The Role of the Research Enterprise in Economic Development

Board of Trustees Workgroup
Research and Health Sciences
April 17, 2008

Karen A. Holbrook
Vice President for Research and Innovation
Science and Technology are the Drivers of Economic Growth

“The world is dramatically being reshaped by scientific and technological innovations, global interdependence, cross-cultural encounters and changes in the balance of economic and political power.”

“College learning for a New Global Century,” 2007
“Innovation will be the single-most important factor in determining America’s success through the 21st century… For the past 25 years, we have optimized our organizations for efficiency and quality. Over the next quarter century, we must optimize our entire society for innovation.”

National Innovation Initiative, Council on Competitiveness, 2004
Innovation

Innovation = the intersection between imagination, insight, ingenuity, invention and impact

• anyone, anywhere
• a product, service or strategy
• open and collaborative
• multidisciplinary and demand-driven
• global
• an element of risk
Innovation Offers Insight into Social Issues

“Innovation has always been the way people solved great challenges facing society.”

“Innovation will lead to the solution of problems that do not even exist yet, to the opening of new vistas of undreamt opportunity for ourselves and future generations.”

Deborah Wince-Smith, CEO, Council of Competitiveness
Innovation connects research discoveries with the world around us, to save lives, improve the quality of life, and increase competitiveness and productivity.
Treating Cancer One Patient at a Time

Personalized care brings the benefits of science closer to the patient.

- **Dr. Timothy Yeatman** is involved in the MACCO (Microarray Analysis of Colorectal Cancer Outcomes) Project — the first Moffitt trial to obtain, via biopsy, tumor tissue samples from patients treated at 10 different medical facilities in Florida. He uses genetic profiling by microarray analysis to find if patient response to specific chemotherapy regimens can be accurately predicted.

- Translational research quickly moves scientific discoveries from the laboratory to the patient by clinical trials to assess new drug safety and effectiveness. An exciting example of this was in December 2005 when the FDA approved Celgene Corporation's Revlimid drug. The drug was approved to treat patients with transfusion-dependent anemia due to myelodysplastic syndrome (MDS) associated with a genetic defect called chromosome 5q deletion. **Dr. Alan List** was key in developing Revlimid. While at the University of Arizona Cancer Center before coming to Moffitt, he identified the compound that influenced what he believed was an important biological target for MDS. He developed the phase I clinical trial of the drug, which simultaneously blocks growth of new blood vessels that nourish tumors and stimulates the immune system. Under List's leadership, Moffitt now participates in a trial to study Revlimid's effectiveness in multiple myeloma.

- **Working to identify the best personalized treatment for advanced-stage lung cancer patients**, **Drs. Gerold Bepler and George Simon** developed the Molecular Analysis Directed Individualized Therapy (MADe iT) trial. Based on the expression of two genes — ERCCI, which predicts for platinum resistance, and RRM1, which predicts for gemcitabine resistance — the patient receives a combination of two standard FDA-approved chemo.

Research by Drs. Timothy Yeatman and Adil Daud helps predetermine which chemotherapy regimens will work best for individual patients.
Innovation Offers Global Insight into Global Problems

- Emerging infectious diseases
- Health care economics
  - burden of disease
  - health care delivery and health disparities
- Renewable energy
- Transportation
- Environmental Sustainability
  - global warming, clean and safe water supplies, air quality and pollution, depletion of natural resources, threatened loss of endangered species
- Poverty, hunger, food security
- Nuclear proliferation
- Terrorism, geopolitical conflicts and, conversely, peace
Global Reach.

Home of The Dr. Kiran C. Patel Center for Global Solutions
www.usf.edu
Professor Robin Murphy leads robotic research and rescue at the University of South Florida. Her team worked at Ground Zero following 9/11 terrorist attacks on the World Trade Center.
Innovation Agenda  
(Council on Competitiveness)

1. Educate the next generation of innovators and prepare students to become citizens of “an interconnected and unequal world.”
2. Deepen science and engineering
3. Explore knowledge intersections where the greatest breakthroughs occur
4. Equip workers for change
5. Support collaboration
6. Energize entrepreneurship
7. Reward long-term strategy and investments and couple them with near-term strategies to make an immediate difference
8. Build world-class infrastructure
9. Invest in frontier research
10. Attract global talent
11. Create high-wage jobs
Embracing Innovation.

