives, CFK has a robust student volunteer program. The organization has been recognized as a Time Magazine Hero of Global Health and was awarded the Oklahoma City National Memorial and Museum's "Reflections of Hope" Award in 2008 for its relief and reconciliation work during Kenya's post election violence.

- Create a system for proof of concept assistance to establish the feasibility of an idea, invention, process, or business model. This can include rapid prototyping and require access to sophisticated scientific and engineering equipment.
- Provide access to incubation space and tools.

+ Talented teams that develop the ideas and enterprise management teams that build startup companies.
  - Use talented interdisciplinary student teams as early in the process as possible. Build on models at other universities such as BioX at Stanford.

+ Time
  - Pay for release time for faculty to work on ideas. (See Recommendation 4: Align, Action 4.2.2)

+ Mentoring and support early in the process from subject matter experts and deal makers (seasoned entrepreneurs, professional service providers, and investors).
  - Involve people who know markets, have connections, and have relevant experience. Build on models from other universities: Deshpande Center, Lassonde New Venture Development Center, Venture-Mentoring Program, Faculty Mentoring Program at Utah.
  - Use a team of experts to serve as Entrepreneurs/Experts/Executives in Residence (EIRS) who will bring in knowledge of the marketplace, call upon their extensive networks for the benefit of the University, and serve as mentors to faculty and staff as they explore potentially commercially-viable ideas.
  - Create a formal volunteer mentor group (working title: Catalysts) based on the MIT approach (high-level serial entrepreneurs, venture capitalists and others who volunteer to mentor faculty and students).
  - Appoint well-connected individuals on and off campus to serve as University liaisons with industry.
  - Create a small cadre of faculty members with multiple experiences successfully commercializing IP to serve as Faculty Peer Mentors similar to the University of Utah's approach.

+ Connections to key people around the world.
  - Use the proposed Carolina Global Innovation Network to make hard-to-secure connections. (See Recommendation 1).
  - Continue to leverage Carolina's relationships and reputation to create new collaborations and expand on existing ones.

+ Service-oriented professionals in the Office of Technology Development (OTD) and other key offices.
  - Establish measures of success for the OTD and other key offices and measure against them.
  - Create the necessary data management and reporting tools to effectively manage IP, possibly in partnership with other universities.
    + Form an advisory committee of external experts and Carolina patent holders to seek the most effective ways to structure the University's patent practices.
    + Bring the marketplace into the analysis of early stage ideas as soon as possible to enhance the use of patent dollars. Involve investors early in commercialization activities.
    + Reduce costs of securing patents. Explore alternate fee models regarding patent costs. Identify and negotiate with a small cadre of top patent law firms to form a group of

preferred vendors with Carolina so that the University will receive a significant discount on patent fees. Coordinate with the UNC General Administration.
+ Allocate additional funds for patent costs after all efforts to reduce costs have been exhausted.
• Effectively handle increased patenting activity.
+ Appropriate funding at various stages.
• Provide pre-seed and seed funding.
• Investigate starting a Carolina Angels Network. Target successful entrepreneurs and other qualified investors among University alumni and friends to invest in firms created by innovative faculty and students.
• Create a program whereby investors pay a nominal fee to preview ideas of potential interest to them.
• Provide forums for investors to learn about new technology and businesses.
• Increase the pipeline by increasing the number of invention disclosures and the number of first-time inventors.
• Increase the number of companies formed and/or technologies licensed.

GOAL 3.3 Measure the impact of innovations and innovators launched at Carolina.
In the future, the University will know the extended benefit of Carolina innovators and innovations to society.

Action 3.3.1 Design and implement a study of the social and economic impact of the University.
• Document the significant role Carolina plays in our local and regional economy.
• Replicate the study, *Entrepreneurial Impact The Role of MIT*, which analyzes the economic effect of MIT alumni-founded companies and its entrepreneurial ecosystem.
• Study the broader contributions in terms of innovation and our influence on political, social, cultural, environmental benefits as well as the economic impact. Convene a group of researchers to include the Vice Chancellor for Research and Economic Development, Office of Institutional Research and Assessment, the Odum Institute for Research in Social Science, and others to discuss the options for this study.

Targeted investments needed to translate important new ideas more expediently and at an increased volume into innovations that improve society.

• **Provide support for social innovation**
$1.25 million (expendable) at $250,000 per year for five years to promote social innovation among faculty, staff, and students, including seed funding and mentors for startups.
• **Implement a commercialization and enterprise development approach**
$25,000 (expendable) to create a plan for commercialization.
$15 million ($10 million endowment and $5 million expendable) to hire up to 18 entrepreneurs-in-residence (EIR). Would include at least four EIRs for social and artistic entrepreneurship.
$3.3 million (expendable) at $660,000 per year over five years to extend Carolina KickStart at TraCS to serve the entire campus.

Lung Transplant Registry

Tom Egan, Professor of Surgery at Carolina, used his influence as a leading lung transplant surgeon to improve the global policies regarding the allocation of lungs for transplant. An outspoken opponent of the status quo, Egan developed an alternative lung allocation system and led a group that designed a new approach to allocating lungs. After the new system was implemented, waiting list deaths were cut in half, and lung allocation became more efficient, resulting in a 40 to 50 percent increase in the number of lungs being transplanted. Other organ committees in the United States are now considering similar policies and other countries are evaluating the new United States system for implementation.

Deshpande Center

Established in 2002 with a $25 million gift from Desh Deshpande, the Deshpande Center at the MIT School of Engineering seeks to increase the impact of MIT technologies in the marketplace. The center depends on the financial and professional support of successful alumni, entrepreneurs, and investors to provide a sustainable source of funding for innovative research and guidance and has funded more than 80 projects with over $9 million in grants. Eighteen of these projects have become commercial ventures and have collectively raised more than $140 million in outside financing.

Hamner Institutes

The Hamner Institutes for Health Sciences is an independent, nonprofit organization that offers an open, collaborative, and cross-disciplinary approach to translational biomedical research. It actively partners with Carolina and, through the Hamner incubator, lab space, and extensive network of partners, makes collaboration among multiple organizations a reality.

MIT Study

According to the study, "Entrepreneurial Impact: The Role of MIT," which analyzes the economic impact of companies founded by MIT alumni, if the active companies founded by MIT graduates formed an independent nation, their revenues would make that nation at least the 17th-largest economy in the world. Within the United States, these companies currently generate hundreds of billions of dollars and hundreds of thousands of jobs to regional economies, particularly in Massachusetts and California.

- **Measure impact of innovation and innovators at Carolina**
  $400,000 (expendable) to engage on-campus groups including Vice Chancellor for Research and Economic Development, Odum Institute and others to study broad contributions of innovations from Carolina, includes $75,000 (expendable) to commission study of "Entrepreneurial Impact of Carolina" to analyze economic impact of companies founded by Carolina alumni.

Total Investment Needed: $19.975 million ($10 million endowment, $9.975 million expendable for a Five-Year Period)
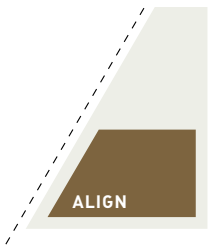
Recommendation 4: Align people, incentives, resources, and processes to strengthen an intentional culture of innovation at Carolina.

ALIGN

GOAL 4.1 Encourage leaders across campus to support and promote innovation in their schools, departments, institutes, and offices.
In the future, administrators and campus leaders will seek ways to advance innovation in their strategic plans. When faculty and staff have promising ideas, leaders will be flexible and creative in finding ways to assist the innovative faculty or staff member when appropriate.

Action 4.1.1 Create a common understanding of the University's innovation goals and evaluate and reward campus leadership for advancing them.
- Since Chancellor Thorp set out the charter to accelerate innovation at Carolina, he will work closely with his senior leadership team so that they reflect the innovation vision in setting priorities and performing their duties. This may include having a standard agenda item on innovation in recurring senior leadership meetings, holding management retreats devoted to exploring ways they can strengthen the culture of innovation at Carolina, and developing rewards based on performance in this area.
- Expect this type of integration in strategy and rewards throughout the campus.

GOAL 4.2 Recruit, retain, and reward faculty, students, and staff who show promise, aptitude, and/or achievement in innovation.
In the future, faculty, students, and staff will be rewarded for pursuing promising ideas to their ultimate application. When the most talented, innovative prospective faculty, staff, and students make their choices on which institutions to join or choose, the supportive innovation culture will weigh favorably for Carolina.

Action 4.2.1 Recruit innovators and future innovators.
- When recruiting faculty, staff, and students, seek people who will contribute to the University's overall culture of innovation, particularly for key leadership positions.
- When hiring new faculty, have as one criteria of consideration the person's history of innovation where appropriate.
- Seek prospective students who show outstanding promise as innovators and/ or entrepreneurs and offer them scholarships.
- Expand the Carolina Innovation Scholarship program to recruit and support students who show outstanding promise as entrepreneurs with scholarships that cover the full cost of tuition, fees, room, and board, renewable for four years.
- For senior staff, ensure that those hired be active supporters of and contributors to accelerating innovations at Carolina.

Action 4.2.2 Reward activities that contribute to the culture of innovation at Carolina.
Create a reward system for the innovation process that is fair, meaningful, and customized for faculty, students, and staff. Design rewards that are tangible and intangible, including scholarships, grants, fellowships, professorships, cash rewards, time, and recognition. Realize that often for faculty the greatest reward is permission to pursue an innovation, especially when it is outside the departmental priorities. Supporting such exceptions might yield breakthroughs that benefit society but only indirectly advance unit priorities.

Current Status

At Carolina there are few extrinsic incentives to drive innovation among faculty, and there are significant barriers to translating promising ideas into new policies, products, and approaches to address challenging local and global issues. For tenure-track faculty, careers are built on research and publishing and doing anything else could be detrimental to future academic advancement. Adjunct professors and professors of practice help bridge the gap between research and publishing and relevance to the outside world. Further, not all deans and departmental chairs have articulated positions concerning the value of innovation or coordinated policies to support it. Limited funds are available to support educational experiences in innovation, to encourage innovation, and to support the translation of ideas into societal benefit.

Digital Media Economics

Penny Abernathy, the Knight Chair in Journalism and Digital Media Economics, is working with several North Carolina community papers and helping other media companies find new ways to be profitable. Abernathy, a former executive at The Wall Street Journal and The New York Times, specializes in preserving quality journalism by helping the news business succeed economically in the digital media environment. As an executive, Abernathy launched new enterprises and helped increase revenue at some of the nation's most prominent news organizations and publishing companies, including The Wall Street Journal, The New York Times and the Harvard Business Review. At The Wall Street Journal, she oversaw the international division and reversed its declining revenue to profitability in less than a year.

Carolina Innovation Scholars

The Carolina Innovation Scholarship, launched in the fall of 2010, is a competitive scholarship program designed to attract innovative entrepreneurial young people to Carolina and provide them full scholarships. Innovation Scholars major in disciplines of their choosing and take advantage of the Minor in Entrepreneurship in the College of Arts and Sciences, research and study-abroad opportunities, and faculty mentoring.

- Build Carolina's academic expertise in the innovation and entrepreneurship fields of study by providing research and teaching grants and fellowships to professors who specialize in either field.
- Incentivize innovation through grants, fellowships, and professorships.
  + Offer a limited number of Innovation Professorships that would allow a faculty member to be exempted from the normal structures of their academic position for up to three years to pursue a promising innovation project. Such professorships could include a) receiving internal support for smoothing institutional hurdles and finding possible sources of funding, b) having the professor work with appropriate communities external to the University, and c) involving undergraduate and graduate students with the project. These limited high-profile professorships would distinguish the University as a place where creative professors are given the chance to take an idea to fruition.
  + Provide incentives and rewards for faculty who actively participate in interdisciplinary problem-oriented instructional clusters and themes that engage our undergraduates and graduate students in addressing local and global issues. (Relates to the *Key Themes Initiative* presented in Recommendation 2: Collaborate)
  + Create an Innovation Prize to recognize and support student-led innovations that demonstrate measureable results including for startups, student groups and initiatives, student-led policy changes, and outreach.
  + Create and/or repackage existing smaller fellowships, funds, and merit awards for students to advance entrepreneurship. These funds would provide students with more opportunities to expand their academic work, by supporting internships, research for senior theses, summer study abroad programs, and other endeavors that directly relate to innovation.
  + Build on the Campus Y Social Innovation Fund and Fund for Social Entrepreneurs.
- Review policies on tenure and promotion and what counts as University service to include consideration of activities that promote innovation. Review the innovation goals with members of existing committees designed to regularly review tenure and promotion policies such as the Provost's Task Force on Promotion and Tenure.

GOAL 4.3 Align the University's internal methods and processes to foster innovation, especially in working across schools.

In the future, the University will regularly assess its internal methods and procedures and make needed changes to support the innovation culture. The University will be known for its entrepreneurial can-do attitude and willingness to quickly address roadblocks to innovation. There will be no incentive for faculty to go outside the system to pursue their translational opportunities. Those pursuits will be easier through the University because of its added value, service attitude, and efficiency.

Action 4.3.1 Align innovation goals with other strategic initiatives.
- Align this work with the Academic Plan, Global Roadmap, Provost's Task Force on Promotion and Tenure, and other relevant strategic initiatives.
- Leverage research institutes and centers since often they operate across boundaries, have different timetables, and regularly engage external partners.

GOAL 4.4 Provide the necessary funds to support nascent and promising innovations on campus.

In the future, advancing innovative activities will be an important part of the criteria for how resources are allocated. Grantors and donors will fund innovation activities because of their confidence in the University's ability to increase the number of innovators and innovations and the velocity in which promising ideas go through the innovation process at Carolina to deliver value to society.

Action 4.4.1 Establish the Carolina Innovation Fund.
Establish the campuswide Carolina Innovation Fund of $25 million to support innovation at Carolina. Build on the Gillings Innovation Fund model that allocated $50 million in private funds to endow an innovation fund for the Gillings School of Global Public Health.

Endowing innovation at the University will encourage experimentation across disciplines, engage the broader Carolina community, promote testing of many ideas that may yield encouraging prospects for further exploration, and take to fruition high potential ideas.

The Carolina Innovation Fund will be available on a competitive basis to faculty, students, and staff, and will be administered by the chancellor, provost, deans, and institute directors and may be divided into a series of targeted funds.

Targeted investments needed to align people, incentives, resources, and processes to strengthen an intentional culture of innovation at Carolina.
- **Recruit Innovators and Future Innovators**
  $5 million (endowment) to more than double the number of **Innovation Scholarships** available each year to incoming Carolina first-year students.
- **Reward activities that contribute to the culture of innovation at Carolina.**
  $6 million to endow two competitive **Innovation Professorships** to allow qualified faculty members up to three years to pursue promising innovation projects.
- **$175,000 expendable for other rewards**
  $200,000 to endow an annual $10,000 **Innovation Prize** to recognize significant achievement in innovation by a student or a student group.
  $25 million to endow the Carolina Innovation Fund to be used by the provost and deans and directors for competitive innovation grants.

Total Investment Needed: $36.375 million ($36.2 million endowment, $175,000 expendable for a Five-Year Period)


Odum Institute

Founded in 1924, the H. W. Odum Institute for Research in Social Science is the nation's oldest multidisciplinary social science university institute. The Odum Institute is not part of a school or department and serves students, faculty, and staff from public health, social work, business, government, and the arts and sciences.

Gillings Innovation Fund

The Gillings School of Global Public Health established a $50 million fund with a gift from Dennis and Joan Gillings to anticipate emerging public health challenges, accelerate solutions, and improve people's lives across North Carolina and around the world. Competitively-funded Gillings Innovation Labs (GILs) apply interdisciplinary, innovative solutions to significant public health challenges. More than a dozen GILs are tackling issues such as new vaccine platforms for the developing world, portable and inexpensive tests of contamination in drinking water, and models for improving mental health treatment systems. The fund supports leaders, including visiting professors and an executive in residence. The school now offers partners from industry and the non-profit world the opportunity to invest in Commissioned Innovation Laboratories (CILs). Through CILs, school faculty and others will solve public health problems of mutual interest to funders and school faculty. The Water Institute at UNC will launch during a major water conference to be held at Carolina on October 25, 2010.
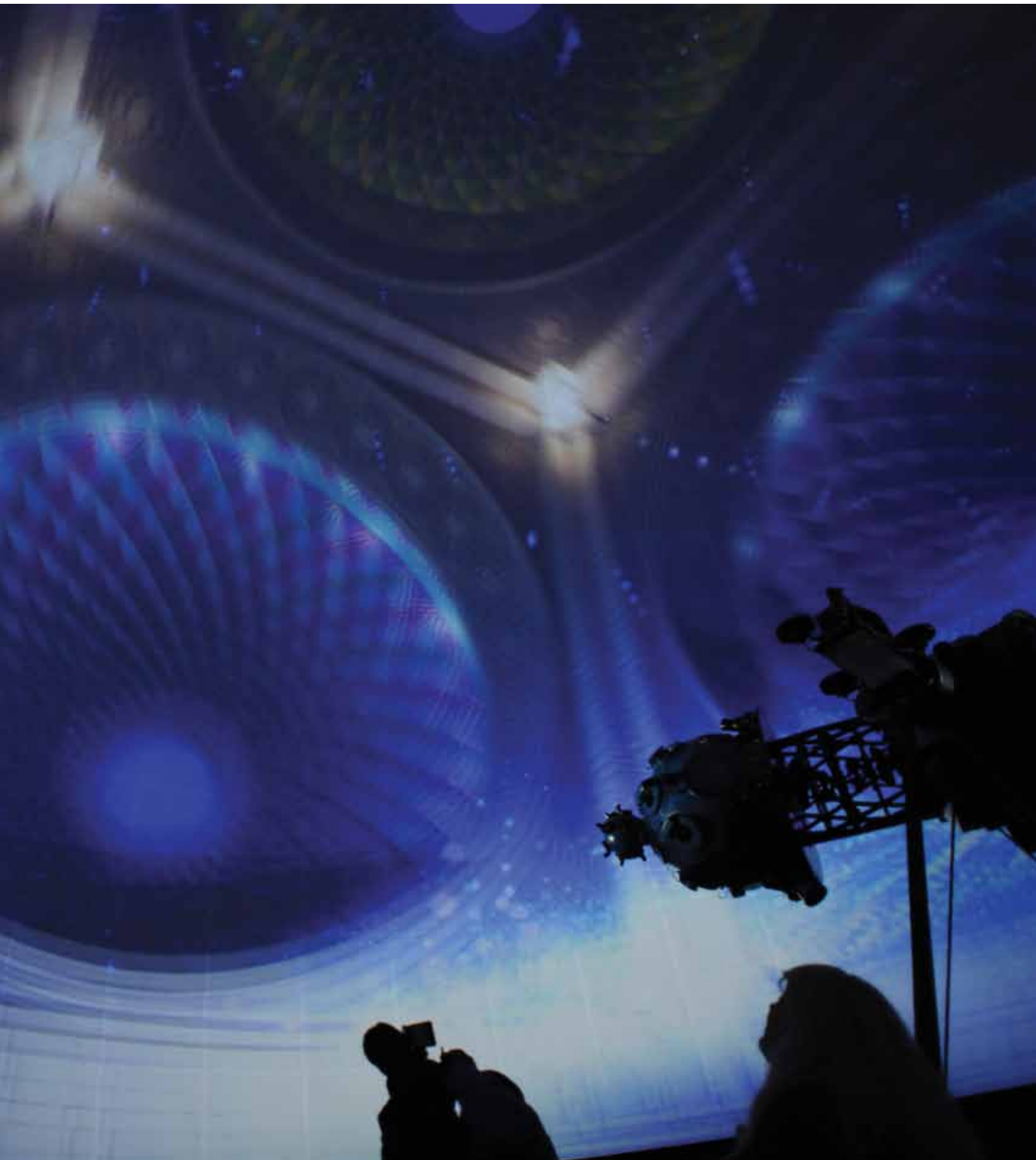
![CATALYZE]

Recommendation 5: Catalyze innovation at Carolina by facilitating the work of faculty, staff, and students as they put important ideas to use for a better world.

GOAL 5.1 Leverage the talents of leaders across campus to prepare, collaborate, translate, and align resources and processes to strengthen an intentional culture of innovation at Carolina.

In the future, faculty, staff, and students will lead a wide variety of integrated initiatives focused on translating promising ideas into innovative practices. Program leaders will meet regularly to leverage resources, assess the overall culture of innovation, and take the next steps to fulfill Carolina's innovation mission. This cooperative network approach will encourage widespread experimentation, autonomy, and integration.

Action 5.1.1 Create management groups of program leaders and their supporters from across campus to provide integrated leadership and support for the innovation goals.
Create the following connector groups:
- Innovation Leaders (working title), made up of faculty, staff, and student program leaders, to meet regularly and promote collaboration, reduce redundancies, inform each other, share resources, contribute their knowledge, and benefit from each other's experiences.
- Innovation Champions (working title), made up of leaders who support the work of Innovation Leaders such as deans, to meet at least three times a year and be co-chaired by the chancellor and provost to ensure that the innovation goals remain priorities and that resources are allocated to support the work.
- The Chancellor's Student Innovation Team will continue to play an important role in advancing innovation and be included as a vital member of the Innovation Leaders group.

GOAL 5.2 Create the Chancellor's Catalyze Group to facilitate the implementation of this Roadmap.

In the future, the goals described in this Roadmap will receive the targeted attention needed over time to realize the vision. The Chancellor's Catalyze Group will continuously encourage the integration, collaboration, and alignment of resources and processes. The campus will have a virtual entry point for anyone interested in learning more about innovation activities and how their plans might fit in. Further, it will have central data services, evaluation and reporting assistance, and access to resources. The collective story of innovation at Carolina and its profound impact on society will be widely disseminated.

**Action 5.2.1 Leverage history by building on the University's strong track record of innovation.**
Build on the successes and example of the Carolina Entrepreneurial Initiative (CEI). For five years, the CEI exemplified a successful cross-campus entrepreneurship initiative. Learn from those involved. Also work with senior leaders, with external partners such as the Innovation Circle, with the Innovation Leaders and Innovation Champions, student teams, and others to advance the innovation goals.

Action 5.2.2 Coordinate and support campuswide efforts to fully realize the vision and goals laid out in this Roadmap.
- Help raise funds to support innovation at Carolina.
- Manage the single-source gateway to innovation to ensure faculty, students, and staff are aware of available resources and opportunities for innovation. (See Recommendation 1: Prepare)

Current Status

The University lacks a management structure to facilitate the implementation of this Roadmap. This role was formerly part of the Carolina Entrepreneurial Initiative.
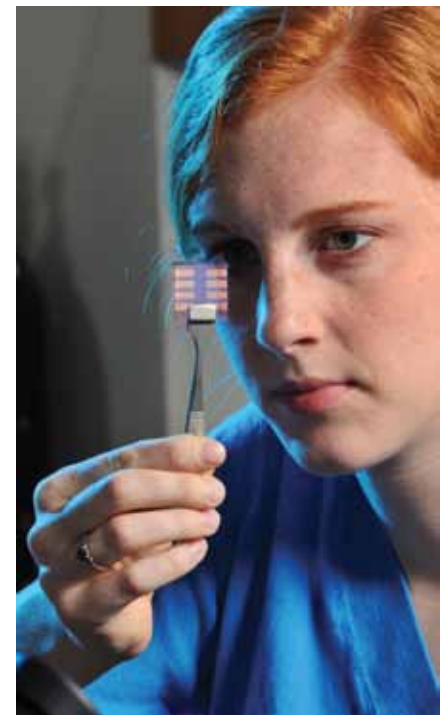
- Track and report results by creating metrics, by automating data collection, standard reports, and capturing best practices and benchmarks.
- Help Innovation Leaders establish rigorous evaluation methods to document and gauge impact.
- Establish a coordinated monitoring system to capture best practices and benchmarks.
- Communicate the stories of innovation at Carolina inside and outside the University to ensure that Carolina is recognized as a leader in converting its ideas to practical benefit.
- Facilitate the reduction of roadblocks to innovation across campus.
- Identify and engage innovation ambassadors from faculty, students, staff, and those external to the campus in the ongoing effort to strengthen the culture of innovation at Carolina.

Targeted investments needed to catalyze innovation at Carolina by facilitating the work of faculty, staff, and students as they put important ideas to use for a better world.

- **Leverage the talents of leaders across campus.**
  $50,000 (expendable) total at $10,000 per year to create and convene three management groups for program: Innovation Leaders, Innovation Champions, and the Chancellor's Student Innovation Team.
- **Create infrastructure to coordinate and support campuswide efforts to fully realize the vision and goals laid out in this Roadmap.**
  $500,000 (expendable) at $100,000 per year for five years for evaluator to create metrics, provide automated data collection and reporting on campus innovation, and conduct annual evaluations.
  $2.75 million (expendable) at $750,000 per year for five years of operations for the catalyze office to help establish rigorous evaluation methods to document and gauge impact of programs, communicate stories of innovation, facilitate reduction of roadblocks to innovation, and to engage innovation groups both within and outside the University.

Total Investment Needed: $3.3 million (expendable for a Five-Year Period)

Photo by Chris Carmichael

Section III Appendices

Financial Summary

Innovation Circle Members

Faculty Working Group Steering Committee

Chancellor's Student Innovation Team Members

Innovation Charter

Financial Summary

	ENDOWMENT	5-YR EXPENDABLE	SUB-TOTAL	SUB-TOTAL
Recommendation 1: Prepare				
Goal 1.1: Ensure Understanding				
1.1.1 Communication Strategy		$1,000,000	$1,000,000	
1.1.2 Gateway to Innovation Resources		$400,000	$400,000	
Goal 1.2: Build Capacity			$0	
1.2.1 Minor and Other CEI programs	$25,000,000		$25,000,000	
1.2.2 Carolina Global Innovation Network		see 1.2.1	$0	
1.2.3 Student Innovation Hub		$10,000,000	$10,000,000	
1.2.4 Innovation/Entrepreneurship Research		$5,750,000	$5,750,000	
	ENDOWMENT	EXPENDABLE	Prepare SUB-TOTAL	
Prepare Subtotal	$25,000,000	$17,150,000		$42,150,000

	ENDOWMENT	5-YR EXPENDABLE	SUB-TOTAL	SUB-TOTAL
Recommendation 2: Collaborate				
Goal 2.1: Interdisciplinary Collaboration				
2.1.1 Applied Sciences Faculty	$15,000,000		$15,000,000	
2.1.2 Humanistic and Cultural Barriers			$0	
2.1.3 Remove Barriers			$0	
2.1.4 Track Collaboration			$0	
Goal 2.2: Key Themes			$0	
2.2.1 Key Themes Project		$6,000,000	$6,000,000	
Goal 2.3: Industry Relations			$0	
2.3.1 Study Industry Relations Issues			$0	
Goal 2.4: Regional Collaborations			$0	
2.4.1 RTP Million Dollar Challenge			$0	
2.4.2 Attract the Capital			$0	
2.4.3 Map the RTP Entrepreneurial Ecosystem		$200,000	$200,000	
2.4.4 Leverage Existing Labs, Spaces			$0	
2.4.5 Triangle Collaboration Fund	$1,000,000		$1,000,000	
Goal 2.5: Strengthen Global Collaborations				
2.5.1 Global Collaboration Fund	$1,000,000		$1,000,000	
	ENDOWMENT	EXPENDABLE	Collaborate SUB-TOTAL	
Collaborate Subtotal	$17,000,000	$6,200,000		$23,200,000

	ENDOWMENT	5-YR EXPENDABLE	SUB-TOTAL	SUB-TOTAL
Recommendation 3: Translate				
Goal 3.1: Social Entrepreneurship			$0	
3.1.1 Social Entrepreneurship		$1,250,000	$1,250,000	
Goal 3.2: Commercialization			$0	
3.2.1 Commercialization			$0	
Planning		$25,000	$25,000	
EIRs- Faculty, Resident, Executive	$10,000,000	$5,000,000	$15,000,000	
KickStart Expansion		$3,300,000	$3,300,000	
Goal 3.3: Measurement			$0	
3.3.1 Measure Ongoing Impact			$400,000	
	ENDOWMENT	EXPENDABLE	*Translate*	SUB-TOTAL
Translate Subtotal	$10,000,000	$9,975,000		$19,975,000

	ENDOWMENT	5-YR EXPENDABLE	SUB-TOTAL	SUB-TOTAL
Recommendation 4: Align				
Goal 4.1: Leadership Support			$0	
4.1.1 Leadership Alignment			$0	
Goal 4.2: Recruit, Retain			$0	
4.2.1 Innovation Scholars	$5,000,000		$5,000,000	
4.2.2 Reward Innovation Activities			$0	
Innovation Professorship	$6,000,000	$175,000	$6,175,000	
Student Innovation Prize	$200,000		$200,000	
Goal 4.3: Align			$0	
4.3.1 Align Innovation Goals w/ Other Strategies			$0	
Goal 4.4: Fund the Roadmap			$0	
4.4.1 Establish Carolina Innovation Fund	$25,000,000		$25,000,000	
	ENDOWMENT	EXPENDABLE	*Align*	SUB-TOTAL
Align Subtotal	$36,200,000	$175,000		$36,375,000

	ENDOWMENT	EXPENDABLE	SUB-TOTAL	SUB-TOTAL
Recommendation 5: Catalyze				
Goal 5.1: Leverage Campus Leaders			$0	
5.1.1 Innovation Management Groups		$50,000	$50,000	
Goal 5.2: Catalyze Group			$0	
5.2.1 Leverage History			$0	
5.2.2 Coordinate and Support Campuswide Roadmap			$0	
Track and Measure Results		$500,000	$500,000	
Operations		$2,750,000	$2,750,000	
	ENDOWMENT	EXPENDABLE	*Catalyze*	SUB-TOTAL
Catalyze Subtotal	$0	$3,300,000		$3,300,000

Grand Total	ENDOWMENT	5-YR EXPENDABLE	TOTAL
	$88,200,000	$36,800,000	$125,000,000

Innovation Circle Members

LOWRY CAUDILL
Chair, Innovation Circle
Co-founder, Magellan Laboratories, Inc. (*Retired*)
Durham, North Carolina

RYE BARCOTT
Founder, Carolina For Kibera
Charlotte, North Carolina

HARRIS BARTON
Managing Director, Capital Dynamics
Palo Alto, California

VAUGHN BRYSON
President, CEO, Eli Lilly & Co. (*Retired*)
President, Clinical Products, Ltd.
Vero Beach, Florida

BEN CAMERON
Program Director for the Arts
Doris Duke Charitable Foundation
New York, New York

TOM CHEWNING
Executive Vice President and CFO, Dominion (*Retired*)
Richmond, Virginia

ALFRED CHILDERS
Co-founder of Magellan Laboratories, Inc. (*Retired*)
Cary, North Carolina

PHILLIP L. CLAY
Chancellor, Massachusetts Institute of Technology
Cambridge, Massachusetts

STACIE COCKRELL
Author, Speaker
Austin, Texas

JOHN DENNISTON
Partner, Kleiner, Perkins, Caufield & Byers
Menlo Park, California

ALSTON GARDNER
Managing Director, Fulcrum Ventures LLC
New York, New York

DENNIS GILLINGS
Chairman, CEO, Quintiles Transnational Corporation
Durham, North Carolina

JULIA SPRUNT GRUMBLES
Vice President, Turner Broadcasting (Retired)
Chapel Hill, North Carolina

REG HARDY
Co-founder and President, Concordia Pharmaceuticals
Fort Lauderdale, Florida

DON HOLZWORTH
Chair, Futures Group, International
Durham, North Carolina

BARBARA ROSSER HYDE
Hyde Family Foundations
Memphis, Tennessee

STUART JANNEY
Chair, Bessemer Securities LLC
Butler, Maryland

KIMBERLY JENKINS
Member, Board of Trustees, Duke University
Adjunct Professor Duke and UNC in Entrepreneurship
Microsoft Senior Executive (*Retired*)
Chapel Hill, North Carolina

BRENT JONES
Managing Director, Northgate Capital
Danville, California

THOMAS P. KENNEDY
Professor of Medicine
Medical College of Georgia
Augusta, Georgia

JASON KILAR
CEO, Hulu LLC
Los Angeles, California

RICHARD KRASNO
Executive Director, William R. Kenan, Jr.
Charitable Trust
Trustee, Kenan Institute of Private Enterprise
Chapel Hill, North Carolina

MYLA LAI-GOLDMAN
CEO, CancerGuide Diagnostics, Inc.
Chapel Hill, North Carolina

RUBY LERNER
President and Executive Director, Creative Capital Foundation
New York, New York

DOUG MACKENZIE
Founder, Partner, Radar;
Affiliated Partner at Kleiner, Perkins, Caufield & Byers
Palo Alto, California

FRED McCOY
Vice Chairman, Synecor LLC
Chairman, TransEnterix, Inc.
Executive Chairman, InnerPulse, Inc.
Chapel Hill, North Carolina

STEVE NELSON
Managing Partner, Wakefield Group
Chapel Hill, North Carolina

TODD POPE
President, CEO, TransEnterix, Inc.
Chapel Hill, North Carolina

JOHN POWELL
Co-founder, Managing Director, Integral Capital Partners
Menlo Park, California

JONATHAN RECKFORD
CEO, Habitat for Humanity
Atlanta, Georgia

THOMAS RIZK
Chairman, CEO, TractManager
Saddle Brook, New Jersey

CHRISTY SHAFFER
CEO, Inspire Pharmaceuticals (*Retired*)
Chapel Hill, North Carolina

SALLIE SHUPING-RUSSELL
Managing Director, BlackRock Alternative Advisors
Chapel Hill, North Carolina

RICHARD STACK
Director, Founder, President, Synecor LLC
Chapel Hill, North Carolina

BILL STARLING
CEO, Synecor, LLC
Managing Director, Science Life Partners
Portola Valley, California

MATTHEW SZULIK
CEO, Red Hat (*Retired*)
Raleigh, North Carolina

TOM UHLMAN
Founder, Managing Partner, New Venture Partners, LLC
Madison, New Jersey

ED VICK
CEO
Chairman, Young and Rubicam (Retired)
Old Greenwich, Connecticut

KAY WAGONER
Co-founder, President, CEO, Director Icagen, Inc.
Chapel Hill, North Carolina

DEBBIE WRIGHT
Chief Counsel Global IP – Open Innovation and Supply Chain,
 Kraft Foods
Chicago, Illinois

Including
JUDITH CONE
Special Assistant to Chancellor for Innovation & Entrepreneurship,
UNC-Chapel Hill
Chapel Hill, North Carolina

MARK MEARES
Director, Corporate & Foundation Relations,
UNC-Chapel Hill
Chapel Hill, North Carolina

Faculty Working Group Steering Committee

JOHN AKIN
Chair, Innovation Faculty Working Group
Carr Distinguished Professor and Chair, Department of Economics

MCKAY COBLE
UNC-Chapel Hill Faculty Chair
Chair, Department of Dramatic Art

JOSEPH DESIMONE
Chancellor's Eminent Professor of Chemistry
William R. Kenan, Jr. Distinguished Professor of Chemical Engineering
Director, Institute for Advanced Materials
Co-Director, Center for Cancer Nanotechnology Excellence

GEOFF SAYRE-MCCORD
Morehead Alumni Distinguished Professor
Chair, Department of Philosophy

ARVIND MALHOTRA
Thomas V. and Janet R. Lewis Scholar, Kenan-Flagler Business School
Associate Professor of Strategy and Entrepreneurship

RICHARD BOUCHER
William Rand Kenan Professor of Medicine
Director, Cystic Fibrosis/Pulmonary Research and Treatment Center
Co-Director, UNC-CH Gene Therapy Center
Director, Carolina KickStart

STEPHEN FRYE
Research Professor, Eshelman School of Pharmacy
Director, Center for Integrative Chemical Biology and Drug Discovery

Chancellor's Student Innovation Team Members

SHRUTI SHAH, CHAIR OF CSIT
ARTI AJMANI
DAVID BARON
MARJORIE BETUBIZA
WILLIAM BOBBITT
WILLIAM BONDURANT
REBECCA BRAMLETT,
  GRADUATE ADVISER TO CSIT
MARY COOPER
LEAH DOWNEY
JASON DUNN

LUKE ELDRIDGE
CONOR FARESE
JOSHUA FORD
NICOLE FRANCESCHINI
COREY HARRIS
SAM HURLEY
IAN LEE
ANDREW LU
HOGAN MEDLIN, STUDENT BODY PRESIDENT
MICHAEL MIAN
KELSEY MILLER

SARAH RIAZATI
ADELE RICCIARDI
CHARLIE SELLEW
PAUL SHORKEY
BENJAMIN SINES
KYLIE SPANGLER
WILLIAM TAYLOR
MACKENZIE THOMAS
JOSHUA THOMPSON
HUDSON VINCENT
MARGARET ZELLNER

Innovation Charter

At his selection in 2008 as chancellor of the University of North Carolina at Chapel Hill, Holden Thorp called on all Carolina students, faculty, staff and alumni to take on an audacious mission:

> *We have so much work ahead of us. Our to-do list is nothing less than the greatest problems of our time: cure diseases, and get those cures to all the people who need them. Find and invent clean energy. Inspire students in our public schools. Feed seven billion people. Describe the world, and replace conflict with understanding.*

In an increasingly inter-connected world faced with a daunting array of divergent and complex problems, the Academy is being called upon not only to educate our future leaders but also to provide answers and solutions. To do so, Carolina must find new ways to create value in its teaching, research and service through innovation and entrepreneurship. Our students must be encouraged to be innovators, problem solvers and creators of new knowledge. Our faculty and researchers must be recognized and rewarded for teamwork across traditional academic silos and for their commitment to turning ideas into enterprise. As one of the world's great public universities, Carolina must lead by creating a campuswide culture of innovation and entrepreneurship focused on real solutions for the great problems of our time.

Building a Vision and Framework for Systematic Innovation and Entrepreneurship

With its celebrated history of leadership and discovery and under the direction of Chancellor Thorp, himself an academic entrepreneur, the University is well positioned to take on this challenge. Launched in 2004, the *Carolina Entrepreneurial Initiative* has encouraged and supported programs across campus to teach and support enterprise creation and innovation. The new entrepreneurship minor and graduate certificate programs have tracks in commercial, social, artistic and scientific entrepreneurship. In the arts, new "creative campus" programs have coalesced performances, special seminars, and faculty music and art commissions around major societal questions such as the death penalty, race and gender. As a result, students and faculty have not only moved toward better understanding but also toward solutions. This summer, the Chancellor launched his Entrepreneurial Boot Camp, a four-day workshop that immersed sixteen dynamic faculty in the entrepreneurial experience. In 2010, the University will begin to award annual Carolina Innovation Scholarships to four entering freshmen to better prepare them to invent solutions and create value, no matter the field they choose.

But for Carolina to institutionalize its commitment to tackling the world's greatest challenges through innovation and entrepreneurship, it must develop a comprehensive roadmap. To do that, Chancellor Thorp is forming an advisory council of respected alumni and friends — the Chancellor's Innovation Circle — to be chaired by Distinguished Alumnus, Lowry Caudill (1979) and led by Judith Cone, the Chancellor's recently appointed special assistant for innovation and entrepreneurship. Judith comes to the University from the Ewing Marion Kauffman Foundation where she served most recently as Vice President for Emerging Strategies and the lead executive behind its very successful Kauffman Campuses Initiative, which helped start the Carolina Entrepreneurial Initiative. Judith and the Innovation Circle will address several key questions:

- What does it mean to be a university committed to innovation and entrepreneurship?
- What are Carolina's strengths to be maximized and the obstacles to overcome?
- How should Carolina proceed to incorporate innovation and entrepreneurship into its teaching, research and service missions?

The **C. Felix Harvey Award** is given to the UNC faculty member or members whose proposed outreach project best reflects applied innovation of scholarly expertise in the humanities and social sciences. It seeks to support faculty who want to move their research findings from the campus to directly serve communities, especially in North Carolina. The first Harvey Award winner, American Studies Professor Bobby Allen, takes an innovative mapping technology and education program to libraries, schools and other organizations around the state to graphically illustrate the history of growth and changes in their communities. This year's winner, **Professor Joelle Powers** in the School of Social Work, is using her proven intervention program to increase the capacity of teachers to recognize and meet the needs of students with mental health problems in Durham Public Schools. The award is named for C. Felix Harvey '43, chairman of Harvey Enterprises & Affiliates and founder of the Little Bank Inc., both in Kinston, N.C.

innovate.unc.edu

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

INNOVATE @ CAROLINA

IMPORTANT IDEAS FOR A BETTER WORLD
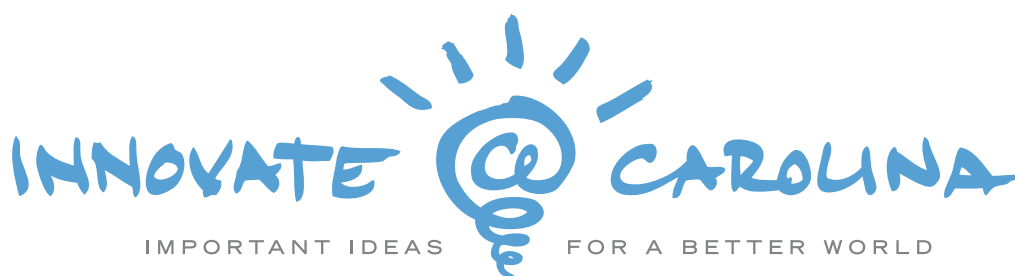
Progress Report

Year Two of Five-Year Plan
Strategic Roadmap to Accelerate Innovation at the University of North Carolina at Chapel Hill

October 2010 – October 2012

Judith Cone
Chancellor's Office of Innovation & Entrepreneurship

Strengthen An Intentional Culture Of Innovation At Carolina

PREPARE

COLLAB-ORATE

TRANSLATE

ALIGN

CATALYZE

Important ideas for a better world
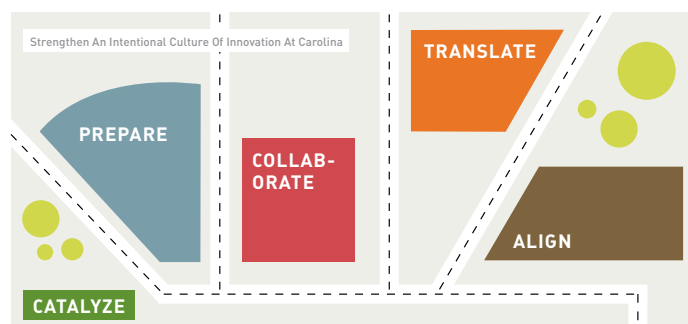
THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

The Chancellor's Innovation Circle

The *Strategic Roadmap to Accelerate Innovation* was developed by three groups who share a passion for Carolina's future:
The Chancellor's Innovation Circle, the Faculty Steering Committee, and the Chancellor's Student Innovation Team.

