Innovation in the University Environment
A Pragmatic Approach

Krisztina “Z” Holly, University of Southern California
Elias Caro, Coulter Foundation
David Chen, University of Virginia
Robert Strom, Kauffman Foundation

April 27, 2010
The “Valley of Death”

- University research: $50B
- Venture capital: $30B
- Seed stage VC: $1B
Cultural barriers

Academia

How can I...
• acquire new knowledge?
• disseminate my ideas?
• get funding for research group?
• enhance my reputation?
• help my students succeed?

Private Sector

• profits
• sales
• jobs
• products
• etc.
Cultural barriers

Academia

Surprises = Good

Private Sector

Surprises = Bad
“If we knew what we were doing, it wouldn’t be called Research”
• Elias Caro  Coulter Foundation
• Robert Strom  Kauffman Foundation
• David Chen  University of Virginia
• Krisztina “Z” Holly  University of Southern California
Innovation Centers

Some Best Practices...
Innovation Centers

• Proof-of-concept funding and project management
• Mentoring and education
• Ecosystem and community
MIT Deshpande Center Outcomes

- 25% of 80 projects >> startups
- $200M VC
- 250+ faculty and students
- 100+ volunteers
USC Ideas Empowered Program

Lesson:

- Academic innovators inexperienced
- Projects take long time to focus
- Teams hard to coach

Ideas Empowered Program:

- Mentoring by outside experts
- Due diligence, coaching, and market analysis done pre-award.
  Ensure team commitment. Involve students from beginning.
<table>
<thead>
<tr>
<th>Lesson:</th>
<th>Ideas Empowered Program:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural gap</td>
<td>Invest in lifelong innovation skills</td>
</tr>
<tr>
<td>IP protection and tech transfer important</td>
<td>Program managed under same umbrella as tech transfer</td>
</tr>
<tr>
<td>Sustainability is a challenge</td>
<td>Retain some licensing revenue - yet still a challenge</td>
</tr>
</tbody>
</table>
NSF Innovation Ecosystems

- $12M Obama budget request
- NSF PFI Pilot funding
- Universities serve as nexus
- Best practices and metrics
- Ultimately should scale
Case Studies:

• Huge leverage, impressive outcomes
• Structures can vary, but same core lessons learned:
  – Build local capacity and ecosystems
  – Select teams wisely and mentor
  – Engage experts
  – Aim for culture change
The Nuts & Bolts of Innovation
Implementing industry development process at universities
Wallace H. Coulter
Science Serving Humanity

- Inventor of the Coulter Principle
- Innovation: Coulter Counter
- Founder & Chairman of Coulter Corporation
- Coulter Pharmaceutical – Non Hodgkin’s Lymphoma
- Recipient of the John Scott Award and National Inventor’s Hall of Fame
- AMIBE Fellow with 82 patents
Translational Research
Partners Program

**MOTIVATION**
- Patients
- Engineering
- Biomedical
- Untapped Innovation
- Gap funding
- WHCF Strength: Translating Innovation

**PROGRAM STRATEGY**
- Eco-System
- Participants Selection
- Critical Elements
- Funding
- Industry Practices
- Culture Change
- Sustainability
- Partnership

**IMPLEMENTATION**
- WHCF Involvement
- Best Practices
- Continuous Improvements
- Road Map
- Metrics
- Roles & Expectations
- Continuous Evaluation
Wallace H. Coulter Foundation
Founded in 1999

- Translational Research Partners
  - Started in 2006 – 5 Year program
  - 10 Universities - $1 M/year
  - Goal - Accelerate translation of biomedical engineering innovation to benefit patients and society.
SUCCESS METRICS

EXCELLENCE & SUSTAINABILITY

- EXCELLENCE
  - % of projects that receive professional funding via license or start-up

- SUSTAINABILITY
  - Innovation process implementation
  - Coulter Venture Fund
Coulter Process Elements