USF UNIVERSITY OF SOUTH FLORIDA

USF's Center for Entrepreneurship - three time recipient of the top national award in entrepreneurship education
www.usf.edu
USF Research: An Innovation Hub
The University Research Enterprise: Generalizations

USF Goal: Build strong and vibrant research programs in areas of current economic importance to and interest to Industry and relevance to society in Florida and beyond.

University technology:
- attracts companies
- attracts investment capital – angel, seed, venture, strategic and corporate, private equity and buyout funding investment banking and IPOs
- helps retain and build companies
- starts up companies
- builds alliances at the intersection of G-U-I
- garners public-private partner grants – SBIR/STTR
Florida’s Commitment to Innovation at Research Universities: Promoting Economic Development

- Florida Centers of Excellence
Florida’s Commitment to Innovation at Research Universities: Promoting Economic Development

- Florida Centers of Excellence
- State University Research Commercialization Assistance Program (SURECAG)
State University Research Commercialization Grants

Grants to SUS tech transfer offices to assist in commercialization of inventions

– Phase 1
  • Early stage of commercialization – one awarded to USF
  • RAID application for cancer therapeutics at $50,000
– Phase 2
  • Business plan development – one awarded to USF
  • Cancer therapeutics at $50,000
– Phase 3
  • Award to existing startups for execution of business plan
  • Recommended for funding, unlikely to receive funding
Florida’s Commitment to Innovation at Research Universities: Promoting Economic Development

- Florida Centers of Excellence
- State University Research Commercialization Assistance Program (SURECAG)
- Florida High Tech Corridor (USF, UCF, UF)
  - research partnerships  - marketing
  - workforce development  - incubators
  - entrepreneurial centers
Congratulations! The Florida High Tech Corridor Council celebrates ten years of high tech growth!

2007 SPONSORS

Economic Development Commission of Florida’s Space Coast
www.SpaceCoastEDC.org

Maddux
www.maddux.com

Metro Orlando Economic Development Commission
www.OrlandoEDC.com

Pinellas County
www.pcei.org

Seminole County
www.BusinessInSeminole.com

University of Central Florida
www.research.ucf.edu

University of Florida
The Foundation for The Gator Nation
www.ufl.edu

USF
www.usf.edu

USF UNIVERSITY OF SOUTH FLORIDA
Sustainable Electrical Energy Delivery System (SEEDS) demonstration site at USF – St. Petersburg, a Progress Energy, USF College of Engineering, and FI High Tech Corridor Project

The renewable energy initiative combines photovoltaic (PV) panels and an advanced battery system to supply renewable energy during power system peaks.
Florida Center of Excellence in Biomolecular Identification and Targeted Therapeutics and the Florida High Tech Corridor Council

Medical Devices Technician – Certification
Production Technician
Quality Specialist
Senior Inspector
Manufacturing Specialist

The Medical Device Technician Certificate provides a five course series that covers the concepts and fundamentals of regulatory affairs, basic instrumentation usage, troubleshooting techniques, basic metrology, and quality assurance for medical manufacturing. The course offerings of this certificate program will focus on the concepts, methods, and tools required for medical device manufacturing. The courses in this certificate program are part of the Quality Compliance Technology and Manufacturing Technology AS degree programs.
Florida’s Commitment to Innovation at Research Universities: Promoting Economic Development

- Florida Centers of Excellence
- State University Research Commercialization Assistance Program (SURECAG)
- Florida High Tech Corridor (USF, UCF, UF)
  - research partnerships
  - workforce development
  - marketing
  - incubators
  - entrepreneurial centers
- Enterprise Florida
  - Innovation Fund
  - Recruitment of SRI, Scripps, Burnham, Max Planck, Torrey Pines, Oregon Health Sciences
Biotech lab, jobs on table

By James Thorner, Times Staff Writer

Published Wednesday, April 16, 2008 11:17 AM

Hundreds of high-tech jobs could be heading the way of Tampa and St. Petersburg.