LOWRY CAUDILL
Chair, Innovation Circle
Co-founder, Magellan
Laboratories, Inc. (*Retired*)
Durham, North Carolina

RYE BARCOTT
Founder, Carolina For Kibera
Charlotte, North Carolina

HARRIS BARTON
Managing Director, Capital
Dynamics
Palo Alto, California

VAUGHN BRYSON
President, CEO, Eli Lilly & Co.
(*Retired*)
President, Clinical Products, Ltd.
Vero Beach, Florida

BEN CAMERON
Program Director for the Arts
Doris Duke Charitable
Foundation
New York, New York

TOM CHEWNING
Executive Vice President and
CFO, Dominion (*Retired*)
Richmond, Virginia

ALFRED CHILDERS
Co-founder of Magellan
Laboratories, Inc. (*Retired*)
Cary, North Carolina

PHILLIP L. CLAY
Chancellor, Massachusetts
Institute of Technology
Cambridge, Massachusetts

STACIE COCKRELL
Author, Speaker
Austin, Texas

JOHN DENNISTON
Partner, Kleiner, Perkins,
Caufield & Byers
Menlo Park, California

ALSTON GARDNER
Managing Director,
Fulcrum Ventures LLC
New York, New York

DENNIS GILLINGS
Chairman, CEO, Quintiles
Transnational Corporation
Durham, North Carolina

JULIA SPRUNT GRUMBLES
Vice President, Turner
Broadcasting (Retired)
Chapel Hill, North Carolina

REG HARDY
Co-founder and President,
Concordia Pharmaceuticals
Fort Lauderdale, Florida

DON HOLZWORTH
Chair, Futures Group,
International
Durham, North Carolina

BARBARA ROSSER HYDE
Hyde Family Foundations
Memphis, Tennessee

STUART JANNEY
Chair, Bessemer Securities LLC
Butler, Maryland

KIMBERLY JENKINS
Microsoft Senior Executive
(*Retired*)
Chapel Hill, North Carolina

BRENT JONES
Managing Director,
Northgate Capital
Danville, California

THOMAS P. KENNEDY
Professor of Medicine
Medical College of Georgia
Augusta, Georgia

JASON KILAR
CEO, Hulu LLC
Los Angeles, California

RICHARD KRASNO
Executive Director, William R.
Kenan, Jr. Charitable Trust
Trustee, Kenan Institute of
Private Enterprise
Chapel Hill, North Carolina

MYLA LAI-GOLDMAN
CEO, CancerGuide
Diagnostics, Inc.
Chapel Hill, North Carolina

RUBY LERNER
President and Executive
Director, Creative Capital
Foundation
New York, New York

DOUG MACKENZIE
Founder, Partner, Radar;
Affiliated Partner at Kleiner,
Perkins, Caufield & Byers
Palo Alto, California

FRED McCOY
Vice Chairman, Synecor LLC
Chairman, TransEnterix, Inc.
Executive Chairman,
InnerPulse, Inc.
Chapel Hill, North Carolina

STEVE NELSON
Managing Partner, Wakefield
Group
Chapel Hill, North Carolina

TODD POPE
President, CEO, TransEnterix,
Inc.
Chapel Hill, North Carolina

JOHN POWELL
Co-founder, Managing Director,
Integral Capital Partners
Menlo Park, California

JONATHAN RECKFORD
CEO, Habitat for Humanity
Atlanta, Georgia

THOMAS RIZK
Chairman, CEO, TractManager
Saddle Brook, New Jersey

CHRISTY SHAFFER
CEO, Inspire Pharmaceuticals
(*Retired*)
Chapel Hill, North Carolina

SALLIE SHUPING-RUSSELL
Managing Director, BlackRock
Alternative Advisors
Chapel Hill, North Carolina

RICHARD STACK
Director, Founder, President,
Synecor LLC
Chapel Hill, North Carolina

BILL STARLING
CEO, Synecor, LLC
Managing Director, Science
Life Partners
Portola Valley, California

MATTHEW SZULIK
CEO, Red Hat (*Retired*)
Raleigh, North Carolina

TOM UHLMAN
Founder, Managing Partner,
New Venture Partners, LLC
Madison, New Jersey

ED VICK
CEO
Chairman, Young and Rubicam
(Retired)
Old Greenwich, Connecticut

KAY WAGONER
Co-founder, Former President,
CEO, Director Icagen, Inc.
Chapel Hill, North Carolina

DEBBIE WRIGHT
Chief Counsel Global IP – Open
Innovation and Supply Chain,
Kraft Foods
Chicago, Illinois

Including
JUDITH CONE
Special Assistant to
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Chapel Hill, North Carolina

MARK MEARES
Director, Corporate &
Foundation Relations,
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Chapel Hill, North Carolina

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Commitment

Holden Thorp, Chancellor

From the Chancellor

Transform the University. Transform the World.

Dear Colleagues:

Three years ago we set out to create an environment at Carolina to encourage more innovation and to help see that the products of these activities would have greater impact on our community, the nation and the world. Much remains to be done to keep this process going, but I hope that you will see in this Progress Report just how we far we have come.

Thanks to all of you and to numerous Carolina faculty, staff, students, alumni and friends for your dedication. We have talked and shared ideas, started new partnerships, and launched classes, projects, performances, startups and spinoffs. It is very gratifying to see how the Carolina community has embraced new opportunities to follow their imaginations and make their ideas real, addressing pressing issues and having a huge impact on the world along the way. Buck Goldstein and I are working on the paperback edition of *Engines of Innovation*, and we taught Introduction to Entrepreneurship to 320 students this fall. UNC has recruited top innovators in their fields, our faculty continue to gain international recognition for their work, and our research rankings are climbing. These are groundbreaking events that would not be possible without your involvement and help.

I want to thank Lowry Caudill for his leadership in both chairing the Innovation Circle and in remaining a constant advocate for and participant in our work over the past two years. Additionally, my gratitude to Judith Cone, who has tirelessly championed this effort and been instrumental in moving projects forward, raising funds, generating new partnerships in the state and across the country, and connecting thousands of staff, students, faculty and others across campus to innovation and entrepreneurship resources. She has brought an entrepreneurial spirit and experienced, steady hand to guiding this effort.

There is no endpoint for where all of this will go. We have made great beginnings, but we still want to do even more. I often tell audiences that the very idea of a public university was dreamed up right here in North Carolina in 1789, the same year George Washington was inaugurated. Our founders had no idea how their innovation would turn out. Thanks to them, we have the chance to take new ideas in even more directions and continue our mission of education and service. And thanks to you, Carolina will always be an Engine of Innovation.

Thank you.

Holden Thorp, Chancellor

UNC social enterprise Nourish International addressing issues of global poverty.

Student in research lab at the University of North Carolina at Chapel Hill.

The Carolina Community Response

The Chancellor's Innovation Circle chaired by Lowry Caudill, the Faculty Steering Committee chaired by John Akin, and the Chancellor's Student Innovation Team led by Shruti Shah worked tirelessly to create the *Strategic Roadmap to Accelerate Innovation at the University of North Carolina at Chapel Hill*. Together they shaped an innovation agenda that is helping distinguish Carolina among its peers for the vision and strategic thinking it represents. Many have joined the effort to move the work forward since the publication of the Innovation Roadmap in October 2010. Among an impressive group of current students, Hudson Vincent and Mackenzie Thomas have shown extraordinary leadership in advancing innovation and entrepreneurship through their efforts with the Chancellor's Student Innovation Team, Carolina Creates, TedxUNC and the Campus Y. Across campus, there are many others who work diligently on behalf of Carolina innovators. A special acknowledgement goes to Mark Meares and Charla Edmonstone-Pickens of the Corporate and Foundation Relations office and to Charlotte Garza for providing leadership and operational support. Michelle Bolas served as host to many international groups and other campus visitors and most importantly, told the stories of Carolina innovators.

For the deans, administrators, and out other campus colleagues who have a passion for innovation and entrepreneurship in all its forms, for the donors who make this work possible, for the volunteers who give so much of their time and talent; your enthusiasm and dedication is having a significant impact on the Carolina community, people around the world, on the environment, and the economy.

It is hard to imagine a person more committed to strengthening an intentional culture of innovation and entrepreneurship than Chancellor Holden Thorp. His actions speak loudly.

Together, you are putting important ideas to use for a better world.

Judith Cone, Special Assistant to the Chancellor for Innovation & Entrepreneurship

Judith Cone, Special Assistant to the Chancellor for Innovation and Entrepreneurship

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The University of North Carolina at Chapel Hill

From W. Lowry Caudill
To the Members of the Innovation Circle,

Chancellor Holden Thorp asked us in 2009 to develop an Innovation Roadmap for the University. Our charge was to create a strategic framework that would position UNC to produce more innovations faster and, in doing so, have a greater impact on our community, nation, and world. It was an audacious goal then, and it remains a significant challenge today.

We have made tremendous progress since the release of the Roadmap in October 2010. As a member of the Board of Trustees, an adjunct professor, an innovator and entrepreneur and a parent, I see the strengths that our faculty, students, staff, and committed alumni and friends bring to the table. Collectively, we share the drive to dramatically increase the positive impact that Carolina has on the world. Individually, we all have a role to play.

This report reveals the work from many: individual innovators from all areas of the campus, partnerships that have formed in both likely and unlikely places, projects that have launched, and startups and spinoffs that have come out of UNC. It is impossible to ignore the culture of innovation and entrepreneurship that has taken root and is blossoming at Carolina. UNC is steadily building its reputation as a place where innovators thrive.

We need your help, now more than ever to become the best public university in the world for innovation and entrepreneurship. Your combined experience and wisdom propelled us to where we are today. As you read through this progress report, keep in mind that the amazing work that has been done still represents a fraction of what it will take to realize our goals. We must continue to support this work in all of its forms by securing the necessary human and financial resources. We have to keep telling our story. It is an honor to continue working with you on this important effort. Thank you for your service.

W. Lowry Caudill, PhD, Chair, Chancellor's Innovation Circle

Lowry Caudill, Chair, Chancellors Innovation Circle

Leadership

When Holden Thorp was selected in 2008 as the University of North Carolina at Chapel Hill's tenth chancellor, he brought to the role a burning passion for entrepreneurship and its power to change lives. He believed that Carolina could do even more to help solve the most pressing problems of our time. As an academic entrepreneur and noted scientist, he had chaired a powerhouse chemistry department and developed technology for electronic DNA chips. He had started a company and raised significant venture capital, but despite all the hard work, the company eventually failed. Learning from that experience, he started another venture that continues to thrive and demonstrates great promise. Surrounded by music and theater (he is an accomplished musician; his mother ran a theater; his wife has a masters in theater management from Yale University), he is just as passionate about the contributions to society of the arts and humanities as the sciences. In fact, he sees the blend as a great competitive advantage for Carolina. Understanding that our world is facing massive challenges that defy boundaries and require multidisciplinary approaches to solve, he believes Carolina can be an exemplar institution of higher education in translating knowledge into practical benefit. Chancellor Thorp thinks that the modern research university must be relevant and connected to communities – local, national and global. In his book, *Engines of Innovation: The Entrepreneurial University*, co-authored with University Entrepreneur-in-Residence Buck Goldstein, he lays out his theories and beliefs for higher education on this topic. His next step was to put these ideas into practice at his own institution. To demonstrate his ongoing commitment to the work, he established the Office of Innovation & Entrepreneurship in the Chancellor's Office and hired a fifteen-year veteran of the Kauffman Foundation to be the Special Assistant for Innovation & Entrepreneurship.

Without the active involvement of the deans and administrators, the accomplishments described in this report would not have been possible.

Planning

In December 2008, when Chancellor Thorp asked this prestigious committee of volunteer alumni, parents, and friends of the University to come together with faculty and students and worked to determine Carolina's future direction for innovation and entrepreneurship, he stated:

"Our to-do list is nothing less than the greatest problems of our time: cure diseases and get those cures to all the people who need them. Find and invent clean energy. Inspire students in our public schools. Feed seven billion people. Describe the world and replace conflict with understanding."

— Holden Thorp

During several months of study, the Innovation Circle, Faculty Steering Committee, and Chancellor's Student Innovation Team examined Carolina's relevant programs and processes, met with constituent groups both on campus and in the region, and visited leaders in innovation and entrepreneurship at Stanford University, Massachusetts Institute of Technology, University of Utah, and the University of Florida to learn how they generate outstanding results in translating knowledge. In New York City, Innovation Circle member Ben Cameron of the Doris Duke Charitable Foundation partnered with Ruby Lerner of Creative Capital and organized a meeting to discuss how to advance innovation in the arts. The Faculty Steering Committee interviewed their colleagues and the Chancellor's Student Innovation Team sought feedback from their peers across campus. The *Strategic Roadmap to Accelerate Innovation at the University of North Carolina at Chapel Hill* (Innovation Roadmap) is the result of their diligent work.

Purpose of this report

This document explains progress toward the recommendations and goals described in the Innovation Roadmap. It also reflects what was learned in the implementation process and outlines the work that remains. In order to assess the current status, having a baseline for comparison purposes is helpful. The December 2009 report, *Innovation and Entrepreneurship at the University of North Carolina at Chapel Hill: Background and Sample of Current Activities*, was created to provide such a reference. (www.innovate.unc.edu)

The Innovation Roadmap highlighted the global challenges that compel Carolina to look outward, discussed what is needed to help solve today's most pressing problems, examined the University's translational mechanisms, and described ways to prepare its faculty and students in the methods of innovation and entrepreneurship. It organized the goals around five major recommendations – Prepare, Collaborate, Translate, Align, and Catalyze. The recommendations, goals, and tactics took into account Carolina's status as a Tier I research university, its history, and its decentralized structure.

To realize the vision laid out in the Innovation Roadmap requires sustained leadership, resources, talent, and time. Carolina has all of these in its dedicated alumni, world-class faculty and staff, gifted students, and many influential friends. Together they can make Carolina the leading public university in innovation and entrepreneurship and consequently deliver immense practical value to society.

Strengthen An Intentional Culture Of Innovation At Carolina

PREPARE

COLLAB-ORATE

TRANSLATE

ALIGN

CATALYZE

Prepare faculty, graduate and undergraduate students, staff, and the broader Carolina community with the knowledge, skills, and connections necessary to translate new ideas into innovations.

Collaborate with diverse groups on campus and beyond to explore issues, options, and creative approaches that may lead to innovations.

Translate important new ideas into innovations that improve society more expediently and at an increased volume.

Align people, incentives, resources, and processes to strengthen an intentional culture of innovation at Carolina.

Catalyze innovation at Carolina by facilitating the work of faculty, staff, and students as they put important ideas to use for a better world.

Important ideas for a better world ▶

Strategy

The Need
The Response
The Methods

Grand challenges

In an increasingly interconnected world confronted by complex local and global issues, the Carolina community asked itself these questions: What are the greatest challenges facing our region, state, nation, and world? Who can help solve them? What will it take? More specifically: Who can find solutions so that hundreds of millions of people worldwide no longer have to risk their lives to access something as simple and precious as clean water? Who can reverse the growing achievement gap of our youth? Who can create viable clean energy alternatives to curb dependence on oil and protect the natural world? Who can help the North Carolina economy grow? Who will launch new enterprises to fuel job creation? Who will help America with its growing competitiveness challenges? Who will help us express and define our human and artistic visions? Who will mentor and develop the intelligent, creative, ethical leaders needed to safeguard our global future?

Response of research institutions to grand challenges

America's institutions of higher education have a unique and critical role to play in addressing the most pressing issues of our day. At a time of seemingly insurmountable problems, society turns to universities and asks them to assume greater responsibility for developing new ideas and ways to address important issues. In turn, universities look to their top talent – innovators, researchers, and program leaders – to produce solutions. American universities aggregate talent since outstanding faculty and students seek the most stimulating environments to conduct basic and applied research and prepare for their future lives.

In 2010, U.S. institutions of higher education enrolled 21 million students (11.5 million full-time and 6.6 million part-time undergraduate students; 2.9 million graduate students) and had 1.4 million faculty members. Expenditures of degree-granting postsecondary institutions were $461 billion. Total expenditures for kindergarten through postsecondary education were 7.9 percent of the gross domestic product in 2009–2010, about 0.9 percentage points higher than in 1999–2000. In the Triangle alone, the research expenditures of universities and RTI exceeded $2 billion in 2009. Taken together, this is an extraordinary set of assets.

Some of the greatest inventions of our time came out of universities:

- Polio vaccine, University of Pittsburgh
- The internet, U.S. Defense Advanced Research Projects Agency (DARPA) and MIT's Lincoln Lab
- First browser for the web, Mosaic, University of Illinois
- Google, Stanford University
- Recombinant DNA, Stanford University
- Meningitis vaccine, University of Rochester
- DNA replication for breakthrough in treating genetic diseases, Oliver Smithies, Nobel Prize in Physiology-Medicine, University of North Carolina at Chapel Hill
- Fred Brooks, early computer architecture and 3D interactive computer graphics, University of North Carolina at Chapel Hill

Carolina's assets

At the core of the University of North Carolina at Chapel Hill's traditions, and central to its future, is a commitment to innovation. The founding of Carolina in 1793 represented an early innovation in education. As the first public university in the nation, its emphasis on teaching, research, and service has helped to shape public higher education as we know it.

Carolina is both compelled and poised to accelerate and apply innovation and its accompanying entrepreneurial focus in a concerted and deliberate way to grapple with fundamental issues affecting the quality of human life and, in that context, to help solve the world's most pressing problems.

The University's strength comes from fostering creativity and discovery in the classroom, the lab, the studio, and on stage and from inspiring a campus-wide culture of inquiry through basic and applied research. Carolina's commitment to a rich liberal arts education and top professional programs equips our faculty and students to assess the current state of knowledge in a discipline, augment that knowledge through rigorous new research, and share the results of this new knowledge in ways that benefit the state, the nation, and the world. From this base of expertise and experimentation, breakthrough approaches are launched.

As the knowledge and capacity of UNC grows and the local, national, and global challenges mount; it is clear that the world needs Carolina now more than ever. With its considerable assets and advantages, it must move more quickly to put important ideas to use for a better world. The Innovation Roadmap outlines a way to build on UNC's legacy and assets to extend its impact even further.

"Our academic mission is to create new knowledge, discover innovative solutions to the world's greatest challenges, educate our outstanding undergraduate and graduate students and contribute meaningfully to the state, nation and world. Through scholarship and creative work, our extraordinary faculty shed light on the past, communicate new ideas and interpret the world. They also take on some of the biggest problems of our time: social and economic disparities, drug addiction, climate change, international conflict, life-threatening diseases and more."

— Karen Gil, Dean, College of Arts & Sciences

Carolina's response: Strengthen a culture of innovation and entrepreneurship

The strategy set forth in the Innovation Roadmap is not limited to building a strong entrepreneurship curriculum or nurturing more startups based on intellectual property. To be sure, these are important topics and are covered in the recommendations. The Roadmap describes a more comprehensive plan on how to strengthen an intentional culture of innovation. This topic and its potential outcomes are too important to be tied to a few programs or tactics. Innovation and entrepreneurship cannot be limited to a school, department, or unit on campus. It is only when the innovation process is embedded into the very fabric of the University that Carolina will reach its full potential as a disruptive force for good.

The Roadmap describes a path to accelerate the number and speed of innovations coming from the University of North Carolina at Chapel Hill. It explains how faculty, students, staff, and the greater Carolina community translate their ideas into innovations addressing a wide range of issues.

Common understanding – terms

Such words as *innovation* and *entrepreneurship* are ubiquitous and used in various ways. For the purpose of this work, they are defined as:

Innovation: The successful implementation of a novel, valuable idea. This definition emphasizes the equal importance of the three elements: Novel – Valuable – Implemented. In the context of our University, it is summarized as: Important ideas put to use for a better world.

Entrepreneurship: Creating an enterprise in order to deliver a product, service, or process targeted to a specific audience, without regard for the resources currently at hand.
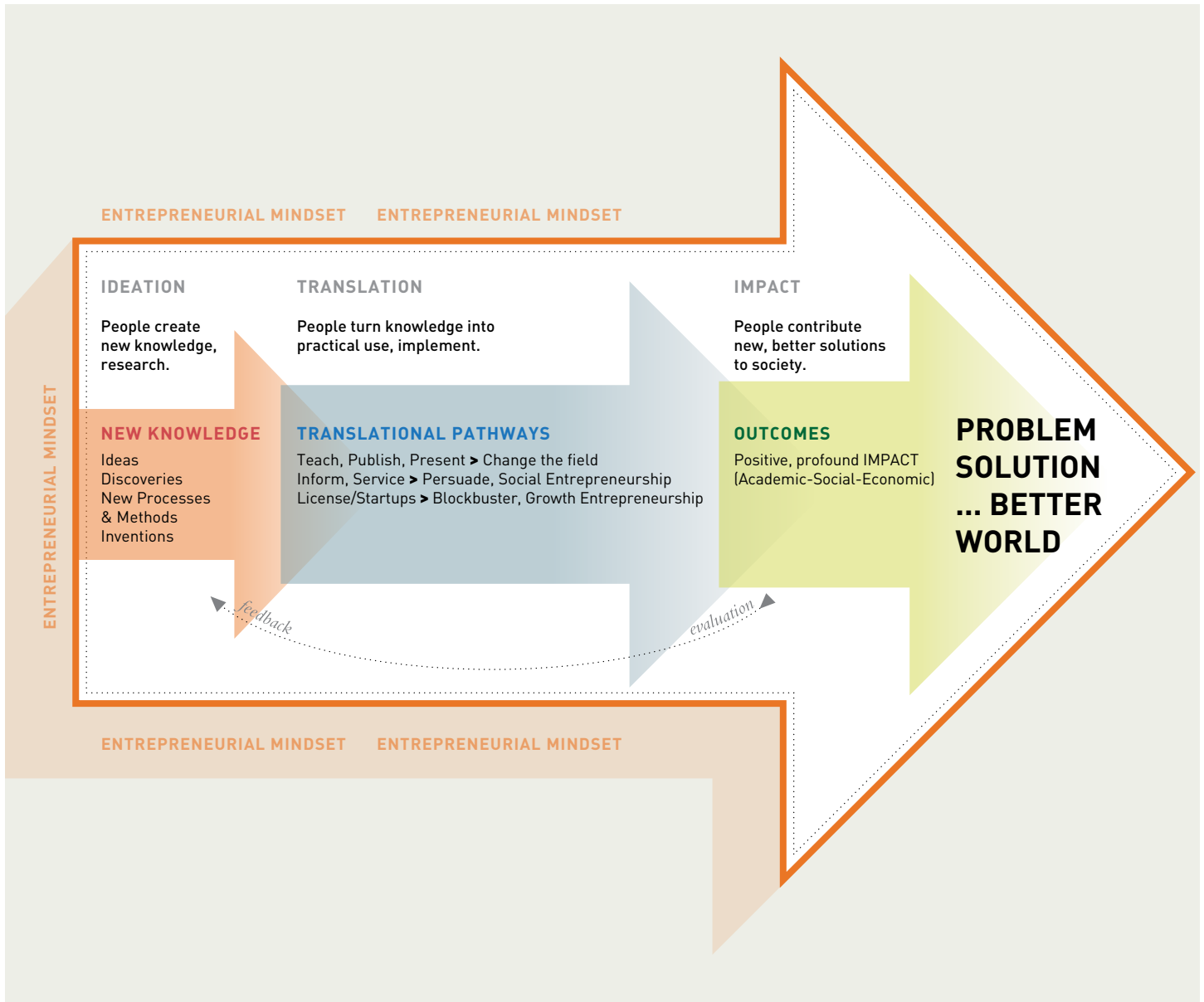
Entrepreneurial mindset: A specific way of thinking that questions the status quo, focuses on converting problems into opportunities by finding new and better actions, convinces others to support the new approach, allows one to persevere through the hurdles, and accepts ambiguity and risk as part of the disruption process.

Entrepreneurial skillset: The set of competencies necessary to successfully open and operate an enterprise. They include understanding customers, knowledge of industry and product, marketing and sales, operations, human resources, legal, technology, negotiations, building strategic alliances, and finance.

Innovation process: Moving from ideation through translation to impact. The process starts with an idea and is then translated in a way that results in the desired impact on the target condition or opportunity.

The innovation process

ENTREPRENEURIAL MINDSET   **ENTREPRENEURIAL MINDSET**

ENTREPRENEURIAL MINDSET

IDEATION

People create new knowledge, research.

TRANSLATION

People turn knowledge into practical use, implement.

IMPACT

People contribute new, better solutions to society.

NEW KNOWLEDGE

Ideas
Discoveries
New Processes
& Methods
Inventions

TRANSLATIONAL PATHWAYS

Teach, Publish, Present ❯ Change the field
Inform, Service ❯ Persuade, Social Entrepreneurship
License/Startups ❯ Blockbuster, Growth Entrepreneurship

OUTCOMES

Positive, profound IMPACT
(Academic-Social-Economic)

PROBLEM SOLUTION ... BETTER WORLD

feedback

evaluation

ENTREPRENEURIAL MINDSET   **ENTREPRENEURIAL MINDSET**

INNOVATE @ CAROLINA

Common understanding – vision and mission

Vision: With a special focus on the world's most pressing problems, innovators and innovations launched at Carolina consistently put important ideas to use for a better world.
Mission: Continually strengthen an intentional culture of innovation so that Carolina is the place where innovators thrive.

Intended Results:
- Ideas and discoveries are leveraged across the University and widely disseminated.
- Carolina classrooms, labs, and studios are incubators of discovery that yield innovations (unique, valuable, put to use) that serve the public good.
- Carolina attracts the most talented and innovative faculty and students in the world because of its dedication to discovery, experimentation, and innovation.
- Carolina is recognized globally as one of the most innovative and entrepreneurial universities in the world.
- The world is significantly improved because of Carolina innovations and its entrepreneurially minded faculty, students, and staff.

Common understanding – culture

Given that it is difficult to predict or orchestrate specific innovations, the Roadmap recommendations focus on providing a supportive climate for the Carolina community so its members can creatively explore responses to major issues. Such a conducive environment requires that leaders make this a priority and implement the structures, incentives, and resources to accelerate the innovation process. Strengthening an intentional culture of innovation requires clarity and alignment among three key elements:

Values: That which is worth doing.
Resources: Required people, time, money, facilities, and equipment.
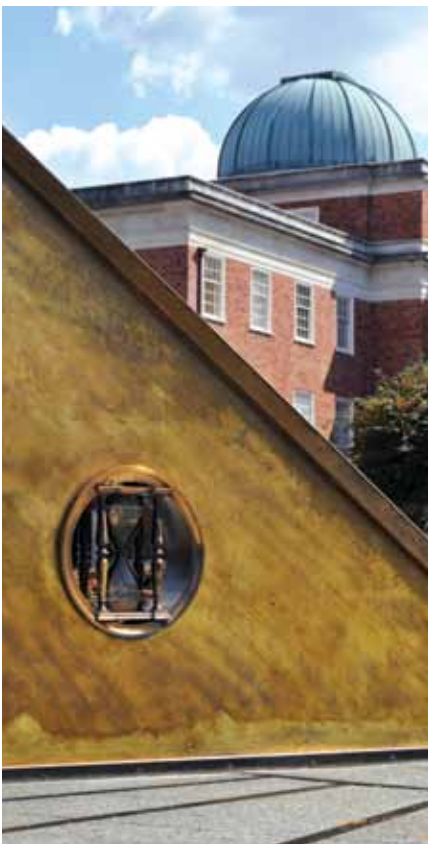**Processes:** Needed structures, rules, and methods.
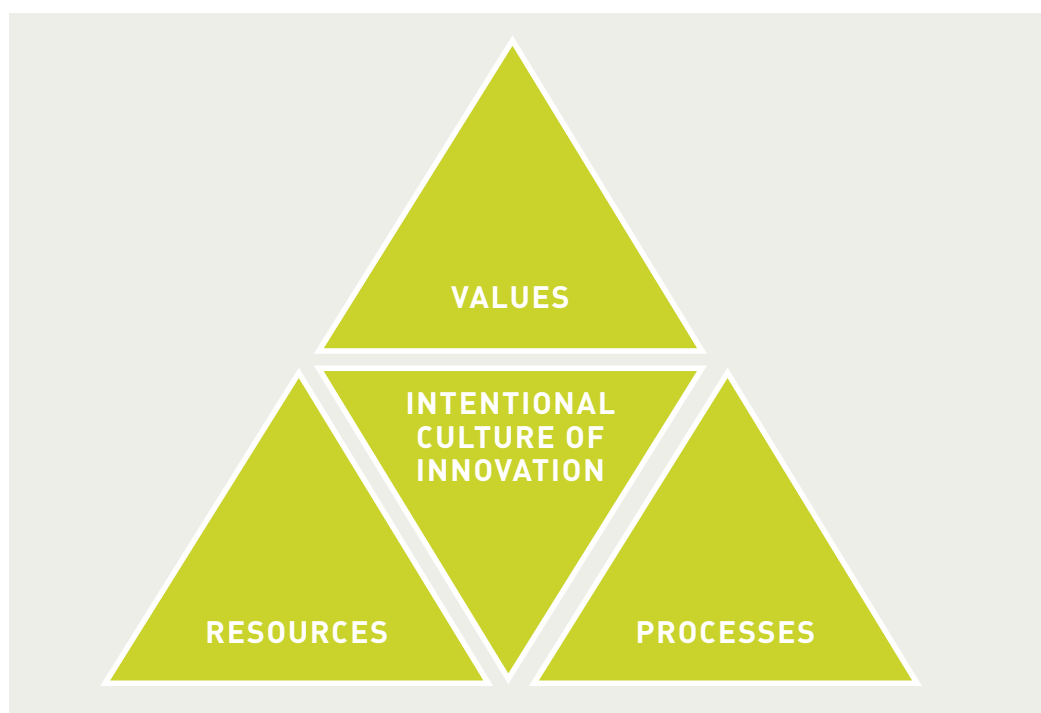
> *A vision without the right resources is just a hallucination*

> *A vision without the right processes is demoralizing*

Carolina's values, resources, and processes must be mutually supportive to create and foster a campus culture of innovation. If we are committed to a goal, then we must allocate appropriate resources to avoid undermining our hopes. If we put resources behind our aspirations, then we must remove bureaucracy that impedes success. Vision without resources is a hallucination. Vision without helpful processes is debilitating.

An innovation culture grows when faculty, staff, and students start with the seeds of ideas, combine them in unusual ways, and discover something new and worthwhile. Since innovation places a premium on the novel, on what has not been done or thought before, it is spurred by entrepreneurial thinking. Entrepreneurial thinkers see problems as opportunities, question everything, conduct analyses, take purposeful action, engage partners, try alternative solutions, learn from failures, make meaning, and persevere to reach the goal. The innovation process starts with ideas and ends with successful implementation resulting in desired impact.

Encouraging faculty, students, and staff to think entrepreneurially means UNC has a responsibility to provide the best environment for such explorations. The campus resources and processes must be aligned to support people posing questions and taking actions that disrupt the status quo in big and small ways. This foundational commitment is far-reaching and such alignment of values, resources, and processes will ultimately affect Carolina's overall impact. It will be a factor in whether top faculty, students, and staff choose Carolina and stay here, truly making UNC known around the world as a place where innovators thrive. The Roadmap takes seriously this issue of support and it is addressed in the recommendations. To create an innovation culture requires the sum of thousands of deliberate actions taken by thousands of faculty, students, staff, and partners directed toward accelerating impact. Over the past two years, the process has begun at Carolina. It is a top-down, bottom-up, inside-out, and outside-in approach.

To strengthen a culture of innovation requires that governing boards demonstrate their commitment to such a culture, that selection committees look for candidates who share a belief in the urgency of translating knowledge to benefit society and have proven track records in doing so; strategic planning efforts throughout the campus include this in their deliberations. Senior administrators and other campus leaders make this one of their top priorities, are forward-thinking in their approaches, find resources, and remove roadblocks to the innovation process. The University's fundraising and communication efforts align to these goals with people assigned to tell the stories of impact and raise the funds needed to implement the work.

The following section reviews progress made during the past two years toward meeting the recommendations and achieving the goals set out in the 2010 *Strategic Roadmap to Accelerate Innovation at the University of North Carolina at Chapel Hill*. It provides a snapshot of the environment in 2009 when the Innovation Circle began its work, key accomplishments to date, lessons learned along the way, and critical next steps.

Water In Our World
UNC's Pan-Campus Theme for 2012–2014

"It's not every day you find an issue where effective diplomacy and development will allow you to save millions of lives, feed the hungry, empower women, advance our national security interests, protect the environment, and demonstrate to billions of people that the United States cares, cares about you and your welfare. Water is that issue." — *U.S. Secretary of State Hillary Rodham Clinton*

Water in Our World is UNC's first pan-campus theme to mobilize resources and people from across campus around a common issue. From its inception, driving forces advocating for this theme have included UNC's Global Research Institute, UNC Global, and the Institute for the Environment, and the Water Institute at UNC. A formal proposal was presented to the Faculty Council in November 2011 by Jamie Bartram and Larry Band that served as the impetus for the two-year campus water theme. The proposal received unanimous approval in December 2011 and plans have been underway ever since that time.

Leadership is provided by co-chairs Jamie Bartram, Director of the UNC Water Institute and a professor in the Gillings School of Global Public Health, and Terry Rhodes, Senior Associate Dean for Fine Arts & Humanities in the College of Arts & Sciences. Under their guidance, the steering committee composed of faculty, staff, administrators, students, and community leaders from a wide array of disciplines, highlights the nature of this theme as an interdisciplinary effort.

Action

Progress Report: Year Two of Five-Year Plan October 2012

Administrators, deans, institute and center directors, faculty, staff, students, and external leaders are responsible for the accomplishments described in this section.

Recommendations at a glance

Recommendation 1: Prepare faculty, graduate and undergraduate students, staff, and the broader Carolina community with the knowledge, skills, and connections necessary to translate new ideas into innovations.

Goal 1.1 Ensure that faculty, students, staff, and the broader Carolina community understand the University's commitment to innovation and the resources available to help them reach their related goals.

Goal 1.2 Build capacity for innovation.

Recommendation 2: Collaborate with diverse groups on campus and beyond to explore issues, options, and creative approaches that may lead to innovations.

Goal 2.1 Enhance robust interdisciplinary collaboration among basic and social scientists, humanistic scholars, and those in hybrid disciplines such as bioengineering and applied sciences to address the great challenges of our times.

Goal 2.2 Collaborate and coordinate around key themes of local, national, and global significance to mobilize the campus toward new understanding of issues and solutions.

Goal 2.3 Improve industry collaborations and increase industry funding.

Goal 2.4 Extend collaborations with state and regional partners to help North Carolina further develop into a leading competitive, global, entrepreneurial, knowledge and innovation economy.

Goal 2.5 Strengthen collaborations with Carolina's strategic international partners.

Recommendation 3: Translate important new ideas more expediently and at an increased volume into innovations that improve society.

Goal 3.1 Support faculty, students, and staff as they develop understanding of issues and contribute solutions to complex social and environmental problems through social entrepreneurship.

Goal 3.2 Effectively organize and manage the University's commercialization services to maximize the quality and volume of potentially important innovations for society. Return revenue from these innovations to the University to support this work when possible.

Goal 3.3 Measure the impact of innovations and innovators launched at Carolina.

Recommendation 4: Align people, incentives, resources, and processes to strengthen an intentional culture of innovation at Carolina.

Goal 4.1 Encourage leadership across campus to support and promote innovation in their schools, departments, institutes, and offices.

Goal 4.2 Recruit, retain, and reward faculty, students, and staff who show promise, aptitude, and/or achievement in innovation.

Goal 4.3 Align the University's internal methods and processes to foster innovation, especially in working across schools.

Goal 4.4 Provide the necessary funds to support nascent and promising innovations on campus.

Recommendation 5: Catalyze innovation at Carolina by facilitating the work of faculty, staff, and students as they put important ideas to use for a better world.

Goal 5.1 Leverage the talents of leaders across campus to prepare, collaborate, translate, and align resources and processes to strengthen the culture of innovation at Carolina.

Goal 5.2 Create the Chancellor's Catalyze Group to facilitate the implementation of this Roadmap.

PREPARE

Recommendation 1: Prepare faculty, graduate and undergraduate students, staff, and the broader Carolina community with the knowledge, skills, and connections necessary to translate new ideas into innovations.

This recommendation has two goals: 1) build awareness; and 2) learn the skills of innovation and entrepreneurship.

GOAL 1.1 Ensure that faculty, students, staff, and the broader Carolina community understand the University's commitment to innovation and the resources available to help them reach their related goals.

Aspirations:
In the future, Carolina's commitment to innovation will be well understood and embraced by the campus community. Faculty, students, and staff will consider how their work in the classroom, lab, studio, and that of the entire research enterprise can advance Carolina's collective, positive impact on society. From the moment they are recruited through the day of graduation, students will have the opportunity to experience how their learning applies to innovation and what they can do to actively participate in the process. Faculty, students, and staff will be drawn to Carolina because of its commitment to innovation and entrepreneurship.

Status in 2009:
The five-year Carolina Entrepreneurial Initiative (CEI), funded by the Kauffman Foundation, catalyzed the first wave of entrepreneurship education on the campus and was ending in 2009. A cross-campus committee, chaired by then Dean of the College of Arts & Sciences Bernadette Gray-Little, worked together to create a wide-range of programs. The initiative was managed by by Jack Kasarda of the Frank Hawkins Kenan Institute of Private Enterprise. The Kenan Institute oversaw the cross-campus programs and created a marketing campaign that included an electronic newsletter, a website, and printed pieces. The goal was to explain the CEI initiative and create awareness of its relevance to diverse populations on campus. To demonstrate the cross-campus nature, Bill Drayton, founder of Ashoka, was the first featured speaker, signaling that social entrepreneurship was just as important as commercial enterprise.

Accomplishments to date:
The Chancellor's Office of Innovation & Entrepreneurship developed and implemented a plan to raise awareness about the Innovation Roadmap among students, faculty, staff, alumni, and parents. It included the website www.innovate.unc.edu, newsletter, social media, and speaking engagements. Campus colleagues embraced the Innovate@Carolina initiative and many described their innovative projects under this umbrella title. (This is discussed further in the final Recommendation: Catalyze).

- Chancellor Thorp and co-author Buck Goldstein promoted their book, *Engines of Innovation*, nationally and on campus with speaking engagements, interviews, and book signings.
- Chancellor Thorp was appointed by then U.S. Commerce Secretary Gary Locke to the National Advisory Council on Innovation and Entrepreneurship (NACIE).
- University communications launched the Minds on a Mission media spot at sporting events in order to reach a national audience. They also developed a strategy for www.unc.edu to support a focus on innovation and entrepreneurship.
- The Deans promoted the messages in their communication outlets as it related to their work.

What we learned:
Hundreds of thousands of people on and off campus received the messages communicated through the Innovate@Carolina campaign, yet that is a fraction of the target audience. The decentralized nature of the campus makes communication to faculty, students, and staff a continual challenge. There is an overload of information and messages pushed to campus audiences. With more than 100 professional communicators deployed in schools, institutes/centers, and departments across campus – each with their own particular interest and story to promote – keeping a focus on innovation and entrepreneurship requires constant attention. This is even more challenging in reaching external audiences. Communicating the story of Carolina's impact is critical to securing the support needed to continue the work.

Next steps:
- Senior leaders (administrators, deans, institute/center directors) continue to insert the messages of innovation and entrepreneurship in their communication strategies.
- University senior communicators continue promoting innovation and entrepreneurship as a top priority, seeking local, statewide, and national exposure in a systematic way.
- Admissions and Student Affairs continue to include the messages of innovation and entrepreneurship in the recruitment process.
- Provide funding to encourage and support these initiatives.

Co-authored by Chancellor Holden Thorp and UNC Entrepreneur-in-Residence Buck Goldstein, *Engines of Innovation* has received national acclaim.

Buiding entrepreneurship, knowledge, skills

The Minor in Entrepreneurship in College of Arts & Sciences complements students' majors in the liberal arts and sciences with the skill base they need to think entrepreneurially and engage in successful venture creation. Launched with a Kauffman Foundation grant eight years ago, the Minor engages the University community through faculty outreach, mentoring networks, workshops and the flagship undergraduate curriculum. Many practicing entrepreneurs, venture capitalists, venture lawyers, and experts on entrepreneurial topics co-teach with a noted academic. This fall, the Minor created an Introduction to Entrepreneurship course open to all undergraduates, co-taught by John Akin, Buck Goldstein, and Chancellor Holden Thorp.

GOAL 1.2 Build capacity for innovation.

Aspirations:

In the future, a broad representation of the Carolina community will gain the knowledge, skills, and connections needed to translate their ideas into greater benefit to society. Faculty, students, and staff, and the greater Carolina community who wish to learn about innovation and entrepreneurship will have easy-to-find, appropriate, and engaging opportunities.

The curriculum will offer classes to help participants develop ideas and apply translation methods. Participants will understand that calculated risks and inevitable failures are part of learning, that translation best occurs by collaborating with a diverse team, and that skills such as negotiating and communicating are important to the process. They will learn how to translate ideas into impact through persuasion and social and commercial entrepreneurship.

Students will have the chance to be involved in one or two campus-wide initiatives addressing a single topic of importance that will yield new understanding and catalyze incremental and radical innovations. Upon graduation, students involved in these programs will appreciate how innovative thinking can help them analyze situations, assess needs, grasp opportunities, create new approaches, test methods, and measure results. They will have experienced the entrepreneurial process and believe in their ability to apply their skills to new endeavors.

Status in 2009:

The cross-campus entrepreneurship initiative, Carolina Entrepreneurial Initiative, created or expanded several programs:

- The Minor in Entrepreneurship (Economics Department, College of Arts & Sciences). The Minor had tracts in social, commercial, artistic, and scientific entrepreneurship. Practicing entrepreneurs, venture capitalists, venture lawyers, and others with the most current and relevant knowledge on specific entrepreneurial topics co-taught the courses with a noted academic. It was designed to promulgate a broad definition of entrepreneurial thinking and help make UNC an engine of innovation. Capped at 100 students a year, it included a mandatory internship in an entrepreneurial venture. Dean Karen Gil led the working group and John Akin, John Stewart, and Buck Goldstein led the program.
- Launching the Venture. Program sponsored by the Center for Entrepreneurial Studies at the Kenan-Flagler Business School, open to all students, faculty and staff, and designed as a series of courses to turn new ideas into viable ventures. (Launching the Venture is further discussed in Recommendation 3: Translate.)
- Honors First-Year Seminars in Entrepreneurship. Small classes to explore multiple topics related to entrepreneurship.
- Graduate Certificate in Entrepreneurship.
- Kauffman Fellows. Competitive grant program for faculty.
- Carolina Challenge. Annual startup competition open to all UNC students, staff, faculty, and alumni.
- Carolina Launch Pad. Renaissance Computing Institute (RENCI) provided mentoring and office spaces for four tech-related ventures.

Other initiatives:
- Carolina KickStart (previously BioStart) was two years old and undergoing a leadership transition. Housed within UNC's Translational and Clinical Science (NC TraCS) Institute, established by Dean William Roper to support and accelerate faculty-founded startups in the life sciences. NC TraCS's "bench-to-bedside" mission aligned with entrepreneurial commercialization of biomedical innovations.
- The public policy department and the law school held clinics for entrepreneurs.
- The Venture Capital Investment Competition® was created at UNC in 1998 as an educational event for MBAs to learn about venture funding and was expanding. It is led by Patrick Vernon.

Accomplishments to date:

1. Programs:
- The Minor in Entrepreneurship in the College of Arts & Sciences launched a large, multidisciplinary format for Introduction to Entrepreneurship in response to student demand. The class is open to all undergraduates and began in fall 2012. Jason Norris, an alumnus of the Minor, set up the JNO Awards. These awards are between $3,000 and $5,000 and awarded to students enrolled in the Minor through a competitive process. Students applying for the award must have a stated interest in launching their own ventures, whether while enrolled at the University or following their graduation.
    o More than 700 students have completed the Minor and their related internships. Students apply their entrepreneurial thinking inside and outside the University. Alumni have started their own ventures, such as Nourish International, ABAN and iContact.
    o Two new tracts in technology and sports will be added to the existing four (social, commercial, scientific, artistic).
    o Funding: Raised $9.1 million of the $12.6 million goal.
- The Faculty Bootcamp was started to encourage an entrepreneurial mindset and helps maximize faculty impact. Managed by the Minor in Entrepreneurship faculty in the Economics Department, it is a four-day workshop for faculty who are invited by the Chancellor. Each member brings an idea or venture relevant to his or her work and develops it through team projects applying entrepreneurial methods. In three years, seventy-five faculty members have completed the workshop. During the past session, two faculty members from other UNC institutions audited the workshop to see if this might replicable to their universities.
- The Kenan-Flagler Business School under the leadership of Dean Dean has more than twenty MBA electives in its entrepreneurship curriculum and an undergraduate certificate in entrepreneurship. The courses cover a broad spectrum, including specialty topics such as family business, entrepreneurship through acquisition, product development, and social entrepreneurship. In addition, the Center for Entrepreneurial Studies offers a wide range of programs, conferences and competitions
    o The Venture Capital Investment Competition® is now in its fifteenth year, the VCIC® competition attracts 1,200 students, 150 venture capitalists, and 100 entrepreneurs each year from three different continents. Twenty-five percent of aspiring entrepreneurs who participate in VCIC go on to raise venture funding.

