Innovation Ecosystems for the Creative Economy

• Innovation Serving Humanity
• Disseminating Knowledge
• Wealth Creation

Or ... Innovation Driving the Economy!

Tom Skalak, VPR
University of Virginia
Culture and Attitude...

An important aspect of innovation ecosystems - Thomas Jefferson and the “U.S. metric system”
Game-changing start-ups are out there. We just don’t know where to look.

WIRED Magazine - Dec, 2009

• Today’s giants have one thing in common: they tried to change the world!

• Google had an audacious goal: “to organize the world’s information”

Are today’s innovators playing it too safe?
Why is true innovation so hard to recognize?

- **A revolution makes life permanently different** – we have trouble imagining change

- **Innovation is invisible, until it bursts into view!**
Spectacular columns are spewing out of the sea about 6 miles off the main Tongan island of Tongatapu.
Why does **Innovation** matter?

- Innovation penetrates all areas of scholarship & practice

- **Artists** fill the blank canvas – through innovation
- **Poets** fill the blank page – through innovation
- **Scientists** do experiments – through innovation

- **Innovation-based economies** will provide for freedom, peace, and societal health

Singapore        Main Street, USA        Silicon Valley
The national Innovation Ecosystem …

- educational systems
- encouraging diverse viewpoints in R&D
- balance of long-range exploration and short-term execution
- early-stage proof-of-concept funding and translational research
- operational capital markets
- fostering collaboration
- mature manufacturing infrastructure
- government-academia-industry partnerships
The critical flow of funds for Translational Research

Basic research grant funding (primarily federal) – NIH, NSF, etc.

Translational research funding – foundations, federal, company funding, etc.

Licenses, start up companies, angel funding, and institutional investors
The cycle of innovation and translational research

**Inputs**
- University hiring, teaching, lab construction investment
- Federal agency funding (NIH, NSF, NIST, DOE) at universities, federal labs
- Corporate-funded R&D at universities
- Early-stage, proof of concept funding at universities
- Corporate-funded R&D at universities
- Federal agency funding (NIH, NSF, NIST, DOE) at universities, federal labs
- Traditional venture capital funding (in new companies), large company R&D
- Corporate ventures, licensing, new companies
- Corporate ventures, licensing, new companies
- Corporate partners
- Corporate partners

**Outcomes**
- Jobs
- Jobs
- Jobs
- Jobs and increase in U.S. GDP
- Jobs & GDP
- Jobs & GDP
- Jobs, GDP, & Healthy Americans

The nation’s basic research investment is realized via translational research. Innovation is launched from excellent basic research.
Faculty do **better basic research** after immersing themselves in translational challenges!
Top-ranked School of Law
(4 IOM members, ex-chief counsel at FDA)

UVa Research Park
562 acres
3,000,000 sq. ft.

Morven programs

Engineering School – 10 Depts,
1st Business minor in U.S.

Top-ranked Business School
&
Batten Inst. for Entrepreneurial Leadership

#1-ranked Commerce School

College of Arts and Sciences – many fields with best-in-class domain knowledge

Comprehensive Medical Center

Medicine
What are today’s sources of innovation?

“R&D 100 Awards” as an indicator

25 years ago: 70% of awards from Fortune 500 companies

Today: 70% of awards from public organizations, universities

Universities are now a primary pipeline for innovation
“Every child is an artist. The problem is how to remain an artist once one grows up.”

*Pablo Picasso*
Some ways to run internal innovation processes ...
• $600 M private foundation
• 1st national program:
  “Translational Research Partnerships” with universities
  $5.0 M over 5 years – funds 6-8 “seed projects” per year
  at $100,000 each – may endow at up to $10 M each

• UVa’s cohort: Stanford, Michigan, Duke
“Translating knowledge to society”

Leading a cultural transformation

People ----------- Patents ----------- Products

40 patent disclosures in 2 years: 10 times national rate
50% converted to licenses: 4 times national rate

Improving childhood surgery/imaging the heart/treating brain cancer
New Pathway for Translational Research at UVa
A people-focused, parallel process

- Improved Licensing
- Added Value
- Stronger Enablements
- Capitalizable Ideas, I.P.
- Rapid Access to Capital: Angels, VCs, SBIR/STTRs
- Start-up Company
- Traditional Incubators
- Acquisition
- Commercial Real Estate
- 2-way Communication & Follow-on Funding Both Inside & Outside UVa

After Coulter

- Established BME lab research
- New BME ideas
- Capstone projects M.D. & external ideas
- Regular M.D./BME meetings Clinical, contextual identification of unmet needs

Milestone-driven, proof-of-concept, parallel market, clinical, technical, I.P., and business R&D

- Selected Coulter projects
- Clinical Market Analysis
- Technical Business Development
- I.P. activity: UVAPF Foundation
- Value ($)

Enlarged Input Stream

Coulter Advisory Committee & Project Director

2-way Communication & Follow-on Funding Both Inside & Outside UVa
Role of outward-facing relationships ... 