An undisclosed nonprofit company proposes creating a $20-million biotechnology research center at the University of South Florida in Tampa and a $14-million electronics plant in St. Petersburg.

The Tampa research center would create 100 jobs paying an average of $75,000 with the promise of up to 271 more jobs in five years, Hillsborough County said.

Employment details were sketchy about the St. Petersburg plant. But the company said it would collaborate with an existing Pinellas County defense contractor to make "multichip modules," an advanced form of circuit boards.

The two projects came to light as Hillsborough commissioners prepared to consider today whether to contribute $6-million from their budget over two years to land the USF research center.

The company also seeks $4-million from the University of South Florida Research Foundation and $10-million from the Florida Innovation Incentive Program. The latter program was created during the administration of Gov. Jeb Bush to help lure world-class, high-impact businesses.
University Infrastructure to Support Innovation and Economic Development “USF Connect”

- Research Foundation - promotes research relationships and contracts with the private sector – promotes public-private partnerships; works with FHTCC; internships
- Research Park – location of start-up companies based on university technology - products
- Incubator – Tampa Bay Technology Incubator
  - companies
USF CONNECT

Bringing your business in touch with USF resources
Tampa Bay Technology Incubator 2007

Number of Companies: 21
Revenues: $2.926 million (8 companies)
Funding: $6.368 million (8 companies)
Payroll: $5.851 million (11 companies)
Average Salary: $73,133
University Infrastructure to Support Innovation and Economic Development
“USF Connect”

- Research Foundation - promotes research relationships and contracts with the private sector – promotes public-private partnerships; works with FHTCC; internships
- Research Park – location of start-up companies based on university technology – products
- Incubator – USF Connect
  - companies
- Technology and Licensing Office
  - protects and licenses technology
  - commercializes technology
- Core facilities
<table>
<thead>
<tr>
<th>Licensing Partner</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Microsystems</td>
<td>Underwater Mass Spectrometer</td>
</tr>
<tr>
<td>Saneron CCEL</td>
<td>Non-embryonic Stem Cells</td>
</tr>
<tr>
<td>Transform Pharmaceuticals</td>
<td></td>
</tr>
<tr>
<td>Nanopharma Technologies</td>
<td>Nanoparticle Drug Delivery</td>
</tr>
<tr>
<td>VioQuest Pharmaceuticals</td>
<td>Cancer Therapeutics</td>
</tr>
<tr>
<td>TransGenex Nanobiotech</td>
<td>Drug Delivery &amp; Therapeutics</td>
</tr>
<tr>
<td>Inovio Biomedical</td>
<td>Gene Therapy</td>
</tr>
<tr>
<td>Tigris Pharmaceuticals</td>
<td>Cancer Therapeutics</td>
</tr>
<tr>
<td>Dolphin Medical</td>
<td>Medical Device</td>
</tr>
<tr>
<td>IRX Therapeutics</td>
<td>Cancer Therapeutics</td>
</tr>
<tr>
<td>Eastman Kodak</td>
<td>Cancer Diagnostic</td>
</tr>
<tr>
<td>Claro Scientific</td>
<td>Clinical Diagnostic</td>
</tr>
<tr>
<td>Modelithics</td>
<td>Wireless Modelling</td>
</tr>
<tr>
<td>Bioplex</td>
<td>Field Biological Detection</td>
</tr>
</tbody>
</table>
Tech Transfer Summary

Five Year Summary USF Faculty at Moffitt

Licenses

Five Year Summary

USF Faculty at Moffitt
How Do You Promote More Economic Development on Campus Via the Research Enterprise?