The Carolina Challenge

The Carolina Challenge is an annual startup competition open to all UNC students, staff, faculty, and alumni with a focus on fostering entrepreneurship through experiential learning. In 2012, individuals from 30 disciplines participated in the competition, a testament to its broadening reach across the UNC community. Entrants compete in one of four tracks: high-tech, low-tech, social, and faculty/staff/alumni.

Carolina Creates

Carolina Creates is a student organization launched by the Chancellor's Student Innovation Team (CSIT) and co-sponsored by Innovate@Carolina and UNC Student Affairs. The mission is to foster creation through connection with five initiatives: Carolina Creates Global (TEDxUNC), Music, Visual Arts, Writers, and Online. The group launched UNC's first crowdfunding platform for innovation projects this spring at carolinacreates.unc.edu.

- o Rankings for Kenan-Flagler Business School:
    - 2012: No. 8, Entrepreneurship, Top Undergraduate Business Schools by Specialty, *Bloomberg Businessweek*.
    - 2011: No. 10, Top Graduate Entrepreneurship Programs, *U.S. News and World Report*.
    - 2010: No. 5, Top Business Schools for Private Equity, *Private Equity Blogger*.
    - 2010: No. 20, Top Graduate Entrepreneurship Programs, *Entrepreneur Magazine*.
- The newly formed Joint M.D.-M.B.A. program brings together the expertise from the UNC School of Medicine and Kenan-Flagler Business School. This unique dual-degree program offers medical students the opportunity to earn both a doctor of medicine and a masters of business administration degree in five years. Unlike most M.D.-M.B.A. programs, Carolina's goes beyond offering health-care management courses by also integrating leadership, innovation, and entrepreneurship into the curriculum.
- Social innovation and social entrepreneurship.
    - o The Campus Y, directed by Richard Harrill, PhD, convened cross-campus leaders to seek integration across the campus and to work with experts in the field like Ashoka and Net Impact.
    - o The Campus Y built student capacity through the Campus Y Social Innovation Incubator program and co-curricular activities in community needs assessment, project planning, fundraising, evaluation, finance, and communication.
    - o The Social Entrepreneur-in-Residence program in the College of Arts & Sciences was created through private support. Dennis Whittle, founder of Global Giving, served as the Global Social Entrepreneur in Residence for Global Education in 2011-2012 and is currently the Richards Donohoe Social Entrepreneur in Residence in the College of Arts and Sciences.
- The Institute for the Arts and Humanities launched the IAH Innovation Fund with funding from the Office of the Vice Chancellor for Research in 2011. Selected projects receive an initial seed grant of $5,000 for planning and preliminary work, and the IAH may award up to $45,000 in additional funds to each project team over the course of three years, dependent upon the project's financial needs and its success in meeting its objectives.
- University Career Services created a variety of capacity building and skill building programs throughout the year. Numerous panels and networking events involving the local entrepreneurial community, attended by more than 500 students annually, help UNC students discuss and engage with those audiences. "Entrepreneurship treks" take students off campus and into the community for entrepreneurial gatherings at organizations like Bull City Forward, 8 Rivers Job and Internship Fair, and the Tech Jobs Under the Big Top event.
- The School of Education under the leadership of Dean Bill McDiarmid launched a Minor in Education in the fall of 2012 open to all undergraduates. It is designed to arm students with the capacity to think critically about educational issues and to participate knowledgeably and productively in public debates about them. Students participating in the Minor will make connections with other disciplines, integrating perspectives from their major. UNC ranked No. 4 among large schools contributing the most graduating seniors to Teach for America in 2011, and Teach for America hired more Carolina graduates than any other single employer in 2009 and 2010.

2. Student leadership:
The Campus Y, the Student Union, the Chancellor's Student Innovation Team (CSIT) and the Entrepreneurship Club provide strong, engaged student leadership. CSIT was created at the beginning of the strategic planning process in January 2010. The first president, Shruti Shah, established the group and passed leadership to current Co-Presidents Hudson Vincent and Mackenzie Thomas. This group founded Carolina Creates, a student organization sponsored by Innovate@Carolina and UNC Student Affairs, which is designed to foster the creative process through connection with five initiatives: Carolina Creates Global (TEDxUNC), Music, Visual Arts, Writers, and Online. To fund student projects, they created the first crowd sourcing tool specifically for UNC. The Carolina Creates website states: "Give back to UNC today by supporting these fantastic student initiatives! You can donate as little or as much as you'd like – your entire gift will count as a donation to UNC Annual Fund and go directly to supporting the student initiative of your choice. Check out all the fantastic opportunities below!" (carolinacreates.unc.edu)

3. Research on innovation and entrepreneurship:
UNC's innovation and entrepreneurship research agenda is advanced through the work of talented scholars across campus. Highlights include:

- Howard Aldrich, Professor and Department Chair, Sociology and Adjunct Professor of Management, Kenan-Flagler Business School, is a respected entrepreneurship scholar. He recently released his latest book, *An Evolutionary Approach to Entrepreneurship: Selected Essays*. For the past several years he has worked with large datasets that track entrepreneurs over time in an attempt to learn what successful entrepreneurs do that distinguishes them from their less successful counterparts.

- Maryann Feldman, Heninger Distinguished Professor, Department of Public Policy, researches the places that promote innovation, the commercialization of academic research, and the factors that promote technological change and economic growth. A large part of Feldman's work concerns the geography of innovation – investigating the reasons why innovation clusters spatially, and the mechanisms that support and sustain industrial clusters. Her dissertation, which was subsequently published as a book, was entitled *The Geography of Innovation*. Recently, Feldman and Nichola Lowe, associate professor in the Department of City & Regional Planning, compiled the initial database of companies to study entrepreneurship in the Research Triangle Park region to see if entrepreneurship creates jobs, capital, and economic stability in North Carolina. This twenty-year retrospective report, *Starting Something: The State of the Entrepreneurial Economy of North Carolina, 1992–2011*, aggregates data from 1,823 high-growth companies founded in North Carolina since 1992 and shows these companies created 40,560 jobs. Of these firms, 397 have attracted $7.7 billion in private capital from more than 600 funds since 1997.

- James (Jim) H. Johnson, Jr. is the William R. Kenan, Jr. Distinguished Professor of Strategy and Entrepreneurship and Director of the Urban Investment Strategies Center at the Frank Hawkins Kenan Institute of Private Enterprise. His research interests include community and economic development, the effects of demographic changes on the U.S. workplace, interethnic minority conflict in advanced industrial societies, urban poverty and public policy in urban America, and workforce diversity issues. Not only

TEDxUNC

Carolina Creates organized the first TEDxUNC conference in January 2012. TEDxUNC: Global Initiative highlighted creation through connection, generating new thought on global issues by connecting existing resources. At TEDxUNC, innovative thinkers from both the university and the greater community discussed their approaches to some of humanity's fundamental concerns.

The University of North Carolina at Chapel Hill

is Johnson a respected scholar, but he is a social innovator. Working closely with Union Baptist Church in Durham, based on his extensive research he designed the Durham Scholars Program and the social-enterprise model for the new Union Independent School. Opened in August 2012, the school provides comprehensive support to local students while serving as a national model. Union Baptist, with 5,000 members, used $2 million of its own funds and borrowed another $8 million to buy land across the street from the church to build the new 49,000-square-foot school. The church launched a campaign, chaired by Johnson, to raise $30 million in endowment to cover operating costs and tuition.

- Emil Malizia, Professor, Department of City & Regional Planning and Director, Institute for Economic Development, conducts extensive research in economic development. The faculty in the Department of City & Regional Planning provided assistance to the Orange County Economic Development Commission through several class projects. In the summer of 2011, Malizia helped Orange County conduct a focused study of UNC spinoffs. In December 2011, he completed "Real Estate Analysis of UNC Spin-off Companies." He continues to work with the County on real estate needs for startups and to advise on incubator space in Chapel Hill.
- Ted Zoller, Director of the Center for Entrepreneurial Studies and Associate Professor of Strategy and Entrepreneurship, Kenan-Flagler Business School, studies social networks in dynamic entrepreneurial regions to better understand the necessary relations between various types of people. In order to identify the senior people in a region who play active key roles in nurturing startup teams, he developed the Dealmakers Algorithm.

What we learned:

The campus provides many excellent research-based educational programs for selected audiences mostly focused on undergraduate students.

- For undergraduates there is some cross-fertilization on campus, yet the Minor in Entrepreneurship in the College of Arts & Sciences is unavailable to undergraduate business students and MBAs.
- Graduate students outside of the Kenan-Flagler Business School, postdocs, and faculty have few educational or co-curriculum opportunities to build their entrepreneurial capacity. Unfortunately, the Graduate Certificate in Entrepreneurship is not currently offered.
- Once the Kauffman Foundation funding ended, financial support for faculty development and faculty research also ceased.
- As is true across the campus during this time of severe budget cuts, program leaders are over-worked and under-resourced.

Next steps:

- Continue to evaluate, support, and improve existing programs.
- Devise a strategy to fill in missing pieces in the educational areas, especially for faculty, graduate students and postdocs.
- Bring together program leaders and sponsors from across the campus in a more formal way to further integrate the work.
- Integrate the lean startup methodology and work closely with National Collegiate Inventors & Innovators Alliance (NCIIA).
- Support faculty research projects.
- Raise funds to support capacity building in innovation and entrepreneurship.

Ted Zoller

Ted Zoller, PhD, Director, Center for Entrepreneurial Studies, Kenan-Flagler Business School, leads the Launching the Venture program. It is a series of courses that help faculty, staff and students from across the UNC campus turn new ideas into viable ventures. Launch is designed as an intense academic exercise that teaches a replicable process for evaluating and launching new ventures. It aspires to instill a lifelong entrepreneurial mindset which transcends the classroom experience.

The Carolina Innovation Scholars Program

The Carolina Innovation Scholars Program was established by Chancellor Holden Thorp in 2009 to attract the brightest and most entrepreneurial students to the University of North Carolina at Chapel Hill. Each scholar receives a four-year award that covers the full cost of tuition, fees, room, and board in addition to an entrepreneurial enrichment stipend. The Carolina Innovation Scholarship is intended to help launch the careers of scholars who are ready to start new ventures, as well as provide them with a wide and growing network of entrepreneurs and support organizations to help fund and nurture the scholars during their time at Carolina. Administered by the Office of Scholarships and Student Aid and linked through the Minor in Entrepreneurship in the College of Arts & Sciences, Scholars are prepared to invent solutions and create value, whether in commerce, science, society, or the arts. The program is privately funded with individually named scholarships: Mackenzie Family Foundation Innovation Scholars; (in honor of) Holden Thorp Leadership Carolina Innovation Scholar; and (in memory of) Frederick J Houk, Jr. Carolina Innovation Scholar.

2012–11 Carolina Innovation Scholars:

- *Mackenzie Innovation Scholars:*
    - o *Courtney Sanford '14 Marietta, GA. Double major: Public Health and Biostatistics; Minor in Entrepreneurship*
    - o *Arjun Bhattacharya '15. Cary, NC. Double major: Biology and Mathematical Decision Sciences; Minor in Mathematics.*
    - o *Andrew Bauer '16. Neptune, NJ. Major: Business*
- *Thorp Innovation Scholar:*
    - o *Kevin Jang '15. Cary, NC. Major: Computer Science*
- *Houk Innovation Scholar:*
    - o *Sarah Browning '15. Fayetteville, NC. Double major: Biology and Global Studies*

COLLAB-ORATE

Recommendation 2: Collaborate with diverse groups on campus and beyond to explore issues, options, and creative approaches that may lead to innovations.

This recommendation has five goals to promote: 1) multidisciplinarity; 2) key themes; 3) industry relations; 4) regional and state connections; and 5) global reach.

GOAL 2.1 Enhance robust interdisciplinary collaboration among basic and social scientists, humanistic scholars, and those in hybrid disciplines such as bioengineering and applied sciences to address the great challenges of our times.

Aspirations:
In the future, collaborations within and beyond the Carolina campus (including with other universities, the private and social sectors, communities, and government) will leverage talent, innovation, and non-traditional partnerships to achieve even greater impact. Those seeking collaborations on campus will find a supportive environment where the rules have been examined and rewritten to smooth the path for interdisciplinary opportunities. Carolina will have highly-rated hybrid disciplines such as bioengineering, environmental engineering, and applied sciences all working together with social scientists and humanities scholars on some of the most serious challenges facing society locally, nationally, and globally, with resources to support their efforts. This is especially important since there is no engineering school at Carolina. Complex issues require advanced disciplinary knowledge and the expertise that comes by combining multiple fields of study.

Status in 2009:
The need for multidisciplinary approaches was apparent, but the path to a solution was elusive. Faculty and administrators had been discussing the need for strengthening applied sciences at Carolina for nearly twenty years.

The decentralized nature of Carolina's campus that puts strong, separate disciplines at the undergraduate, graduate, and professional levels was simultaneously a major obstacle to finding solutions to urgent problems. Ad hoc collaboration was strong but formal hybrid disciplines and multidisciplinary approaches were few.

The Department of Environmental Sciences and Engineering in the Gillings School of Global Public Health offered a multidisciplinary experience for those interested in working at the interface between people and the environment.

The Joint Department of Biomedical Engineering (BME), established December 2003, was an academic department co-located at the University of North Carolina at Chapel Hill and North Carolina State University linking the School of Medicine at UNC to the College of Engineering at NC State. NC State offered a BS in Biomedical Engineering and UNC-Chapel Hill offered the BME concentration in the Applied Sciences undergraduate

Grad student Andrew Stuart in the lab of Dr. Wei You at UNC

degree program. Disparities existed across the three facets of BME (UNC, NC State and the Curriculum in Applied Sciences and Engineering), including curriculum challenges and differences between UNC and NC State in expectations and criteria for teaching, buyout, salary, and research support, tenure expectations, mentoring, promotion, and five-year RTP rules. A growing imbalance in student enrollment vs. faculty recruitment was heightened by challenges of severe budget cuts.

Accomplishments to date:
- Innovation Circle Chair, Lowry Caudill, convened a group of leading faculty members led by Ed Samulski to explore how to further applied sciences at Carolina. The Applied Science Task Force's recommendation of a new department of Applied Physical Sciences in the College of Arts & Sciences has been accepted by the Dean of the College. This is a major breakthrough.
- The 2011 Academic Plan established "interdisciplinarity" in teaching, research and public service as a central focus and outlined action steps to proactively build support for it across campus.
- Institutes and Centers strengthened interdisciplinary collaboration. Examples:
  - The Center for Integrative Chemical Biology and Drug Discovery brings dedicated medicinal chemistry expertise to bear on biological targets of therapeutic relevance under investigation by UNC faculty.
  - The Center for Nanotechnology in Drug Delivery in the Division of Molecular Pharmaceutics, Eshelman School of Pharmacy focuses on safely and effectively translating new drug and imaging discoveries into clinical trials using nanotechnology with the goal to improve human health.
  - The Carolina Population Center is a community of scholars and professionals collaborating on interdisciplinary research and methods that advance understanding of population issues.
- The Joint M.D.-M.B.A. program brings together medicine and business as described in the previous section.
- The Frank Hawkins Kenan Institute of Private Enterprise appointed noted scientist and academic entrepreneur, Joe Desimone, as its new head. Its charge is to become a global leader in innovation and entrepreneurship.
- Biomedical Engineering recruited top faculty and external funding has increased every year since 2009. In the past fiscal year, 2011–2012, external funding grew by 26.2 percent. It has established new initiatives and extended and improved its educational component at the undergraduate and graduate levels both at UNC and NC State. The College of Arts & Sciences gave its consent to begin preparations for BME to extend into the College with full obligation and control of the UNC BME undergraduate curriculum. The graduate program spanning UNC and NC State has been completely revamped and received very positive feedback in its 2012 external review.

John Papanikolas' lab in Caudill Labs at UNC.

Administratively, the department made major changes in order to enhance efficiencies and reduce costs. Five out of the eight technology companies presenting at the recent NC TraCS Emerging Company Showcase came out of BME. The department is chaired by Nancy Allbritton.

- Digital Humanities Lab led by Bobby Allen received a $1.39 million grant from the Andrew W. Mellon Foundation to expand digital humanities at UNC-Chapel Hill. Digital Humanities is an area of research, teaching, and knowledge creation at the intersection of computing and humanities. It is interdisciplinary and embraces a variety of topics, ranging from curating online collections to mining information from large data sets.

"The greatest training we can offer our students is to teach them to realize the connectivity of our world. We have the opportunity to teach holistically through all that we have and do at Carolina. Education should not be a check list. It should be a great, wonderful, sometimes even messy experience that helps students learn to move more freely and creatively in the world. "

—McKay Coble, Professor of Dramatic Art, Former Chair of the Faculty

What we learned:
Input from multiple disciplines and professions, both inside and outside of the academy, are necessary for dealing with challenging issues. The 2011 Academic Plan calls for the need to "reach agreement on our priorities and provide the resources to realize them." Inherent in the recommendation is the acknowledgement that to be successful at advancing interdisciplinary solutions the University must be strategic in setting its priorities and directing resources.

Forging an agreement like the Applied Science Task Force recommendations requires dedication and time from top academics and support from the chancellor, the provost and dean(s) at the beginning of the process. The faculty members devoting significant time to such a committee need to know that it is a campus priority and that there is support for their recommendations.

Next steps:
- Continue to advance hybrid disciplines by finding the needed internal and external champions and sustainable financial support.
  - o Tie the advancement of hybrid disciplines to Carolina's Strategic Plan for Research and ultimately to the University's Strategic Plan. Include in all major University strategy deliberations and fundraising plans.
  - o Strengthen existing hybrid disciplines like biomedical engineering and environmental engineering.
  - o Implement the Applied Science Task Force recommendation for a new Department of Applied Physical Sciences in the College of Arts & Sciences.
- Support the recommendation in the Academic Plan to prioritize interdisciplinary proposals and provide them with effective and equitable administrative support.
- Continue to strengthen the collaboration between the School of Medicine and the Kenan-Flagler Business School and other such alliances.
- Lower barriers and streamline processes.
- Raise funds to support the work.

GOAL 2.2 Collaborate and coordinate around key themes of local, national, and global significance to mobilize the campus toward new understanding of issues and solutions.

Aspirations:
In the future, through collaborative initiatives that examine one important topic at a time such as water, poverty, economic disparities, climate change, or fossil-fuel scarcity, the Carolina community will stimulate intellectual exchange and discovery across the humanities, fine arts, social and natural sciences, and professional schools. This approach will yield a dramatic positive impact on our community's understanding of the issues it seeks to address, build bridges between disciplines, produce new collaborative teaching and research, and result in significant innovations.

Status in 2009:
UNC-Chapel Hill was highly collaborative and had engaged in some multidisciplinary projects but had never adopted a pan-campus theme.

Accomplishments to date:
- Created Key Themes initiative and selected water as first theme calling it *Water in Our World*. The Faculty Council approved the concept of key themes and water as the first focus which was featured at University Day, October 12, 2012.
- Formed cross-campus steering committee to lead, manage and promote the initiative.
- Coordinated support from across campus to encourage creative and collaborative approaches to addressing the water topic. From its inception, driving forces advocating for this theme have included the Global Research Institute, UNC Global, the Institute for the Environment, and the Water Institute at the Gillings School of Global Public Health.

What we learned:
It takes a combination of interest from the faculty and leadership at the provost level, a process that enables buy-in across campus to select a topic, significant administrative and financial support, a dedicated project manager, and a dedicated fundraiser to plan and manage such a campus-wide initiative.

Next steps:
- Assess the outcomes of this approach.
- If the method proves successful in advancing understanding of an issue, builds cross-campus relationships, and leads to new knowledge and solutions; we recommend faculty leaders consider planning the next key themes at least two to three years in advance.
- Build in a one-year planning phase to identify support before launch of a new theme. Hire a Key Themes director with content expertise and project management experience in organizing multi-faceted projects with diverse constituencies.
- Begin fundraising well in advance of the launch.
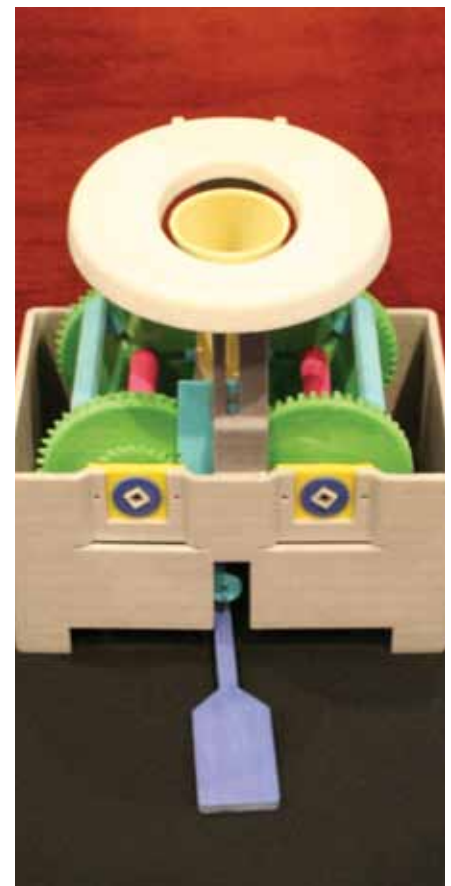
Sanitation Creations

With a graduate degree from UNC's Gillings School of Global Public Health, alumna Liz Morris founded Sanitation Creations to offer environmentally-friendly, hygienic sanitation solutions that are odorless, waterless, and economical. Morris was a participant in UNC's Launching the Venture, winner of the 2012 Cherokee Challenge, 3rd place winner in the Muhammad Yunus Social Business competition sponsored by the UNC General Administration, and is receiving mentoring from the Blackstone Entrepreneurs Network.
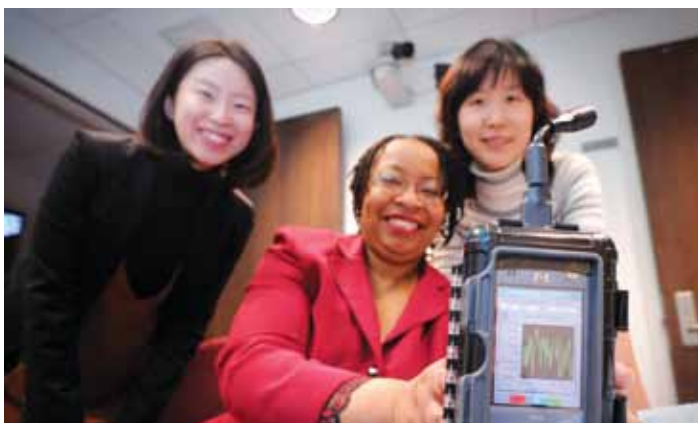
Debra Barksdale, Associate Professor in UNC's School of Nursing, and graduate students display an impedance cardiograph.
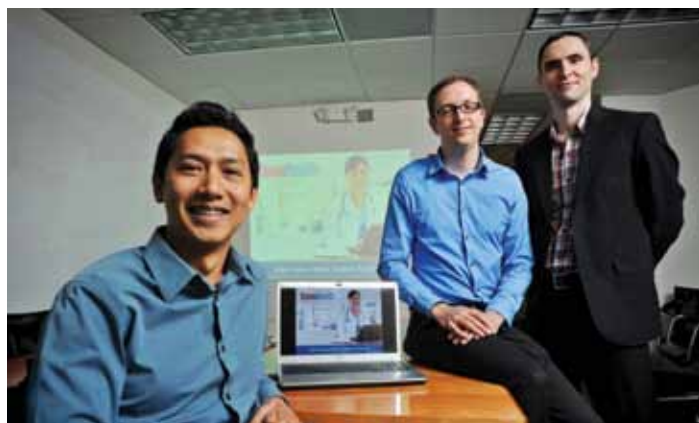
The team from Keona Health, a UNC startup that has developed a system for delivering online triage services to patients by registered nurses.

Aquagenx

Based on the work of Mark Sobsey, PhD, UNC's internationally recognized water sanitation and hygiene expert, Aquagenx has created a portable, affordable household-level test. It detects and quantifies fecal bacteria in water without the need for a lab, electricity, or expertise. The field test could prevent the spread of infectious disease that kills millions annually by identifying high-risk communities and prompting action. Aquagenx is a resident team in the Campus Y Incubator, won first place and $15,000 in seed funding in the Carolina Challenge, and were chosen as the South Regional Champion in the Walmart Better Living Business Plan Challenge.

GOAL 2.3 Improve industry collaborations and increase industry funding.

Aspirations:

In the future, Carolina will have strong industry partners, working collaboratively toward mutually beneficial goals. Research dollars will grow significantly in the next five years due to strategic attention to this opportunity. Industry will view Carolina as a smart, fair, speedy, and service-oriented partner with brilliant researchers working at the cutting edge of their fields.

Status in 2009:

In 2009, UNC had a significantly smaller share of its research sponsored by industry than its peers. In 2007, UNC received $8.670 million in industry funding or roughly five percent of the total research funding. Like many other schools, UNC was a black box to industry. It was difficult to know whom to contact, there was a lack of communication among campus staff and faculty, and there was no concerted effort to improve this condition. See figures 1 and 2.

Accomplishments to date:

- 2012 research funding from industry grew to $26 million.
- The Vice Chancellor for Research has created an Industry Relations Task Force to rethink how UNC handles direct and indirect costs when it comes to sponsored research from industry and how to significantly improve total industry research funding over the next five years.
- The School of Medicine has created a full-time position to help increase industry funding, especially in the area of drug discovery. A drug discovery web portal is in beta testing now that will help potential industry sponsors better understand UNC's broad portfolio in this area.
- Currently the University is negotiating several novel UNC-industry collaborations.

FIGURE 1: TRENDS IN NON–FEDERAL RESEARCH FUNDING, UNC–CHAPEL HILL, 2002–2012
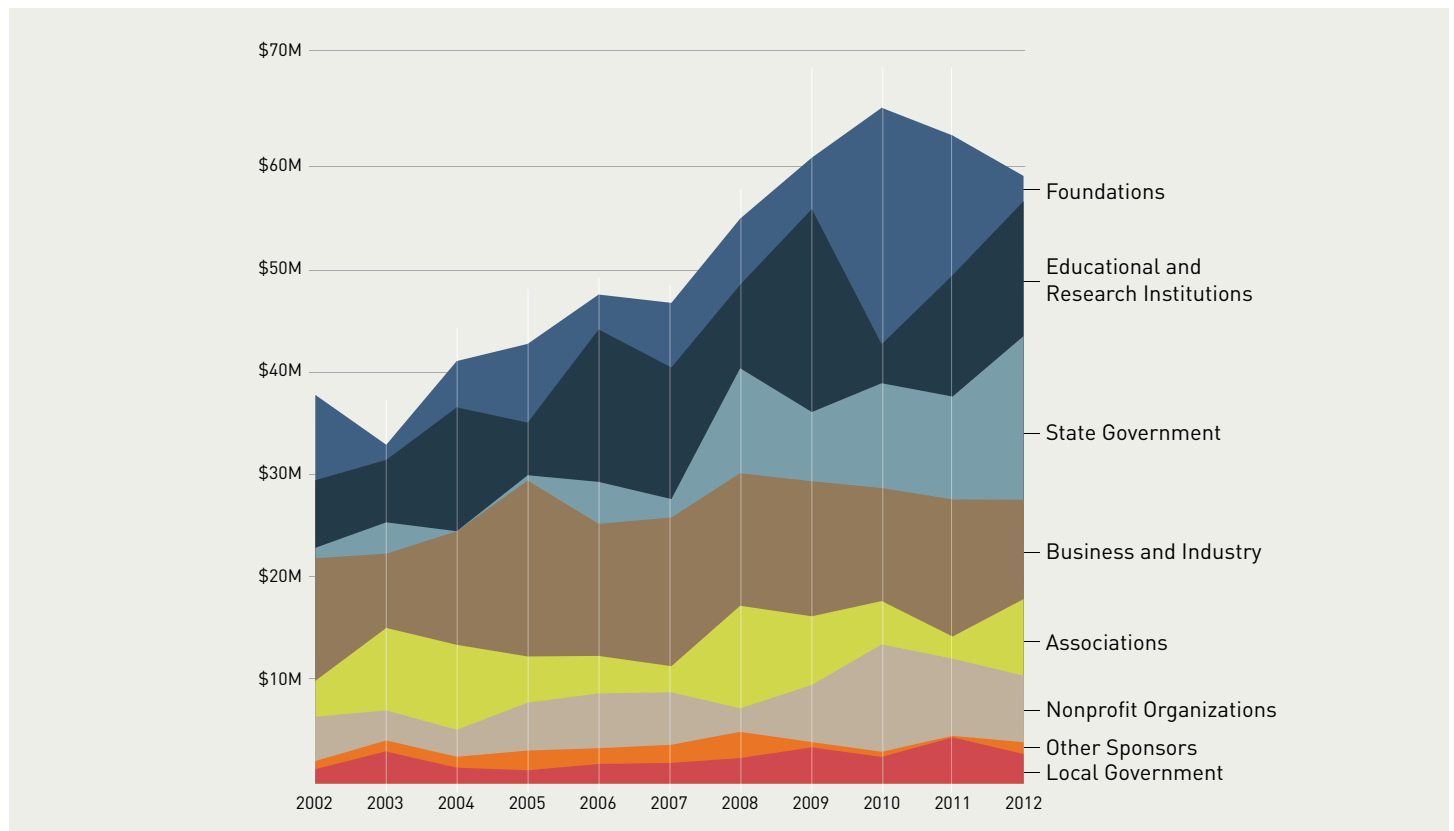
FIGURE 2: SOURCES OF RESEARCH FUNDING, FY 2012, UNC–CHAPEL HILL

FY 2012 research funding,
UNC–Chapel Hill,
all sources: $767M

Federal Government: 71%

Educational and
Research Institutions: 8%

Foundations: 7%

Business and Industry: 6%

State Government: 3.6%

Nonprofit Organizations: 2.3%

Associations: 1.4%

Local Government,
Non-U.S. Federal,
Other Sponsors: each <1%
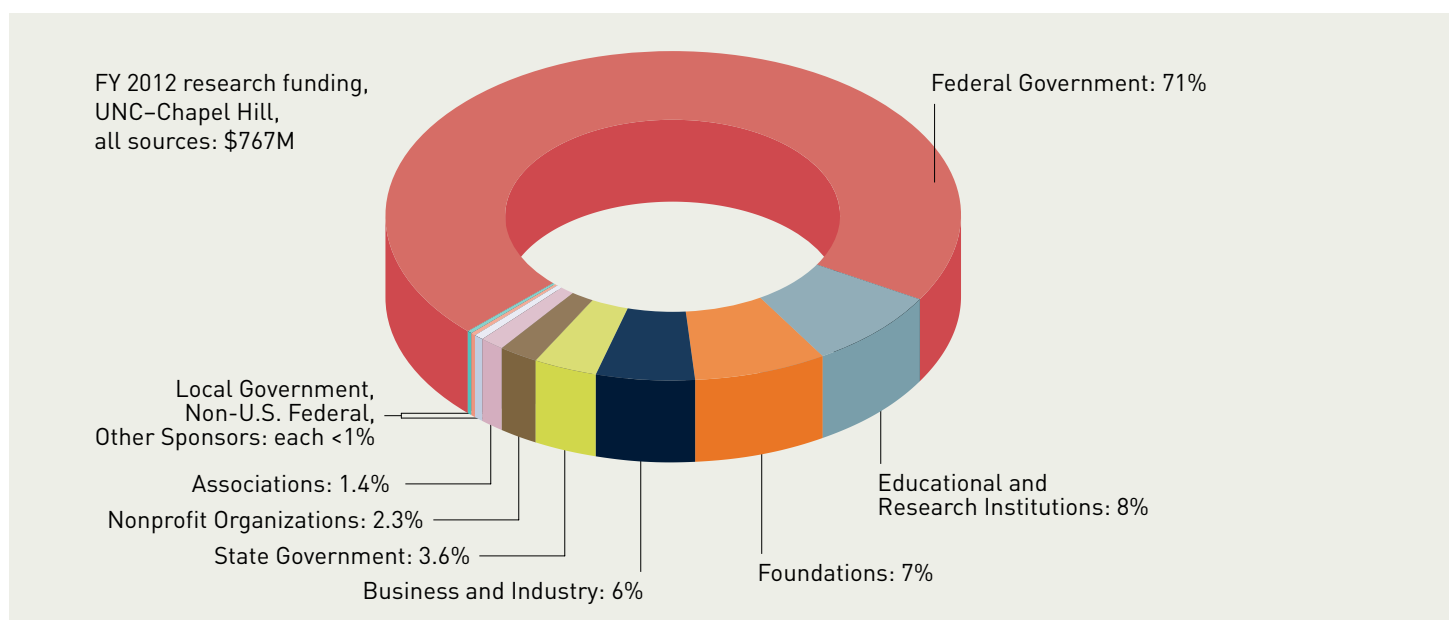
Thomas Stith

As Director of Economic Development for the Frank Hawkins Kenan Institute of Private Enterprise, Thomas Stith leads the Center for Jobs and Innovative Business Development. The Center recently received a five-year, $642,949 grant from the U.S. Economic Development Administration (EDA) and $1 million in matching funds from the Kenan Institute. EDA is funding centers in eight states to leverage university assets to promote American innovation and strengthen regional economic ecosystems.

COLLABORATE

What we learned:

There are at least two contributing factors to the low percent of research funding coming from industry at UNC: 1) lack of engineering; and 2) absence of strategic approach to improving industry relations. Collaboration among all units that deal with industry is needed in formulating and executing a plan for improving industry relations including: Office of Technology Development, Office of Sponsored Research, Corporate and Foundation Relations, Clinical Trials, Legal, deans of research-intensive schools, and high-producing research faculty.

Next steps:

- Encourage the Task Force on Industry Relations to release a bold plan to improve industry relations. An intentional effort to recruit industry research must be undertaken with clear guidelines adopted across the campus to streamline processes and provide consistent service.
- Get wide institutional buy-in to support improving industry collaborations.
- Ask the Commercialization Task Force to also make recommendations on how to improve industry relations.

GOAL 2.4 Extend collaborations with state and regional partners to help North Carolina further develop into a leading competitive, global, entrepreneurial, knowledge, and innovation economy.

Aspirations:

In the future, the Research Triangle Park (RTP) region will be a leading entrepreneurial engine in the United States. Governments and industry leaders around the world will contact North Carolina leaders when considering significant investments, partnerships, and resource allocation. Entrepreneurs will have the knowledge and skills they need to grow companies and will be connected into a strong network of seasoned business people. The path will be smoothed for them and the needed funding available. Strategic initiatives will have been successful in solidifying North Carolina's economic future.

Status in 2009:

Carolina did not play a major leadership role in regional partnerships or economic-development related activities, relying heavily for its statewide engagement on the significant role historically played by the School of Government in training local, county and state officials. The strong tradition of faculty-engaged scholarship across disciplines defined Carolina's service in the public realm, but neither of these valuable activities were specifically geared at developing the state's innovation economy or competitive advantage in the global marketplace. The Frank Hawkins Kenan Institute of Private Enterprise played a leadership role in the aeronautics industry and in some projects related to Eastern Carolina.

Accomplishments to date:
- Created Blackstone Entrepreneurs Network (collaboration among UNC-Chapel Hill, North Carolina State University, North Carolina Central University, Duke University, and the Council for Entrepreneurial Development) with a $3.6 million gift from the Blackstone Charitable Foundation. Its purpose it to create a highly networked entrepreneurial region using experienced entrepreneurs to collectively mentor a pipeline of startups with high-growth potential.
- The School of Government under the leadership of Dean Mike Smith created the Government Innovation Grant Awards, a technology-based innovation awards program. The program, a partnership among the School, Local Government Federal Credit Union, and North Carolina Local Government Information Systems Association, is designed to spur and reward technology-based innovation by offering incentives to North Carolina local governments engaged in innovative, replicable endeavors that help improve citizen services.
- Researchers in entrepreneurial studies are working on mapping the entrepreneurship ecosystem of the Triangle and studying the region's economy.
- The Center for Jobs and Innovative Business Development at the Frank Hawkins Kenan Institute of Private Enterprise under the leadership of Thomas Stith received a five-year, $642,949 grant from the U.S. Economic Development Administration (EDA) and $1 million in matching funds from the Kenan Institute to promote business growth and job creation in eastern North Carolina. EDA is funding centers in eight states through the University Center Economic Development Program, a partnership to leverage university assets to promote American innovation and strengthen regional economic ecosystems. In North Carolina, Fayetteville State University, and Western Carolina University in Cullowhee also received grants. The goal is to extend the reach and impact of an extensive network of partners already working in the area to create a vibrant economic development ecosystem for eastern North Carolina.

What we learned:

It is apparent to leaders in the state, the region and locally that each group – be it a university, a state agency, an economic development group, or the private sector – has to work together to advance our state and nation. And, it is equally apparent that we each need to improve our own initiatives to promote innovation and entrepreneurship.

There is a willingness and hunger to collaborate, especially on seizing big opportunities as can be seen in the joint projects between faculty members and regional and state development efforts.

In 1950, the creation of RTP put the region on the map as being innovative. That model has been emulated around the world and still positions the Triangle as a leader. Such a disruptive plan is needed today.

Chancellor Holden Thorp

Blackstone Network

UNC led in the formation of the Blackstone Entrepreneurs Network to help North Carolina's world-class researchers, universities, and entrepreneurs come together to bring more high-growth potential startups to market. The Blackstone EN does this by recruiting the region's most successful serial entrepreneurs to serve as Entrepreneurs-in-Residence (EIRs) who work as a team to guide high-potential startups out of universities and the region. Blackstone EIRs bring their connections and experience to grow a network dense with dealmakers and help build successful companies. In its first year of operations, Blackstone EN has nine EIRs, seventy-two potential companies reviewed, and twenty network clients currently working with EIRs.

COLLABORATE

Next steps:
- Participate in the current strategic planning process to reimagine the future of the RTP and the Triangle.
- Collaborate with Innovation Circle members who are leading entrepreneurs and capital providers to explore ways UNC can contribute to the state's innovation goals.
- Work with the State of North Carolina and regional economic development groups to contribute to widespread prosperity.
- Continue the close working relationships with the towns of Chapel Hill and Carrboro as well as with Orange County.

GOAL 2.5 Strengthen collaborations with Carolina's strategic international partners.

Aspirations:

In the future, Carolina will enhance and leverage the relationships with our emerging roster of close strategic international partners – schools such as National University of Singapore, King's College-London, Tsinghua University, and Universidad San Francisco de Quito, which is instrumental to our Galapagos projects, and other partners. When working on important complex global problems, these strong, complementary institutions offer vital knowledge, resources, and access.

Accomplishments to date:

UNC Global has strengthened Carolina's strategic partnerships through internal and external efforts. On campus, UNC Global has established a Partnership Roundtable comprised of delegates representing each of the University's strategic and emerging partnerships, or areas of the world in which the University seeks to develop partnerships. Led by UNC's chief international officer, the Roundtable has contributed to the support and extension of the partnerships. Externally, the Global Relations office within UNC Global has developed collaborative relationships with the corresponding international offices at partner institutions. Achievements include:
- The launching of the first strategic partnership website with King's College London that is co-managed by the international offices at both partner institutions.
- The establishment of stronger cooperative marketing efforts with the National University of Singapore.
- The development of additional protocols for hosting international visitors.
- The development of a Global Visiting Students Program, which will bring non-degree, non-exchange students to campus, helping to further strengthen relations with partner institutions.

Niklaus Steiner, PhD, Director of the Center for Global Initiatives, started the Social Entrepreneur-in-Residence program, and brought in Dennis Whittle to be the first. The Center for Global Initiatives is a catalyst for the innovative work of faculty and students at the University. The Center is entrepreneurial in its approach to fostering initiatives that deepen knowledge and understanding of our complex world. For its work, the Center is recognized by the U.S. Department of Education as one of only eleven National Resources Centers in Global Studies.

Joe DeSimone

In August 2012, Joseph DeSimone, PhD was selected by James Dean, Dean of the Kenan-Flagler Business School, to lead the prestigious Frank Hawkins Kenan Institute of Private Enterprise. Dean Dean believes DeSimone has the right mix of academic credentials, entrepreneurship experience, leadership ability, commitment to excellence, and devotion to Carolina to lead the Kenan Institute into its next era as a global leader in entrepreneurship.

DeSimone is the Chancellor's Eminent Professor of Chemistry at the University of North Carolina at Chapel Hill, and William R. Kenan, Jr. Distinguished Professor of Chemical Engineering at North Carolina State University and of Chemistry at UNC. DeSimone is also an adjunct member at Memorial Sloan-Kettering Cancer Center. He has published over 290 scientific articles and has 130 issued patents in his name with over 80 patents pending.

DeSimone is a member of both the National Academy of Sciences (2012) and the National Academy of Engineering (2005). He is also a member of the American Academy of Arts and Sciences (2005). DeSimone has received over 50 major awards and recognitions including the 2012 Walston Chubb Award for Innovation by Sigma Xi; the 2010 AAAS Mentor Award in recognition of his efforts to advance diversity in the chemistry PhD workforce; the 2009 NIH Director's Pioneer Award; the 2009 North Carolina Award; the 2008 Lemelson-MIT Prize for Invention and Innovation.

DeSimone, an innovative polymer chemist, has made breakthrough contributions in green chemistry, fluoropolymer synthesis, colloid science, and nano-biomaterials. He pioneered supercritical CO_2-based polymerization reactions and the self-assembly of molecules in compressible media. In 2002 DeSimone, along with Dr. Richard Stack (Duke University) and Dr. Robert Langer (MIT), co-founded Bioabsorbable Vascular Solutions (BVS) to commercialize a fully bioabsorbable, drug-eluting stent. The stent achieved CE Mark approval in Europe in 2011 and is being further evaluated in a series of international clinical trials led by Abbott for the treatment of coronary artery disease. DeSimone's group is now heavily focused on harnessing the fabrication technologies from the semiconductor industry to design high-performance, cost-effective vaccines and medicines. DeSimone and his team have developed a roll-to-roll particle fabrication technology called PRINT (Particle Replication in Non-wetting Templates). They are exploiting the advantages of PRINT to generate "calibration quality" nano-tools to define the geometric (size, shape), surface (zeta potential, stealthing ligands), and deformability limitations for the effective delivery of drugs and vaccines. DeSimone recently launched Liquidia Technologies (www.liquidia.com), which employs roughly 60 people in Research Triangle Park, North Carolina and has raised over $60 million in venture financing, including the first ever equity investment by the Bill and Melinda Gates Foundation in a for-profit biotech company. Liquidia has converted PRINT into a GMP compliant process and has recently brought its first product, a seasonal influenza vaccine based on PRINT particles, into its first clinical trial.

Recommendation 3: Translate important new ideas more expediently and at an increased volume into innovations that improve society.

This recommendation has three goals: 1) create social projects and enterprises; 2) commercialize university ideas; and 3) measure impact.

GOAL 3.1 Support faculty, students, and staff as they develop understanding of issues and contribute solutions to complex social and environmental problems through social entrepreneurship.

Aspirations:
In the future, social entrepreneurship will flourish resulting in innovations that help address some of the most challenging issues locally, nationally, and globally. UNC-Chapel Hill will be highly regarded for its rigorous attention to evaluation and assessment as a core pillar of its service activities, and known for the number of successful social businesses, nonprofits, and triple-bottom line companies that it produces.