- Eliminate “not invented here” culture 
- Find talent anywhere! 
- Find ways to have “inside-outside flux” of change agents
Relationships are a key driver to translation

<table>
<thead>
<tr>
<th>Corporate</th>
<th>Foundation</th>
<th>Investor Networks</th>
</tr>
</thead>
</table>
| • Johnson & Johnson  
• Abbott Diagnostics  
• Medtronic  
• Boston Scientific  
• Vital Images  
• Targesson  
• Genzyme  
• Bristol Myers Squibb  
• Pfizer  
• Merck  
• Adenosine Therapeutics  
• Luna Technologies  
• Gore Technologies  
• ImClone Systems  
• Philips  
• Siemens  
• IBM | • Coulter Foundation  
• Kauffman Foundation  
• Hartwell Foundation  
• Focused Ultrasound Surgery Foundation  
• Whitaker Foundation  
• Robert Wood Johnson Foundation  
• Juvenile Diabetes Research Foundation | • Tall Oaks Capital Partners  
• Virginia Active Angel Network  
• Harbert Ventures  
• De Novo Ventures  
• InterSouth Venture Partners  
• Southern Capital Venture Partners  
• Healthcare Ventures  
• Lumira Capital  
• Aurora Venture Partners  
• Hatteras Venture Partners  
• Piedmont Capital  
• Neuroventure Partners  
• Hutchinson Law Group  
• Morrison and Foerster |

- **Venture Summit in Spring 2010** brought $15 B in VC funds to UVa, faculty leaders offered “Windows on the Future” talks, 100% of new cos funded (6/6) at $14M
Ways to Enhance Effectiveness for Corporate Partnerships

- Dedicated relationship manager
- Diverse oversight board and in-person final reviews
- Teams with diverse people
- Urgency, “will to kill” projects, quarterly reporting
- Presenting integrated and responsive university group – from the “front door” of grants & contracts to the “back door” of the tech transfer staff
- Recognize what private sector does better! (toxicology, product development, regulatory, etc.)
Importance of Culture ...
The “young” appreciating the “old”

Padua, Italy

Research, innovation, and change are continuous. What are the things worth doing? How will we accomplish these things?
Bronowski, *Science and Human Values*

- “What science has to teach us .... the irresistible need to explore.” - It’s the artist/child in us all!

These are **attributes** that all corporations and comprehensive **university partners** need!

New ideas **change the world.**
“No amount of savings and investment, no policy of macroeconomic fine-tuning, no set of tax and spending initiatives can generate sustained economic growth unless it is accompanied by the countless large and small discoveries that are required to create more value from a fixed set of natural resources.”
- economist Paul Romer

“There never was a great scientist who did not make bold guesses, and there never was a bold man whose guesses were not sometimes wild.”
- J. Bronowski, in Science and Human Values
Innovative Thought and Practice

- Diversity of thought breeds better ideas. Emphasize it! Realize what we don’t know.

  - use architect’s and diagrammatic view of “design and build” projects

  - associative thinking across fields accelerates new designs … use analogies when possible

  - take time to talk and learn from people

  - new ideas change the world!
Negroponte, MIT Media Lab
“Creating a Culture of Ideas”

• “Encouraging risk, openness, and idea-sharing”
  - Add personal humility, respect for the ideas of others.

• Get diverse eyes on a problem, listen to the young, foster collaboration.  - Perspective can improve performance and create disruptive solutions.

• “The ability to make big leaps of thought ... a common denominator in innovation”  - associative thinking, creative synthesis, right brain/big picture
Art/Science/Business ... associative thinking .... Innovation?
Is the U.S. ready to lead innovation for the creative economy?

“The flying machine which will really fly might be evolved by the combined and continuous efforts of mathematicians and mechanicians in from one million to ten million years.”
- *The New York Times, October 9, 1903*

“We started assembly today.”
- *Orville Wright's Diary, October 9, 1903*