- Oversight Committee (OC)
- Coulter Program Director
- Office of Technology Transfer (OTT)
- IP/Commercial Risk Analysis
- Partnership Engineer & Clinician
Oversight Committee

- VC & Industry
- BME & SOM Chairs
- CHAIR
- Office of Technology Transfer
- Clinicians
Coulter Process: Pre-selection

**Idea Generation**
- Disease Focus Groups, Networking

**Screening**
- GO/NO GO

**Risk Assessment**
- IP, FDA, CMS, Clinicians Industry, Funding to critical experiment

**Selection**
- Oral Presentation to OC
Coulter Process: Risk Reduction

- **Ongoing**
  - CPD & OC Mentoring
  - Licensing

- **Quarterly**
  - Reports to OC
  - OC Seed Funding

- **Semi-Annual**
  - OC Operating Review

- **Annual**
  - OC Follow on Funding
  - OC Program Assessment
Key Success Factors

- **PROGRAM**
  - Competent CPD (industry, entrepreneur). Embedded in OTT
  - OC (composition, role definition)
  - OTT (OC membership & participation in project teams, IP investment, business development, flexible deal structure)
  - Process adaption & institutionalization
    - Best practices sharing and adoption

- **PROJECT**
  - Partnership BME & MD (passion, commitment)
  - Project Selection (thorough IP & commercial risk assessment)
    - White Hot Risk
    - Critical Experiment
  - Management
3 yrs non-audited results

- >100 Projects funded ($25 Million)
- 22 projects received VC/angel funding (>80M)
- 14 projects licensed to established companies
- 13 projects received SBIR/STTR/Grants
- Collaborations have produced 10’s millions in NHI research funding
- Patent applications : >100
Innovation for an Entrepreneurial Economy:
The Role of the University

National Science Foundation
Partnerships for Innovation
April 26, 2010

Dr. Robert Strom, Director
Research & Policy
Ewing Marion Kauffman Foundation
“Every individual that we can inspire, that we can guide, that we can help start a new company, is vital to the future of our economic welfare.”

- Ewing Marion Kauffman
Innovation for an Entrepreneurial Economy: The Role of the University

- Research
  - Academic
  - Policy
- Teaching
- Outreach
Research
What Research Questions?

- Entrepreneurship → Innovation → Productivity → Growth
- Entrepreneurial Dynamics:
  - Firm and Industry Birth, Growth and Death
- Barriers to Entrepreneurship
  - Demographic:
    - Gender
    - Race
    - Age
    - Immigration
  - Institutional
    - Legal
    - Financial
    - Regulatory
Asset based innovation and design at the University of Virginia

National Science Foundation Partnerships for Innovation
IN THE INNOVATION ECONOMY, THE MOST VALUABLE CURRENCY ARE GREAT IDEAS
THE CHALLENGE IS TO CREATIVELY AND ACTIVELY MANAGE THESE IDEAS FOR TEACHING, SCHOLARSHIP, AND WEALTH CREATION
• Funding

• Project management
  – Process management
  – Resources, IP

• Follow on funding to commercialization
Project funding
• Raised over $7M from partners including Coulter Foundation, J&J, Astra Zeneca, Siemens and Hartwell Foundation

• Developing new partnerships Medtronic, Sanofi Aventis, BASF, St. Jude, and Celgene
Project funding

• Lessons
  – Seek diverse sources of funding, synergies
  – Be flexible on terms
  – Speed and responsiveness
Project management
Process management
Project management and process management

Lessons
• Process oriented
• Be transparent and be personal
• Manage expectations regularly

Outcomes
• Over 50 unique projects funded
• Over 70 faculty in 21 departments covered
Follow on funding to commercialization
• Lessons
  – Start early
  – Capture feedback from industry and investors and use often

• Outcomes
  – 13 licenses to both startups and international companies
  – 5 startups with over $7M capital raised
  – $13M of follow on funding to advance projects
Challenges and opportunities
The landscape is changing rapidly.

In this climate of uncertainty, companies are turning to Universities for insight.

Be open and share best practices.
finish