Status in 2009:
With UNC's teaching, research and public service mission, Carolina faculty, staff, and students had a long history of engagement with the community, state, nation, and world. The Center for Public Service supported and awarded faculty and student engaged-scholarship for many years. The Campus Y had a 150-year history of student service and social justice activity, and the campus had over 650 registered student organizations mainly engaged in service activity. Co-curricular activities for promoting innovation and entrepreneurship in the social realm had been largely informal. The Minor in Entrepreneurship in the College of Arts & Sciences had a social entrepreneurship tract and a limited number of classes were available through the Public Policy department and the Kenan-Flagler Business School.

Accomplishments to date:
- Innovation Circle members Tom Uhlman and Jonathan Reckford convened leaders in all programs, departments, and schools that engage in social innovation and entrepreneurship to discuss how the work of each fit into the overall campus ecosystem. From that meeting, Richard Harrill, director of the Campus Y, agreed to continue to bring the groups together to forma strong campus network of leaders.
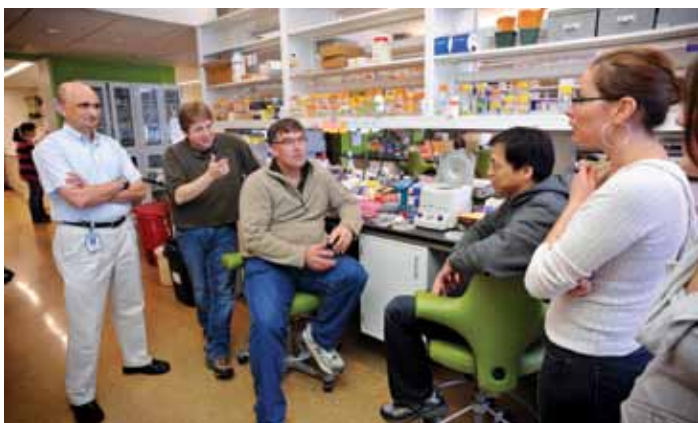
The Genome Sciences Building brings faculty and researchers together, fostering collaboration among multiple units across campus.

Carolina Launch Pad is funded by RENCI through the UNC Office of the Provost.

- The Campus Y:
  - Created an advisory board and is developing an integrated strategy for the campus to create and grow social ventures. It includes representatives from Student Affairs, the Office of Diversity and Multicultural Affairs, the Kenan-Flagler Business School Center for Entrepreneurial Studies/Kenan Institute of Private Enterprise, the Public Policy Clinic in the Department of Public Policy, the Urban Investment Strategies Center, BASE, APPLES, the Minor in Entrepreneurship in the College of Arts & Sciences, student representatives, social entrepreneurs, representatives from schools and/or institutes and centers that have faculty, students and staff who create social ventures or assist those who do.
  - Launched a social innovation incubator located in its historic building on the main quad. In its first year, after a rigorous selection, four student innovation teams were chosen to be housed in the incubator. Residence in the incubator is open to student teams across campus (not limited to Y groups) and can include hybrid social/for-profit ventures. Selected teams receive individualized mentoring and support for their project development, capacity-building curriculum delivered through expert workshops, and space for one-year for their ventures.
  - Developed co-curriculum available free to students across campus, providing expert workshops in areas such as business plan development, budget and finance, communications, legal liability issues, fundraising, and strategic planning.
- Launching the Venture, the Carolina Challenge, and the Minor in Entrepreneurship continued to grow their popular social tracts.
- The Center for Global Initiatives piloted the Social Entrepreneur-in-Residence program in 2011. CGI recruited Dennis Whittle, founder of Global Giving, who met regularly with students on their projects and ventures and assisted with the production of UNC's first TEDx event.
- Raised funds to establish the Social Entrepreneur-in-Residence Program in the College of Arts & Sciences.
- Recruited and coached teams to participate in the first Social Business Competition organized by the UNC General Administration with special guest Nobel Prize- winning founder of microfinance, Mohammed Yunus. Each of the seventeen campuses submitted two social businesses and both UNC-Chapel Hill teams were finalists with Sanitation Creations taking third place overall.

Incubator in Chapel Hill

The soon to be opened downtown incubator is the first in Chapel Hill's history. Jim Kitchen, UNC alumnus and adjunct in the Kenan-Flagler Business School, began mentoring UNC students who gravitated to his free space above Julian's on Franklin. Bursting at the seams, Jim realized he was onto something and began talking to the Mayor, town administrators and council members and Ted Zoller about opening an incubator. Fast forward six months, and the incubator is set to open in December. It is a mutually beneficial public and private partnership between the University, the Town of Chapel Hill, Orange County Economic Development, the Downtown Partnership, and private supporters.

Bethany Hargis in the H4 center in Career Services at the University of North Carolina at Chapel Hill. The collaborative workspace is open to students, faculty and staff during the summer months.

- Innovation Labs in the Gillings School of Global Public Health were launched with funds from a $50 million gift from Dennis and Joan Gillings to anticipate emerging public health challenges, accelerate solutions, and improve people's lives across the state and the world. In addition, Dean Barbara Rimer of the School recruited Don Holzworth, a noted global health care entrepreneur, to serve as Entrepreneur-in-Residence. He works with faculty to create tangible solutions to global health problems, including building ventures as university spinouts and developing in-country ventures to support local economies. There have been eighteen Gillings Innovation Laboratories funded and two Commissioned Innovation Labs awarded. The Innovation Labs were so successful that other funders wanted to partner with the School to solve problems through Commissioned Innovation Labs. To date there are 18 Gillings Innovation Laboratories funded and two Commissioned Innovations Labs awarded by ChildFund and the International Association of Plumbing and Mechanical Officials
- The Carolina Center for Public Service created the Robert E. Bryan Social Innovation Fellowship. The Fellowship is open to aspiring social change-makers who are interested in providing a significant contribution locally, nationally, or internationally through the creation of an entrepreneurial project that addresses a community issue or need.
- Led by Dean Jack Richman, the School of Social Work's Jordan Institute launched the Middle Space, a nonprofit to help private companies, public agencies, and other nonprofits improve the triple bottom line of their organizations – their economic, environmental, and social performance.

What we learned:
Carolina students, faculty, and staff are continually seeking entrepreneurial and innovative solutions to the world's pressing social problems. To achieve lasting impact and to equip them with the skills and capacities necessary to navigate both the for-profit and non-profit sectors requires rigorous planning and training. Special attention is needed around outcome evaluation and assessment of activities.

Next steps:
- Allocate resources to provide a rigorous academic foundation for students pursuing social entrepreneurship. Provide more advanced educational opportunities in such topics as measuring performance outcomes of social ventures, organization-building, diversified funding plans for nonprofit organizations, and related topics.
- Establish a social innovation seed fund.
- Provide fundraising support at a university-wide level for the social innovation initiative.
- Ensure that student and faculty social entrepreneurs have access to seed funding and a mentor/assistance program with entrepreneurs-in-residence, faculty experts and those external to the university.

GOAL 3.2 Effectively organize and manage the University's commercialization services to maximize the quality and volume of potentially important innovations for society. Return revenue from these innovations to the University to support this work when possible.

Aspirations:
In the future, more innovative ideas will be developed at Carolina and launched efficiently into the commercial sector. Carolina will be recognized as one of the top leaders in technology development and transfer because of the breadth of our innovations and the effectiveness of our leadership, people, strategies, policies, and their resulting impacts.

Status in 2009:
Historically, UNC lagged significantly behind its peers in commercializing its intellectual property. The Office of Technology Development had fewer employees and a lower budget than its peers. It also had fewer startups with an average of 2 a year over a ten-year period, and licensing revenue hovered around $2 million a year during that period.

Carolina KickStart was created to expand commercialization services to life science startup teams and the Carolina Express License was under consideration. Launching the Venture and the Carolina Challenge were also working with startups. See figure 3 for details.

FIGURE 3: UNC-CH OTD 4-YEAR SUMMARY (FY06–FY09)

	Total 4 Yrs FY06–FY09	Average for 4 Yrs FY06–FY09
Disclosures	469	117
New Patents Filed	450	113
U.S. Patents Issued	102	26
Foreign Patents Issued	118	30
Licenses/Options/Letters of Intent	260	32
Software License	31	8
Miscellaneous Agreements	3302	823
Revenue-Royalties	$9,700,000	$2,425,000
Startup Companies	15	4
Startups signing Carolina Express License	0	0

Accomplishments to date:
- The first campus-wide commercialization meeting was convened by Innovation Circle members Christy Shaffer and Don Holzworth in early 2011. The purpose of that meeting was to discuss ways to make Carolina a higher-performing institution in technology transfer. That meeting demonstrated the need for a comprehensive plan.

Deborah Stroman, PhD CLU

Deborah Stroman, Ph.D. CLU teaches Sport Administration at UNC and is chairperson of the Black Faculty and Staff Caucus, faculty advisor to the Carolina Business Club and Sigma Alpha Lambda (honors leadership society); director of the undergraduate sport administration internship program; and departmental academic advisor. Her research interests are social issues in sport, entrepreneurship, and leadership. An entrepreneur, she founded the company LASER™ (Life After Sports with Effective Results) to counsel former college and professional athletes to successfully transition from their sports career.

Scott Singleton Synerca
First User of Carolina
Express License

Scott Singleton, PhD, is an associate professor in the Eshelman School of Pharmacy and on the front line in the fight against resistant bacteria. To be able to partner with companies to develop new, more effective antibiotic compounds and bring them to market, Singleton started Synereca Pharmaceuticals in July 2009. He is the company's president and chief scientific officer. In March 2010, Synereca became the first UNC research spinoff company to use the Carolina Express License. Synerca also received a Carolina KickStart commercialization grant to sort out property rights and patents.

TRANSLATE

- Personnel turnovers (Vice Chancellor for Research, Director for the Office of Technology Development) delayed strategic planning. The new Vice Chancellor for Research, Barbara Entwisle, recently established a Task Force on Commercialization to recommend a comprehensive plan for the campus.
- Carolina KickStart, Launching the Venture, Carolina Challenge, the newly-created Blackstone Entrepreneurs Network, unit laison, and the Office of Technology Development are working together resulting in an increase in the pipeline of startups. In 2012 Carolina jumped from the previous average of 2 per year to seven licensed startups.
- The Office of Technology Development:
  - o The Carolina Express License, developed in late 2009, has gained national recognition as a model of how to expedite the commercialization process. The Carolina Express License is a standard license agreement aimed exclusively at UNC startups and intended to increase the number of new companies started and technologies licensed rather than maximizing financial gain. The license offers the same terms to all UNC startups and, while optional, offers the best possible deal available from the University in areas such as royalties (1 percent on products requiring FDA approval based upon human clinical trials and 2 percent on all other products – cash payout to the University in the event of a merger, stock sale, asset sale or IPO – 0.75 percent of the company's fair market value) and other provisions that encourage broad commercialization of the licensed technology. To date seventeen companies have executed an Express License, (FY10-FY11-FY12: 3, 6, 8 = average 6/yr) and the model has been adopted by several other universities and institutions.
  - o The startups increased from an average of 3.75 during the FY06-09 period to an average of 8 during the FY10-12 period. There was a steady climb during FY10-FY11-FY12 to 5, 7, 11 startups per year. See figure 4, 5, 6, and 7 for details.

FIGURE 4: UNC-CH OTD AVERAGES (FY06–FY09, FY10–FY12)

	Average for 4 Yrs FY06–FY09	Average for 3 Yrs FY10–FY12
Disclosures	117	143
New Patents Filed	113	124
U.S. Patents Issued	26	31
Foreign Patents Issued	30	28
Licenses/Options/Letters of Intent	32	30
Software License	8	8
Miscellaneous Agreements	823	730
Revenue-Royalties	$2,425,000	$2,433,333
Startup Companies	4	8
Startups signing Carolina Express License	0	6

FIGURE 5

In 2010, AUTM data shows that the University of Carolina at Chapel Hill brought in $737,591,959 in research expenditures. Out of the fifteen listed, Carolina ranks:

- Inputs
  - o Licensing Revenues: 14th
  - o Expenses Reimbursed: 7th
  - o Percent Reimbursed: 4th
- Investments in Commercialization (costs)
  - o Patent Expenses: 14th
  - o Patent Expenses/Research Dollars as %: 13th
- Results
  - o Disclosures: 14th
  - o Disclosures/$100M Research Exp as %: 15th
  - o Patents Filed: 14th
  - o Startups: 13th
- Staff
  - o Licensing FTE: 14th
  - o Other FTE: 13th
  - o Research expenditures per FTE: 2nd (fewer people per research expenditures)

- Carolina KickStart developed a series of programs to advance commercialization:
  - o BioEntrepreneur Workshop. Brings biomedical researchers and clinicians from UNC and Duke University together for an overview of life science startups and has local entrepreneurs work one on one with the faculty to help them lay out a twelve-month action plan. Results: 42 faculty attended which has yielded 3 startup companies to date.New Enterprise Opportunity (NEO). Designed to support faculty members with very early-stage technology. NEO provides a number of services to help form, launch, and grow the company: incorporation and documentation, consultants for SBIR grants and providing an evaluation of the technology, and recruitment of the CEO.
  - o KickStart Commercialization Award. Provides pre-seed funds of up to $50,000 to help UNC startups meet early milestones in their commercialization efforts. The awards are flexible for early-stage companies and fund both technical activities (validation studies, prototype development) and business activities (market research, IP review). These awards have funded eighteen UNC startups with $665,206 with an ROI of 9.1 (companies received $6,110,696 in non-dilutive and institutional investment).
  - o KickStart Labs. Launched in Fall 2012, provides 6,000 sq. ft. of dedicated on-campus Class A wet-lab incubator space and offices for UNC startups. The state-of-the-art facility provides bench space, office space, shared areas (cold-room, hoods), and shared equipment.

Clinical Sensors

Clinical Sensors, Inc. was established in 2009 by Professor Mark Schoenfish, PhD, to develop sensors for diagnosing infection in Intensive Care Units (ICUs) and assessing prognosis upon treatment. The company is focused on the development of miniaturized sensors for analysis of sepsis biomarkers to save lives, reduce complications, and decrease health care costs related to the treatment of sepsis. Clinical Sensors is currently receiving mentoring with the Blackstone Entrepreneurs Network.
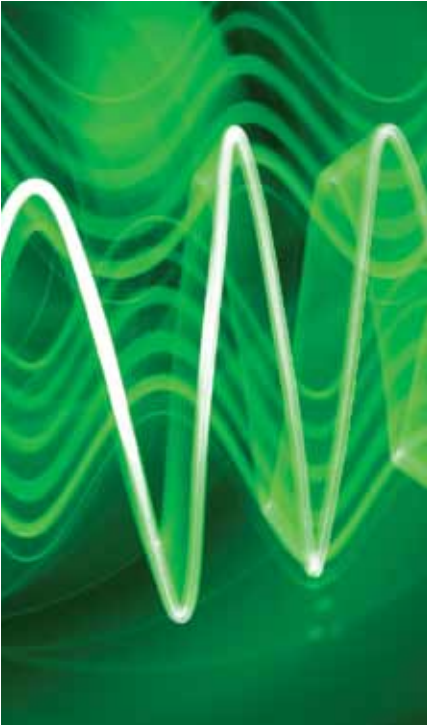
Impulsonic

Impulsonic was founded by students and researchers from the GAMMA lab in the Computer Science department at the University of North Carolina at Chapel Hill. Over the past six years, the GAMMA lab has leveraged its high-performance computer graphics expertise to develop cutting-edge technology for real-time sound synthesis and rendering for a variety of applications, ranging from movies and games, to architectural design and outdoor noise modeling. Impulsonic will bring next generation audio and acoustics technology to these applications through innovation.

The short-term lease and access to capital equipment is ideal for startups with SBIR or early VC funding. Assisted with 12 Facility Use Agreements (FUAs) and reduced the average time to get such an agreement in place from six to two months.

o Research to Revenue and eTeams. Teams of students from the sciences (PhD, post-doc), the law school, and the business school work together to provide an initial assessment of a UNC technology. Working with a local entrepreneur as coach, the teams assess the IP, technical risk, and market feasibility. Results: 28 technologies were evaluated by a total of 62 students. Currently 35% of students have moved to careers related to technology development or startups.

o Communication. Held a series of webinars on basics of entrepreneurship. A total of 225 unique visitors have viewed the series. Carolina KickStart monthly newsletter includes current news on UNC startups, curated articles on entrepreneurship and local events. The newsletter reaches 744 subscribers.

o Engage the entrepreneurial community.
  • Emerging Company Showcase. Produced in conjunction with Innovate@Carolina, RENCI, OTD and the Kenan-Flagler Business School, showcases companies spinning out of UNC. An hour of short company pitches in two tracts is followed by several hours of networking where more than 250 entrepreneurs, investors, consultants, and service providers meet with each company. Two dozen companies are selected each year with attendance averaging 236 (increasing by 23% per year).
  • Business lead recruitment. Results: 24 companies/potentials have been introduced to management talent; 12 now playing an active role in company development.

o Mentorship to faculty, staff, and students aspiring to commercialize their technology. Business and Technology Innovation Fellowships were established. The Business Fellow is a recent M.B.A. graduate who is given access to UNC's early-stage pipeline to find a startup opportunity. The Technology Fellow, funded by the Kauffman Foundation, is a recent PhD student who has worked in the lab of a technology that is being spun out. Two past fellows have successfully launched startups. They have secured a combined $530,000 in funding for their startups ($80,000 and $450,000).

o Pharmacy Technology Scout. Uncovered pipeline of commercial potential out to 3+ years; 10 potential new startup opportunities identified.

o Track and report. Developed a CRM database to track contacts and UNC startups. Database includes 878 contacts with details on technical/business expertise, CVs, LinkedIn Info, associated companies, and contact information.

o Dean of Pharmacy Bob Blouin appointed Dhiren Thakker as associate dean of entrepreneurship, established the Center for Drug Discovery led by Stephen Fry, and recruited a noted translational scientist to bring his entire team to Carolina. Additionally, the Pharmacy School includes engaged scholarship (entrepreneurial activities) in their tenure considerations.

Led by Rich Superfine,PhD, Rheomics is a UNC startup that builds systems to diagnose clotting disorders and cancer metastasis.

Augment Medical was developed by students in the joint UNC/NCSU Biomedical Engineering program and is a resident team at UNC's Carolina Launch Pad.

- The Center for Entrepreneurial Studies in the Kenan-Flagler Business School enhanced two programs to help founders: Launching the Venture and Carolina Challenge.
  - o Launching the Venture is an interactive six-month course designed to assist faculty entrepreneurs in evaluating the feasibility of their potential company, designing a business strategy, and creating a business plan. The course is free to UNC-affiliated faculty, staff, and students. It is offered in partnership with the OTD and Carolina KickStart. Launching the Venture continues to help faculty, staff, and students from across UNC-Chapel Hill turn new ideas into viable ventures. Since its inception in 1999, Launch has helped create over fifty startups.
  - o The Carolina Challenge annual startup competition is open to all UNC students, staff, faculty, and alumni with a special focus on fostering entrepreneurship. It has enhanced the program and extended its reach over the years. In 2012, individuals from thirty different disciplines participated in the competition, which is a testament to its ever-broadening reach and importance to the University community. Entrants compete in one of four tracks: high-tech, low-tech, social, and faculty/staff/alumni. The Carolina Challenge awards $50,000 in prize money each year to a total of twelve competing ventures. In 2012, there were 400 total participants – 258 were competitors and the others were judges. Of the 258, 79 were current MBAs or BSBAs, 15 were faculty-student teams, and the rest were non-business students. Public health PhD student, Alice Wang and second-year MBA student Alan Lefebvre won the top-prize of $15,000 for KM Water Solutions.
- Blackstone Entrepreneurs Network was established to guide high-potential startups. (Described in previous section)

What we learned:
Creating and implementing a strategic, coordinated approach to supporting Carolina's commercialization efforts is even more urgent today than previously. With the intense focus on addressing societal needs by converting knowledge into practical value, faculty are creating more work for the technology transfer office. Yet, many faculty are unaware of where to turn for help with their ideas. When the focus on innovation increases the volume of high-potential startups (a desired outcome), it also increases the need for additional staff and patent dollars. An already understaffed, over-worked, under budgeted OTD finds it challenging to keep up with the demand.

Targeted Reading Intervention

Dr. Lynne Vernon-Fagens in the UNC School of Education created Targeted Reading Intervention (TRI) to meet the needs of the rural communities, teachers and students. The TRI is a dual-level professional development intervention for both K-1 classroom teachers and their struggling readers.
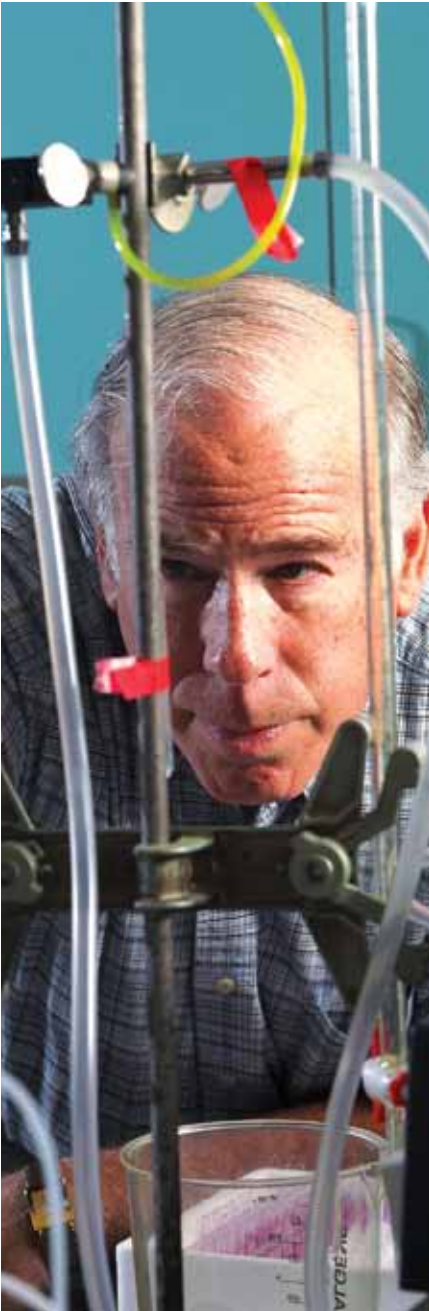
Phil Singer, PhD in his lab, UNC-Chapel Hill. Singer is a professor of Environmental Sciences and Engineering, Director of the UNC Drinking Water Center, and a member of the National Academy of Engineering.

Carolina traditionally has underperformed in translating its knowledge into practical benefit through commercializing its IP, thus there was no culture of startups that helped push the university forward. Nor had the University kept track of the startups coming from students. The Kenan-Flagler Business School has shown leadership in its curricular and co-curricular programs and has some successful student-created startups.

Agreeing on the philosophical framework for innovation and commercialization is critical and will inform decisions on structure, people, processes, and budgets. Carolina wants its innovators to contribute practical benefit to society, especially addressing some of today's most serious issues. The University must back that mandate with significant support, maximize intellectual property, and find the right licensing for technologies. It must invest the resources upfront and demonstrate patience, especially since Carolina IP is heavily weighted toward life science. When the University thinks of patent dollars as investments rather than expenses, revenues generated from licenses become of secondary concern. If UNC cares most about moving ideas to impact, then it will make the long-term investment required.

Once the Chancellor made commercialization a priority and brought together the resources needed, progress began. The University is at a crossroads.

UNC has much work ahead in translating its knowledge into practical benefit as the following data indicate.

Next steps:
- Move forward with the Task Force for Commercialization. It will include at least the following groups: Office of Technology Development (OTD), Corporate Relations, Office of Sponsored Research, Carolina KickStart at the TraCS Institute, Kenan-Flagler Business School/Center for Entrepreneurial Studies/Kenan Institute of Private Enterprise, Office of Innovation & Entrepreneurship, student representatives, academic entrepreneurs, serial entrepreneurs, investors, professional service providers, representatives from schools and/or institutes and centers who have faculty, students, and staff who commercialize or assist those who do, and others as identified.
- Leverage the Frank Hawkins Kenan Institute of Private Enterprise. The new leader, Joe DeSimone, is an academic entrepreneur, helped lead the design of the Carolina Express License, holds 70 patents, and has a spinout called Liquidia. Recommend a bold and innovative plan for commercialization for Carolina backed by the University. For any plan to be successfully implemented means the University will have to provide the optimal organizational structure, assign experienced leaders for this work, and adequately fund commercialization as a core function of the research agenda.
- Continue to support programs across the campus dedicated to commercialization.

GOAL 3.3 Measure the impact of innovations and innovators launched at Carolina.

Aspirations:
In the future, the University will know the extended benefit of Carolina innovators and innovations to society.

Status in 2009:
In 2009, it was difficult to find the correct information on startups and on commercialization. Databases were either non-existent, in multiple places, or issued conflicting information.

Accomplishments to date:
- The Office of Innovation & Entrepreneurship engaged program leaders across campus to discuss the need for a common platform for managing contacts, networks, and programs as a first step to measurement. Discussions are under way with the Salesforce Foundation to implement Salesforce as the CRM for the innovation and entrepreneurship programs. The Blackstone Entrepreneurs Network is the first program to adopt Salesforce and has found it to be a helpful tool in tracking and communicating information to various stakeholders.

FIGURE 6: ASSOCIATION OF UNIVERSITY TECHNOLOGY MANAGERS AUTM

	Research Expenditures	Licensing FTE	Other FTE	$Research/ Licensing FTE	Licensing Revenues	Patent Expenses
Stanford	$805,973,770	17	13	$47,410,222	$65,466,286	$7,059,494
Univ. of California System	$5,171,519,289	72	91	$71,826,657	$104,434,511	$26,583,654
Univ. of Texas System	$2,346,099,522	46.7	54.3	$50,237,677	$38,309,487	$7,726,017
Univ. of Utah	$450,488,999	9.75	18.5	$46,204,000	$37,547,208	$3,296,298
MIT	$1,400,945,000	20	15	$70,047,250	$69,200,000	$15,300,000
Univ. of Michigan	$1,139,493,986	9	17	$126,610,443	$39,822,113	$5,731,315
Univ. of Florida	$535,877,029	17	6.5	$31,522,178	$29,235,006	$4,346,136
Univ. of Illinois Chicago Urbana	$878,072,000	22	11	$39,912,364	$13,471,311	$4,743,201
Ohio State Univ.	$755,661,682	6.82	6.02	$110,800,833	$1,907,046	$3,401,174
Univ. of Washington/Wash. Res. Fdn.	$887,329,593	15.38	42	$57,693,732	$69,032,163	$3,857,918
Univ. of Wisconsin at Madison	$1,029,000,000	24	46	$42,875,000	$54,300,000	$9,780,000
Duke Univ.	$826,993,375	10	16	$82,699,338	$25,733,526	$3,868,220
Univ. of North Carolina Chapel Hill	$737,591,959	6	7	$122,931,993	$2,597,841	$2,955,491
North Carolina State Univ.	$360,795,000	6	9	$60,132,500	$5,117,361	$2,691,790
Univ. of Virginia Patent Fdn.	$276,308,000	7	9	$39,472,571	$5,206,704	$2,999,202

What we learned:

- The diffused nature of the innovation and entrepreneurship programs seems to work fairly well on campus in assisting life science startups. Non life science startups do not such extensive support.
- Data collection and measuring impact has not been a priority and systems are non-existent or do not meet the needs of the staff. The current OTD tracking and measurement software is causing an already understaffed office to spend extra time tracking down data and making reports.

Next steps:

- Establish a tracking system across the campus for social and commercial startups and their impact.
    - Continue Salesforce implementation.
    - Equip OTD with the appropriate software needed to operate efficiently.
- Document the significant role Carolina plays in our local and regional economy.
    - Convene a group of researchers to include the Office of the Vice Chancellor for Research, Office of Institutional Research and Assessment, the Odum Institute for Research in Social Science, and others to discuss the options for this study.
    - Replicate the study, *Entrepreneurial Impact The Role of MIT*, which analyzes the economic effect of MIT alumni-founded companies and its entrepreneurial ecosystem.
    - Study the broader contributions in terms of innovation and our influence on political, social, cultural, and environmental benefits as well as the economic impact.

Please note that data from the Association of University Technology Managers (AUTM) is self-reported and there are variations in how institutions categorize items. For instance, California and Texas aggregate their data by state.

	Patent Exp/ Res. Dollars	Expenses Reimbursed	Percent Reimbursed	Patent Investment	Disclosures	Disclosures/ $100M Research Exp.	Patents Filed	Startups
Stanford	0.88%	$2,747,634	39%	$4,311,860	467	58	476	N/A
Univ. of California System	0.51%	$20,825,631	78%	$5,758,023	1565	30	1183	75
Univ. of Texas System	0.33%	$4,107,164	53%	$3,618,853	713	30	704	33
Univ. of Utah	0.73%	$1,057,047	32%	$2,239,251	208	46	219	18
MIT	1.09%	$8,760,000	57%	$6,540,000	521	37	569	17
Univ. of Michigan	0.50%	$4,040,148	70%	$1,691,167	290	25	307	10
Univ. of Florida	0.81%	$2,408,283	55%	$1,937,853	295	55	288	9
Univ. of Illinois Chicago Urbana	0.54%	$1,241,005	26%	$3,502,196	327	37	377	8
Ohio State Univ.	0.45%	$686,615	20%	$2,714,559	173	23	129	8
Univ. of Washington/Wash. Res. Fdn.	0.43%	N/A	N/A	N/A	354	40	273	7
Univ. of Wisconsin at Madison	0.95%	$1,250,000	13%	$8,530,000	356	35	216	5
Duke Univ.	0.47%	$1,631,600	42%	$2,236,620	214	26	282	5
Univ. of North Carolina Chapel Hill	0.40%	$1,955,913	66%	$999,578	125	17	125	5
North Carolina State Univ.	0.75%	$1,877,506	70%	$814,284	124	34	68	4
Univ. of Virginia Patent Fdn.	1.09%	$1,475,871	49%	$1,523,331	139	50	185	2

FIGURE 7: UNC-CH OTD 5-YEAR SUMMARY (FY06–FY10)

	FY06	FY07	FY08	FY09	4-yr total	4-yr average
DISCLOSURES						
Inventions (incl. research tools)	86	86	99	118	389	97
Software	0	18	15	16	49	12
Other	11	9	8	3	31	8
Total	**97**	**113**	**122**	**137**	**469**	**117**
PATENT ACTIVITY						
New Patents Filed	113	109	121	107	450	113
U.S. Patents Issued	32	32	18	20	102	26
Foreign Patents Issued	39	36	22	21	118	30
Total Issued	**71**	**68**	**40**	**41**	**220**	**55**
COMMERCIALIZATION AGREEMENTS						
Licenses/Options/Letter of Intent	55	87	50	68	260	65
Software License	4	2	10	15	31	8
Total Commercialization Agreements	**59**	**89**	**60**	**83**	**291**	**73**
MISCELLANEOUS AGREEMENTS						
MTA*	586	717	756	753	2812	703
CDA	43	75	99	162	379	95
Other (IIAs, Patent Exemption Agreements, etc.)	29	20	30	22	101	25
Total Miscellaneous Agreements *	**668**	**812**	**885**	**937**	**3302**	**826**
REVENUE						
Royalties ($ millions)	**$2.2**	**$1.7**	**$2.8**	**$3.0**	**$9.7**	**$2.4**
NEW VENTURE DEVELOPMENT						
Start-Up Companies	6	1	7	1	15	4
Start-ups signing Carolina Express					**0**	**0**

*In 2010 OTD adopted significant changes in its MTA program to reduce the volume.
 FY12 was the first full year for these changes.
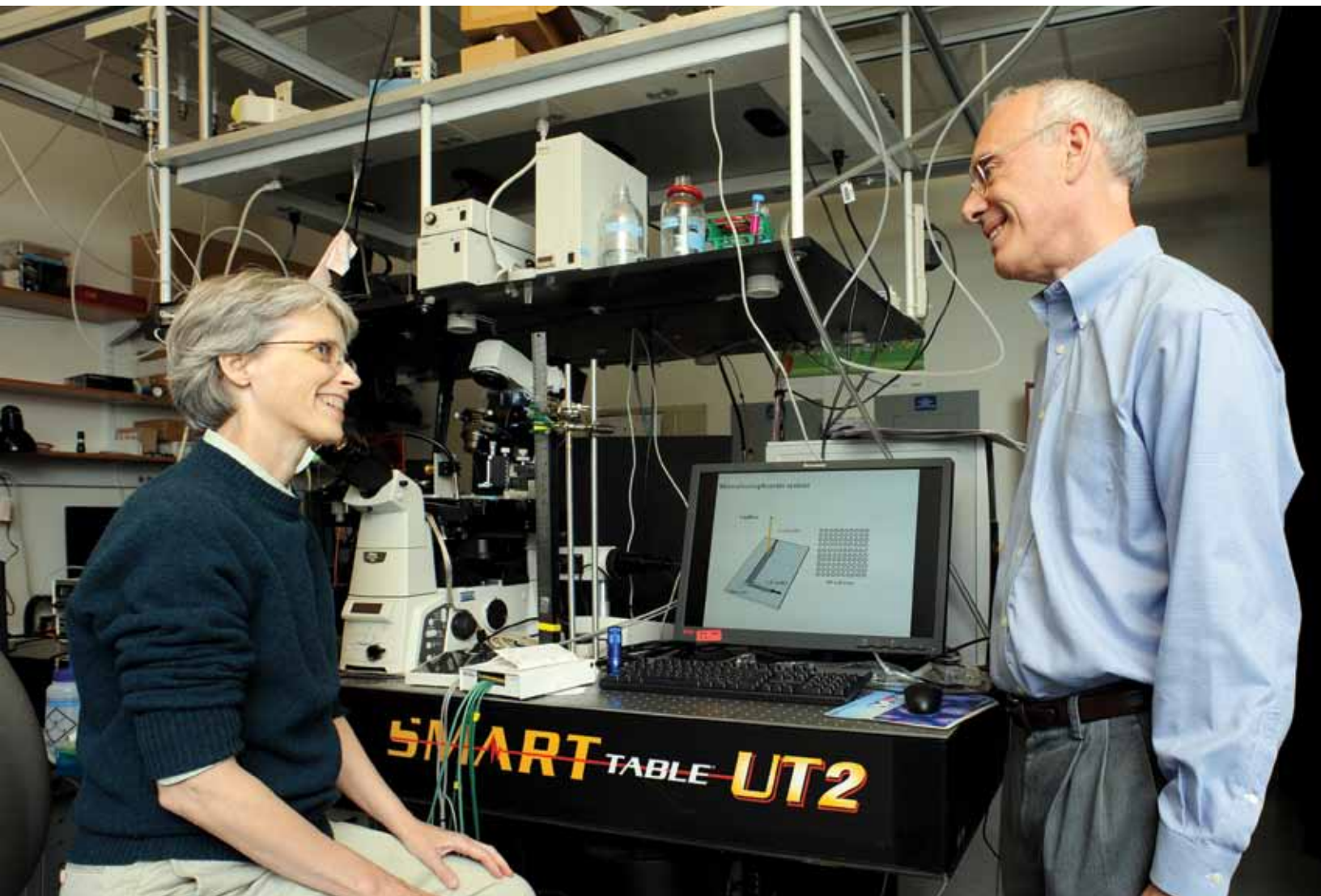
Nancy Allbritton

Nancy Allbritton, MD, PhD, is Professor & Chair of the UNC/NCSU Joint Department of Biomedical Engineering, the Paul Debreczeny Distinguished Professor of the UNC Department of Chemistry, and Professor, UNC Department of Pharmacology. She obtained her B.S. in physics from Louisiana State University, Ph.D. in Medical Physics/Medical Engineering from M.I.T., and M.D. from Johns Hopkins University. Allbritton was a professor in the Departments of Physiology and Biophysics, Biomedical Engineering, Chemistry, and Chemical Engineering at the University of California, Irvine until her recruitment to UNC in 2007.

At UNC Dr. Albritton co-founded Cell Microsystems to address the challenges with current cell separations - high capital cost, intensive manpower and time requirements, a high rate of cell death, the need for large samples, severely limited options for cell identification, and technology limitations resulting in the inability to separate the cells of interest. The IsoRaft system is an elegant yet simple cell separation and clone selection technology that addresses many of these limitations. It lowers the barrier to entry for performing cell isolations by reducing both the fixed and variable costs, making cell separation technology affordable to every individual lab.

Her current research is directed at the development of new technologies to address biological problems with a primary emphasis on cell and protein-based methodologies. Allbritton founded two previous biotech start-ups based on technology developed in her lab: Cell Biosciences (now Protein Simple) and along with Drs. Sims and Wang, she founded Intellego, Inc., a UCI spin out that became a subsidiary of Amkor, Inc.

Ric Boucher

William Rand Kenan Professor of Medicine
Director, UNC Cystic Fibrosis and Pulmonary Diseases Research and Treatment Center
Co-Director, UNC Gene Therapy Center

Richard C. Boucher Jr., MD, is recognized internationally as a preeminent leader in cystic fibrosis research, having made a series of seminal discoveries and pioneered the development of important therapies. At UNC he has built a global center for pulmonary disease investigation and clinical care. Cystic Fibrosis (CF) is the most common lethal genetic disease in the Caucasian population, affecting one in 3300 births. Other ethnic populations are affected less frequently. The CF gene codes for a protein responsible for controlling salt and water transport across the cells lining the lung, pancreas, and other organs. When this gene is abnormal, secretions in these organs become dehydrated and sticky, and eventually clog airways.

Since the 1970s, his work at UNC has focused on cystic fibrosis whose cause was unknown until Dr. Boucher's discoveries in the early 1990s. Working closely with aUNC team headed by Oliver Smithies, PhD, Professor of Pathology and Laboratory Medicine and a co-recipient of the 2007 Nobel Prize in physiology or medicine, theycreated the first cystic fibrosis mouse model and discovered the extracellular signaling functions of adenosine triphosphate (ATP) in the lungs and its importance in healthy lung functioning. This discovery became the basis for the UNC startup Inspire Pharmaceuticals. Inspire Pharmaceuticals developed and marketed a drug that mimics the ATP function for use with cystic fibrosis patients and in the process created 250 jobs, went public, and later was sold.

From the days of his research, Boucher had a commitment to getting treatments into clinics to help patients. Before the advancements in CF treatments, the average life expectancy of a young person with CF was 16 years old; now it is well over 40. Christy Shaffer, former CEO of Inspire Pharmaceuticals said of Boucher, "Ric was doing translational research long before most people had even heard that term. He has the academic credentials and is a serial entrepreneur—that combination is rare. "

Christy Shaffer and Rick Boucher

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ALIGN

Recommendation 4: Align people, incentives, resources, and processes to strengthen an intentional culture of innovation at Carolina.

This recommendation has four goals: 1) strengthen support from campus leaders; 2) recruit, retain, reward innovators; 3) align processes; and 4) fund innovations.

GOAL 4.1 Encourage leaders across campus to support and promote innovation in their schools, departments, institutes, and offices.

Aspirations:
In the future, administrators and campus leaders will seek ways to advance innovation in their strategic plans. When faculty and staff have promising ideas, leaders will be flexible and creative in finding ways to assist the innovative faculty or staff member when appropriate.

Status in 2009:
In 2009, there was no way to systematically encourage a culture of innovation and entrepreneurship. The Carolina Entrepreneurial Initiative had introduced the concept as a cross-campus entrepreneurship focus, recruited and organized a campus-wide leadership structure, and launched successful programs. Once Kauffman funding ended, formal campus-wide support for faculty and student innovation was limited.
The only space on campus institutionally supported for startups was at the Renaissance Computing Institute (RENCI) which housed the Carolina Launch Pad program.

Accomplishments to date:
- Top administrators have consistently and strategically demonstrated support for innovation and entrepreneurship:
- The Chancellor through the release of his book, *Engines of Innovation*, participation in the U.S. Department of Commerce's National Advisory Council on Innovation and Entrepreneurship (NACIE), and numerous speaking engagements. He worked closely with the senior leadership team to advance the innovation vision through their work. This included innovation as a standard agenda item in regular senior leadership meetings and senior communication officers promoting the story of innovation and innovators at Carolina.
- The Provost has directly supported several key initiatives and championed the Roadmap in general. Recently, he presented the Innovate@Carolina work at the annual Association of American Universities (AAU) Provosts meeting.
- Senior communication and advancement personnel have promoted innovation and entrepreneurship.
- The Special Assistant to the Chancellor for Innovation and Entrepreneurship has worked with leaders across campus and served on key task forces and committees, sponsored events and programs, presented the Innovate@Carolina initiative to numerous audiences, and worked closely with the leaders across the campus.

A Ban Against Neglect (ABAN) founder Callie Brauel

Local kids help out on a recent work day at UNC student-led venture Hope Gardens

- Created innovation spaces for students, faculty, and staff including the Carolina Union Innovation HUB, H4 in Career Services, the Campus Y Social Innovation Incubator, innovation space in the Health Sciences Library, Carolina Launch Pad at RENCI, LAUNCH (downtown Chapel Hill incubator), wet lab space for faculty and students in the new Genome building, and Entrepreneurs Lounge in Sitterson Hall – the home of computer science. Carolina Launch Pad supports five emerging companies each year. Launch Pad is a collaboration between RENCI, OTD, and the Kenan-Flagler Business School that supports information technology startups founded by UNC faculty, students, and staff. Companies receive office space at RENCI for one year, high speed Internet connectivity, conference facilities, office supplies and easy access to consultations with RENCI technical staff. In addition, Launch Pad connect hosted start-ups with coaching, mentoring, and presentations by professionals with OTD, the business school, and the local business community.
- The C. Felix Harvey Award is given to the UNC faculty member or members whose proposed outreach project best reflects applied scholarly expertise in the humanities and social sciences. It seeks to support faculty who want to move their research findings from the campus to directly serve communities.
- Entrepreneurs-in-Residence are at work across campus helping faculty vet their ideas for market potential and building ventures. Currently there are EIRs serving pan-campus, in the department of economics, schools of public health, social work, education, public policy, medicine, and business, and with the Blackstone Entrepreneurs Network.
- Associate deans of entrepreneurship have been appointed in medicine, pharmacy, and computer science to lead their entrepreneurship development efforts. This marks an important step in further solidifying the commitment of these units to entrepreneurship. Respectively, they are Cam Patterson, Dhiren Thakker, and Tim Quigg.
- The Dean of the Kenan-Flagler Business School, Jim Dean, hired a new director for the Frank Hawkins Kenan Institute of Private Enterprise. He sought a leader who could turn the Institute into a global leader in entrepreneurship and selected Joe DeSimone.
- Institute for the Arts and Humanities (IAH) holds an annual competition for the most innovative faculty ideas and then works closely with the applicants and awards recipients to help them create and execute on their plans.
- The Office of the Vice Chancellor for Research, in conjunction with Innovate@ Carolina sponsored a Carolina Apps competition to bring Carolina-born ideas to wider audiences through the creation of innovative mobile applications with broad public appeal. The use of mobile apps in the

Dennis Whittle, EIR

UNC has the potential "to become the Silicon Valley of social entrepreneurship," says Dennis Whittle '83, the first Global Social Entrepreneur-in-Residence at UNC's Center for Global Initiatives. Entrepreneurs-in-Residence are a common feature on the campus helping faculty vet their ideas for market potential and building ventures. The serve in the the schools of public health, social work, education, public policy, medicine, business, and the College and Arts & Sciences.

research, translation, and application of knowledge developed at UNC is a relatively new frontier. The first proposal selected was developed from concept to finished product with the technical assistance of an external development team and launched for beta testing this fall.