• Incentivize collaborative projects
• capitalize on state-wide partnerships
• Assure proper match between tech transfer assistance and work in the pipeline for commercialization
## Direct Patent Costs

<table>
<thead>
<tr>
<th></th>
<th>Patent Applications</th>
<th>Patent Fees</th>
<th>Direct FTEs</th>
<th>Research $</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Florida</td>
<td>192</td>
<td>$1.7 mm</td>
<td>4</td>
<td>300 M</td>
</tr>
<tr>
<td>Univ. Florida</td>
<td>197</td>
<td>$4 mm</td>
<td>15</td>
<td>582 M</td>
</tr>
<tr>
<td>Central Florida</td>
<td>119</td>
<td>$1 mm</td>
<td>3</td>
<td>121 M</td>
</tr>
</tbody>
</table>
How Do You Promote More Economic Development on Campus Via the Research Enterprise?

• Incentivize collaborative projects
• capitalize on state-wide partnerships
• Assure proper match between tech transfer assistance and work in the pipeline for commercialization
• Assure preparation of science, technology and business workforce
• Obtain seed funding from outside investment sources
• Communicate opportunity
• Measure Success
How Do You Measure Success?

**Metrics**

<table>
<thead>
<tr>
<th>IMPACT</th>
<th>EXCELLENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
<td>New knowledge</td>
</tr>
<tr>
<td>Community</td>
<td>Enhanced reputation</td>
</tr>
<tr>
<td>State</td>
<td>Recruitment of outside talent</td>
</tr>
<tr>
<td>Nation</td>
<td></td>
</tr>
<tr>
<td>International</td>
<td></td>
</tr>
</tbody>
</table>
How Do You Measure Success?

Metrics

ROI – Leveraging of State and Federal Funds

• New dollars into Florida
• License and royalty income
• Disclosures -> patents -> licenses -> royalties -> startups
• Companies recruited
• Participation in development of research parks/incubators
• Jobs created/saved
• Partnerships created
• Additions to local industry clusters
How Do You Measure Success?

Metrics

SUSTAINABILITY – the view forward and long-term vitality
• New dollars to replace state dollars as they are decreased or depleted
• Evidence as a nidus of growth

COMMITMENT OF THE UNIVERSITY TO SUCCESS
• Infrastructure to support research
• Invest in personnel, space, equipment and provide incentive funds to support engagement in innovation
• Encourage faculty to engage in the innovative culture
• University support for technology transfer
• Access to capital
• Level of University oversight
How Do You Promote More Economic Development on Campus Via the Research Enterprise?

- Incentivize collaborative projects
- Capitalize on state-wide partnerships
- Assure proper match between tech transfer assistance and work in the pipeline for commercialization
- Assure preparation of science, technology and business workforce
- Obtain seed funding from outside investment sources
- Communicate opportunity
- Measure Success
- Communicate Success
Advantages of Innovation and Economic Development to USF

Financial:

• Enhances the financial position of the university and inventors – BUT – not a cash cow to be relied upon
• Modest income from:
  • licenses and royalties
  • fees for use of equipment
  • equity in start up companies
  • new relationships that → new grants
  • opportunities to consult
• Core facilities
Advantages of Innovation and Economic Development to USF

Beyond financial:

• The ultimate technology transfer is students
• The community gains new jobs, additional tax revenues
• Vibrant relationships within the university environment
• Provides faculty with a creative entrepreneurial outlet
• Meets community needs
  • new jobs
  • additional tax revenues
  • recruitment advantages
• Builds reputation and prestige
• Becomes a magnet – students are a draw!
Engaging Communities.

A Community Engaged University — The Carnegie Foundation for the Advancement of Teaching

www.usf.edu
ECONOMIC IMPACT REPORT

$3,200,000,000

Today, USF brings the force of $3.2 billion to bear on the economy of the Tampa Bay region.

USF UNIVERSITY OF SOUTH FLORIDA
Universities and Innovation – Looking Forward

“The conceptual economy will favor nations that reach globally for markets, and those that embrace different cultures and absorb their diversity of ideas into the innovation process.”

• Technology will continue to drive research as a global enterprise
• Universities will develop and participate in a global agenda and prepare students to become global citizens
• Universities will collaborate by clicks and bricks
• Universities will also compete – but collaboration need to trump competition
• Research will engage more than science and technology and involve culture, language, ethics and economics