Overview

- The National Research Landscape
- Research Activity in the LSU System
- The National Commercialization Landscape
- Tech Transfer Activity in the LSU System
- Implications for Economic Impact of LSU
Measuring Research Activity

- The National Science Foundation (NSF) conducts an annual survey (referred to as “HERD”) that is considered the premier measure of university research and development (R&D) activity.

- The HERD captures actual annual university expenditures on R&D from all sources of funding.

- The HERD has very specific directions and definitions, increasing its reliability and comparability.

- Expenditures are NOT the same as Awards.

- Major categories are total, federal, state, industry
National R&D Expenditures FY2011: Top 25 vs. All LA University R&D (NSF, dollars in thousands)

Scale Matters!!
### National University Research Landscape

| NSF HERD FY2011: | $65 billion academic R&D expenditures  
|                 | $41 billion from federal sources |

#### ALL U.S. Universities
- 63% federally funded

#### Total R&D $$ change
- One year (FY10-11): 6%
- Five year (FY06-11): 31%

#### Federal R&D $$ change
- One year (FY10-11): 9%
- Five year (FY06-11): 32%

#### LSU System
- 42% federally funded

#### Total R&D $$ change
- One year (FY10-11): -1%
- Five year (FY06-11): 14%

#### Federal R&D $$ change
- One year (FY10-11): 1%
- Five year (FY06-11): 21%
LSU System Annual R&D Expenditures
(without UNO, dollars in thousands)

![Bar chart showing LSU System Annual R&D Expenditures from FY2004 to FY2012. The chart includes a legend indicating 'Total' and 'Federal' expenditures. The chart highlights an average federal percentage of 38% of total expenditures.](image-url)
LSU System Total R&D Expenditures, By Campus (dollars in thousands)
LSU System Federal R&D Expenditures, By Campus (dollars in thousands)
LSU A&M Peer Comparison: FY2011 TOTAL R&D Expenditures (NSF, dollars in thousands)
LSU A&M Peer Comparison: FY2011 FEDERAL R&D Expenditures (NSF, dollars in thousands)
Major Sources of LSU System R&D Expenditures  (dollars in thousands)
Measuring Technology Transfer

“Technology transfer” refers to a broad set of activities and agreements that help move inventions along the pathway from concept to commerce.

The federal Bayh-Dole Act of 1980 is the legal foundation of most university tech transfer activity.

The Association of University Technology Managers (AUTM) conducts an annual survey of metrics which capture certain activities of university tech transfer.
## Technology Transfer:

<table>
<thead>
<tr>
<th>Myth</th>
<th>vs.</th>
<th>Reality</th>
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<tbody>
<tr>
<td>“Universities make a fortune with their inventions.”</td>
<td></td>
<td>Half of institutions made less than $2 million in 2011</td>
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<td>“Licenses always go to large, established companies.”</td>
<td></td>
<td>Nearly 70% of licenses go to small companies &amp; start-ups</td>
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<td>“Most disclosures should be turned into start-ups.”</td>
<td></td>
<td>Only about 15% of licenses are for inventions that are broad enough to form the basis of a start-up.</td>
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<tr>
<td>“All licenses make lots of money for the university.”</td>
<td></td>
<td>Only 0.5% of licenses make more than $1 million/yr.</td>
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National Commercialization Landscape

Benchmarks for Technology Transfer Activity

- 1 invention disclosure per ~$2.5 million in R&D
- ~25% of disclosures eventually get licensed
- 1 start-up company per ~$100 million in R&D
- ~47% of legal expenses reimbursed
- Patent apps filed on ~60% of new disclosures
- Only 0.5% of licenses generate >$1 million
- Average ROI for Universities ~ 3.3%

Source: Speaker Analysis of AUTM FY2011 Report
LSU System Invention Disclosures

Actual vs. Expected Invention Disclosures
(1 per every $2.5 million in R&D expenditures)
LSU System Invention Disclosures, by Campus
LSU System Licenses & Options Signed, by Campus
Start-up Companies based upon LSU System Inventions  (expect 1 for ~$100 Million R&D)
LSU System License Income

![Chart showing LSU System License Income from 2002 to 2012. The bar chart is color-coded to represent different entities: HSC-S, HSC-NO, Pennington, Ag Center, and LSU A&M. Each year from 2002 to 2012 is represented, with the income scale ranging from $0 to $13,000,000.](image)
LSU System License Income, By Campus, without Ag Center

![Bar chart showing license income by campus from 2002 to 2012. The chart includes bars for LSU A&M, Pennington, HSC-NO, and HSC-S, with income values ranging from $0 to $700,000.](image-url)
Return on Investment (ROI): LSU System License Income as % of R&D
LSU System Campuses: Legal Fees Spent & Reimbursed

<table>
<thead>
<tr>
<th>Year</th>
<th>Expended (in $)</th>
<th>Reimbursed (%)</th>
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<td>2002</td>
<td>7</td>
<td>4</td>
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<td>2003</td>
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<td>2011</td>
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<tr>
<td>2012</td>
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</table>
LSU System Campuses: Legal Reimbursement Percentage

LSU A&M
Ag Center
Pennington
HSC-NO
HSC-S
National Average
LSU System Campuses:
Tech Transfer Office Staffing Levels
(System total FTE in white box, year office launched in legend)
University Research & Economic Impact

- Research activity is a fundamental *input* supporting the mission of a land grant institution.

- Knowledge and innovation are *outputs* of this research activity.

- These *outputs* can be transferred out through *multiple channels*:
  - Student internships & corporate hiring of graduates
  - Publications & presentations
  - Faculty consulting, collaboration & visiting appointments
  - Industrial research partnerships
  - Licensing inventions to existing or start-up businesses

- Strengthening LSU’s research enterprise, and thus its economic impact, requires sustaining and increasing the activity flow through this R&D “pipeline” of inputs and outputs.
Evaluating the R&D Pipeline at LSU: Trends of Concern???

The desired university outputs cannot grow when the fundamental R&D inputs are declining.
A CLOSING QUESTION:

What must be done to sustain and enhance the inputs into the LSU R&D pipeline to increase both the volume and variety of outputs, and thus expand LSU’s economic impact?