- UNC Health Care:
    - o Launched a Center for Innovation aimed at the development of patient-centered innovations that address the current challenges facing our nation's health care delivery system related to cost efficiency, quality of care, innovative health care delivery, and alignment of incentives among industry participants. The Center's mission is to initiate, evaluate, disseminate and support adoption of patient-centered disruptive innovations in the delivery and financing of health care and increase value with improved health outcomes and lower costs. The Center provides rapid assessment, coordinated facilitation, partnership development, and funding for innovation using nimble and agile approach.
    - o Innovation has long been a focus of UNC Health Care and the UNC School of Medicine. Last year with the support of resources that now form the Center for Innovation, UNC Health Care and Blue Cross and Blue Shield of NC opened a new and collaborative primary care practice called Carolina Advanced Health (www.carolinaadvancedhealth.org) that aligns incentives between payer and provider and offers an advanced model of care under one roof for patients with chronic illness. UNC Health Care's continued focus on innovation is expected to result in new business model innovations, clinical process redesign efforts, new care delivery models and pathways, continuum of care expansions, new technology deployments, and translational research discoveries.
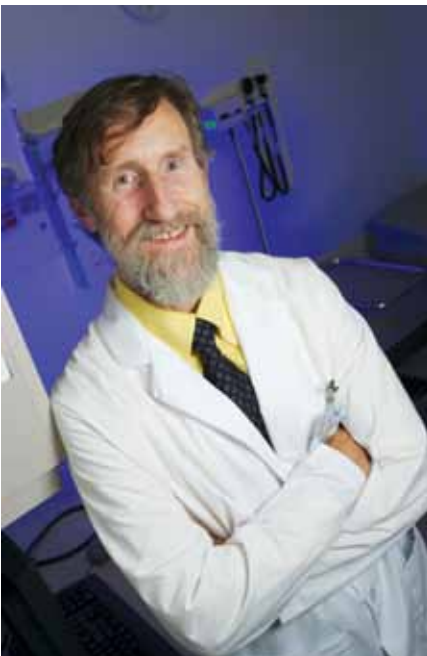
What we learned:

For the translation of ideas into practical value to become part of the institutional culture requires sustained and intentional effort and the consistent alignment of resources, people, budgets, time, space, and reward systems. The three steps in the Innovation Process – ideation, translation, and impact – typically are not equally supported in a major research university. The first step, ideation includes research which is UNC's core competency. The second step, translation to audiences beyond academic peers, is more difficult within the framework of the research university which impacts the final step – impact.

Next steps:

In order to keep the momentum and continue the Roadmap implementation:

- Senior administrators, deans, directors, department heads, and student leaders continue to focus on innovation as a top priority and direct time and resources appropriately.
- Board of Trustees, Board of Visitors, Parents Council in Student Affairs, and key advisory boards across campus continue to make innovation and entrepreneurship a priority.
- All major university strategy documents reflect innovation as a priority.
- Demonstrate institutional commitment by including innovation and entrepreneurship as a top priority in the upcoming multi-billion dollar fundraising campaign.

UNC Health Innovation Centers

Directed by Chief Innovation Officer David Rubinow, MD and Chair of Psychiatry, UNC Health Care's Health Innovation Center was launched to initiate, evaluate, disseminate and support adoption of disruptive innovations in the delivery and financing of health care that are patient centered and increased value with improved health outcomes and lower costs.

GOAL 4.2 Recruit, retain, and reward faculty, students, and staff who show promise, aptitude, and/or achievement in innovation.

Aspirations:
In the future, faculty, students, and staff will be rewarded for pursuing promising ideas to their ultimate application. When the most talented, innovative prospective faculty, staff, and students make their choices on which institutions to join or choose, the supportive innovation culture will weigh favorably for Carolina.

Status in 2009:
Carolina has a long history of recruiting and supporting innovators who are recognized leaders in their respective fields of study. In the December 2009 *Sample of Current Activities*, a historical timeline shows the rich history of innovations launched for the public good since the University's founding in 1789.

Accomplishments to date:
UNC boasts a world-class faculty and gifted student body. The following is a snapshot of some of the incredible achievements by Carolina innovators in the past two years, as well as success stories in UNC's ability to compete for top faculty and student talent.

Outstanding Achievements.
- An HIV study led by UNC professor Myron S. Cohen, MD, was named the 2011 Breakthrough of the Year by the journal *Science*. The study, HIV Prevention Trials Network 052, evaluated whether antiretroviral drugs can prevent sexual transmission of HIV among couples in which one partner has HIV and the other does not. The research found that early treatment with antiretroviral therapy reduced HIV transmission in couples by at least 96 percent. The work prompted the observation by U.S. Secretary of State Hillary Clinton that "The goal of an AIDS-free generation is ambitious, but it is possible."
- Kevin Guskiewicz, PhD, Kenan Distinguished Professor and Chair in the Department of Exercise and Sport Science, has made major advances in the diagnosis, treatment, and prevention of sports-related concussions. Through a combination of laboratory and on-the-field research, Guskiewicz has played an important role in raising awareness about the prevalence and dangers of sports-related brain injuries in both professional and youth athletics. He received the MacArthur Genius Award in 2011 for his work.

Recruitment.
- Sasha Kabanov, PhD and a group of twenty researchers from the University of Nebraska moved halfway across the country this summer to the University of North Carolina at Chapel Hill. Kabanov leads the Center for Nanotechnology and Drug Delivery in the UNC Eshelman School of Pharmacy. He works primarily in the areas of polymer-based drug and gene delivery, as well as biologically active polymers. He established the field of polymer genomics, which investigates the effects of polymers and nanomaterials on cellular responses to develop safe and efficient therapeutics. He is a pioneer in the use of nanotechnology to treat cancer and other diseases and is known for his discovery of a polymer that can make anticancer medications up to one thousand times more effective than

Concussion research

Kevin Guskiewicz, PhD, is the Kenan Distinguished Professor and founding director of the Matthew Gfeller Sport-Related Traumatic Brain Injury Research Center and the Center for the Study of Retired Athletes at The University of North Carolina at Chapel Hill. Over the past 17 years, his clinical research program has focused on sport-related concussion. He has investigated the effect of sport-related concussion on balance and neuropsychological function in high school and collegiate athletes, the biomechanics of sport concussion, and the long-term neurological effects of concussion in retired professional football players. Kevin has received 22 funded research grants, and published 135 manuscripts (95 peer-reviewed journal publications; and 8 textbook chapters on sport concussion). In 2010 he was named to the NCAA's Concussion Committee and the NFL's Head, Neck, and Spine Committee. In September 2011, he was awarded a MacArthur Fellowship, given annually to individuals who "show exceptional merit and promise for continued and enhanced creative work."

AIDS research

UNC's Myron Cohen, MD and his research team have made one of the greatest breakthroughs of 2011. Early results of HTPN 052 suggest that HIV transmission can be halted between couples if the infected person is treated with antiviral medications. UNC's Dr. Mina Hosseinipour (shown below with her study team), ran the study site in Malawi at UNC Project.

conventional chemotherapeutic agents against drug-resistant tumors. He has also invented technologies that hold promise for more effective treatments of brain-related diseases such as stroke, Alzheimer's, and Parkinson's.

- Stephen Frye, PhD was recruited because of his extensive industry background as a medical chemist with GlaxoSmithKline. Frye is Director of the Center for Integrative Chemical Biology and Drug Discovery, Fred Eshelman Distinguished Professor of Pharmacy. He is also the lead principal investigator for the North Carolina Comprehensive Chemical Biology Center, a UNC-based, National Cancer Institute designated center that engages in oncology drug discovery. His research focuses on chemical biology of chromatin regulation and drug discovery.

- Carolina Innovation Scholars are some of the brightest and most sought after students in the country. They receive a four-year reward that covers the full cost of tuition, fees, room, and board. Linked through the Minor in Entrepreneurship in the College of Arts & Sciences, Carolina Innovation Scholars benefit from mentoring and enrichment across the University. Currently there are five scholars; three more will be recruited this year. The program is funded by three individual funds: Mackenzie Family Foundation Innovation Scholarships, Frederick J. Houk, Jr. Carolina Innovation Scholarship, and Holden Thorp Leadership Carolina Scholarship. They are: Mackenzie Scholars – Courtney Sanford, Arjun Bhattacharya, Andrew Bauer; Houk Scholar – Sarah Browning; and Thorp Scholar – Kevin Jang.

What we learned:
UNC's demonstrated focus on innovation and entrepreneurship attracts top faculty and students from across the country. Entrepreneurship is intriguing to incoming students and a useful recruitment tool in the admissions process. Faculty who want to develop their ideas are choosing this campus because of its reputation in turning ideas into action. Tenure policy and reward systems need to be in line with recruitment and retention efforts. It will take constant vigilance to ensure that Carolina becomes and remains the place where innovators thrive.

Next steps:
- In all recruitment activities, hire people who believe in the vision of putting important ideas to work for a better world and have a track record of facilitating innovation and entrepreneurship. When forming search committees and hiring search firms, discuss this vision and include those who are committed to it. This is paramount in the search for the new chancellor and then later the provost and vice chancellor for advancement.

- Create a reward system to encourage innovation that is fair, meaningful, and customized for faculty, students, and staff. Design rewards that are tangible and intangible, including scholarships, grants, fellowships, professorships, cash rewards, time, and recognition. Realize that often the greatest reward for faculty is permission to pursue an innovation, especially when it is outside the departmental priorities.

- Review policies on tenure and promotion and what counts as University service to include consideration of innovation activities, especially with committees such as the Provost's Task Force on Promotion and Tenure.

- Continue to raise funds to support this work.

GOAL 4.3 Align the University's internal methods and processes to foster innovation, especially in working across schools.

Aspirations:

In the future, Carolina will regularly assess its internal methods and procedures and make needed changes to support the innovation culture. The University will be known for its entrepreneurial can-do attitude and willingness to quickly address roadblocks to innovation. There will be no incentive for faculty to go outside the system to pursue their translational opportunities. Those pursuits will be easier through the University because of its added value, service attitude, and efficiency.

Status in 2009:

It was well known that campus translational systems needed updating, did not support multidisciplinarity, were rule-laden, cumbersome, and slow. The OTD office was understaffed leading to some frustration on campus and in the community. The Eshelman School of Pharmacy included consideration of engaged scholarship in its tenure policy, but the overall tenure policies for the campus did not include credit for engagement and commercialization.

Accomplishments to date:
- While progress has been made in changing rules and regulations to be more supportive of the innovation process overall, much work remains.
- The Vice Chancellor for Finance & Administration, Karol Gray, is overseeing major improvements in internal processes through at least three task forces – Industry Relations, Commercialization and Clinical Trials.
- The Vice Chancellor for Research holds monthly meetings for key staff members to discuss how to streamline operations and better work with industry. The group represents such units as: Sponsored Research, OTD, Carolina KickStart, Corporate and Foundation Relations, Legal, Conflict of Interest, Clinical Trials, and the Office of Innovation & Entrepreneurship. It has proven to be a helpful forum.
- The Vice Chancellor for Research has convened three task forces: Industry Relations, Commercialization, and Clinical Trials.

What we learned:

There is a desire to work in a collaborative, multidisciplinary manner, but campus systems remain a major impediment. UNC can be a confusing environment for those who want to work outside of their units and for those trying to use outdated systems to produce novel results. Processes need significant attention.

Next steps:
- Leadership at the highest administrative level needs to indicate that improving processes to support the innovation ecosystem is critical.
- Continue overall improvements currently underway and develop an ongoing method to streamline processes.
- Encourage the Task Force on Commercialization and the Industry Relations Task Force to include in their reports ways to streamline processes.

Sasha Kabanov Group

Elena Batrakova, PhD, Sasha Kabanov, PhD, and eighteen postdocs, researchers, and grad students have found a new home in the Genetic Medicine Building. The group from the University of Nebraska moved halfway across the country this summer to the University of North Carolina at Chapel Hill to join the Center for Nanotechnology and Drug Delivery in the UNC Eshelman School of Pharmacy. Kabanov's group brings to UNC a research program that will receive more than $2.5 million in research funding from the National Institutes of Health over the next three years.

Gillings Innovation Labs

The laboratories, funded through a gift to the public health school by Dennis and Joan Gillings, aim to help accelerate delivery of real-world solutions for some of the most challenging public health problems. Each innovation lab engages in one or more of the following areas: high-impact research, demonstration projects, and teaching practices which anticipate future public health challenges and accelerate sustainable solutions in North Carolina and around the world. Currently there are 18 funded laboratories working in areas from Microfinance in Health to Mapping Tropical Disease: A Most Critical First Step.

GOAL 4.4 Provide the necessary funds to support nascent and promising innovations on campus.

Aspiration:
In the future, advancing innovative activities will be an important part of the criteria for how resources are allocated. Grantors and donors will fund innovation activities because of their confidence in the University's ability to increase the number of innovators and innovations and the velocity in which promising ideas go through the innovation process at Carolina to deliver value to society.

Status in 2009
The Kauffman Foundation grant ended and along with it the sources of funds for course creation, program support, and awards to faculty and students.

Accomplishments to date:
- Raised $52 million for the various initiatives described in the Roadmap and for other initiatives that promote innovation and entrepreneurship.
- Several grant programs were created such as: Awards from the Minor for Entrepreneurship in the College of Arts & Sciences, Carolina KickStart, IAH Awards, the Campus Y Incubator Award, and App Development.

What we learned:
The Office of Advancement at UNC is structured to support units, so cross-campus initiatives like the global initiative, innovation and entrepreneurship, or the pan-campus water theme are dependent on intentional fundraising collaboration between units.

Next steps:
- Create a fundraising plan for Innovate@Carolina in conjunction with the upcoming multi-billion dollar campaign and assign direct support for its implementation.
- Secure commitment from deans, directors and their respective lead development officers to promote innovation as it relates to their area.
- Create grants and investment funds *inside* the University.
    - o Proof of concept grants.
    - o Investment funds through an alumni angel fund.
- Connect UNC startups to funding sources (grants and investment) *outside* the University.

Otto Zhou

Brain Tumors

Otto Zhou, PhD, Distinguished Professor, Physics-Astronomy, has been awarded nearly $2 million in American Recovery and Reinvestment Act (ARRA) funding from the National Cancer Institute to apply carbon nanotube X-ray technology invented at UNC to a promising experimental microbeam radiation therapy now housed in massive synchrotrons – facilities larger than Kenan Stadium. Using carbon nanotechnology, Zhou and Sha Chang, associate professor of radiation oncology, hope to be the first to deliver the same radiation dose with a desktop-size device. About 44,500 Americans are annually diagnosed with brain tumors; only 30 percent survive. "We've made little progress in 30 years in the survival rate," Zhou says. "We want to build a system to cure brain tumors."
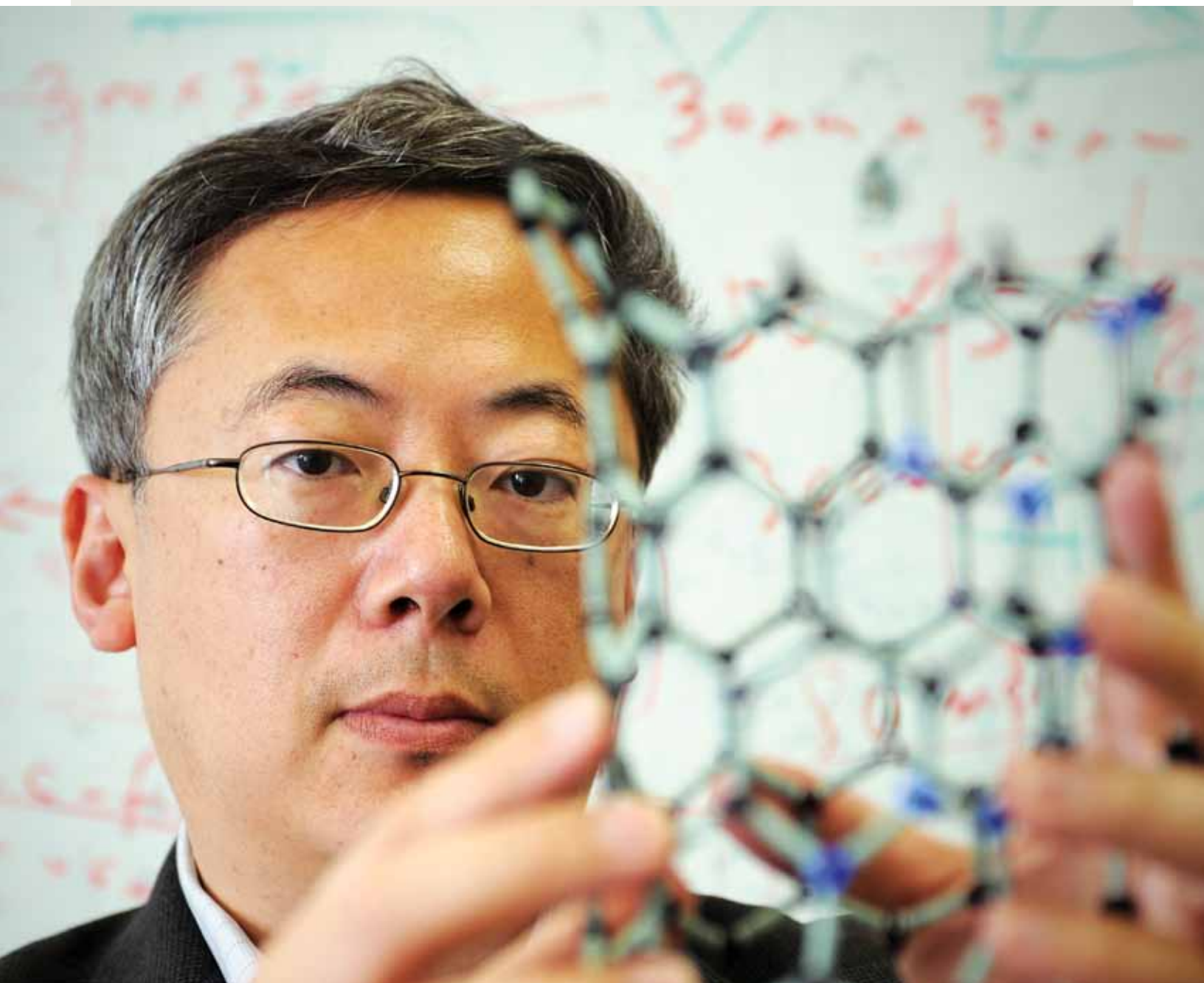
CATALYZE

Recommendation 5: Catalyze innovation at Carolina by facilitating the work of faculty, staff, and students as they put important ideas to use for a better world.

This recommendation has two goals: 1) leverage campus resources; and 2) catalyze the work.

GOAL 5.1 Leverage the talents of leaders across campus to prepare, collaborate, translate, and align resources and processes to strengthen an intentional culture of innovation at Carolina.

Aspirations:
In the future, faculty, staff, and students will lead a wide variety of integrated initiatives focused on translating promising ideas into innovative practices. Program leaders will meet regularly to leverage resources, assess the overall culture of innovation, and take steps to fulfill Carolina's innovation mission. This cooperative network approach will encourage widespread experimentation, autonomy, and integration.

Status in 2009:
The Kauffman-funded Carolina Entrepreneurship Initiative convened leaders from across campus. As a result collaborations and informal partnerships were formed. When funding ended the infrastructure for collaboration ended as well.

Accomplishments to date:
Established the Office of Innovation & Entrepreneurship in the Chancellor's Office to connect resources, people, and programs with existing and emerging opportunities.
- Formally and informally met with innovators and leaders from across the campus to regularly create new connections and promote collaboration.
- Worked to reduce redundancies and encourage the sharing of resources among programs.
- Maintained a collective and ongoing conversation about innovation and entrepreneurship with audiences internal and external to the university through an inclusive process.
- Monitored and supported projects at various stages of development across campus, filling gaps, and making connections to resources and people where possible. Targeted projects included applied sciences, the Kenan Institute director search, App development competition, pan-campus water issue, and the development of a collaborative county/town/university incubator.
- Worked closely with the Chancellor's Student Innovation Team as it continues to play an important role in advancing innovation initiatives.

What we learned:
Building a tightly linked, effective, and collaborative ecosystem for innovation and entrepreneurship takes time and deliberate attention. It is a people-intensive enterprise that involves nurturing relationships and building trust among individuals and groups that sometimes feel under-supported. The Carolina community continually demonstrates a willingness to extend themselves beyond the confines of their immediate discipline or program to collaborate, imagine, build, and implement.

Next steps:
- Continue to work with colleagues across campus to connect them to each other, raise awareness, leverage existing resources, and fill in gaps.
- Serve as a catalyst for cross-campus initiatives such as Global Entrepreneurship Week.
- Make small awards to program leaders and student groups to support their work.
- Encourage program leaders to use common technology tools to collect data, tract activities, and report impact.
- Release innovate.unc.edu website 2.0 that serves as a navigational gateway to campus resources for innovation and entrepreneurship. Encourage program leaders to link to the website and republish the navigation page on their websites.
- Raise funds to support this work.

GOAL 5.2 Create the Chancellor's Catalyze Group to facilitate the implementation of this Roadmap.

Aspirations:
In the future, the goals described in this Roadmap will receive the targeted attention and resources needed over time to realize the vision. The Chancellor's Catalyze Group (now the Chancellor's Office of Innovation & Entrepreneurship) will continuously encourage the integration, collaboration, and alignment of resources and processes. The campus will have a virtual entry point for anyone interested in learning more about innovation activities and how their plans might fit in. Further, it will have central data services, evaluation and reporting assistance, and access to required resources. The collective story of innovation at Carolina and its profound impact on society will be widely disseminated.

Status in 2009:
The marketing efforts to promote innovation and entrepreneurship across campus through the Carolina Entrepreneurial Initiative, funded by the Kauffman grant, had ended and the website affiliated with CEI was de-activated. There was no individual or group charged with continuing the work.

Students at TEDxUNC map their global travels.

CATALYZE

Accomplishments to date:
- Established the Chancellor's Office of Innovation & Entrepreneurship.
- The Special Assistant for Innovation and Entrepreneurship and the Chair of the Innovation Circle fulfilled more than 90 speaking engagements with deans, chairs, standing committees, faculty, employees, parents, women's groups, alumni, and external groups in Chapel Hill, the region, state, and nationally. The Office worked with communication officers across campus to cross-pollinate the messages about innovation and entrepreneurship.
- Developed the website innovate.unc.edu as a major communication tool for gathering and communicating Carolina's stories about innovators. Created a user-friendly central online gateway to innovation and entrepreneurship to help the Carolina community learn more about the resources, courses, programs, and people available to support innovation and opportunities for involvement.
- The UNC home page on the web has a permanent link to Innovate@Carolina and it carried year-long lead story series about innovators at Carolina.
- Published newsletters and communicated using social media: blogs, Twitter, LinkedIn, and Facebook. Help others publish stories on UNC innovators and innovations through campus media outlets including unc.edu, endeavors. unc.edu, and the University Gazette.
- Brought to campus world-class innovators such as Steve Case, founder of AOL and philanthropist; Desh Deshpande, entrepreneur and philanthropist; Cheryl Dorsey President of Echoing Green; Robert Langer, MIT professor with 800 issued or pending patents and numerous spinouts; Thomas Fogarty, noted pioneer in medical device inventions; and Art Collins, former CEO of Medtronic.
- Provided funding for staff support and helped raise sponsorships for upcoming Global Entrepreneurship Week November 12-18, 2012. GEW is an international week-long celebration of entrepreneurship funded by the Kauffman Foundation. UNC's program will include nearly 30 talented speakers over the course of the week, as well as an information fair and a 24-hour "entrepreneurathon".

Faculty:
- Communicated innovation goals to faculty through provost and senior leadership and speeches.
- Encouraged selected faculty to promote understanding of the Innovation Roadmap goals with their colleagues.
- Aligned the Roadmap goals with the Academic Plan through discussions with the Academic Plan Steering Committee.

Students:
- Office of Innovation and Entrepreneurship oversaw and engaged in activities of the Chancellor's Student Innovation Team (CSIT).
- Attended and sponsored entrepreneurship events across campus (TEDxUNC, Emerging Companies Showcase, Campus Y Social Innovation, Campus Y Incubator selection process, and Carolina Challenge finals).

Staff:
- Encouraged (through presentations and meetings) administrators and campus leaders to work with their staff members to explain the innovation goals and to solicit their involvement.
- Encouraged (through presentations and meetings) senior administrators and campus leaders to include the innovation goals in presentations to key audiences.

What we learned:
Consistent message, networks, individual relationships, credibility, resources, and a combination of one-on-one conversations with the ability to reach audiences through electronic media are all key elements in building a culture of innovation for UNC. Each of these needs to continue to realize the potential for truly embedding innovation and entrepreneurship as a lasting hallmark of the Carolina way.

Next steps:
- Work with the Admissions office to include messages about innovation and entrepreneurship at Carolina throughout the recruiting process.
- Continue telling UNC's innovation story and engaging current and potential audiences in the work.
- Continue to work closely with key individuals in departments and programs to strengthen a network of super-connectors around innovation and entrepreneurship across campus.
- Mobilize the interests and talents of student groups across campus in conjunction with the Chancellor's Student Innovation Team (CSIT). Expand the reach of student innovation efforts to more deliberately involve graduate students and post-docs.
- Work closely with the Office of Advancement to help raise the required resources.
- Continue to represent the University at key meetings nationally.
- Help measure impact.
- Advocate for strengthening a culture of innovation and entrepreneurship at Carolina.

Special Acknowledgment to the Deans

Without your strong support, this work would not have been possible. You exemplify *commitment, strategy,* and *action* for the greater good.

Dean Bob Blouin, Eshelman School of Pharmacy
Dean Jack Boger, School of Law
Dean James Dean, Kenan-Flagler Business School
Dean Karen Gil, College of Arts & Sciences
Dean Susan King, School of Journalism
Dean Gary Marchionini, School of Information & Library Sciences
Dean Steve Matson, Graduate School
Dean Bill McDiarmid, School of Education
Dean Jack Richman, School of Social Work
Dean Barbara Rimer, Gillings School of Global Public Health
Dean William Roper, School of Medicine
Dean Mike Smith, School of Government
Dean Kristen Swanson, School of Nursing
Dean Jane Weintraub, School of Dentistry
Dean Jan Yopp, Summer School

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THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

UNC–CHAPEL HILL:
TOP 10 RESEARCH UNIVERSITY

UNC Board of Trustees Commercialization and
Economic Development Committee

July 22, 2015
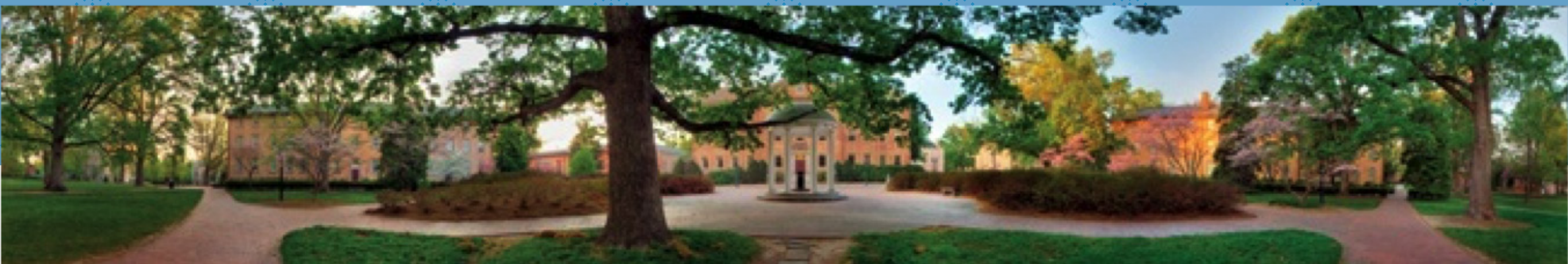
Barbara Entwisle
Vice Chancellor for Research

Photo by Sam Kittner

UNC RESEARCH

RESEARCH TO IMPACT PIPELINE
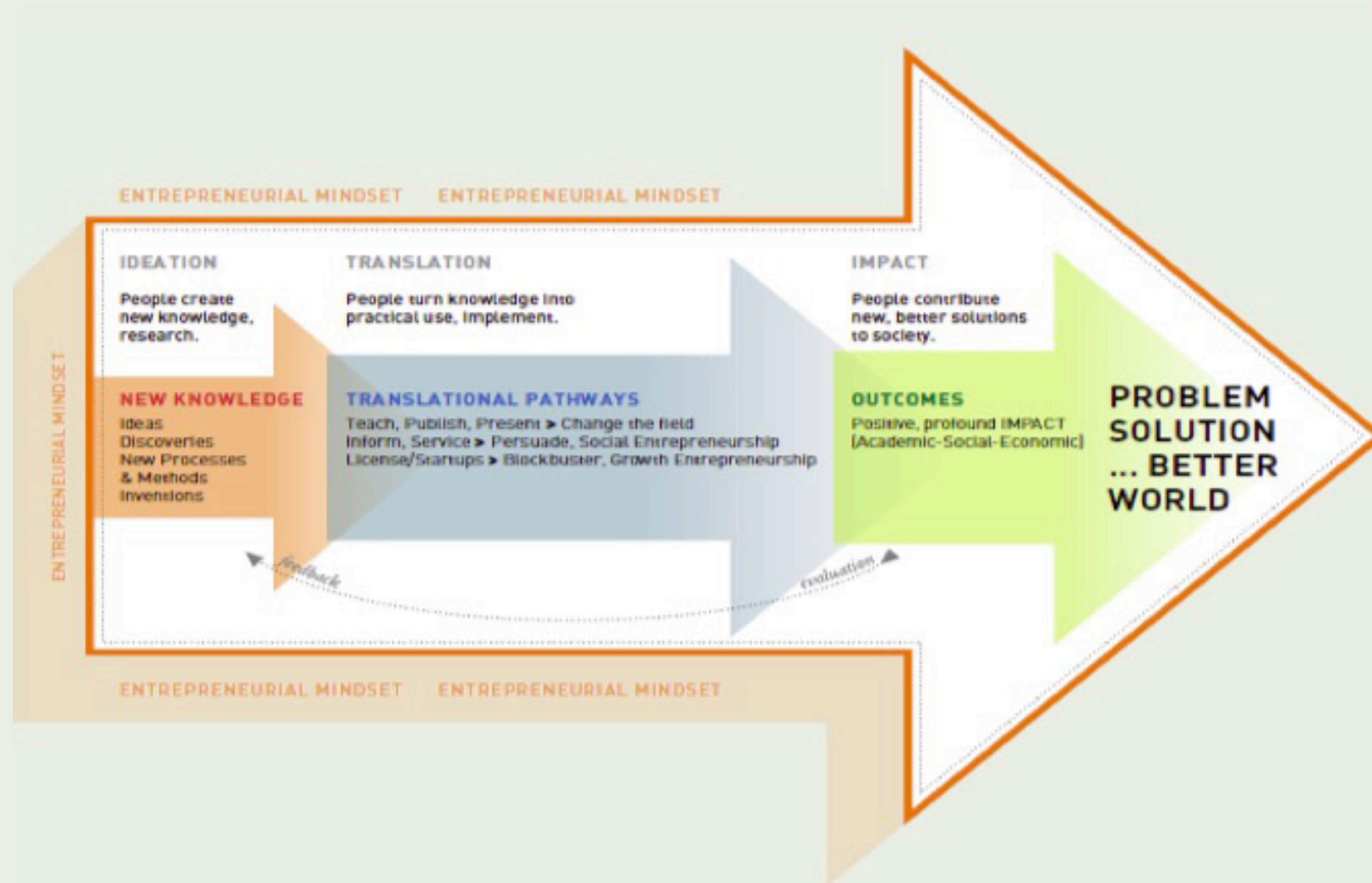
SUCCESS MEASURES FOR RESEARCH

1.

National Rankings Based on Research Spending

2.

Trends in Awards from External Sponsors

3.

Big Research Wins

UNC RESEARCH

UNC'S NATIONAL RANKING IN RESEARCH

#9 UNC–CHAPEL HILL

◆ Source: NSF Higher Education Research & Development (HERD) Survey FY13

◆ Every university fills out the NSF survey. Standard definitions.

◆ Information for FY13 released in February 2015

◆ UNC's NSF HERD spending total was just under $1 billion in FY13

◆ Useful for comparing UNC research strength to other universities

Top 10 Research Universities
(Research spending from all sources)

#1 John Hopkins University

#2 University of Michigan, Ann Arbor

#3 University of Washington, Seattle

#4 University of Michigan, Ann Arbor

#5 University of California, San Diego

#6 University of California, San Francisco

#7 Harvard University

#8 Duke University

#9 **University of North Carolina, Chapel Hill**

#10 University of California, Los Angeles

UNC | RESEARCH

UNC'S NATIONAL RANKING IN RESEARCH

As reported to NSF for National HERD Survey
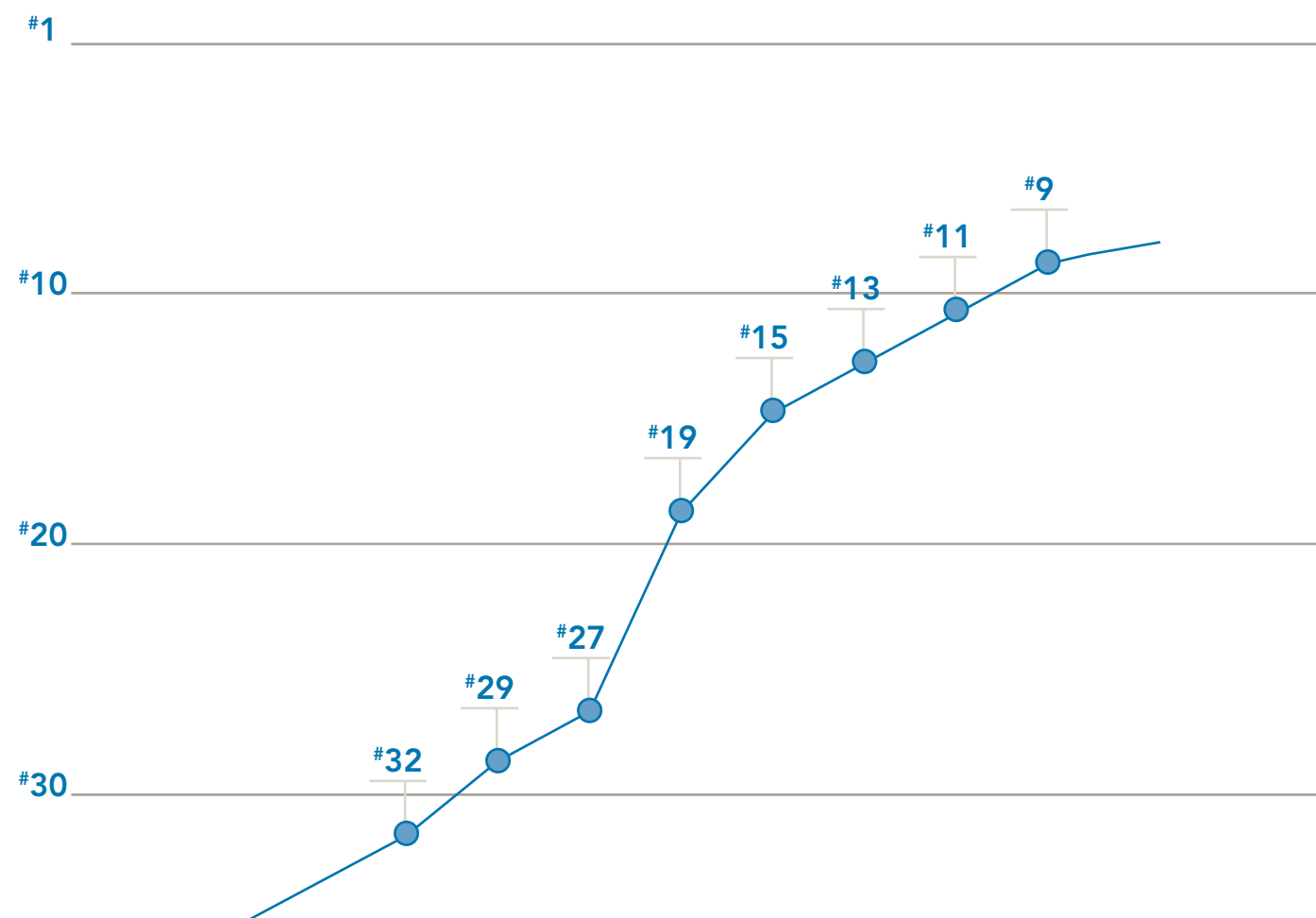
TRENDS IN RESEARCH AWARDS FROM EXTERNAL SPONSORS

Preliminary Figure for FY15

$796,171,468* (FY2015)

◆ Source: UNC Research Administration Management System & eSubmission (RAMSeS)

◆ Current data available in real-time

◆ Useful for assessing current strength of UNC's research enterprise

◆ Still evaluating FY15 data

UNC RESEARCH

TRENDS IN RESEARCH AWARDS FROM EXTERNAL SPONSORS

Source: UNC-CH RAMSES Data (FY15)
Still evaluating FY15 data

$291M $305M $345M $376M $439M $488M $537M $578M $580M $593M $611M $678M $716M $803M $788M $767M $778M $793M $796M

1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
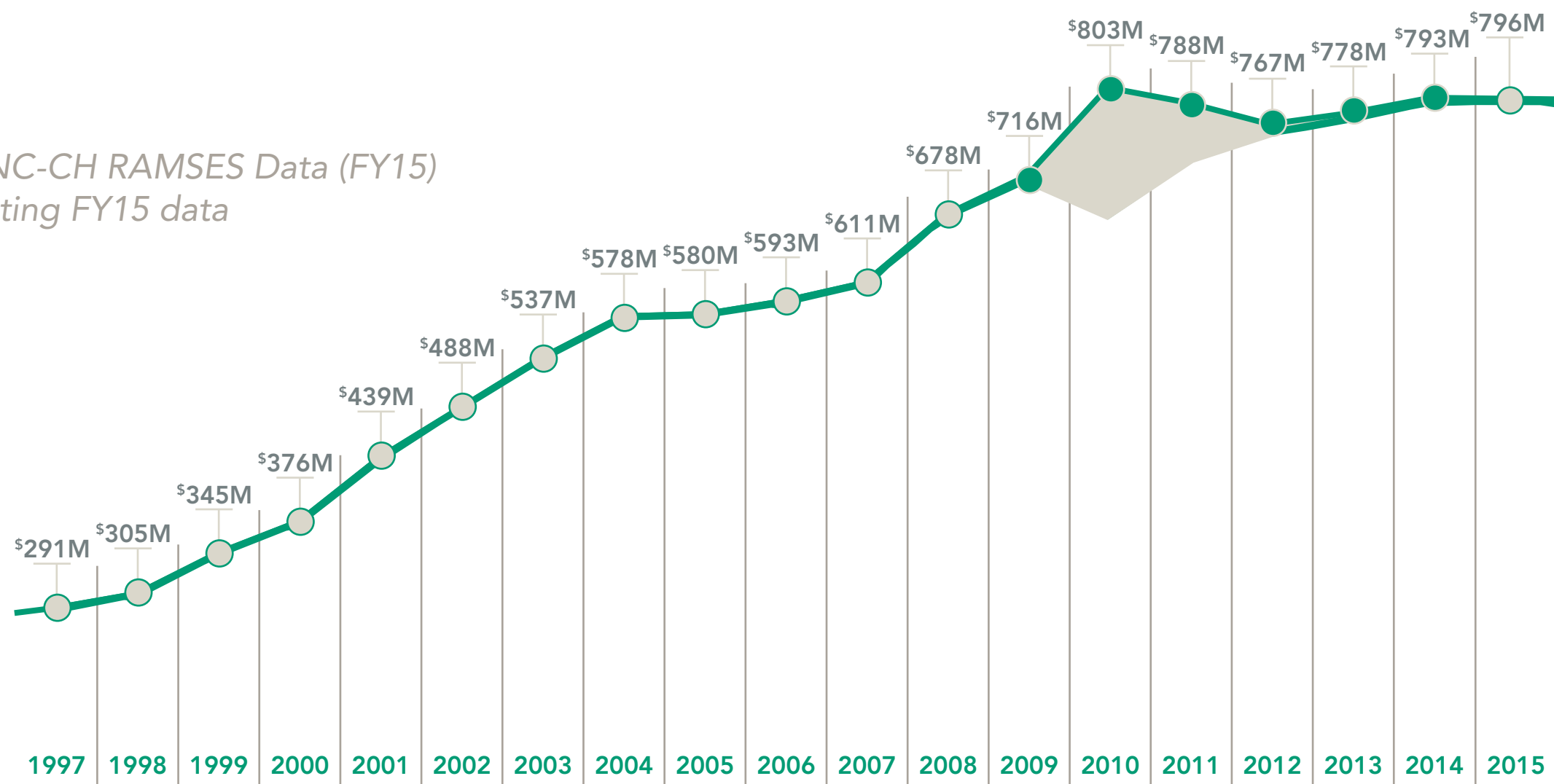
BIG RESEARCH WINS FOR FY15

$180M

MEASURE/
Evaluation
Project
(USAID)

$28M

National
Longitudinal
Survey of
Adolescent &
Young Adult
Health
(NIH)

$20M

Partnership
for the
Cure for AIDS
(GSK-UNC)

$20M

Coastal
Resilience
Center of
Excellence
(DHS)

$6.5M

Center of
BioModular
Multi-scale
Systems for
Precision
Medicine
(NIH)

UNC RESEARCH

THANK YOU

For more information about UNC Research

go to **research.unc.edu**

UNC RESEARCH

DRAFT

Memorandum

To: Innovation and Impact Committee
From: Phil Clay
Date: May 8, 2014 (Revised June 10th to incorporate items from committee discussion)
RE: Issues for Discussion at the May Meeting of the Committee

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The purpose of this memorandum is to summarize the work of the Innovation and Impact Committee of the UNC Board of Trustees, and to identify tasks and priorities in our continuing work.
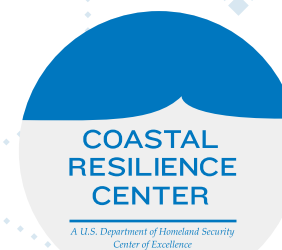
The charge to the committee is to advance the goal of using research-generated discoveries by the faculty and ideas generated by members of our academic community to create economic and social impact for the campus and the state. These impacts may result from the commercialization of research output and/or the creation of enterprises and initiatives that advance ideas for solving problems. As a public university, chartered by and for the people of North Carolina, creating and supporting an ecosystem and environment on campus that supports both broad and deep engagement with the state and the world is the outcome we seek and one wholly consistent with our mission as an institution.

The University benefited greatly from the pioneering work on these issues initiated by former Chancellor Holden Thorp. The Innovation Roadmap, published in 2010, outlined a series of opportunities and goals for the University and stimulated initiatives across the campus. That initiative and the activities that followed in the past four years provide a greatly elevated starting point for the work of Innovation and Impact Committee.

This memorandum aims to foster discussion about what the university has learned and put in place in recent years and what remains to be done. Together with notes and materials from the last four meetings of the committee, this memo aims to ground the discussion at the committee meeting on May 20th_.   Also, it addresses several questions regarding our effort of transforming our research into innovations and impacts:

1. What is in place and capable of being a resource for our agenda?
    a. There is broad support from all stakeholders for a larger role for the state and region in entrepreneurship and for universities to take the lead.

b. The university has more than $800 million in annual research and as such already has standing as a first ranked research institution.

c. Since 2009, the university has put a number of new programs in place, including the Carolina Express License, Carolina Kickstart, and the new services offered by the Frank Hawkins Kenan Institute for Private Enterprise. Strategic investments in the Office of Technology Development have increased its efficiency, effectiveness, and importantly, its sustainability.

d. A new $2 million fund at UNC-CH to support university venture initiatives has been approved.

e. There is an evolving set of places and venues on campus and in Chapel Hill where entrepreneurs get together to support each other, to benefit from mentoring and trying out new ideas. Launch, incubation, and accelerator activities are numerous and include mentors, coaches, and active ventures that grew out of these venues. The business school and the Kenan Institute are actors in these activities.

f. There are faculty, centers, and schools that increasingly model the change the committee aims to promote.

g. There is the expectation on campus and across the state that UNC will play a leading role in the state.

