New Data for STEM Education Research

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And many many coauthors and collaborators, particularly Jason Owen Smith, Bruce Weinberg, Matt Ross, Reza Sattari, Akina Ikudo, Wei Chen, Evgeny Klochikhin, John Cuffe, Kaye Husband Fealing, John King, Stan Johnson, Nathan Goldschlag Ron Jarmin, and Nik Zolas This research was supported by NSF Education and Human Resources DGE Awards 1348691, 1547507, 1348701, 1535399, 1535370; NSF NCSES award 1423706; NIHP01AG039347, the Ewing Marion Kaufman and Alfred P. Sloan Foundations, USDA AFRI grant number 1005677, NSF SciSIP Awards 1064220 and 1262447;..
Transmission of research ideas can occur through:

- People employed doing research (measured with grants)
  - Placement of individuals (Oppenheimer – the best way to send knowledge is to wrap it up in a human being)
  - Start up of businesses
  - Through social networks

- Purchases of equipment and services
  - Consumer led innovation
  - Development of comparative advantage
  - Economies of scale
A conceptual framework
Mashing up University Admin data and Census Bureau Data to Create New Statistics

- Key Census Datasets
  - Business Register – Employer and Nonemployer
    - Used for Matching business records
  - PVS System
    - Used for Matching person records
  - LBD
    - Data underlying the Business Dynamics Statistics
  - LEHD
    - Data underlying the Quarterly Workforce Indicators

“NPR membership” Model

63 researchers have accessed data
What results

UMETRICS DATA
University data on Federal awards:
Employee, vendor, subaward transactions

CENSUS DATA
Secure data on people and businesses:
Employment records, business dynamics & characteristics

JOB PLACEMENTS
Where research employees get their next jobs

START-UP ACTIVITY
What types of businesses research employees found

VENDOR CHARACTERISTICS
What types of businesses supply research

Analyze by: Occupational category | Funding agency | Research area | Years since leaving university
Wrapping it up in a person: Examining employment and earnings outcomes for Ph.D. recipients

Nikolaus Zulauf,1 Nathan Goldschlag,1 Ron Jarmin,1 Paula Stephan,2,3 Jason Owers-Smith,4 Rebecca F. Knox,5 Barbara McNamara Allen,6 Bruce A. Weinberg,5,6,7 Julia L. Lane1,5,6,8

This research output has an Altmetric score of 377. This is our high-level measure of the quality and quantity of online attention that it has received. This score was calculated when the research output was last mentioned on 08 February 2016.

Altmetric has tracked 4,800,033 research outputs across all sources so far. Compared to these this one has done particularly well and is in the 99th percentile: it's in the top 5% of all research outputs ever tracked by Altmetric.

http://www.sciencemag.org/content/350/6266/1367.abstract
Firm characteristics

Fig. 2. Annual payroll per worker at establishments that employed UMETRICS doctoral recipients, establishments owned by firms that perform R&D, and all U.S. establishments. Values for average annual payroll per employee are (U.S.$1 ×1000).
Earnings
Startups/Entrepreneurship

Figure 2: Data Construction for Human Capital Measures of Startups

**Step 1:** Identify person and firm types in three years prior to startup

- **R&D Firm (BRDIS/SIRD)**
  - 420,000 EIN-Year observations
  - 74,000 EINs
  - Link by EIN-Year

- **ICF**
  - Demographics for 260M individuals
  - Link by PIK

- **High-Tech Industry (Hecker)**
  - 61 NAICS six-digit industries
  - Link by NAICS

- **University (IPUMS/Carnegie)**
  - 130 EINs
  - Link by EIN

  **Startup Worker History File**
  - 690.4M Total PIK-EIN-Year Observations
  - 48.3M Observations for Startups at time t=0
  - Link by PIK-EIN-Year

- **Research Experienced**
  - 140,000 actual UMETRICS
  - 190,000 predicted (ML) UMETRICS
  - Link by PIK-EIN-Year

**Step 2:** Collapse and tabulate human capital totals by startup EIN

<table>
<thead>
<tr>
<th>Startup EIN</th>
</tr>
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<tbody>
<tr>
<td>5.3M Startup Observations</td>
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<tr>
<td>48.3M Employees</td>
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</table>

<table>
<thead>
<tr>
<th>Startup Count Employee Count</th>
<th>R&amp;D Lab</th>
<th>High-Tech</th>
<th>University</th>
<th>Research Experience</th>
<th>Female</th>
<th>Foreign Born</th>
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<tbody>
<tr>
<td>Startup Count</td>
<td>1.6M</td>
<td>900,000</td>
<td>400,000</td>
<td>35,000</td>
<td>2.8M</td>
<td>1.7M</td>
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<tr>
<td>Employee Count</td>
<td>8.1M</td>
<td>3.0M</td>
<td>950,000</td>
<td>50,000</td>
<td>22.5M</td>
<td>8.4M</td>
</tr>
</tbody>
</table>
Estimating the Contribution of Research Trained Individuals on Local Economies

Akina Ikudo, University of California, Los Angeles
Matthew B. Ross*, Ohio State University

IRIS Research Meeting, 2017
June 20, 2017
A broader understanding of 'impact' could help measure the diverse benefits of their academic careers.

**BY MICHAEL SISAKSTEIN**

When Julia Lane began working in scientific funding policy she was quickly taken aback by how unscientific the discipline was compared with the rigorous processes she was used to in the labour-economics sector. "It was a relatively weak and marginalized field," says Lane, an economist at New York University.

In 2005, John Marburger, science adviser to then-President George W. Bush, felt much the same. He called on researchers and policymakers to focus on the "science of science policy", or empirical assessment of outcomes and returns from funding agencies such as the National Institutes of Health (NIH) and National Science Foundation (NSF). "When the Congressional Budget Office does simulations of the effects of investment in areas like tax or education policy, they use models and processes," says Lane. "But he said that when it comes to science, essentially all we say is 'send more money'."

Around 2010 also began increase in research assessments. The US federal government started using indicators such as the National Institutes of Health (NIH) and National Science Foundation (NSF). "When the Congressional Budget Office does simulations of the effects of investment in areas like tax or education policy, they use models and processes," says Lane. "But he said that when it comes to science, essentially all we say is 'send more money'."
What is needed: National program

- Current: 32 universities participating in IRIS; 30 more at varying stages of commitment (about 50% of federal university R&D funding)

- Initial 3 year commitment to
  - Sign IRIS MOU
  - Provide annual data feeds
  - Identify data and communication contacts
  - Contribute a yearly fee to support infrastructure

- Members receive
  - Individual and collective reports
  - Underlying tables and graphics for your use
  - Benchmarking against aggregates
  - Access to de-identified data for researchers
  - A seat at the table for new product design
  - Other products and services with additional investments
Why it matters:
Not documents - people

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Questions

• Julia Lane

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