2. What is it that we have learned to date that will help us scope, plan, and manage future efforts?

a. Despite some initiatives triggered by the Roadmap from 2010 and examples of faculty and centers that model the change we want to see, there is considerable lack of information among faculty about resources available, about how to take the first step in moving from research to applications, and about the necessary collaboration and engagement in order to start an enterprise.

b. There is now a convergence of science and technology as a major trend within research universities. UNC is one of the few universities with a mega research volume but without a school of engineering in this convergence era. We have put in place a Department of Applied Sciences and invested in the Department of Biomedical Engineering that is joint with NC State that over time can partially address this shortcoming. The other part of the solution can come from collaborations.

c. Our funded research is heavily biomedical, and this is an area for strategic investment in commercialization of technology. We are also very strong in the public health, behavioral, and social sciences, where research is less likely to be commercialized.

d. Surveys show that the faculty does think about how their results can be used. The question is: what is the best activator of faculty initiative for research translation? The surveys also show the knowledge is

uneven and not "top of mind." This includes openness to taking risks and engaging venture and corporate players.

3. What remains to be explored by the committee?

    a. While we have a large volume of research underway on campus, our commercialization metrics fall short of those of our peer universities. This is partly due to the composition of our portfolio, which is heavily weighted toward basic research, in addition to having a substantial showing in disciplines such as behavioral and social sciences where the commercialization potential is low. There is, however, much room for improvement. Critically, results from much of our research do not translate to applications without some additional work on the part of faculty. This takes time, has some associated costs, and involves risks. What is the translation infrastructure required for this?

    b. We need to update our exploration of best practices in other states both with respect to the research ventures and the interface between the university and the state, and between the university and industry. Specifically a number of states including California, Massachusetts Arizona, Michigan, and Connecticut are putting in place or have put in place strategies that tie the state's activities to the research of their universities, including state investments aimed at promoting jobs.

    c. There are also growing collaborations on research applications with the philanthropic and nonprofit communities including critical areas of health and medicine. As federal funds are reduced, these sources become more important as does corporate research.

    d. What does an innovation agenda in research mean for educational programs, student activities, alumni relations, town-gown relations, etc.? Over the past four or five years, UNC has developed outstanding programs for students, including the entrepreneurship minor and courses provided through the Business School. The town and region are developing new incubation and acceleration spaces. How does research connect? How does the agenda fit into the evolving Department of Applied Sciences, BME, Data Science, etc?

    e. Design is an element of discovery, product development and commercialization. Design is typically taught in schools of architecture, engineering, business. What is the appropriate approach to addressing design for Chapel Hill?

    f. We have only just begun to explore how to tie UNC, North Carolina State, Duke North Carolina Central, and the Research Triangle Park together with local industries to create a broad infrastructure. How do we identify and then remove, lower, or alter barriers to collaborations and insert positive incentives and support? Are there cultural or other barriers to address? Who leads this effort?

g. Campus space for work to support innovation, is important, including research and project space, and more generally "maker space." A committee is preparing an inventory of campus space.

h. We need to revisit Carolina North in light of developments since the original plan and the recession. Does the enterprise model still hold up for our innovation agenda? Are there additional roles that the acreage allows?

i. UNC has a global brand. Among our research peers, academic collaborations are increasingly international. Access to interesting problems, partners and resource opportunities beckon. What are the low hanging fruit for leveraging the UNC brand? (Water, for example, is one of our signature research areas as well as a major global topic in health, technology, law, etc.)

j. How does an innovation agenda relate to a university campaign? What is the role of venture philanthropy? What are the synergies? Tensions? Should there be a "foundation" to support innovation related work?

k. How can we better tell the story of impact? The growth of awareness of our work has grown recently. We need a deeper communication to those who already know the topic and UNC, and a higher-level communication to those who do not know the topic but are high-level stakeholders of the University.

4. What are the challenges to be overcome?

a. What is the structure of the senior administration team for leading the innovation effort? What is the role of other senior officers, deans, etc.? How is the faculty mobilized for various roles? What are the eventual governance issues?

b. How do we combine the three domains in which research and education take place – real, virtual, and connected? What are the venture opportunities in education?

c. A thrust that highlights an innovation and entrepreneurship agenda requires a cultural shift at UNC. This is already underway. What are the opportunities, frictions, and challenges evident from the last 3-5 years' experience?

d. How do we engage the venture community in support of an innovation agenda? There is the special challenge of raising early stage capital and attracting firms who will seek and encourage university- enabled projects. What do we want to know from them? What are the risks and cautions?

e. How do we engage corporate supported research? What are the lessons from the experience in recent years? How do we attract them to be partners the local ecosystem in the way early RTP did?

f. How can we, as an institution, most effectively and seamlessly engage with corporate partners whether for technology transfer, research or workforce needs?

g. How do we communicate our intentions and frame value to the University community and the public?

h. What are the unique problems of a public university in advancing an agenda which is most elaborated in mainly private institutions or in states with an aggressive innovation agenda? How have public peers overcome the associated limitations of the public section working with private firms?

i. What resources are needed to kick-start and sustain an innovation agenda for at least five years? What is the source(s)?

5. What is to be done? Where do we go from here? Listed below are some options for the work of the committee and the administration. I imagine that some combination would be appropriate.

a. A working paper that addresses selected questions above. To be prepared over the summer.

b. A Fall 2014 Workshop Series where the outsiders are invited in present and discuss. Meetings or time allocation to overlap BOT meetings. Invite outsiders, potential partners, etc. Examine models such as APLU's Innovation and economic Prosperity Universities Program, for organized and structured engagement with North Carolina corporate, economic development and community interests.

c. A more focused agenda for fall committee meetings to hear administration proposals.

d. A 5-year plan of action prepared by January 2015.

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

MEMO

Date: September 12, 2014
To: UNC Chapel Hill Board of Trustees Committee on Innovation and Impact
           Chair, Phil Clay
From: Judith Cone, Special Assistant to the Chancellor-Innovation and Entrepreneurship
Re: Overview of Status Report on the UNC Chapel Hill Innovation Ecosystem

Barbara Entwisle, Vice Chancellor of Research, Joe DeSimone, Chancellor's Eminent Professor of Chemistry, UNC, and I have worked together on this Committee, and I am grateful to Vice Chancellor Entwisle for her input on these documents. As you know, Professor DeSimone is on leave as he is building a venture capital-based 3-D printing company in Silicon Valley.

Members of the Board of Trustees Committee on Innovation and Impact, together with UNC Chapel Hill senior leaders and campus colleagues, have been exploring how to build a superior ecosystem for innovation and entrepreneurship. The goal is to produce maximum social and economic impact for the citizens of North Carolina and beyond. This will require a fertile mix of programs, resources, and relationships to support and enhance innovative work by a wide variety of people in the University community as well as introduce major new initiatives.

And the creation of such an ecosystem has now reached a pivotal point. Much has been done; the campus is filled with existing and new activity. More needs to be done in order to build on early results and tap the University of North Carolina at Chapel Hill's full potential for impact. We are grateful to the Board for its committed leadership and look forward to continued work together.

The *Status Report on the UNC Chapel Hill Innovation Ecosystem,* which accompanies this memo, is framed as a set of responses to questions posed by Committee Chair Phil Clay in his June 10, 2014 memo. Chair Clay's document asked for updates and recommendations on a wide range of items related to the complex, campus-wide efforts in innovation. In the enclosed *Status Report,* the responses are grouped into five categories covering fourteen key questions. Each key question is answered in the same format: a summary of *Actions To Date*, a recap of *What We Have Learned,* and recommendations on what *Remains To Be Done.*

1

For a more focused view, this memo provides a brief on the full *Status Report.*

- It starts with a few short narrative sections outlining the nature of the work, where it stands, and major priority areas going forward.
- Then, since the Committee's main interest is in what lies ahead, informed by the past, the rest of the memo contains the forward-looking parts of the *Status Report.* For all key questions, the *Remains to Be Done* sections are included in this memo. They are presented in order, with only a minimal amount of introduction to each.

SUMMARY OF STATUS REPORT ON THE UNC CHAPEL HILL INNOVATION ECOSYSTEM

Strategy guides the work.

Innovation work at Carolina continues to be guided by the strategic direction described in the *Innovation Roadmap* of 2010. The *Roadmap* and *Two-Year Progress Report* (covering progress through 2012) are available at http://innovate.unc.edu/impact/strategy. Per the plan of conducting a formal review every other year, the second progress report will be released in a few months, and will go into greater detail about innovation and entrepreneurship work through 2014. The innovation vision and mission are:

> *Vision*: With a special focus on urgent challenges, innovators and innovations launched at Carolina consistently translate important ideas for the public good.

> *Mission*: Ensure that Carolina is a place where innovators thrive.

Chancellor Folt speaks in terms of the University being an excellent, accessible, innovative public institution that excels at research, teaching, and translating ideas into impact. It is now time to solidify the innovation infrastructure, continue to learn from others, better engage strategic partners, and dedicate the same relative level of investment that has been committed to the University's research and teaching missions.

We have a community of dedicated people working together.

It is appropriate to acknowledge all those who have advanced the innovation and entrepreneurship agenda as early adopters. Starting in 2003 with the Kauffman Campuses grant, through the 2010 strategic planning efforts to their implementation today, a small number of staff and unit leaders have worked tirelessly to create programs, run spaces, mentor others, file patents, secure licenses for intellectual property, help create ventures, and engage a wide community of supporters. Consequently, this campus is regularly lauded as a leader in entrepreneurship education, and as being in the vanguard of building a culture of innovation.

We are grateful to the Deans and their faculty and staff who not only initiated many programs, but have opened them to the entire campus and community. We applaud the students who

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have championed practical innovation as a way to make a difference in the world. Finally, none of this would have been possible without the support of donors and the commitment of senior leadership and the Board of Trustees.

The University has made great strides, some highlights of which will be noted briefly in this memo. Evaluation and impact measurement continue to be important, as does communicating the multi-faceted value generated by Carolina. Much more attention to measurement and communication is needed.

The campus is at a pivotal moment.

Progress in innovation and impact at UNC Chapel Hill has reached a pivotal stage. The collaborative spirit of Carolina faculty, staff, and students has allowed many initiatives to thrive and grow with very few resources. Senior leaders are dedicated to ingraining innovation into the campus' identity, and to harnessing the resources needed to leap forward and become an exemplar university in this field. Donors have supported these activities and are ready to support more.

Several task forces and strategic planning efforts have articulated needs and solutions, providing the framework to move the innovation agenda forward. Areas receiving task-force (or task-force-quality) attention have included: industry relations, commercialization of University IP, support for new ventures, new curricula in applied physical sciences, biomedical engineering and data studies, and needs for physical space.

Many new programs already are nurturing their first fruits. More important, the combined efforts of many have moved UNC Chapel Hill to the threshold of next-level gains. It is worth stepping back briefly to consider the general nature of where we stand:

The University is poised for even greater impact.

The goal is to produce ever-increasing social and economic benefits for the State of North Carolina and beyond. This, in turn, requires an ecosystem with two main features: *excellent infrastructure*, and *a high level of human engagement*.

- *Excellent infrastructure* means a strong set of programs, processes, facilities and resources for translating ideas into practical form. It includes systems to move faculty along the path of developing their research for commercial use. It includes programs that prepare people to be innovators and entrepreneurs—such as by teaching startup skills and/or relevant technical skills—and that help new ventures take off. Beyond licensing and startups, there are myriad other ways of putting new ideas to use and some of these need supporting infrastructure as well.

- *A high level of human engagement* means bringing many people into the work. Large numbers of faculty, students, and people in the region need to become involved as

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active innovators, while many more serve as advocates, helpers, or funders. Senior leaders need to align their resources and create supportive processes. Our efforts need active support from many external constituents such as partners from industry, the alumni base, and other funders.

These elements, when combined, can lead to powerful impact. And UNC Chapel Hill is now firmly on the road towards having a winning combination.

It is time to scale and sustain the work and seek disruptive opportunities.

One way to view the work to date is as a successful proof-of-concept stage. We have shown that the innovation ecosystem is feasible, desirable, viable and relevant to nearly every area of the campus. New programs are succeeding; more people are participating; some initial results (such as increased startup activity) are evident. And now the larger possibilities beckon. Like an emerging company that has validated its technology and its business model, this ecosystem is now ready for the investments that will move it to full-scale production mode. The ecosystem needs to be constantly improved and capable of producing both incremental and disruptive innovations.

To take innovation and impact to the next level, the entire agenda needs to be *institutionalized* and *resourced* at higher levels. Two pressing needs stand out.

- If technology commercialization and economic development are to be major strategic functions of the University, a dedicated office needs to be created to lead, coordinate and direct them. At present, direct responsibility for these functions is shared between a small OTD staff on a limited budget and various units across campus. While localized, grassroots efforts are both commendable and necessary, they must be balanced with central leadership and fully resourced.

- Funding is necessary to stabilize, expand, and create the missing pieces to the ecosystem. The University needs a budget for innovation and impact, and funding goals need to be part of the upcoming capital campaign. This would include funding for the new office just mentioned, as well as support to make various ground-level efforts *sustainable and scalable,* create missing programs, and build the needed spaces required.

Examples of Progress to Date and Emerging Needs

Some highlights of work done in recent years:

- In 2010, UNC Chapel Hill had *no* dedicated facilities for nurturing startups. Now it has a wide array with more planned, with associated education-and-support programs, all being heavily used: KickStart Labs, CUBE Social Innovation Incubator, Launch Chapel Hill, 1789 Venture Lab, and more. The new CreatorSpace is set to open next year in

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Murray Hall. But limits have been reached. A number of these facilities and programs are either at their carrying capacities, and/or about to lose their physical spaces soon—at the very time when demand for them keeps growing rapidly.

- Under the Vice Chancellor of Research, operations of the Office of Technology Development have been upgraded and streamlined. However, it is unreasonable to expect the six licensing associates in OTD alone to make quantum-leap gains – indeed, other units on the campus have started their own, domain-specific commercialization efforts to complement the work of OTD. Creation of spinout companies has increased due to the work of OTD, Carolina KickStart, the Center for Entrepreneurial Studies, the CUBE, and the Frank Hawkins Kenan Institute of Private Enterprise, as well as school and department liaisons. Innovations like the Carolina Express License, designed to incentivize faculty and streamline the licensing process, have also contributed to increased technology spinouts. It would help greatly to put all of these under the aegis of the new office mentioned above so that there is central integration as well as distribution across the campus. The University community will continue to create new initiatives and to augment the agenda with further support.

- Since the Kauffman Campuses grant of 2003, UNC Chapel Hill has become a leader in entrepreneurship education. More recently, faculty working groups have led the creation of new or augmented programs in subject areas critical to innovation such as Applied Physical Sciences, Biomedical Engineering, and Data Studies. All of these need further funds in order to grow and flourish sustainably. Furthermore, new initiatives of this type such as examining how to strengthen the department of Computer Science need to be considered and coordinated strategically.

What remains to be done?

The remainder of this memo is dedicated to the third part of each of the responses in the longer *Status Report*: Itemizations of what *Remains To Be Done* in key areas. First the questions posed by Chair Clay are presented, followed by the next steps recommended to address them.

We look forward to discussing this with you.

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QUESTIONS POSED BY PHILIP CLAY
ON BEHALF OF THE INNOVATION & IMPACT COMMITTEE

Key questions laid out in Chairman Clay's memorandum of June 10, 2014 are summarized here. Some are paraphrased and all are arranged into five main topic areas, which will serve as a template for the rest of the report.

A. Leadership, Strategy, and Alignment
- What are the optimum administrative structures and functions for leading our efforts in innovation and entrepreneurship? What are the roles of other senior officers and deans? How is the faculty mobilized for various roles?

B. Carolina's Innovation Assets
- How does research connect throughout all of our programs and work in innovation and entrepreneurship?
- What does an innovation agenda mean for various segments of the UNC Chapel Hill community and their activities? (education programs, student activities, faculty, staff, alumni, town-gown relations)
- How can we best address design (and cultivate "design thinking") in innovation and entrepreneurship?
- What are the space requirements to support a robust innovation ecosystem? What is our strategy for Carolina North? Does the existing plan hold up? If not, how will we determine what to do?
- How can we leverage Carolina's global brand for maximum impact?

C. External Engagement
- How can we engage industry partners in building a strong innovation ecosystem?
- How can we form a strong regional infrastructure of support for our innovation agenda in the Triangle?
- How can we build and maintain an innovation ecosystem that supports both broad and deep engagement with the state?

D. Funding
- How will we adequately fund our research and its application, in light of declining federal and state dollars?
- How can we engage the venture community in support of new ventures?
- How does an innovation agenda relate to a university development campaign – and to other possible opportunities for funding?

E. Learning and Communicating
- How can we continually learn from others while also leading in innovation and entrepreneurship?
- What communication strategies are needed to bring the University community and the public on board with our innovation agenda – and to tell the story of impact?

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WHAT REMAINS TO BE DONE
Responses from the Status Report

A. LEADERSHIP, STRATEGY, AND ALIGNMENT

Q: What are the optimum administrative structures and functions for leading our efforts in innovation and entrepreneurship? What are the roles of other senior officers and deans? How is the faculty mobilized for various roles?

Remains to Be Done — I&E OFFICE
Recommendations
• Continue to be a catalyst. Articulate the vision and mission, engage a wide variety of internal and external stakeholders, and advocate for a culture of innovation and entrepreneurship campus-wide.
• Continue to evaluate the ecosystem, advocate for necessary changes and promote new advancements in how our campus accomplishes this work.
• Implement tools that can be shared within the *Carolina I&E Network* such as the adoption of Salesforce, which is under way.
• Celebrate successes and tell the stories of innovators and their impact.
• Help raise funds for campus initiatives.

Remains To Be Done — OFFICE OF RESEARCH
Recommendations
• Continue the mission of growing research and maximizing its impact. Work closely with the Offices of Development, Communication, Innovation & Entrepreneurship, and the proposed Office of Commercialization and Economic Development, as well as with departments, centers, and institutes, to help increase research funding and facilitate the translation of research into practical benefit.
• Provide streamlined services for sponsored research proposals and agreements with private industry through the Office of Industry Contracting.
• Enhance communication research benefits through the Office of Research Communications.

Remains To Be Done —PROPOSED OFFICE OF COMMERCIALIZATION AND
ECONOMIC DEVELOPMENT
Recommendations
• Create the Office of Commercialization and Economic Development to fulfill the following two missions:

> *Mission for Commercialization – From Invention to Impact: Provide maximum benefit to the people of North Carolina and beyond by optimizing the University's systems for practical innovation, and by licensing university intellectual property promptly to those who will most effectively and appropriately propagate it into use for society.*

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Mission for Economic Development: Grow North Carolina's economy and competitiveness by engaging key faculty/staff experts and students to develop and implement a strategy to address economic development drivers in our State.

Remains To Be Done — SENIOR OFFICERS AND DEANS
Recommendations
- Continue to include goals related to innovation and impact in their strategies and actions. Senior leaders need to align institutional resources and processes accordingly. Since the Chancellor and Provost are working closely with administrative leaders and deans on strategic planning and the Development Office is preparing for the new capital campaign, this is the time to incorporate innovation goals.
- Articulate to their constituents how and why the University is building an innovation ecosystem and how it is relevant to their areas of responsibility or research. Specifically encourage their faculty, staff, and students to consider the rewards of converting ideas into practical benefit.
- Balance central services and unit programs to keep them strategically aligned and fully integrated.
- Deans: Continue creating structures and environments that support innovation. Prioritize innovation initiatives in development goals as well as in communication strategies. Following the lead of some deans, it is helpful if each assigns an innovation and entrepreneurship liaison officer to join the university's I&E Network group, and to serve as an internal contact person and champion. The Schools of Medicine and Pharmacy and the Department of Computer Science have associate deans/chair with titles related to entrepreneurship.
- Deans: Ensure that their faculty feel supported in undertaking scholarly work in ways that benefit non-academic sectors and have impact. Align incentives and rewards.

Remains To Be Done — MOBILIZING FACULTY FOR VARIOUS ROLES
Recommendations
- More effectively help faculty understand that translation is an extension of their scholarly pursuits.
- Find ways the University can incentivize and facilitate translational work. For instance, faculty need time to invest in the translation process.
- Effectively guide faculty through the translation process.
  - Expand the Faculty Bootcamp or some such equivalent(s).
  - Use successful, respected faculty innovators as mentors and guides for others. Expand on the KickStart Faculty Fellows program – which is modeled after a University of Utah program.
- Streamline the Conflict of Interest Review process.
- Create a cross-campus entrepreneurship education curricular committee to continue refining how faculty teach entrepreneurship to various audiences.
- Better engage with Carolina faculty who are noted scholars in innovation and entrepreneurship to learn from them and extend their scholarly work.

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B. CAROLINA'S INNOVATION ASSETS

Q: How does research connect throughout all of our programs and work in innovation and entrepreneurship?

Remains To Be Done — RESEARCH
Recommendations
- Given the focus at Carolina (and, indeed, nearly everywhere) on interdisciplinary work, continue to promote collaboration and research across disciplines as a fertile source of potential innovations.
- Develop more integrated, clearer systems and support for faculty interested in commercializing their research including allocating time for faculty to become involved.
- Create and implement a comprehensive plan to educate and involve graduate students and post docs in the translational work of the campus, while also pursuing studies within their disciplines. Include connections between MBAs and graduate students and post docs in the sciences.
- Within the general structure of federal and state regulations, resolve conflicts of interest in an expedient, fair, and respectful manner so that faculty and graduate students are able to appropriately engage in innovation activities.

Q: What does an innovation agenda mean for various segments of the UNC Chapel Hill community and their activities?

Remains To Be Done — EDUCATIONAL PROGRAMS
Recommendations
- Continue developing and enhancing the entrepreneurship curriculum in units across campus to include methodologies for the entire innovation process: imagine-design-build-grow. Incorporate creativity and design thinking more fully in the existing entrepreneurship programs.
- Strengthen entrepreneurship educational programs for graduate students and post docs. Identify funding that could facilitate participation in these programs.
- Continue creating/expanding courses in Applied Physical Science, Biomedical Engineering, Data Studies, and Computer Science.
- Create targeted programs to best meet the needs of faculty in learning how to translate their work. Focus on just-in-time learning with a mixture of online tutorials, mentoring, and small groups.
- Market the educational programs more effectively, and in general make it easier for all audiences to find the resources and people they need.

Remains To Be Done — STUDENT ACTIVITIES
Recommendations
- Better align student innovation activities with the research agenda of the University, exposing students to problems and potential solutions in areas outside their personal knowledge, and

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attuning them to the University's efforts to address pressing global challenges. This will help to expand students' thinking, so that when they generate their own ideas for startups (as many now do), they can see possibilities beyond the limited scope that is often typical of student enterprises.

- Engage graduate students more fully in the innovation agenda.
- Find ways to harness the expertise of post docs and when appropriate, engage them with faculty spinouts.
- Better market campus resources to all students.
- Expand the Innovation Scholars program.

Remains To Be Done — ALUMNI RELATIONS
Recommendations
- Develop a high-level strategy for engaging alumni support for the innovation agenda. Segment the alumni and call upon them for their expertise as entrepreneurs, investors, and subject-matter experts as well as donors.
- Create an Innovation Fund for the campus that would support all aspects of the innovation agenda.
- Tie in alumni through regional innovation hubs.

Remains To Be Done — TOWN-GOWN RELATIONS
Recommendations
- Continue working with Chapel Hill and Orange County officials on how to attract, support, and retain entrepreneurs and harness innovation for the economic and social benefit of the community. Good relations have been established and talks are underway for next phases of this work.
- Encourage landlords who own office space to offer flex terms and lower rents for startups.
- Build a world-class Innovation Center in Downtown. (see Space section)
- Create a strategy to engage local influential individuals in this work.

Remains To Be Done — FACULTY
Recommendations
- Reach more faculty with the opportunities of the innovation agenda.
- Develop an integrated network of innovation liaisons working with a core staff to be closely in tune with all faculty work and to educate faculty about Carolina's innovation agenda and resources.
- Create integrated, comprehensive systems that support faculty from early-stage innovation through all phases of translating knowledge into practical use. Build bridges of assistance across gaps in the process that are hard for faculty innovators to traverse on their own.
- Streamline all systems to remove resistance to the process, especially conflict of interest and facilities use.
- Find the resources needed for faculty to pursue innovations.

Remains To Be Done — STAFF

Recommendations

Garner resources to bring additional staff support to the innovation ecosystem. Develop clear linkages between the offices and programs that provide staff support and guides to help others navigate the landscape.

Q: How can we best address design (and cultivate "design thinking") in innovation and entrepreneurship?

Remains To Be Done — DESIGN

Recommendations

- For faculty entrepreneurs, integrate ideation and design methods into the full-service technology development approach that begins in the lab, well prior to invention disclosure. Lean Startup methods for the life sciences are made available through an NIH program, but our campus needs to create its own version.
- For students, support full integration of design methods into areas where this is already being done or planned—notably APS, BME, the proposed Data Studies competencies, and the CreatorSpace – while exploring potential uses of the methods in other curricular and co-curricular offerings.
- Expand the University's educational programs in design thinking for faculty and University program leaders, and continue exploring ways to ingrain design on our campus, especially as we create new spaces for innovation.

Q: What are the space requirements to support a robust innovation ecosystem? What is our strategy for Carolina North? Does the existing plan hold up? If not, how will we determine what to do?

Remains To Be Done — SPACE

Recommendations

- Allocate adequate space for Applied Physical Sciences, Biomedical Engineering, and maker space: The Chancellor, Provost, Dean of Medicine and Dean of Arts and Sciences are addressing these needs and have made significant investments.
- Find permanent wet lab and office space on campus for faculty entrepreneurs and their spinouts. The need is immediate and urgent, with the current space at the Genome Sciences Building due to be vacated by February 2015.
- Create an Innovation Headquarters on central campus. Having such a physical location would present a strategic opportunity. It would serve as a front door for the campus where people can come for assistance, and donors could be inspired by a tangible reminder of the impact Carolina is having. The proposed Commercialization and Economic Development Office could also use this space for some of its activities.
- Build a world-class Downtown Innovation Center. A proposed downtown Chapel Hill Innovation Center (CHIC) would bridge the campus and community while becoming home to the already-successful accelerator, Launch Chapel Hill, and the popular 1789 Venture Lab. (With its current lease expiring in December 2015, Launch Chapel Hill is considering its

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options.) In addition to event and ideation space and a design center, CHIC would provide new spaces for growing companies that want to stay in Chapel Hill, including potentially those requiring web lab space, as well as space for investors and professional service providers, and for strategically chosen industry partners such as the local Google office. The groups of people involved in creating Launch Chapel Hill and 1789 are actively engaged in conversations about CHIC.

- Investigate building a Life Science Innovation Center. There are several reasons to build an innovation center for the life sciences: 1) It will be a place where industry can interface with faculty and graduate students; 2) Commercialization staff can have offices near a large portion of the University's innovation portfolio; and 3) It will provide much-needed faculty access to wet-lab space, offices, and equipment as they remain full-time professors/researchers but also start a company. Once the Genome Sciences space is unavailable come February 2015, faculty startups will have no space on campus. New resources need to be available to all faculty, even if they are administered by an academic unit.

Q: How can we leverage Carolina's global brand for maximum impact?

Remains to be done — GLOBAL BRAND
Recommendations
- The choice of *Water in our World* as the University's first cross-campus theme, three years ago, has proven successful on several fronts. Decide if there will be another cross-campus theme, or perhaps a series of smaller themes, that draws together the Carolina community to addresses major issues.
- Recruit top faculty and graduate students who are globally oriented and have a strong translational bias.
- Leverage the power of Carolina's alumni and families to grow a global innovation ecosystem.
- Explore the idea of regional hubs and how they might support the innovation agenda.

C. EXTERNAL ENGAGEMENT

Q: How can we engage industry partners in building a strong innovation ecosystem?

Remains To Be Done — INDUSTRY RELATIONS
Recommendations
- In the next few months, the Offices of Research, Development, and the proposed Commercialization and Economic Development Office will work with the Chancellor and Provost, Career Services, deans and others to develop a common shared plan for UNC Chapel Hill's collaborations with industry.
- Better coordinate within the University.
- Pursue (and, where necessary, expand) efforts to align University policies and procedures with industry practices and expectations.

- Communicate to industry that UNC Chapel Hill is actively seeking partnerships.
- Make it easy for industry to know how to enter the University's "front door," and smooth the way for industry partners to work with us.

Remains To Be Done — REGIONAL
Recommendations
Create a comprehensive strategy for maximizing local industry-university partnerships. The Offices of Development, Research, proposed Commercialization and Economic Development, Career Services, and unit representatives will need to work together on the plans and their execution.

Remains To Be Done — WORKFORCE
Recommendations
- UNC Chapel Hill has an opportunity to partner with industry and to gain synergies by better understanding workforce needs across industry sectors. University-industry relations should include mechanisms for engaging external stakeholders in the development of ways to ensure that our graduates have critical skillsets, which will vary by discipline but also include core strengths in areas such as data and innovation processes.
- Develop alternative career tracks for PhDs, including working in faculty spinouts and/or starting their own ventures. Strengthening this area will give the University a platform to better understand statewide needs and develop new strategies for addressing them.
- As UNC Chapel Hill forms its economic development strategy, there will be opportunities to leverage engagements with the nine regional economic development partnerships in the state and NC Business Development in the Department of Commerce.

Q: How can we form a strong regional infrastructure of support for our innovation agenda in the Triangle?

Remains To Be Done — REGIONAL
Recommendations
- Continue to build on established relationships with NC State, Duke and NC Central and identify specific opportunities for multi-institution collaboration on projects related to innovation and entrepreneurship.
- Develop Blackstone 2.0, taking the Blackstone Entrepreneurs Network to the next level.
- As noted elsewhere in this memo, the University needs to invest in end-to-end support for commercializing IP from faculty research. Not only would this stimulate startups and venture investment within the region, it is crucial for increasing impact generally.
- Accelerate involvement of potential investors early in the idea development stage.
- Communicate and engage more effectively with alumni who can help with these goals.

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Q: How can we build and maintain an innovation ecosystem that supports both broad and deep engagement with the state?

Remains To Be Done — ENGAGEMENT WITH THE STATE
Recommendations
- Enhance the benefits that the University provides to the state, and raise the perception of them through more effective communication.
- Create an economic development strategy in the proposed Office of Commercialization and Economic Development. This office will coordinate with senior leaders at UNC Chapel Hill to help build the innovation ecosystem. It will also play a key role in developing and articulating new strategies to work with (and for) people across the state. In every sense, it will raise the profile of UNC Chapel Hill as an engaged collaborator in building the State's future.
- Develop a data-driven strategy and approach to understand the true impact of UNC Chapel Hill and the UNC system on North Carolina.
- Create a dashboard to communicate Carolina's impact.

D. FUNDING

Q: How will we adequately fund our research and its application, in light of declining federal and state dollars?

Remains To Be Done — FUNDING RESEARCH
Recommendations
- Continue to support researchers as they seek research funding.
- Continue developing a comprehensive, diversified campaign with innovation and impact as top priorities.
- Become more engaged with venture philanthropy.

Q: How can we engage the venture community in support of new ventures?

Remains To Be Done — VENTURE FUNDING
Recommendations
Create a comprehensive strategy to engage the venture community and fund the full development cycle. As currently envisioned, key components of the strategy would be:
- Expand and coordinate (or consolidate) the University's Technology Development Grant programs to fund proof-of-concept studies across all schools and disciplines and then into investment. Many university technologies never reach the marketplace because no commercial relevance has been demonstrated which would attract both people and funding. These technologies need proof-of-concept or validation studies showing whether they do, in fact, have potential for becoming products or solutions that users would buy. Funding for such studies is extremely difficult to acquire, as these activities are beyond the scope of typical federal research grants, but too risky for investors or industry partners to fund. The proposed grants will range from $25K to $75K and will be awarded to projects on a competitive basis. Project applications will be evaluated by a panel of industry-relevant

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experts. Beyond allocating funds, this panel will provide feedback to the OTD and the faculty member(s) as part of the review process.

- Create an SBIR Gap Fund. One of the greatest opportunities for unlocking university technologies is through Small Business Innovation Research (SBIR) grants if the timing issue can be addressed. Startups built around university innovations can seek SBIR funds to demonstrate feasibility (Phase I) and to develop the product (Phase II). However, many companies struggle because of the time gap of SBIR funding. A successful Phase I SBIR grant (usually of about $250K) is followed by the submission and review of an application for a Phase II grant (about $750K to $1M). The time from completion of Phase I to the funding of Phase II can be 9 to 12 months. Many startups do not have the resources to continue to pay scientific staff or rent space during this period and waste valuable time waiting for the evaluation of the application. The proposed SBIR Gap Fund will bridge this gap for university startups. The funding will be on the order of $100K to $150K to help the company remain viable while it seeks additional funds. Stringent review will be critical to the wise investment of these funds.
- Connect to local VCs. The Blackstone Entrepreneurs Network was formed to activate connections among startups, successful entrepreneurs, and investors (or "dealmakers"). From University research on dealmakers, we know that North Carolina, and the Triangle region in particular, has investor activity that is not as maximized as it is in other locations due to a lack of connectivity. UNC Chapel Hill will need to intentionally build more ways of connecting local funders to University opportunities, including through local alumni.
- Connect to key hubs to create relationships with VCs and other constituents. Investment from outside North Carolina will be critical to UNC Chapel Hill's ability to commercialize research and realize impact. Our undergraduate entrepreneurship programs and VCIC program for MBAs have established activities in Silicon Valley and New York City, exposing students to the investment communities in those hubs. However, the University needs to build more direct connections and opportunities for engaging investors from other regions with our most promising emerging companies. Additionally, alumni who are investors can be made aware of University IP and invited to provide advice. There have been discussions by some alumni about creating an alumni seed fund.
- Provide needed technical and administrative assistance. This strategy would include integrating startup services for faculty across the campus, including Carolina KickStart and the Concierge Service for Entrepreneurs, with leadership from the proposed Office of Commercialization and Economic Development (which would include OTD).
- Fully implement the Carolina Research Venture Fund.

Q: How does our innovation agenda relate to a University development campaign – **and to other possible opportunities for funding?**

Remains To Be Done — CAMPAIGN
Recommendations
- As noted earlier in this report, assure that fundraising for innovation is a significant component of the next campaign.

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- Work with Development and senior leaders (such as deans and directors) across campus to support their individual I&E fundraising goals.
- Explore various foundation models for supporting I&E work on university campuses.
- Continue conversations with alumni who have expressed interest in a venture philanthropy fund for the University.
- Create a central Innovation Fund.

E. LEARNING AND COMMUNICATING

Q: How can we continually learn from others while also leading in innovation and entrepreneurship?

Remains To Be Done — LEARNING AND LEADING
Recommendations
- After studying many commercialization operations, UNC Chapel Hill leaders stepped back to ask an intriguing question: How would the University commercialize IP if it were the first ever to attempt this type of function? The conversation was between experts on campus and those outside. Once the leaders settled on an approach, they again sought feedback from a wide audience to test assumptions and make modifications. The result is the proposed Office of Commercialization and Economic Development, which will give the University the opportunity to implement the new approach in an iterative process – taking steps, testing those steps and the assumptions behind them, making corrections, and then moving forward. Leaders will continue to call upon their wide network of external expert practitioners as well as the University's own experts to develop improved practices that can inform the field.
- To fully realize the potential of the University's innovation ecosystem, individual I&E spaces, programs, and curricular activities need the resources to adopt best practices and apply lessons learned.
- UNC Chapel Hill needs to carefully consider the pros and cons of a closely held separate structure for certain innovation activities.

Q: What communication strategies are needed to bring the University community and the public on board with our innovation agenda – and to tell the story of impact?

Remains To Be Done — COMMUNICATION
Recommendations
Under the direction of the Vice Chancellor for Communications, a new communications team and structure (Carolina Compass) brings the opportunity for added resources, direction and collaboration around innovation communications. Some areas for action include:
- Formalize a system for effectively gathering and pooling information (content) on innovation and entrepreneurship activities at UNC Chapel Hill. This will require having a network of campus communicators team up with the central communications office.
- Create portals and pathways for faculty, students, and external audiences to learn about innovation and entrepreneurship programs specific to their needs, so they can find help quickly and easily. This work would be executed through the I&E Office.

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- Create a national strategy for raising UNC Chapel Hill's profile as a thought leader in this area through key story placements, rankings, etc.
- Provide resources, tools, and guidance to stakeholders, e.g., faculty, staff, student innovation groups and working group members – so that they, in turn, can communicate consistently with audiences.
- Create an easy-to-understand dashboard of the University's economic impact on the State of North Carolina. This should include the direct impact of research, commercialization statistics, and other direct economic benefits.
- Develop and execute investor- and industry-specific communication strategies.
- Develop and execute alumni-specific communication strategies.
- Develop and execute a communication strategy for other key stakeholders.

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THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

UNC Chapel Hill Board of Trustees Innovation and Impact Committee
Response to Questions Posed in June 2014 Memo
Judith Cone
September 2014

This paper responds to the questions posed to the Administration by Board of Trustees' Committee on Innovation and Impact Chair Phil Clay in his memorandum of June 10, 2014. Administrative liaisons to the Committee are Vice Chancellor of Research Barbara Entwisle, Joe DeSimone, Chancellor's Eminent Professor of Chemistry, and Judith Cone, Special Assistant to the Chancellor for Innovation and Entrepreneurship, who was asked to write the response in consultation with Vice Chancellor Entwisle.

The Innovation and Impact Committee is exploring ways to maximize the volume and quality of innovations from UNC Chapel Hill by strengthening the innovation ecosystem to benefit North Carolina and beyond. The University wants to fuel transformation at Carolina and make it a vibrant place of research, teaching, and innovation, addressing the most challenging issues of our time.

In the June 10 Memo the Committee presented the following questions to University Administration and asked for each to be answered in three parts 1) actions to date, 2) what have we learned, 3) what remains to be done. Questions and responses are arranged here under five main headings.

A. Leadership, Strategy, and Alignment
- What are the optimum administrative structures and functions for leading our efforts in innovation and entrepreneurship? What are the roles of other senior officers and deans? How is the faculty mobilized for various roles?

B. Carolina's Innovation Assets
- How does research connect throughout all of our programs and work in innovation and entrepreneurship?
- What does an innovation agenda mean for various segments of the UNC Chapel Hill community and their activities? (education programs, student activities, faculty, staff, alumni, town-gown relations)
- How can we best address design (and cultivate "design thinking") in innovation and entrepreneurship?
- What are the space requirements to support a robust innovation ecosystem? What is our strategy for Carolina North? Does the existing plan hold up? If not, how will we determine what to do?
- How can we leverage Carolina's global brand for maximum impact?

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C. External Engagement
  • How can we engage industry partners in building a strong innovation ecosystem?
  • How can we form a strong regional infrastructure of support for our innovation agenda in the Triangle?
  • How can we build and maintain an innovation ecosystem that supports both broad and deep engagement with the state?

D. Funding
  • How will we adequately fund our research and its application, in light of declining federal and state dollars?
  • How can we engage the venture community in support of new ventures?
  • How does an innovation agenda relate to a university development campaign – and to other possible opportunities for funding?

E. Learning and Communicating
  • How can we continually learn from others while also leading in innovation and entrepreneurship?
  • What communication strategies are needed to bring the University community and the public on board with our innovation agenda – and to tell the story of impact?

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A. LEADERSHIP, STRATEGY, AND ALIGNMENT

Q: What are the optimum administrative structures and functions for leading our efforts in innovation and entrepreneurship? What are the roles of other senior officers and deans? How is the faculty mobilized for various roles?

CONTEXT: ABOUT IMPACT
In responding to this question, it is helpful to make a distinction between commercialization of technology, and innovation as a process of putting important ideas to use for the public good. Bringing new technologies to market through startups or licensing is very important – but is only one way to be innovative and have impact. The University has taken a broad approach to innovation and has described three key translational methods used by faculty, students, and staff:

1. *Launch innovators into the world.* Graduates armed with technical knowledge, grounded in the liberal arts, and inspired to action by example are powerful ongoing contributors to impact. Carolina wants its students to graduate with the tools and confidence to apply entrepreneurial thinking and action throughout their lives. Many parties at the University have been working together to identify – and then cultivate – new skills and attributes that students will need in order to have positive impact in a fast-changing world. For example, a recent Faculty Working Group on Data Studies recommended that all students graduate data literate.

2. *Influence based on research.* Many faculty use the knowledge derived from their research to develop cases that influence government and corporate policy, inform the development of programs and interventions to influence attitudes and behaviors, or to advance the state of practice in fields including science, medicine, government, and education. Through artistic and social endeavors, other faculty, students, and staff create broader understanding of issues and provoke new insights into human affairs.

3. *Create social and commercial enterprises.* This encompasses the *formal* technology commercialization process (based on university-owned intellectual property) as well as *informal* enterprise creation (the starting of ventures that do not depend on university IP). Due to patent tracking, the formal type is officially recorded, while many of the informal type go uncounted. Students are particularly active in informal enterprise creation, although of course, faculty participate in this space also.

While the Board of Trustees Innovation and Impact Committee is broad in its vision, the focus so far has been largely, although not exclusively, on innovation in relation to commercialization and economic development.

All types of innovation require leaders to:
• Make innovation and impact a top priority and build a supportive climate.

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- Communicate with multiple audiences inside and outside the University about why this is important and involve them.
- Provide sophisticated guidance and education through formal and informal programs.
- Engage strategic partners to facilitate innovative endeavors.
- Provide incentives and rewards; remove barriers.
- Fully resource the efforts.
- Ensure that the building blocks of innovation are in place (APS, BME, Data studies, Computer Science).
- Promote diversity in interdisciplinary work (team science, convergence, implementation science).
- Communicate Carolina's impact on North Carolina and on the world.

The above-listed fundamentals of an innovation ecosystem will appear in various sections throughout this document. In myriad ways, UNC Chapel Hill leaders demonstrate their commitment to innovation through their actions.

Regarding the senior administration team:

Some major steps have been taken since 2010 in terms of creating, and enhancing the work of, key offices. These offices, in turn, have done much to help build (or to revamp) systems and programs for innovation. Some critical next steps are being planned. While several offices could be highlighted, two existing and a proposed new one are discussed:

Chancellor's Office of Innovation & Entrepreneurship:

Actions To Date — I&E OFFICE
Established in 2010, this office leads campus-wide efforts to strengthen a culture of innovation and entrepreneurship and encourages all three translational approaches. Early on it engaged faculty, students, and external groups (including five Board of Trustee members) to create a strategy (the *Innovation Roadmap*) and then to implement it (documented in the *Two-Year Progress Report*). The *Roadmap* called for actions such as having the campus adopt a central major global issue such as water. It also highlighted the need for diversity in interdisciplinary approaches to help solve complex problems. It recommended creating and/or strengthening the building blocks of innovation: Applied Physical Sciences, Biomedical Engineering, Data Studies, and Computer Science.

Using the *Roadmap* as a guide and iterating along the way, the I&E Office has advocated for the issues stated above and has encouraged advancements in teaching entrepreneurship and building innovation spaces. One of the most important tasks has been to identify roadblocks and then collaborate with administrators and staff members to remove or at least lessen them. Whether people wish to pursue social, artistic, commercial, sports, health, or scientific innovations, the I&E Office monitors programs and services to ensure everyone is well served by the University community. The Office publishes progress reports on the University's innovation ecosystem every two years.

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From the beginning, the Office has turned to student leaders to help set the agenda and implement the work. The Chancellor's Student Innovation Team, created in 2010, has been an integral part each step along the way, followed by a more recent graduate-student team.

Further, the I&E Office works with units across campus to start and/or improve their work, involves students as leaders in these initiatives, helps to raise funds, and provides seed grants for projects. The Office, along with the Center for Entrepreneurial Studies, co-founded Launch Chapel Hill, and it helped establish 1789 Venture Lab and the CUBE Social Innovation Incubator in collaboration with the Campus Y. It established a campus-wide community of faculty, staff, and students involved as leaders in innovation and entrepreneurship, the *Carolina I&E Network*, to grow the ecosystem. The Network has approximately 125 on the mailing list and an average attendance of 85 at monthly meetings. The I&E Office has organized these meetings to introduce the group to each other, further integrate the campus's work, provide connections to senior leaders (Chancellor Folt was the kickoff speaker), present informational sessions, bring up issues that need to be addressed, and pursue new opportunities.

The Office communicates the stories of innovation through its innovate.unc.edu website and social media. It represents the University in developing the Triangle entrepreneurship ecosystem, in the State, and on the national stage.

Finally, the I&E Office has helped raise millions of dollars for innovation and entrepreneurship. (The *Roadmap* goal was $125 million, and that target is close to being reached with one year left in the plan.) In turn, the University has helped social ventures, student startups, and faculty spinoffs get started. Thousands of students have engaged in experiential education to learn what it means to think and act entrepreneurially.

What We Have Learned — I&E OFFICE
The strategic and catalytic role of this Office is important to drive innovation in myriad ways on campus and to ensure that resources and processes are aligned with the vision. Singularly, it works across all dimensions of the University: Administrative and academic leadership, research, teaching, service, undergraduates, graduate students, post docs, faculty, staff, donors, and the community. This type of panoramic view allows Carolina, as a large complex organization, to make the type of strategic decisions necessary to be a vibrant innovation hub that tackles the biggest challenges of our time.

Much progress has been made; much important work remains. Culture building requires consistency over time.

Remains to Be Done — I&E OFFICE
Recommendations
• Continue to be a catalyst. Articulate the vision and mission, engage a wide variety of internal and external stakeholders, and advocate for a culture of innovation and entrepreneurship campus-wide.
• Continue to evaluate the ecosystem, advocate for necessary changes and promote new advancements in how our campus accomplishes this work.

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- Implement tools that can be shared within the *Carolina I&E Network* such as the adoption of Salesforce, which is under way.
- Celebrate successes and tell the stories of innovators and their impact.
- Help raise funds for campus initiatives.

Office of the Vice Chancellor for Research:

Actions To Date — OFFICE OF RESEARCH

The Office of the Vice Chancellor for Research represents the front end of the innovation pipeline. Despite the sequester and the federal shutdown, Carolina has continued to increase its research and it now ranks 9th nationally in federal funding, and 11th from all sources. Federal sponsors account for most of this funding. Accordingly, the Office of Research has had a strategic focus on diversification, making investments and organizational changes to support funding from industry, including our own spinouts. It has also made investments to help maximize the impact of Carolina's research through support for the CTSA, and through the research centers and institutes, where applied research related to policy, programs, and practices is largely based. It is these accomplishments that highlight even more graphically the underperformance on the other end of the pipeline.

With respect to commercialization specifically, the Office of Research has made improvements in the Office of Technology Development (OTD) through personnel and budget changes and better systems. It created a patent review process and a Technology Development Grant program as well as waived indirect charges on Phase I SBIR/STTR grants. OTD is performing much more effectively than previously.

As background, prior to 2010, for many years the Office of Technology Development, reporting to the Vice Chancellor for Research, was the only organization on campus commercializing research. It seemed unable to fill that role adequately, as shown by weak indicators of performance compared with peer institutions. As a consequence, in 2004 the School of Medicine started the Carolina KickStart initiative with funds from a NC TraCS CTSA award. During that same time, the Carolina Express License was created by a faculty task force and went into use in 2010.

What We Have Learned — OFFICE OF RESEARCH

The Research Office has a large and growing portfolio that now includes nearly $800 million in research. It has 11 offices that support research development, compliance, and impact, is responsible for 16 university centers and institutes, and works with all faculty to advance their research. Carolina's research portfolio is more than twice the size of the next largest in the UNC system (NCSU) and, because the portfolio is dominated by the life sciences, is highly regulated.

Throughout the University's history, research and teaching have received the majority of resources, while service was lauded but certainly not an equal partner in allocations. Now that impact has risen to a priority, innovation will need to be supported accordingly.

The size and complexity of the Research Office's portfolio is important because Carolina is in a time of transformation. The services offered by OTD have improved, but those advances in

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themselves will not be sufficient to deliver the types and quality of services needed across multiple audiences quickly enough to close the innovation performance gap. Take the sum of our good actions, and we improve. Take the vision of what we could become, and it means we have to be disruptive for the public good.

There are plans to create a separate office for commercialization and economic development (discussed in the next section).

Remains To Be Done — OFFICE OF RESEARCH
Recommendations
- Continue the mission of growing research and maximizing its impact. Work closely with the Offices of Development, Communication, Innovation & Entrepreneurship, and the proposed Office of Commercialization and Economic Development, as well as with departments, centers, and institutes, to help increase research funding and facilitate the translation of research into practical benefit.
- Provide streamlined services for sponsored research proposals and agreements with private industry through the Office of Industry Contracting.
- Enhance communication research benefits through the Office of Research Communications.

Proposed Office of Commercialization and Economic Development:

This proposed new office will report to the Chancellor and provide the needed focus on end-of-the-pipeline impact. It will be nimble and experimental, give visibility to the goals, and be able to hire the type of additional talent needed. Most important, it will enable the University to take next-level steps to become a leader in these fields.

Actions To Date/What We Have Learned — PROPOSED OFFICE OF COMMERCIALIZATION AND ECONOMIC DEVELOPMENT
Presentations to the Committee highlighted the underperformance of Carolina in commercialization. While the University is much improved due to the investments of the Office of Research and those of other units around campus, incremental improvements will not catapult Carolina into becoming a global leader in this area.

Since commercialization is a critical component of the innovation ecosystem, University leaders believe this proposed office is needed to integrate the various entities on campus (including the OTD) into a unified effort and add additional services. It would build on the solid base that has been developed since 2010 and make Carolina a highly effective university in commercialization. A great deal of analysis and planning has gone into how such an office could be designed.

Economic development has been covered during the Committee meetings in relationship to the impact Carolina has on the state. The economic strength of North Carolina is of utmost importance to the University. This is our State, and we are dedicated to serving its citizens.

Having a senior-level position dedicated to economic development will harness campus-wide efforts, draw on the strengths of our research, and leverage faculty, staff, and students in a

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coordinated way to make lasting and significant improvements. The proposed office would work with experts in economic development across campus to create and implement a strategy for maximizing UNC Chapel Hill's efforts, in partnership with local, regional, and state leaders from business, government, and support organizations. Further, this Office would, in partnership with Development and Research, help lead a major focus on developing industry relations.

Multiple factors are now converging that make this the time to create the proposed office:

- The Board of Governors, Board of Trustees, Chancellor and Provost are aligned behind making innovation and impact a top priority and increasing benefits to the State from UNC Chapel Hill research.
- The campus has been building a culture of innovation and has made progress in commercialization. Deans who lead units that engage in commercialization, as well as academic entrepreneurs, want the University to take the needed actions to make Carolina an exemplar in these areas.
- State government officials are encouraging universities to increase their commercialization efforts.
- Federal funding agencies increasingly favor research geared to translation and commercialization of basic science.
- Millions of people in North Carolina already benefit from the economic impetus that Carolina, as a major research university, provides, but the need is great.
- UNC Chapel Hill has not had a university-level representative for economic development since 2010, when the two-person Office of Economic and Business Development closed upon Director Jesse White's retirement. Faculty and staff working on topics related to economic development continue to meet monthly during the academic year to discuss issues, but there is no comprehensive framework for advancing their efforts.
- The Office of Research is large and complex, dealing with a budget of nearly $800 million that is concentrated in the highly complex fields of human life sciences. Having a separate office that works closely with Research, but is focused on commercialization, could help in managing all aspects of the work more effectively.

Remains To Be Done —PROPOSED OFFICE OF COMMERCIALIZATION AND ECONOMIC DEVELOPMENT
Recommendations
• Create the Office of Commercialization and Economic Development to fulfill the following two missions:

Mission for Commercialization – From Invention to Impact: Provide maximum benefit to the people of North Carolina and beyond by optimizing the University's systems for practical innovation, and by licensing university intellectual property promptly to those who will most effectively and appropriately propagate it into use for society.

Mission for Economic Development: Grow North Carolina's economy and competitiveness by engaging key faculty/staff experts and students to develop and implement a strategy to address economic development drivers in our State.

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The roles of other senior officers and deans:

Actions To Date — SENIOR OFFICERS AND DEANS
Strengthening a culture of innovation that maximizes Carolina's impact on the citizens of North Carolina and beyond is the responsibility of every leader.

Senior leaders throughout the campus have contributed to the innovation agenda. The Provost and Vice Provosts, along with the Vice Chancellors for Research, Development, Student Affairs, Administration/Finance, Workforce Strategy, Legal Affairs, Communications, and Special Assistant for I&E have been instrumental in the advances to date. Some deans lead units that have more a direct relationship to commercialization, but all can and do drive innovation and impact.

Frustrated by inadequate commercialization services offered by central administration prior to 2010, and motivated by a vision of what was possible, a few deans, whose schools are most prolific in generating patentable intellectual property, took the lead. Wanting to close the commercialization gap, they created their own programs and shared them with others across the campus. Most notable in this regard are the deans of the School of Medicine, Kenan-Flagler Business School, the Eshelman School of Pharmacy and the College of Arts & Sciences, working with the Departments of Computer Science and Chemistry. Some have included innovation in plans for the upcoming campaign.

What We Have Learned — SENIOR OFFICERS AND DEANS
To have a robust, highly effective, and sustainable innovation and entrepreneurship ecosystem, the University's related goals and strategies need to be fully integrated by each senior administrative leader and dean, and resources and processes need to be aligned.

The University's commercialization efforts are now distributed between central services and localized programs. Carolina KickStart, UNC Kenan-Flagler's Frank Hawkins Kenan Institute of Private Enterprise and the Center for Entrepreneurial Studies provide important services to augment the work of OTD, especially around the creation of new businesses based on university IP. Finding the optimal mix between centralized leadership and decentralized services will fully leverage campuses resources.

Remains To Be Done — SENIOR OFFICERS AND DEANS
Recommendations
- Continue to include goals related to innovation and impact in their strategies and actions. Senior leaders need to align institutional resources and processes accordingly. Since the Chancellor and Provost are working closely with administrative leaders and deans on strategic planning and the Development Office is preparing for the new capital campaign, this is the time to incorporate innovation goals.
- Articulate to their constituents how and why the University is building an innovation ecosystem and how it is relevant to their areas of responsibility or research. Specifically encourage their faculty, staff, and students to consider the rewards of converting ideas into practical benefit.
- Balance central services and unit programs to keep them strategically aligned and fully integrated.

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- Deans: Continue creating structures and environments that support innovation. Prioritize innovation initiatives in development goals as well as in communication strategies. Following the lead of some deans, it is helpful if each assigns an innovation and entrepreneurship liaison officer to join the university's I&E Network group, and to serve as an internal contact person and champion. The Schools of Medicine and Pharmacy and the Department of Computer Science have associate deans/chair with titles related to entrepreneurship.
- Deans: Ensure that their faculty feel supported in undertaking scholarly work in ways that benefit non-academic sectors and have impact. Align incentives and rewards.

Mobilizing faculty for various roles:

Actions To Date — MOBILIZING FACULTY FOR VARIOUS ROLES
Faculty are at the heart of the innovation effort, whether they contribute by creating intellectual property, starting enterprises, or maximizing impact in other ways. A variety of programs and initiatives are under way to spur faculty involvement in commercialization and entrepreneurship more broadly. For example:

- Carolina KickStart, the Center for Entrepreneurial Studies, the Office of Technology Development, the Kenan Institute of Private Enterprise, the CUBE, Launch Chapel Hill and unit programs all help faculty with commercialization. Carolina KickStart has created a faculty mentor program whereby faculty seasoned in commercialization coach those new to the process. Other formal training programs are available, such as Launching the Venture, as well as many mentoring programs such as the Concierge program at the Kenan Institute and the ongoing assistance provided by OTD staff. Entrepreneurs-in-Residence are in place throughout the University and work closely with administrators, faculty, staff, and students.
- Faculty have a role on the OTD Advisory board, have been on task forces for commercialization and industry relations, and speak at the OTD Innovations Seminar Series.
- Carolina KickStart has consistently advocated for incubation space. It spearheaded the use of part of the second floor of the Genome Sciences Building for office and wet-lab space for faculty ventures, and pre-negotiated conflict of interest and facilities use agreements.
- The Faculty Entrepreneurship Bootcamp, hosted by the Economics Department's Minor in Entrepreneurship and staffed with facilitators from on and off the campus, is a four-day program for faculty who want to learn the principles of moving their ideas forward to application. This past year, several faculty from other UNC universities attended, and there are conversations about expanding it further.
- Other programs focus on innovative engagement and outreach, such as the Felix Harvey Award. As formally stated, this award is meant to *recognize exemplary faculty scholarship that reflects the University's commitment to innovation*.

What We Have Learned — MOBILIZING FACULTY FOR VARIOUS ROLES
Not all faculty wish to be involved in the innovation work of the campus. Some perceive innovation in the narrow sense to mean commercialization of IP, and think that such activity is not relevant to them. Communicating that innovation is about impact engages more faculty. For faculty who do wish to commercialize their work, there is an awareness gap in terms of knowing where to turn for help and how to navigate the process. Some find the task too daunting to even begin. Among those faculty already engaged in commercialization, the majority are not seasoned in this type of work and would benefit from added guidance and services. The process of managing conflict of interest remains a major barrier to this work at Carolina.

Remains To Be Done — MOBILIZING FACULTY FOR VARIOUS ROLES
Recommendations
- More effectively help faculty understand that translation is an extension of their scholarly pursuits.
- Find ways the University can incentivize and facilitate translational work. For instance, faculty need time to invest in the translation process.
- Effectively guide faculty through the translation process.
  - Expand the Faculty Bootcamp or some such equivalent(s).
  - Use successful, respected faculty innovators as mentors and guides for others. Expand on the KickStart Faculty Fellows program – which is modeled after a University of Utah program.
- Streamline the Conflict of Interest Review process.
- Create a cross-campus entrepreneurship education curricular committee to continue refining how faculty teach entrepreneurship to various audiences.
- Better engage with Carolina faculty who are noted scholars in innovation and entrepreneurship to learn from them and extend their scholarly work.

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B. CAROLINA'S INNOVATION ASSETS

Q: How does research connect throughout all of our programs and work in innovation and entrepreneurship?

CONTEXT

As a leading research university, Carolina is connected to local, national and global communities. Society often looks to the top talent at universities – scientists, innovators, program leaders – to produce new solutions to pressing local and global challenges. Such complex problems require diversity of thought and collaboration in finding solutions based on interdisciplinary research. Research, especially research that brings together diverse talent, is at the heart of our innovation agenda.

Actions To Date — RESEARCH FUNDING

The steady growth of research funding at the University over the past 15 years is a tribute to the talent, hard work, and success of the faculty (a product of earlier as well as current investments) and an interdisciplinary approach to advancing knowledge and understanding. UNC Chapel Hill faculty are part of an internationally-recognized research enterprise that draws from five health sciences schools (Dentistry, Medicine, Nursing, Pharmacy, and Public Health), plus UNC Health Care and its teaching hospitals, as well as the College of Arts and Sciences and the other professional schools. UNC Chapel Hill is particularly known for its collaborative and interdisciplinary culture, as evidenced by the centers and institutes that are vital to its research program. Team science is the norm.

The 2011 Academic Plan identified *interdisciplinarity* in teaching, research and public service as a central focus, and outlined action steps to build support for it across campus, thus leveraging a comparative advantage the University already enjoys. Fully half of the external funding received supports projects that include faculty from more than one department, often from more than one school within the University. Institutes and centers have a particular role in supporting interdisciplinary collaboration and helping to leverage impact. For example:

- The North Carolina Translational and Clinical Sciences (NC TraCS) Institute combines the research strengths, resources and opportunities of UNC, partner institution RTI International and planning partner North Carolina Agricultural and Technical State University (NC A&T). The mission of NC TraCS is to accelerate clinical and translational research in health science, from discovery to dissemination to patients and communities. It seeks to overcome barriers to translation by improving efficiency, training the research workforce and sharing successful research methods. It is the sponsor of Carolina KickStart, 4D, and other relevant programs.
- The Cecil G. Sheps Center for Health Services Research seeks to improve the health of individuals, families, and populations by understanding the problems, issues and alternatives in the design and delivery of health care services. This is accomplished through an interdisciplinary program of research, consultation, technical assistance and training that focuses on timely and policy-relevant questions concerning the accessibility,

adequacy, organization, cost and effectiveness of health care services and the dissemination of this information to policy makers and the general public.

- The Asia Center works with the College of Arts and Sciences, professional schools, and various departments, centers and student organizations at UNC Chapel Hill, and collaborates with other regional and international institutions to develop and implement educational programs about Asia.

UNC Chapel Hill is leading a national conversation on convergence. Chancellor Folt and Joe DeSimone, Chancellor's Eminent Professor of Chemistry, helped organize a National Academies conference on the topic, and the conference report stated:

"Convergence" of the life sciences with fields including physical, chemical, mathematical, computational, and engineering sciences is a key strategy to tackle complex challenges and achieve new and innovative solutions. For example, researchers draw on contributions across these disciplines to advance our understanding of health and disease at genetic, cellular and systems levels and to develop and deliver novel therapeutics designed to treat diseases earlier, more successfully, and with fewer side effects.

Numerous reports have explored advances that are enabled when multiple disciplines come together in integrated partnerships (e.g., A New Biology for the 21st Century (NRC 2009); Research at the Intersection of the Physical and Life Sciences (NRC 2010); The Third Revolution: The Convergence of the Life Sciences, Physical Sciences, and Engineering (MIT, 2011); and the National Bioeconomy Blueprint (White House, 2012). As a result, institutions have increasingly moved to implement programs that foster such convergence or are interested in how they can better facilitate convergent research.

Research-based interdisciplinary work, often carried out in collaboration with colleagues at other institutions around the world and/or in the private sector, has been fertile ground for innovative, applied solutions. For example, the exceptional work of the Water Institute under the leadership of Jamie Bartram, together with the Institute for the Environment under the leadership of Larry Band, has drawn experts from around the world to its annual water conference, and has launched multidisciplinary efforts to solve issues of access to safe, clean water sources.

Programs to help faculty translate their research into innovations include Carolina KickStart and the Concierge Program for Entrepreneurs (including patent landscape analysis) at the Kenan Institute of Private Enterprise. OTD Associates assist faculty on an individual basis.

What We Have Learned — RESEARCH FUNDING
An innovation and entrepreneurship agenda that prioritizes commercialization and other translational methods is, by definition, one that depends on excellent interdisciplinary research to initiate the process. Yet, faculty who want to explore ways to apply their research struggle to find the time. They also need the right mentorship. Waiting until a faculty member files an invention disclosure with OTD misses opportunities to work on research ideas in their earliest stages and help guide their development.

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With the exception of graduate students in the Kenan-Flagler Business School, graduate students and postdocs have few educational or co-curricular opportunities to build their entrepreneurial capacity. A major challenge has to do with conflict of interest issues around the participation of students in startups based on faculty IP.

Remains To Be Done — RESEARCH FUNDING
Recommendations
- Given the focus at Carolina (and, indeed, nearly everywhere) on interdisciplinary work, continue to promote collaboration and research across disciplines as a fertile source of potential innovations.
- Develop more integrated, clearer systems and support for faculty interested in commercializing their research including allocating time for faculty to become involved.
- Create and implement a comprehensive plan to educate and involve graduate students and post docs in the translational work of the campus, while also pursuing studies within their disciplines. Include connections between MBAs and graduate students and post docs in the sciences.
- Within the general structure of federal and state regulations, resolve conflicts of interest in an expedient, fair, and respectful manner so that faculty and graduate students are able to appropriately engage in innovation activities.

Q: What does an innovation agenda mean for various segments of the UNC Chapel Hill community and their activities?

CONTEXT
UNC Chapel Hill has many stakeholders pursuing a myriad of activities. To carry out the innovation and entrepreneurship agenda with maximum effect, it is worthwhile to consider how that agenda is being expressed in and integrated with the following:
- Educational programs
- Student activities
- Alumni relations
- Town-gown relations
- Faculty
- Staff

Good work has been done on all fronts but many needs remain. Below is a review of each area:

Educational programs:

Actions To Date — EDUCATIONAL PROGRAMS
UNC Chapel Hill has developed outstanding programs for faculty and students in innovation and entrepreneurship, with varying degrees of saturation depending on the target audience. Curricular offerings include: undergraduate and graduate entrepreneurship concentrations

through courses at the Business School, the Entrepreneurship Minor led by the Economics Department in the College of Arts & Sciences, a joint MBA/MD program, the Reese News Lab in the School of Journalism, a new Education Innovation Masters program in the School of Education, and courses in schools and departments across campus such as Public Health and Social Work.

Curriculum in the building blocks of innovation (APS, BME, Data Studies, Computer Science) is being created and/or strengthened. A new CreatorSpace will be tied into the APS and BME courses and open next year in Murray Hall.

Programs outside the classroom for faculty and students include: Carolina KickStart and 4D, Concierge Service for Entrepreneurs, Blackstone Entrepreneurs Network, Launch Chapel Hill, 1789 Venture Lab, the Campus Y CUBE Social Innovation Incubator, and UNC Health Innovations. Depending on the level of interest and point in the innovation process (imagine-design-build-grow), UNC Chapel Hill has a program that will help develop innovation skills and provide connections to other resources.

What We Have Learned — EDUCATIONAL PROGRAMS
As a recent survey revealed, many faculty are unaware of the services and educational programs available. When faculty do use these, they report benefits from formal programs like the Faculty Bootcamp and Launching the Venture, and from co-curricular workshops through programs like the Carolina Challenge and CUBE.

Students are looking for ways to combine their innovative and entrepreneurial passions with their formal studies. At the same time, students in areas that are not necessarily thought of as entrepreneurial benefit from exposure to the fundamentals of an innovation toolkit. These include the abilities to work in multidisciplinary teams, see opportunities and design imaginative solutions, communicate and execute on goals, be literate in data, have exposure to design methodologies, and navigate a rapidly-changing global environment.

Remains To Be Done — EDUCATIONAL PROGRAMS
Recommendations
• Continue developing and enhancing the entrepreneurship curriculum in units across campus to include methodologies for the entire innovation process: imagine-design-build-grow. Incorporate creativity and design thinking more fully in the existing entrepreneurship programs.
• Strengthen entrepreneurship educational programs for graduate students and post docs. Identify funding that could facilitate participation in these programs.
• Continue creating/expanding courses in Applied Physical Science, Biomedical Engineering, Data Studies, and Computer Science.
• Create targeted programs to best meet the needs of faculty in learning how to translate their work. Focus on just-in-time learning with a mixture of online tutorials, mentoring, and small groups.
• Market the educational programs more effectively, and in general make it easier for all audiences to find the resources and people they need.

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Student Activities:

Actions To Date — STUDENT ACTIVITIES
In addition to curricular and co-curricular programs, the University has seen an increase in student-led activities to engage and build participation in an innovation ecosystem. Examples include: TEDxUNC, hackathons organized by student groups in Computer Science, Global Entrepreneurship Week activities, Carolina Creates, Kairos (featuring top student startup leaders), Design for America, University Innovation Fellows, CreatorSpace Student Leaders, the Chancellor's Student Innovation Team (CSIT) and Chancellor's Graduate Student Innovation Team (CGSIT). The I&E Office works with these student groups to plan and execute activities throughout the year, including a recent Innovation Fair and Maker Fair during Week of Welcome.

Some graduate students work closely with their faculty advisors to develop potential innovations, consult via student teams, and serve in such paid internships as the Blackstone Fellows. On a limited basis, a few graduate students work as interns in OTD and receive two-year fellowships to work on a faculty spinout.

Each year the University actively recruits a few top students to come to Carolina on a four-year full scholarship as undergraduate Innovation Scholars. These students are automatically part of the Entrepreneurship Minor and are invited to join the related campus leadership organizations.

What We Have Learned — STUDENT ACTIVITIES
Students are drawn to activities that allow maximum room for creativity, exploration and growth. UNC Chapel Hill has successfully built an innovation culture among undergraduate students across disciplines. Students who have ideas for forming startups can find support through various programs. Most of their startup ideas tend to be disconnected from significant areas of expertise and research on our campus, however. Student engagement with some of those areas, and with the faculty leads, could potentially be a source for more entrepreneurial solutions to the challenges that Carolina is taking the lead in addressing.

Remains To Be Done — STUDENT ACTIVITIES
Recommendations
• Better align student innovation activities with the research agenda of the University, exposing students to problems and potential solutions in areas outside their personal knowledge, and attuning them to the University's efforts to address pressing global challenges. This will help to expand students' thinking, so that when they generate their own ideas for startups (as many now do), they can see possibilities beyond the limited scope that is often typical of student enterprises.
• Engage graduate students more fully in the innovation agenda.
• Find ways to harness the expertise of post docs and when appropriate, engage them with faculty spinouts.
• Better market campus resources to all students.
• Expand the Innovation Scholars program.

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Alumni relations:

Actions To Date — ALUMNI RELATIONS
The University's innovation agenda has sparked new relationships with alumni and parents who are themselves entrepreneurs, investors, or generally supportive of the work. Beginning with the Innovation Circle (a group of external stakeholders assembled to help create strategy for the campus), potential supporters have been provided many ways to become involved in the University's work in innovation. Alumni and parents as well as foundations have funded needs outlined in the *Roadmap*, including the endowment for the Entrepreneurship Minor, funding for innovation in the arts and humanities, social entrepreneurship, programs in the Business School, Innovation Scholars, and for many other initiatives across campus. In addition to giving, UNC alumni are working diligently to support the innovation agenda through mentorship in programs such as Launching the Venture, Blackstone Entrepreneurs Network, and Carolina KickStart, as well as through efforts to build the student innovation ecosystem. (For example, a local entrepreneur who is an alumnus founded and provides the majority of funds for the 1789 Venture Lab on Franklin Street).

What We Have Learned — ALUMNI RELATIONS
Despite much progress in this area to date, UNC Chapel Hill has just scratched the surface of the potential that exists in engaging alumni as donors, mentors, investors and often as creative forces in the University's projects and people. The Office of Development is eager to work more systematically towards alumni relationships that can yield significant future support for innovation work.

Remains To Be Done — ALUMNI RELATIONS
Recommendations
• Develop a high-level strategy for engaging alumni support for the innovation agenda. Segment the alumni and call upon them for their expertise as entrepreneurs, investors, and subject-matter experts as well as donors.
• Create an Innovation Fund for the campus that would support all aspects of the innovation agenda.
• Tie in alumni through regional innovation hubs.

Town-gown relations:

Actions To Date — TOWN-GOWN RELATIONS
For some time, talks with the Town of Chapel Hill about economic development centered around Carolina North, which called for innovation space particularly for faculty. As plans for Carolina North slowed, the University continued looking for ways to work with the Town to further support local economic development in addition to the University being a major employer and consumer of services and products. Helping develop and be home to Carolina startups is now part of the Town's and County's agenda. The Launch Chapel Hill business accelerator is a joint project among the Town of Chapel Hill, Orange County Economic Development, successful

entrepreneurs, and the University to support and accelerate startups of both UNC alumni and local residents. This partnership has been tremendously successful.

What We Have Learned — TOWN-GOWN RELATIONS
The Town of Chapel Hill and Orange County are pleased with the Launch Chapel Hill project and are eager to continue working together to support entrepreneurs. There are a number of challenges in creating a thriving startup scene in Chapel Hill. Rents are high and space is sparse near campus. There is not a major Chapel Hill corporation that is championing the startup ecosystem, such as occurs in Durham with Capital Broadcasting.

Remains To Be Done — TOWN-GOWN RELATIONS
Recommendations
• Continue working with Chapel Hill and Orange County officials on how to attract, support, and retain entrepreneurs and harness innovation for the economic and social benefit of the community. Good relations have been established and talks are underway for next phases of this work.
• Encourage landlords who own office space to offer flex terms and lower rents for startups.
• Build a world-class Innovation Center in Downtown. (see Space section)
• Create a strategy to engage local influential individuals in this work.

***Faculty*:**

Actions To Date — FACULTY
The innovation agenda has resonated with the majority of faculty, especially when discussed in more general terms as a means of extending their scholarly work to have practical benefits and impact beyond the academic realm. Some faculty come and stay at Carolina because of its ethos of research-based service. Even so, innovation themes are more readily embraced by faculty whose work is obviously translational (especially in computer science and the health sciences). UNC Chapel Hill has worked to recruit and retain noted innovative faculty members and to celebrate their work, striving to be a University where innovators thrive. Only a small percent of faculty have patentable discoveries, and not all of them want to commercialize those discoveries. In the latter case, OTD waits for invention disclosures from faculty while KickStart and unit liaisons start to work with faculty as early as possible to better move discoveries into the commercialization pipeline.

Two examples of faculty work show the diversity in types of impact. Both received much support from innovation team members on campus. As then chair of Music in Arts & Sciences, Mark Katz was asked to create the arts entrepreneurship track in the Entrepreneurship Minor, and he also received funds and support through an IAH Innovation award. Professor Katz created several new courses, including The Art and Culture of the DJ, Beat Making Lab, Rap Lab, and Rock Lab. With Professor Katz's assistance, his two adjunct faculty took Beat Making around the world and created an independent company to promote Beat Making and art activism. Professor Katz leveraged this work to win a U.S. Department of State grant for $1 million to create *Next Level*, a program that sends American artists abroad to foster cultural exchange, conflict resolution, and entrepreneurship.

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On a different front, faculty members Shelley Earp and Stephen Frye are commercializing their discoveries. Their firm Meryx is a new spinout company from Lineberger Comprehensive Cancer Center and the Eshelman School of Pharmacy. In partnership with the National Cancer Institute (NCI), they are developing a novel therapeutic treatment for acute lymphoblastic leukemia (ALL). They have a platform of small-molecule drugs for a wide range of clinical indications; cancer, anti-viral, and anti-thrombotic. The team is led by co-founders Stephen Frye, PhD; H. Shelton "Shelley" Earp, III, MD along with Seth Rudnick, MD, Chairman of the Meryx board and Mary Napier, PhD Operations Lead.

Specific support for faculty who wish to commercialize their technology is handled by the Office of Technology Development, the Carolina KickStart program, the Concierge Service for Entrepreneurs at the Kenan Institute of Private Enterprise, and through I&E liaisons within the schools themselves.

What We Have Learned — FACULTY
Those faculty already inclined toward translating their research into practical application tend to find the resources that they need to be successful. Many faculty remain confused about the best pathways to take and are not well informed about the opportunities that are available. Often they are unsure about how to handle such issues as conflict of interest. Some have not recognized or found the linkages between their research/careers and translation to non-academic audiences.

Remains To Be Done — FACULTY
Recommendations
• Reach more faculty with the opportunities of the innovation agenda.
• Develop an integrated network of innovation liaisons working with a core staff to be closely in tune with all faculty work and to educate faculty about Carolina's innovation agenda and resources.
• Create integrated, comprehensive systems that support faculty from early-stage innovation through all phases of translating knowledge into practical use. Build bridges of assistance across gaps in the process that are hard for faculty innovators to traverse on their own.
• Streamline all systems to remove resistance to the process, especially conflict of interest and facilities use.
• Find the resources needed for faculty to pursue innovations.

Staff:

Actions To Date — STAFF
UNC Chapel Hill students and faculty are supported in their innovation work by a small cadre of program staff, distributed across campus. These staff members work with each other and with faculty and students who are not directly engaged in the innovation agenda but have critical roles to play. Staff from the Office of Technology Development, KickStart, Kenan Institute of Private Enterprise, unit liaisons, those who operate the innovation spaces as well as offer the accompanying programs, and many others work tirelessly.

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What We Have Learned — STAFF

Innovation often requires flexible thinking and approaches that challenge bureaucratic systems. University staff have worked to find ways through roadblocks and to expedite processes that are critical to advancing innovation, although there is still more to be done. Staff members in this area are too few and are under-resourced.

Remains To Be Done — STAFF
Recommendations
Garner resources to bring additional staff support to the innovation ecosystem. Develop clear linkages between the offices and programs that provide staff support and guides to help others navigate the landscape.

Q: How can we best address design (and cultivate "design thinking") in innovation and entrepreneurship?

CONTEXT

Those involved with design thinking promote methodologies that include: seeing a problem or opportunity in the world, targeting the need, ideating possible solutions, and then ultimately designing a solution – all from a customer-driven or user-driver perspective. Increasingly, these methods are being used not only to design products but to design new businesses, whether they are startups or new arms of existing firms, and to design not-for-profit ventures that address social issues. The process centers around answering three key questions: Is this desirable? Feasible? Viable?

Design thinking may be combined with other concepts such as the lean startup model, which emphasizes building a new company iteratively, with feedback from customers, before scaling to each next step. The result is a highly-adaptable approach, which (when executed well) can produce startups that truly meet needs, while reducing the cost and risk involved. This is a departure from traditional business plan approaches in which entrepreneurs first map out a detailed master plan for their startups and try to find financing.

Actions To Date —

UNC Chapel Hill has shifted to teaching entrepreneurship on the basis of design thinking, lean startup, and business models with a focus on guided ideation as an integral part of design. The Human-Centered Design Toolkit, funded by the Gates Foundation, shows how to use the same methodologies in not-for-profits and social enterprises. Human-centered design is used by the Reese News Lab in the School of Journalism to generate solutions such as Capitol Hound, a social enterprise that provides a searchable audio archive and alert system for people following the North Carolina General Assembly floor sessions and committee meetings. In the Business School and the Entrepreneurship Minor, design thinking and lean startup methods are being integrated into the curriculum. Co-curricular support teams like Design for America (undergraduate-led), the Biomedical Engineering Club (graduate-student led), Carolina Creates (undergraduate-led) and

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the new Carolina Makers club (graduate and undergraduate student-led) conduct events and workshops that provide opportunities for idea development and solution design. Formally, design methodologies are integrated into the BME curriculum and will be a component of the curriculum in the new department of Applied Physical Sciences (APS).

APS also has led in the development of a new maker space (with the working title Carolina CreatorSpace) scheduled to open in the fall of 2015. A faculty working group of more than 25 members met during the past year to make recommendations for a 3500 ft^2 central space that will provide tools, technology and instruction for students and faculty in making physical objects. The space will support both curricular and co-curricular programming. It will be a hub that connects existing spaces on campus where design and making already occur, such as the Environmental Science Engineering (ESE) Design Center in the Gillings School of Global Public Health, the Art Lab in the Art Department, the Playmakers Theater Shop in the Paul Green Theatre, the University Libraries' 3-D printing hub in the Kenan Science Library, and the new children's maker space in the Morehead Planetarium.

What We Have Learned —
Methodologies for seeing problems, targeting need, ideating possibilities, and designing customer-driven solutions are effective means of innovation. Design thinking, human-centered design, improvisation and other creative methodologies add value to the entrepreneurial process, generating more actionable and successful ideas.

The campus program leaders and faculty are in the process of incorporating these methods in their offerings. Design is at the forefront in the discussion of I&E spaces.

Remains To Be Done — DESIGN
Recommendations
- For faculty entrepreneurs, integrate ideation and design methods into the full-service technology development approach that begins in the lab, well prior to invention disclosure. Lean Startup methods for the life sciences are made available through an NIH program, but our campus needs to create its own version.
- For students, support full integration of design methods into areas where this is already being done or planned—notably APS, BME, the proposed Data Studies competencies, and the CreatorSpace – while exploring potential uses of the methods in other curricular and co-curricular offerings.
- Expand the University's educational programs in design thinking for faculty and University program leaders, and continue exploring ways to ingrain design on our campus, especially as we create new spaces for innovation.

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Q: What are the space requirements to support a robust innovation ecosystem? What is our strategy for Carolina North? Does the existing plan hold up? If not, how will we determine what to do?

Space requirements:

Actions To Date — SPACE

In 2010 there were no formal spaces on campus dedicated to hosting and supporting startups. Since then, programs and spaces have opened and are essential infrastructure for the University's burgeoning innovation ecosystem. The Campus Y has created and has even increased its services for social entrepreneurs. The Entrepreneurship Minor is in the process of opening its new space in Gardner Hall. Faculty, staff, students, and donors have made numerous trips to visit innovation spaces. Teams have visited many spaces in Boston, Chicago, Stanford, California, Las Vegas, New York City, and others.

The spaces now available on and adjacent to campus include:

Launch Chapel Hill – Opened May 2013
    Type: Student, faculty, alumni, community; edge of campus.
    Capacity: Approx. 12-15 ventures (depending on size of teams).
    Funding: Three-year co-investment from Chancellor's Office ($300K), Town of Chapel Hill ($150K), Orange County ($150K) and the Becker Family ($300K). In-kind donations from Triangle Office Equipment and 3 Birds Marketing.
    Benefits: Bridges gap in support for recent UNC alums; keeps them in the Chapel Hill community. Great for town/gown relationship.
    Limitations: Capacity is limited and space is challenging for events. Lease ends in December 2015.

KickStart Labs Faculty Entrepreneurs Office and Wet Lab Space – Opened December 2012
    Type: Faculty commercialization of scientific research.
    Capacity: 2000 ft^2 office/meeting space; 4000 ft^2 lab with pre-established terms for faculty use, as well as clear conflict of interest terms, capacity to incubate 10-12 startups
    Benefits: Proximity for faculty to go between their work and a startup in its earliest stages. UNC has the ability to house startups on campus using a Facility Use Agreement (FUA) usually in the faculty founder's lab. FUAs have been a good stop-gap solution but have drawbacks including: (a) poor oversight and management (b) poor optics, and (c) no interactions and synergies between companies. Dedicated incubation space addresses these challenges.
    Funding: Carolina KickStart
    Limitations: Control of the space in the Genome Science Building transfers from SOM to College of Arts and Sciences in February 2015. All indications are that the KickStart Labs will need to move. No appropriate future space has been identified.

Campus Y CUBE Social Innovation Incubator – Opened December 2012
    Type: Student, faculty startups that are non-scientific commercial, social, or artistic.
    Capacity: 6 ventures plus ability to host workshops and events.

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Funding: Investment from Chancellor's I&E Office for staff position; private fundraising for remainder.

Benefits: Supports the campus-wide social innovation and public service community. Provides entrepreneurial skill development, as well as space, through mentoring, workshops, and other co-curricular programs open to the campus.

Limitations: Programs and space are at capacity. Growth upside is high but without resources to capitalize.

1789 Venture Labs – Opened May 2013

Type: Student non-scientific commercial, social, artistic; edge of campus

Capacity: 40+ ventures currently working out of the space, plus ability to host workshops and events for up to 100 people.

Funding: Currently funded by alum Jim Kitchen with some University support through the CES.

Benefits: Popular space for entrepreneurs on Franklin Street; bridge to the community.

Limitations: Budget

Entrepreneurs Lounge CS (Computer Science)

Capacity: Meeting space for up to 15; no permanent workspace.

Benefits: Provides space for groups to meet around a common theme.

Limitations: Not a hackerspace (with equipment). No dedicated workspace for teams to use.

Kenan Institute Reading Room

Capacity: Meeting space for up to 3 teams of 4-6 people; no permanent workspace.

Benefits: Provides much needed co-working space at the Kenan Center.

Limitations: Space can only be used on a temporary basis; no dedicated space.

What We Have Learned — SPACE

For a dynamic, fully-functioning innovation ecosystem, UNC Chapel Hill needs a portfolio of spaces that serve faculty and students and are woven together to form an integrated whole. Executing a well-considered space plan is key to institutionalizing innovation and entrepreneurship on campus and ensuring that Carolina's efforts are world class, achieving impact on par with or exceeding other leading universities. Physical spaces present a thoughtful way to centralize some activities with nodes spread throughout the ecosystem, taking advantage of the benefits of diffusion while realizing the opportunities of integration. Programs on campus have bootstrapped through proof-of-concept and have proven the need for, and effectiveness of these spaces.

Remains To Be Done — SPACE

Recommendations

• Allocate adequate space for Applied Physical Sciences, Biomedical Engineering, and maker space: The Chancellor, Provost, Dean of Medicine and Dean of Arts and Sciences are addressing these needs and have made significant investments.

- Find permanent wet lab and office space on campus for faculty entrepreneurs and their spinouts. The need is immediate and urgent, with the current space at the Genome Sciences Building due to be vacated by February 2015.
- Create an Innovation Headquarters on central campus. Having such a physical location would present a strategic opportunity. It would serve as a front door for the campus where people can come for assistance, and donors could be inspired by a tangible reminder of the impact Carolina is having. The proposed Commercialization and Economic Development Office could also use this space for some of its activities.
- Build a world-class Downtown Innovation Center. A proposed downtown Chapel Hill Innovation Center (CHIC) would bridge the campus and community while becoming home to the already-successful accelerator, Launch Chapel Hill, and the popular 1789 Venture Lab. (With its current lease expiring in December 2015, Launch Chapel Hill is considering its options.) In addition to event and ideation space and a design center, CHIC would provide new spaces for growing companies that want to stay in Chapel Hill, including potentially those requiring web lab space, as well as space for investors and professional service providers, and for strategically chosen industry partners such as the local Google office. The groups of people involved in creating Launch Chapel Hill and 1789 are actively engaged in conversations about CHIC.
- Investigate building a Life Science Innovation Center. There are several reasons to build an innovation center for the life sciences: 1) It will be a place where industry can interface with faculty and graduate students; 2) Commercialization staff can have offices near a large portion of the University's innovation portfolio; and 3) It will provide much-needed faculty access to wet-lab space, offices, and equipment as they remain full-time professors/researchers but also start a company. Once the Genome Sciences space is unavailable come February 2015, faculty startups will have no space on campus. New resources need to be available to all faculty, even if they are administered by an academic unit.

Regarding Carolina North:

The future of Carolina North is being discussed by others and will not be covered in this document.

Q: How can we leverage Carolina's global brand for maximum impact?

Actions To Date — GLOBAL BRAND
At the core of UNC Chapel Hill's innovation agenda is the desire to put the resources of the University to use in solving some of the most pressing challenges of our time – in North Carolina and globally.

The University leverages its global reach and distinguished reputation in a number of ways, such as to recruit and retain faculty, staff, and students and convene international leaders around complex issues. The brand helps position UNC faculty as leaders in setting strategic agendas with federal agencies and other policy and funding groups. The brand is important in securing strategic partnerships as well.

An outstanding example of global leverage is *Water in Our World,* UNC's first cross-campus theme. It has been co-led over the past three years by Jamie Bartram, director of the internationally-recognized Water Institute in the Gillings School of Global Public Health and Terry Rhodes, Senior Associate Dean for Fine Arts and Humanities in the College of Arts & Sciences, home to some of the nation's best programs in the arts and humanities. A key feature of the water theme was its breadth and ability to engage these disciplines as well as the sciences. It has advanced understanding of the issue, raised Carolina's already-strong global profile in water research, built relationships on campus as well as beyond, and led to developing new knowledge and solutions. The exceptional work of the Water Institute, together with the Institute for the Environment under the leadership of Larry Band, has drawn experts from around the world to its annual water conference, and has launched multidisciplinary efforts to solve issues of access to safe water, sanitation, and hygiene.

Another example of the University's global reach is related to advancing innovations in AIDS treatment and cure. One lab in this area is led by Dr. David Margolis and another by Dr. Myron Cohen. Through the Margolis Lab, UNC Chapel Hill is part of the international consortium CARE (Collaboratory of AIDS Researchers for Eradication of the disease), and discussions are under way to establish a UNC-led public-private partnership with key strategic partners to continue pushing towards a cure. Meanwhile, a world-renowned research team led by Dr. Cohen has shown that with the right type and time of delivery of antiretroviral treatments, sexual transmission of HIV-1 can be prevented. Dr. Cohen's work was recognized by *Science* magazine as the *Breakthrough of the Year* in 2011.

The Gillings School of Global Public Health put *global* in its name in 2008 although it had always had a global perspective. The School's new Gillings Global Gateway initiative is a way to make its world-renowned experts more accessible and engaged.

UNC Chapel Hill has also been building strategic international partnerships with schools such as National University of Singapore, King's College-London, Tsinghua University, Universidad San Francisco de Quito (which is instrumental to the Galapagos initiative) and others. When working on complex global issues, these institutions offer vital knowledge, resources, and access.

UNC Global has strengthened Carolina's strategic partnerships through internal and external efforts. On campus, UNC Global has established a Partnership Roundtable composed of delegates representing each of the University's existing and emerging partnerships, or areas of the world in which the University seeks to develop partnerships. Led by the University's chief international officer, the Roundtable has contributed to the support and extension of the partnership network. Externally, the Global Relations office within UNC Global has developed collaborations with the corresponding international offices at partner institutions.

The Kenan-Flagler Business School has had a multi-year global strategy. Innovation programs include GLOBE® (Global Opportunities in Business Education), which brings together three of the world's best business schools to provide undergraduate students a premier international business education. UNC Chapel Hill partners with the Chinese University of Hong Kong and the Copenhagen Business School to offer a unique, integrated global curriculum to prepare students

as future managers and business leaders. GLOBE Fellows are chosen upon application to the undergraduate Business program during the early fall of their sophomore year, and participate over 18 months during their junior and senior years. As a requisite part of the GLOBE program, students take coursework in entrepreneurship and private equity.

The Venture Capital Investment Competition (VCIC) turns the traditional business plan competition on its head by bringing in teams of students from around the world who want to try their hand at awarding investment dollars to worthy startups. Started by CES in 1997, this year's event drew teams from 66 schools representing 12 countries and three continents. The UNC Chapel Hill team made the finals in the competition for the 10th time, placing third overall behind first-place Columbia University and runner-up Colorado's Leeds School of Business.

For undergraduate students, UNC's global strategy executed through the Global Education Center has increased opportunities both to study abroad and to engage in community-based scholarship and service work around the world. The result is an increase in student-founded or recent alumni-founded global not-for-profits such as A Ban Against Neglect (which works to simultaneously address the issues of uneducated street girls and environmental waste in Ghana), Nourish International (working to eradicate hunger globally through a network of domestic campus organizations), and Carolina for Kibera (with the goal of alleviating poverty through community collaboration in this African ghetto).

What We Have Learned — GLOBAL BRAND
UNC Chapel Hill's global strategy has played a significant role in advancing a broad-reaching innovation agenda on campus. High-profile multidisciplinary efforts led by accomplished, well-regarded faculty are creating and moving innovative ideas forward. Initiatives like the cross-campus theme, as well as the work of institutes and centers that engage in multidisciplinary approaches to addressing complex challenges, need to be well-resourced and supported. Further, connecting students' global experiences to opportunities for creative problem solving in communities around the world contributes to their development of an innovative skillset and mindset that will serve them no matter what their future pursuits may be.

Remains to be done — GLOBAL BRAND
Recommendations
• The choice of *Water in our World* as the University's first cross-campus theme, three years ago, has proven successful on several fronts. Decide if there will be another cross-campus theme, or perhaps a series of smaller themes, that draws together the Carolina community to addresses major issues.
• Recruit top faculty and graduate students who are globally oriented and have a strong translational bias.
• Leverage the power of Carolina's alumni and families to grow a global innovation ecosystem.
• Explore the idea of regional hubs and how they might support the innovation agenda.

C. EXTERNAL ENGAGEMENT

Q: How can we engage industry partners in building a strong innovation ecosystem?

CONTEXT

This is a multifaceted issue, as industrial firms and universities can and do interact with each other in a variety of ways. Areas of mutual interest include: research and technology development, workforce development, and the strength of the regional ecosystem (for new startups as well as existing firms). Each area holds the potential for deeper collaboration and each will be addressed separately. The goal for UNC Chapel Hill is to actively and strategically engage with industry in an integrated as well as diffused manner to increase the volume, type, and degree of positive benefits for all concerned.

Regarding research, technology development, and industry relations generally:

Actions To Date — INDUSTRY RELATIONS

The Roadmap called for a more strategic, coordinated, and deliberate approach to engaging with industry partners in all of the areas mentioned above. While units across campus have good relations with industry related to their disciplines (RENCI, the Business School, School of Pharmacy, School of Medicine, etc.), there remains an acute need for a coordinated, high-level University approach to this area. Discussions of how to increase collaboration with industry have been ongoing, involving internal and external stakeholders, and culminated with the UNC Chapel Hill Industry Task Force study released in 2013 that focused on increasing knowledge transfer between the University and industry. It stated:

> The goal of improving university-industry partnerships is not unique to UNC Chapel Hill. In fact, it is central to recommendations made in the just-released National Academy of Sciences report, *Research Universities and the Future of America,* which calls for "the relationship between business and higher education…[to] evolve into more of a peer-to-peer nature, stressing collaboration in areas of joint interest rather than the traditional customer-supplier relationship in which business procures graduates and intellectual property from universities (p. 92)."

Specifically, the Task Force cited the need for central strategic integration to enhance UNC Chapel Hill's industry relationships by coordinating them across the areas of philanthropy, sponsored research, commercialization, and clinical trials. Further, the Task Force report called for streamlined processes and accounting procedures, and for finding ways to make it easier for industry to engage with the University through central contact points.

Plans for the proposed Office of Commercialization and Economic Development are in harmony with plans from the Offices of Research and of Development for strengthening university-industry collaborations. These three groups will work together to strategically advance all aspects of university-industry collaborations working closely with units and will finalize a definition of their interconnected roles and responsibilities.

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Recently, the Office of Research took several steps to streamline procedures and make it easier for industry to work with the University. One example is the creation of the new Office of Industry Contracting (OIC), which will consolidate back-office support for such contracting. This office re-organizes contracting work that the Office of Sponsored Research (OSR) and the Office of Clinical Trials (OCT) have been doing for more than a decade. The OIC will have responsibility for reviewing and executing all sponsored research proposals and agreements with private industry. The Office of Technology Development will continue to be the contact point for industry licensing of intellectual property.

And, in a parallel development, the Development Office has made increased industry funding an objective of its new campaign strategy. Judging from the experience of other universities, most of this funding will be for research. Benchmarking of peer institutions demonstrates that there is an opportunity to increase industry funding as a source of the University's R&D funding, as well as to engage with industry donors to build new innovation spaces.

The proposed Office of Commercialization and Economic Development will include a director-level position focused on developing external strategic partnerships in several categories, one being industry relationships. This Office will have a particular focus on engaging industry and other partners in the full process of moving ideas to implementation.

What We Have Learned — INDUSTRY RELATIONS
The topic of *industry relations* is broad and touches nearly every part of the University. Just as UNC Chapel Hill is a large, complex organization with both central and distributed leadership, many industry partners are large multinationals in which different units and people are focused on various functions. Think of how GlaxoSmithKline has an ongoing need to build its product portfolio through R&D, which makes various parties at the company interested in university research and intellectual property development. Meanwhile, all Glaxo units (not just R&D) hire university graduates; conversely the University and its spinouts hire former Glaxo employees. The company's corporate foundation has a wide breadth of interests, and Glaxo has a local presence in RTP. Optimizing the complexities of such a relationship is a challenge, and one we are eager to address.

It is not feasible that all activities fall within a central office, as illustrated by the difference in mission and goals between Career Services and technology licensing. Indeed, some schools have invested in personnel to help develop partnerships with industry and to grow the industry-supported research portfolio, e.g., the School of Medicine and the Eshelman School of Pharmacy. The Office of Research, the Development Office, and the planned Commercialization and Economic Development Office will come to agreement about how each will help share a comprehensive plan and align with that plan to improve results.

Remains To Be Done — INDUSTRY RELATIONS
Recommendations
• In the next few months, the Offices of Research, Development, and the proposed
   Commercialization and Economic Development Office will work with the Chancellor and

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Provost, Career Services, deans and others to develop a common shared plan for UNC Chapel Hill's collaborations with industry.
- Better coordinate within the University.
- Pursue (and, where necessary, expand) efforts to align University policies and procedures with industry practices and expectations.
- Communicate to industry that UNC Chapel Hill is actively seeking partnerships.
- Make it easy for industry to know how to enter the University's "front door," and smooth the way for industry partners to work with us.

Regarding the regional ecosystem:

Actions To Date — REGIONAL
The Innovation and Impact Committee heard from Bob Geolas, President and CEO of the Research Triangle Foundation, about the current vision for reinventing the Research Triangle Park. This includes engaging with industry in new ways especially by connecting to the entrepreneurial community. UNC Chapel Hill leaders serve on the RTP board and on the board of the Triangle Universities Center for Advanced Studies Inc. (TUCASI). In those roles they are deeply involved with planning for the future of the region and aligning UNC Chapel Hill's goals.

Various members of the University community are engaged with local industry. The National Consortium of Data Sciences, created by RENCI Director, Stan Ahalt, brings together leaders in academia, industry, and government to address the data challenges of the 21st century. The Triangle Region is ripe with opportunities, and there are many examples of fruitful partnerships. Most are forged on a case-by-case basis and thus difficult to discuss from a comprehensive view. For instance, Career Services actively engages corporate partners in the work of the University beyond job placement activities. The School of Medicine and SAS entered into a multi-year collaboration to develop analytics-driven population health management capabilities to help providers personalize care for patients with type 2 diabetes. Other partnerships abound.

What We Have Learned — REGIONAL
The University is fortunate to have such high-level industry located in the RTP and the surrounding region. While the University units and faculty with the help of the Development Office's Corporate and Foundation Relations Division engage in important regional partnerships, there is much more opportunity than we have capitalized on thus far.

Remains To Be Done — REGIONAL
Recommendations
Create a comprehensive strategy for maximizing local industry-university partnerships. The Offices of Development, Research, proposed Commercialization and Economic Development, Career Services, and unit representatives will need to work together on the plans and their execution.

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Regarding workforce development:

Actions To Date — WORKFORCE
Thousands of UNC students are graduating with entrepreneurial skills and mindsets developed through experiential learning that includes ideation, design, and the entrepreneurial process. Additionally, the professional schools and Graduate School continue to look at ways to foster innovative thinking and practices through their curriculum and training. Examples include the joint MBA/MD program between the Business School and the School of Medicine, and early immersion and flipped classroom techniques for first-year students in the School of Pharmacy and increasingly in the College of Arts & Sciences.

Another fundamental skill for innovative students is proficiency in data and computational skills. The Faculty Working Group on Data Studies called for all UNC Chapel Hill students to graduate data literate. Its report released in April 2014 stated:

> Data literacy has become essential to research and scholarship, to learning at all levels, to translational endeavors, and to future student career success. In fields from healthcare to the humanities; the acquisition, management, analysis, and use of data has become a required skillset for college graduates. Further, because Carolina is committed to having its faculty and students see the world broadly and think critically and multi-dimensionally, data literacy should be embedded in an understanding of the influence of data on individuals and society. This contextualization of data includes examining such areas as the effects of data proliferation on social constructs, communication, privacy, security, and ethical considerations.

What We Have Learned — WORKFORCE
Innovation occurs at the intersections of diverse disciplines, experiences and knowledge. A prepared workforce today requires an innovative skillset and mindset that needs to be both formally taught in the classroom and informally learned through opportunities to imagine, design, build and grow ideas outside of the classroom. UNC schools, departments and programs are inventing and re-inventing ways to foster these opportunities but could benefit from more direct engagement with industry partners to better understand their needs and develop deeper collaborations.

Recent studies at the national level show that most PhDs and postdocs will need to pursue alternate career paths to academia. There is an opportunity for UNC to lead in developing new programs to prepare PhD students and postdocs for alternative career tracks.

Remains To Be Done — WORKFORCE
Recommendations
- UNC Chapel Hill has an opportunity to partner with industry and to gain synergies by better understanding workforce needs across industry sectors. University-industry relations should include mechanisms for engaging external stakeholders in the development of ways to ensure that our graduates have critical skillsets, which will vary by discipline but also include core strengths in areas such as data and innovation processes.

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- Develop alternative career tracks for PhDs, including working in faculty spinouts and/or starting their own ventures. Strengthening this area will give the University a platform to better understand statewide needs and develop new strategies for addressing them.
- As UNC Chapel Hill forms its economic development strategy, there will be opportunities to leverage engagements with the nine regional economic development partnerships in the state and NC Business Development in the Department of Commerce.

Q: How can we form a strong regional infrastructure of support for our innovation agenda in the Triangle?

CONTEXT
Over the past several years a growing Triangle-wide innovation and entrepreneurship ecosystem has emerged. This is partly the result of increased focus on I&E at the region's research universities as they develop and execute their own agendas, as Carolina is doing. It is also a response to a statewide emphasis on growing an innovation economy, and to the needs of a local startup community that has increased in size and scope.

Actions To Date — REGIONAL
UNC Chapel Hill is helping lead and shape a regional agenda to spur innovative new companies, fuel the state's economy, take advantage of strengths at each of the region's research institutions through new collaborations, and provide a pipeline of potential ideas and technologies to the existing corporate community. University leaders are regular speakers, serve on boards and steering committees for Triangle funders and organizations that support innovation and entrepreneurship, and participate in task forces and think tanks about the regional ecosystem.

The University has led several programs to bring more resources to the regional ecosystem while fast-tracking UNC-born companies. The Blackstone Entrepreneurs Network was created by UNC Chapel Hill and involves the area's most experienced entrepreneurs in identifying and mentoring high-growth-potential companies from our own campus, Duke, NC Central and NC State, as well as in the broader community. The Network is run from UNC Chapel Hill and the University has received additional support from the funder for a national replication program. The first replication site in Denver opened this past spring.

The Kenan Institute of Private Enterprise led a joint proposal with Duke, NC State, and NC Central to become an NSF I-Corps (Innovation-Corps) node. I-Corps is a National Science Foundation initiative to increase the economic impact of NSF-funded basic research. In collaboration with the National Collegiate Inventors and Innovators Alliance (NCIIA), NSF offers select participants from U.S. academic laboratories training in a special, accelerated version of Stanford University's Lean LaunchPad course. Although the award went to another region, that stimulus has led to the coalition working on other ideas together. (The first for this group was Blackstone).

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University leaders served on the Innovate Raleigh design team, which resulted in the launch of HQ Raleigh, an Entrepreneurs House, and continue to be involved in other regional venues for supporting entrepreneurs. Durham's American Underground is also working with UNC Chapel Hill leaders to bring an American Underground startup co-working space to Chapel Hill. UNC Chapel Hill is providing market landscape and patent analysis to Duke in exchange for services from the startup ventures clinic in Duke's law school.

The University regularly collaborates with support programs and startup incubators and accelerators, and co-sponsors events ranging from startup weekends to hackathons to major conferences across the state.

What We Have Learned — REGIONAL
Generally there is widespread belief that this region has the potential to be one of the country's top five entrepreneurial hotspots. Some building blocks are in place to reach that goal. Each university and city has its own entrepreneurship initiatives.

Yet, the region underperforms in several ways, one of them being the amount of venture capital invested. What is missing? Is it lack of capital, or a lack of investable deals (i.e. promising startups) that would draw capital here? Is it both? If outside capital is invested, will startups have to leave the region? All of these present challenges, but investable deals are at the core of the issue. This has significant ramifications for UNC Chapel Hill. The University wants to create such investable deals by developing commercializable IP, but very early grant money is needed for development to de-risk ideas enough to make them attractive to equity investors.

By working together locally, with partners throughout the state, by being connected via a few strong regional hubs, and by recruiting talent and investment dollars outside of the region, The Triangle can become a dynamic entrepreneurial hotspot.

Remains To Be Done — REGIONAL
Recommendations
• Continue to build on established relationships with NC State, Duke and NC Central and identify specific opportunities for multi-institution collaboration on projects related to innovation and entrepreneurship.
• Develop Blackstone 2.0, taking the Blackstone Entrepreneurs Network to the next level.
• As noted elsewhere in this memo, the University needs to invest in end-to-end support for commercializing IP from faculty research. Not only would this stimulate startups and venture investment within the region, it is crucial for increasing impact generally.
• Accelerate involvement of potential investors early in the idea development stage.
• Communicate and engage more effectively with alumni who can help with these goals.

Q: How can we build and maintain an innovation ecosystem that supports both broad and deep engagement with the state?

CONTEXT

UNC Chapel Hill has contributed to the economic and social well-being of North Carolina citizens through a long commitment of service, putting its vast resources and expertise to use for the State. The Board heard a report on the direct economic value that comes from the research enterprise alone. (Its $800M per year in federal research funding creates the equivalent of 4,000+ full-time jobs, with average salaries of $75,000 and a North Carolina-based payroll of $300M annually. It does business with 1,100 North Carolina vendors and has created over 80 spinout companies.) Schools and units across campus work in different ways to fulfill their service missions, while also exploring ways to collaborate and engage with the State to bring innovations to bear. The University's centers and institutes often have very applied agendas and contribute to advancing innovations for the public good. The response to this question will focus on being more collectively strategic in serving North Carolina in broad and deep ways.

Actions To Date — ENGAGEMENT WITH THE STATE

Through student-service learning opportunities, UNC Chapel Hill students connect with North Carolina communities and learn methodologies for identifying a problem, working on community-informed solutions, and implementing new ideas. Through community-engaged research, Carolina faculty address the concerns of citizens across the state. For example:

- The UNC Chapel Hill Center for Public Service has long served as an engagement arm for the campus, supporting faculty who do applied work in communities across North Carolina. CPS has added ways to help faculty take innovative approaches in their community-engaged scholarship, and has been an active partner in advancing a University-wide innovation agenda.
- The School of Government has deep and widespread relationships in all 100 North Carolina counties, and has worked for many years to help develop the capacities of local and county governments, as well as the state's elected officials.
- UNC Health Care brings tremendous benefit to North Carolinians by extending its reach into communities statewide, and providing services at no cost through free clinics in the neediest parts of the state. UNC Health Care and the UNC School of Medicine recently partnered to launch Innovate Health Care@Carolina, a center to support adoption of disruptive innovations in the delivery and financing of health care. The focus is on ideas that are "patient centered and increase value with improved health outcomes and lower costs." Further, since 2006, UNC Chapel Hill has played a leadership role in the North Carolina Healthcare Quality Alliance (NCHQA), a statewide collaboration for using evidence-based strategies to improve the quality of care in practices across the state. Through the UNC North Carolina Area Health Education Centers (AHEC) program, the Alliance is able to fully integrate quality improvement into its support services, and help practices implement technology for that purpose. North Carolina is the only state in which health care quality improvement goals and health information technology support are seamlessly integrated.
- The Institute for the Environment works with policy makers and experts across the state, and with leaders of UNC's world-renowned environmental sciences community, in developing

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solutions to the critical challenges North Carolina faces. In doing so, it educates future environmental leaders and engages with the people of North Carolina and the nation to address environmental challenges.
- The Kenan-Flagler Business School's STAR program and NC Center for Strategic Economic Growth engage students with impressively strong results. The reputation of these programs is touted at legislative, regional, and local business levels.

These are just a few examples. As noted earlier, UNC Chapel Hill is also active in creating and leading a development agenda for the Triangle region to spur new companies, fuel the state's economy, take advantage of strengths at each of the area's research institutions through new collaborations, and provide a pipeline of new ideas and technologies to the existing corporate community.

What We Have Learned — ENGAGEMENT WITH THE STATE
Across many fronts, UNC Chapel Hill is deeply engaged with public- and private-sector leaders and experts in finding better solutions to the most pressing challenges faced by North Carolina. Since this work is led largely within schools and units of the University, it has been challenging to articulate to State leadership a comprehensive view of how UNC Chapel Hill is applying its innovation agenda to benefit North Carolina. Indeed, few people in any capacity know about the full extent of the University's statewide collaborations or the impacts that these efforts are having.

Remains To Be Done — ENGAGEMENT WITH THE STATE
Recommendations
- Enhance the benefits that the University provides to the state, and raise the perception of them through more effective communication.
- Create an economic development strategy in the proposed Office of Commercialization and Economic Development. This office will coordinate with senior leaders at UNC Chapel Hill to help build the innovation ecosystem. It will also play a key role in developing and articulating new strategies to work with (and for) people across the state. In every sense, it will raise the profile of UNC Chapel Hill as an engaged collaborator in building the State's future.
- Develop a data-driven strategy and approach to understand the true impact of UNC Chapel Hill and the UNC system on North Carolina.
- Create a dashboard to communicate Carolina's impact.

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D. FUNDING

Q: How will we adequately fund our research and its application, in light of declining federal and state dollars?

CONTEXT

Even though federal and state funding for research has been declining in recent years, Carolina continues to compete well. Total funding for FY14 was $793 million, up from $778 million in FY13, despite the sequester and federal shutdown. Without much prospect for improvement in federal and state funding of research in the near term, continued growth will require a more diversified approach, including funding from industry.

Actions To Date — FUNDING RESEARCH

The University continually seeks alternative funding sources from industry, philanthropies, and individual donors. The Office of Research has invested in improved support for industry-funded clinical trials, supported an innovative collaboration with Eastman Chemical based in the Chemistry Department, waived F&A on Phase I SBIR/STTR grants involving our own spinouts, and is now in the process of creating a new Office of Industry Contracting, that will consolidate back office support for these activities. The Vice Chancellor for Development is setting ambitious goals for support from industry, philanthropies, and individual donors as part of the new campaign. Development and Research are finalizing new policy and procedures that will enable them to partner even more effectively on private fund raising for research.

What We Have Learned — FUNDING RESEARCH

Federal funding dollars are consolidating to a few top universities and Carolina is positioned in this group. The only way to stay in the top category is by hiring and retaining top faculty and recruiting outstanding students at all levels. To be maximally successful, faculty and students need state-of-the-art buildings and equipment. With State support declining, alternative funds are needed to recruit and retain world-class faculty and refresh the innovation infrastructure that supports their work.

Remains To Be Done — FUNDING RESEARCH

Recommendations

- Continue to support researchers as they seek research funding.
- Continue developing a comprehensive, diversified campaign with innovation and impact as top priorities.
- Become more engaged with venture philanthropy.

Q: How can we engage the venture community in support of new ventures?

CONTEXT

Funding new ventures is one part of the equation, but Carolina has to also figure out how to fund the development process that leads to strong IP for a license. This answer addresses the full funding cycle.

The University's approach to developing licensable IP is informed by the classic venture capital approach, which supplies not only milestone-driven financial resources but also expertise in the venture/commercialization process, specific domain expertise, and access to a wide network of specialized talent and advisors.

The commercialization process requires different types of funding at different stages to help de-risk the technology and develop it into a viable product. Funding comes in many forms, from technology development grants to industry funding, angel capital, and/or venture capital. Funding is needed first to demonstrate proof of concept or validate the discovery, increasing its attractiveness for either launching a startup or licensing to an established firm. In the case of a startup company, funding needs to continue as the technology is developed into a marketable product. The University recognizes funding gaps that exist in bringing technologies to market: 1) technology development funding within the University, 2) bridge funding between Phase I and II of SBIR grants, and 3) early-stage seed funding which is increasingly needed as angel- and venture-capital investors take a more risk-averse approach. All combine to create a major gap early in the process:
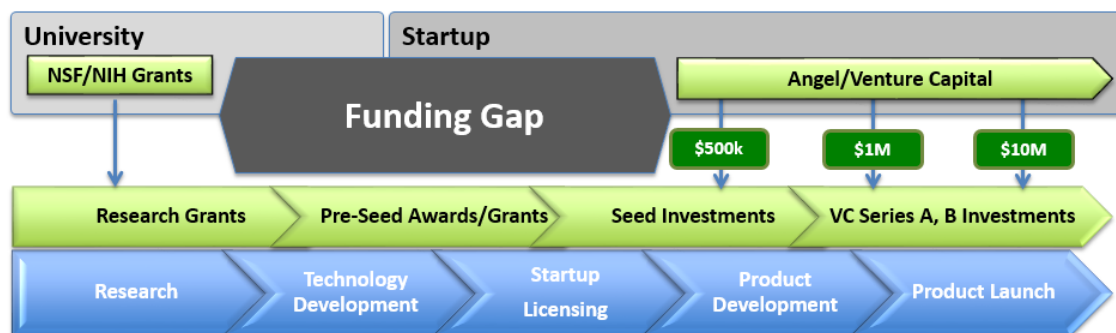
Actions To Date — VENTURE FUNDING

The University funds commercialization activity in various ways. One of the first efforts was the KickStart Commercialization Awards (up to $50k each), which target emerging and new companies licensing (or planning to license) UNC life science technologies. A more recent program is OTD's Technology Enhancement Grants. This program was started by the Office of Research but is now housed within the Office of Technology Development and complements the KickStart program, expanding eligibility to all kinds of faculty IP but focusing specifically on unlicensed technologies (up to $30K each). The TraCS 4D pilot program is the newest entrant into this field. For early-stage companies needing funds for feasibility studies, the University supports their SBIR grant applications and works closely with the local SBTDC. Carolina KickStart engages

several SBIR consultants who work with companies to write and review grant proposals as well as conduct mock review panels. Recently, to help speed the development of early stage technologies, the Vice Chancellor for Research announced that indirect costs on Phase I SBIR/STTR awards would be waived.

To help maximize University assets, the Board of Trustees asked Administration to create a small evergreen investment fund. The Carolina Research Venture Fund, a $2 million fund available for investments in UNC Chapel Hill spinout companies.

In March 2014, Sallie Shuping-Russell discussed the Carolina Research Venture Fund with the Innovation and Impact Committee. Her memo states:

> The purpose of CRVF is two-fold: (1) a strategic purpose to maximize the research assets by getting them into the marketplace and (2) an investment purpose to get sufficient return on the investments which can be reinvested into the CRVF, making it an evergreen fund. Because of this two-fold mission – and because the initial funds will not come from the Investment Fund – the CRVF does not have to receive a "venture capital" level of return. Its return goal will be to generate return of capital and provide sufficient excess return to enable CRVF to become an evergreen fund.

In order to facilitate informed decisions about investable IP at Carolina, the CRVF will establish its own advisory board of venture capitalists. Further quoting from the memo:

> In addition, CRVF will establish its own Venture Capital Advisory Committee (VCAC). This will comprise leading venture capitalists from across the country and within North Carolina. Examples from outside the region include partners or ex-partners from Kleiner Perkins Caulfield & Byers, Greylock, NEA, Polaris, Domain, Andreessen Horowitz, Sequoia, Trident and others. VCAC will provide strategic advice to the Board as needed. It will also discuss with the manager(s) the viability of potential companies and offer advise to address concerns which start-up companies face as they grow. VCAC will also offer a long-term vision for new markets that could underwrite larger impact investments. It is also hoped that these venture firms would provide additional follow-on capital as the UNC-based companies develop.

The Venture Capital Advisory Committee will be an important tangible connection to the venture capital community that can be further leveraged. External investors have been attracted during the past several years largely through entrepreneurship support programs sponsored by Carolina KickStart, UNC Kenan-Flagler's Center for Entrepreneurial Studies, Kenan Institute of Private Enterprise, and the Blackstone Entrepreneurs Network. Additionally, some investments come from individual relationships formed by a handful of seasoned faculty entrepreneurs. Carolina KickStart has engaged with a number of venture capital firms to enhance commercialization. Interactions have ranged from informal meetings with faculty, to help assess the commercial potential of a technology, to formal presentations to the firms for investment. KickStart also has worked with the Office of Technology Development on recruiting professionals from outside the University to help inform decisions about patenting investments. The Blackstone Entrepreneurs Network engages with experienced entrepreneurs (many of whom are themselves investors), who use their networks of VCs and funders to make connections for the companies that they

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mentor. Local investors also regularly attend University-sponsored pitch events for new firms, such as the Carolina Challenge (funded by a private investor, managed by UNC Kenan-Flagler's-Center for Entrepreneurial Studies), and the Emerging Companies Showcase, which draws approximately 300 attendees and includes technology and life-science tracks.

Hatteras Discovery Fund is an early-stage arm of Hatteras Venture Partners. Due to the strong relationship between the University and the Partners and its geographic target area, HDF has looked at several startups and invested in G1 Therapeutics, and is doing due diligence on others. Through research led by faculty PI Ned Sharpless, G1 has developed a novel small-molecule-based method for preventing the hematological side effects of exposure to ionizing radiation and cancer chemotherapy. Not only did HDF invest dollars, the Partners built a board of seasoned professionals for G1, hired a top CEO, and continue to carefully guide the company. It is these types of relationships we seek.

Meanwhile, the University's Office of Technology Development plays a role in finding venture dollars using a more one-on-one relationship model. The role that OTD might play in a University strategy to enhance relationships with the venture community is under active discussion.

Engagement with the venture community for teaching and mentoring young entrepreneurs draws top investors from around the world to Carolina. Some are embedded in different parts of campus as Entrepreneurs-in-Residence. The Center for Entrepreneurial Studies' Global Venture Capital Investment Competition (VCIC) offers investors the opportunity to get involved with the nation's top business school students and network with fellow VCs while getting an early glimpse of some pre-screened investment opportunities, 25% of which raise venture capital after pitching at VCIC.

What We Have Learned — VENTURE FUNDING
Most often, university ideas in the life science space are too early-stage for venture capital to be the first money. This requires the University to have a strategy for moving ideas to commercialization with technical assistance and the appropriate funding for each segment of the journey.

The majority of UNC Chapel Hill faculty engaging in commercialization activities have little experience with this type of endeavor. There are notable exceptions, but most faculty lack the expertise, time, financial resources, and career incentives to be highly successful. To support these faculty, it is helpful to pair expertise with funding, but it is not necessary that they come from the same source. Depending on a number of factors, some faculty lead in commercializing their discoveries and some take a more passive role. For the latter, the University may be better served by the faculty member continuing the research that generated the ideas in the first place. Just as venture capitalists surround their investment with experts from a wide range of fields, the University needs to do likewise. This is happening ad hoc in various areas on campus, but with too few people and resources to fully maximize the opportunities that members of the Carolina community are creating.

The traditional pace of faculty receiving grant funds for technology development is too slow. Not only are funds scarce along the development pathway, but technology development funds such as from SBIR/STTR come in periodic cycles. The proposal and review process can provide helpful if stringent external feedback on ideas and plans to move forward. There can be gaps in productivity as faculty seek funding, submit proposals, and wait for awards. In the meantime, the commercialization activity is stalled. Faculty also need continuing guidance in applying funds for prototyping, to keep moving forward in technology development. Support is needed in identifying and selecting vendors, and with contracting and NDAs.

Universities are challenging environments for investors to navigate without dedicated guides. UNC Chapel Hill would benefit from a structure designed to cultivate relationships with investors and help them make connections to emerging technologies or ideas that may be of interest. The University's startup companies would benefit from more involvement of investors as they are exploring avenues for moving a technology forward. With an acute need for funding during the proof-of-concept phase, there is a role for the investment community to play in advancing University-born technologies, particularly those that fall outside the funding available through federal agencies such as NIH or NSF.

It will take several years to judge the CRVF performance, but we are hopeful this vehicle will provide needed dollars to a few high-performing companies and also create new connections to venture capitalists.

Remains To Be Done — VENTURE FUNDING
Recommendations
Create a comprehensive strategy to engage the venture community and fund the full development cycle. As currently envisioned, key components of the strategy would be:
• Expand and coordinate (or consolidate) the University's Technology Development Grant programs to fund proof-of-concept studies across all schools and disciplines and then into investment. Many university technologies never reach the marketplace because no commercial relevance has been demonstrated which would attract both people and funding. These technologies need proof-of-concept or validation studies showing whether they do, in fact, have potential for becoming products or solutions that users would buy. Funding for such studies is extremely difficult to acquire, as these activities are beyond the scope of typical federal research grants, but too risky for investors or industry partners to fund. The proposed grants will range from $25K to $75K and will be awarded to projects on a competitive basis. Project applications will be evaluated by a panel of industry-relevant experts. Beyond allocating funds, this panel will provide feedback to the OTD and the faculty member(s) as part of the review process.
• Create an SBIR Gap Fund. One of the greatest opportunities for unlocking university technologies is through Small Business Innovation Research (SBIR) grants if the timing issue can be addressed. Startups built around university innovations can seek SBIR funds to demonstrate feasibility (Phase I) and to develop the product (Phase II). However, many companies struggle because of the time gap of SBIR funding. A successful Phase I SBIR grant (usually of about $250K) is followed by the submission and review of an application for a Phase II grant (about $750K to $1M). The time from completion of Phase I to the funding of Phase II can be 9

to 12 months. Many startups do not have the resources to continue to pay scientific staff or rent space during this period and waste valuable time waiting for the evaluation of the application. The proposed SBIR Gap Fund will bridge this gap for university startups. The funding will be on the order of $100K to $150K to help the company remain viable while it seeks additional funds. Stringent review will be critical to the wise investment of these funds.

- Connect to local VCs. The Blackstone Entrepreneurs Network was formed to activate connections among startups, successful entrepreneurs, and investors (or "dealmakers"). From University research on dealmakers, we know that North Carolina, and the Triangle region in particular, has investor activity that is not as maximized as it is in other locations due to a lack of connectivity. UNC Chapel Hill will need to intentionally build more ways of connecting local funders to University opportunities, including through local alumni.
- Connect to key hubs to create relationships with VCs and other constituents. Investment from outside North Carolina will be critical to UNC Chapel Hill's ability to commercialize research and realize impact. Our undergraduate entrepreneurship programs and VCIC program for MBAs have established activities in Silicon Valley and New York City, exposing students to the investment communities in those hubs. However, the University needs to build more direct connections and opportunities for engaging investors from other regions with our most promising emerging companies. Additionally, alumni who are investors can be made aware of University IP and invited to provide advice. There have been discussions by some alumni about creating an alumni seed fund.
- Provide needed technical and administrative assistance. This strategy would include integrating startup services for faculty across the campus, including Carolina KickStart and the Concierge Service for Entrepreneurs, with leadership from the proposed Office of Commercialization and Economic Development (which would include OTD).
- Fully implement the Carolina Research Venture Fund.

Q: How does our innovation agenda relate to a University development campaign – and to other possible opportunities for funding?

Actions To Date — CAMPAIGN
The Development Office has been an integral partner in promoting the I&E agenda. It has worked in a unit-based approach to identify and secure funds for initiatives across campus. As the culture has strengthened, deans and senior leaders have supported fundraising specific to their individual areas. Senior Development leadership at the University has indicated support for innovation priorities in the next capital campaign. The Office of Corporate and Foundation Relations within Development has been particularly helpful in connecting faculty innovators and program staff to potential individual donors. Rather than creating a central innovation fund, development efforts targeted individual units and their programs.

What We Have Learned — CAMPAIGN
There are a potentially significant number of UNC Chapel Hill alumni yet to be engaged with this work. They include entrepreneurs, investors (some with particular interests in research and commercialization), and industry partners who are generally supportive of the University's

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innovation agenda. A coordinated effort from senior administration leaders is critical to maximizing the potential of these philanthropic prospects.

Lack of centralized funds to support the overall campus ecosystem building, fund experiments, and catalyze efforts is a significant limitation.

Remains To Be Done — CAMPAIGN
Recommendations
- As noted earlier in this report, assure that fundraising for innovation is a significant component of the next campaign.
- Work with Development and senior leaders (such as deans and directors) across campus to support their individual I&E fundraising goals.
- Explore various foundation models for supporting I&E work on university campuses.
- Continue conversations with alumni who have expressed interest in a venture philanthropy fund for the University.
- Create a central Innovation Fund.

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E. LEARNING AND COMMUNICATING

Q: How can we continually learn from others while also leading in innovation and entrepreneurship?

CONTEXT

UNC Chapel Hill was one of only a handful of universities that intentionally chose to strengthen a culture of innovation and entrepreneurship in a systematic and holistic way. Arizona State University is another that took the same approach – and interestingly, both Arizona State and UNC Chapel Hill were Kauffman Campuses. Both became part of the Kauffman Foundation's learning community of 35 universities, led by the person who is now UNC Chapel Hill's Special Assistant to the Chancellor for Innovation & Entrepreneurship. Other universities are aware of UNC Chapel Hill's work and have used its approach as a model. Campus leaders are part of a community of universities that meet regularly and exchange ideas.

Actions To Date — LEARNING AND LEADING

During the 2010 planning process, teams made up of faculty and staff, students, and external constituents traveled to various places to learn and bring back best practices. They visited MIT, Stanford, the University of Florida, the University of Utah, New York City (for arts innovation) and other innovation hubs. Since that time, innovation leaders at UNC Chapel Hill have continually benchmarked I&E work on other campuses and in entrepreneurship ecosystems nationally and globally – again with the purpose of learning and adopting best practices. During the past several years, the Eshelman School of Pharmacy has brought in university commercialization leaders to speak with the campus community about best practices, as has OTD for its Innovation Seminars.

Members of the University are connected globally to entrepreneurship-education networks and commercialization organizations, and are international leaders themselves. One campus leader is an early member of a university-industry group and is documenting best practices for that organization. The experienced OTD staff stays abreast of the field of tech transfer and incorporates new methods when appropriate. UNC Chapel Hill leaders speak regularly at international conferences and attend to learn from others as well as host and talk with leaders from other campuses and countries.

A University of Pennsylvania program is the model for the New Enterprise Organization (NEO) program at Carolina. In some cases, the University only needs to provide advice and make the right connections to help campus innovators launch startups. Others need more support. The NEO program is designed to assist faculty members with very early-stage technology who do not wish to spend the massive amounts of time that starting a new venture may require. NEO provides a number of extra services to help form, launch, and grow the company: incorporation and documentation support, consultants for SBIR grant writing, an evaluation of the technology, and recruitment of the CEO.

UNC Chapel Hill led in establishing a standard easy IP license called the Carolina Express License. Its purpose is to greatly reduce the time and cost of processing technology licenses and thereby incentivize faculty and investors. OTD has executed 33 Carolina Express Licenses since 2010. The

University averaged 3 new companies per year in the several years before 2010 and now is averaging 5 to 7 per year, but this is not just the result of the Carolina Express License. It also reflects the support of Carolina KickStart in the School of Medicine and the Kenan Institute of Private Enterprise, and an improving economy. UNC has executed an additional 7 licenses for startups that were not Express Licenses during this same time period.

What We Have Learned — LEARNING AND LEADING
Faculty, staff, and students at UNC Chapel Hill are highly involved in entrepreneurship and innovation. Several people on our campus are global academic leaders in these fields.

Every major university works hard at commercialization and revisits the models that it uses. At some universities, separate entities like the Wisconsin Alumni Research Foundation have been formed to more effectively bridge the academic world and the marketplace. WARF's website states:

> The Wisconsin Alumni Research Foundation (WARF) is the private, nonprofit patent and licensing organization for the University of Wisconsin–Madison, one of the world's great research universities. WARF was founded in 1925 and is a pioneer and innovator among university-based technology transfer offices. WARF's mission is to support, aid and encourage UW–Madison research by protecting its discoveries and licensing them to commercial partners for beneficial use in the real world.

Many models for catalyzing, funding and supporting innovation programs are available to provide continuous learning opportunities for UNC Chapel Hill as it advances an innovation agenda.

Remains To Be Done — LEARNING AND LEADING
Recommendations
- After studying many commercialization operations, UNC Chapel Hill leaders stepped back to ask an intriguing question: How would the University commercialize IP if it were the first ever to attempt this type of function? The conversation was between experts on campus and those outside. Once the leaders settled on an approach, they again sought feedback from a wide audience to test assumptions and make modifications. The result is the proposed Office of Commercialization and Economic Development, which will give the University the opportunity to implement the new approach in an iterative process – taking steps, testing those steps and the assumptions behind them, making corrections, and then moving forward. Leaders will continue to call upon their wide network of external expert practitioners as well as the University's own experts to develop improved practices that can inform the field.
- To fully realize the potential of the University's innovation ecosystem, individual I&E spaces, programs, and curricular activities need the resources to adopt best practices and apply lessons learned.
- UNC Chapel Hill needs to carefully consider the pros and cons of a closely held separate structure for certain innovation activities.

CONTEXT
Effective communications about innovation and entrepreneurship serve a number of ends. They demonstrate the University's commitment to advancing the public good, reinforce its reputation for fostering creativity and discovery, encourage people to become involved, and illustrate the University's impact on the community, state, and beyond.

Actions To Date — COMMUNICATION
The Communication Office, Chancellor's Office of I&E, Office of Research, and the distributed communicators' network serving campus units all contribute to communicating the work and the impact of the innovation ecosystem. The Vice Chancellor of Communication is developing a campus-wide communication strategy, and since two key themes of the University are innovation and impact, his team will work with campus communicators on better delivering key messages. They already are working on getting more stories about innovative people at our campus.

The Office of Innovation & Entrepreneurship is a central catalyst that serves as a hub of communications about a wide range of related on- and off-campus activities. The University's innovation and entrepreneurship vision has been communicated to key audience segments by multiple means. Channels of communicating have included standard platforms (web, e-newsletters, social media) plus staff have made numerous presentations on- and off- campus, locally and nationally, including serving on the Governor's Innovation-to-Jobs Task Force. The I&E website serves as a central portal and can be found at innovate.unc.edu.

The Office of Research Communication focuses on faculty research, their stories, and the impact of their work. A new Director was just recruited who brings a decade of experience in science and research communications at NASA to assist in the development and execution of a communication strategy for UNC's research enterprise. The *Endeavors* online magazine is a popular resource available at endeavors.unc.edu.

What We Have Learned — COMMUNICATION
Several conversations with the Board Committee on Innovation and Impact have centered around the frustration of not effectively communicating the impressive work being done at UNC Chapel Hill and its impacts on the citizens of North Carolina and beyond. A broad communications strategy for innovation needs to be an essential component of the University's overall strategy, and also integrated with targeted strategies for specific key stakeholders.

Our story is one and many. The overarching story is about the innovation vision and mission, and how the ecosystem makes it possible to achieve real-world goals. This is an important message to communicate as it encourages people to join the University community and to support the work. It also positions UNC Chapel Hill as a leader in taking a holistic approach to innovation and entrepreneurship.

The many stories of how people at UNC Chapel Hill are impacting the world are told through the University website, news releases, and social media. Unit communication teams have their own websites, news operations, and media to target various audiences. Many produce high quality print pieces, conduct conferences, and have faculty, students, and staff representing them at international symposia. All of these communication efforts need to be not only continued, but organized in ways that are targeted to key audiences.

It is challenging to mount a broad and consistent overall effort in communicating the University's innovation work. Resources have been limited, and there are many other messages that the University needs to deliver. Having clarity at the leadership level about vision and goals is helping to reinforce the communication efforts, and will make it easier to help schools and units deliver innovation messages from their perspectives. Having a vice chancellor of communications and the resources for him to create a strong team clearly addresses this challenge.

Remains To Be Done — COMMUNICATION
Recommendations
Under the direction of the Vice Chancellor for Communications, a new communications team and structure (Carolina Compass) brings the opportunity for added resources, direction and collaboration around innovation communications. Some areas for action include:
- Formalize a system for effectively gathering and pooling information (content) on innovation and entrepreneurship activities at UNC Chapel Hill. This will require having a network of campus communicators team up with the central communications office.
- Create portals and pathways for faculty, students, and external audiences to learn about innovation and entrepreneurship programs specific to their needs, so they can find help quickly and easily. This work would be executed through the I&E Office.
- Create a national strategy for raising UNC Chapel Hill's profile as a thought leader in this area through key story placements, rankings, etc.
- Provide resources, tools, and guidance to stakeholders, e.g., faculty, staff, student innovation groups and working group members – so that they, in turn, can communicate consistently with audiences.
- Create an easy-to-understand dashboard of the University's economic impact on the State of North Carolina. This should include the direct impact of research, commercialization statistics, and other direct economic benefits.
- Develop and execute investor- and industry-specific communication strategies.
- Develop and execute alumni-specific communication strategies.
- Develop and execute a communication strategy for other key stakeholders.