What I Learned About Careers at the IMA Last Year

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UD Math Grad Student Seminar
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This talk will ....

• Be partial answers to important questions that you should be asking
• Give a picture of recent job markets
• Include information that many students wish they were told early in their studies
• Include skills and traits that a number of industrial mathematicians, scientists and engineers said they wanted.
Recent job market data

• Based on AMS data and other sources
• SIAM Report on Mathematics in Industry 2012 (www.siam.org/reports/) link
• Slides on job data from Bill Kolata’s talk (www.ima.umn.edu/2013-2014/SW4.7-9.14/)
Phd job data
PhD job data

New Stat. PhDs --> Ind. & Gov.

- Government (blue)
- Industry (red)

Years: 1986-2012

Graph shows the trend of new statistics PhDs moving into industry and government sectors over the years.
TT job data

Tenure Track Positions Filled in Math Departments by Highest Degree Offered

- Bachelors Degree
- Masters Degree
- Doctoral Degree
Why Industry?

Rationale for Taking a Job in Industry

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Had an industrial mentor</td>
<td>6%</td>
</tr>
<tr>
<td>Worked w. faculty with ind. connections</td>
<td>12%</td>
</tr>
<tr>
<td>Experience w. ind. Internship</td>
<td>24%</td>
</tr>
<tr>
<td>Had a job in industry</td>
<td>32%</td>
</tr>
<tr>
<td>Intellectual challenge</td>
<td>36%</td>
</tr>
<tr>
<td>Expected better opp. for career adv.</td>
<td>52%</td>
</tr>
<tr>
<td>Expected higher compensation</td>
<td>66%</td>
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</tbody>
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"PhDs tend to underestimate the quality of science done in industry. You will get to solve challenging problems."
IMA and UMN activities

• MCIM – internships, speakers
• IMA:
  o industrial postdocs
  o Webinars
  o participating corporations and laboratories
  o Math Modeling in Industry workshop
  o Career workshop
What students said:

• “I wish someone told me this early in my studies”
• “I never knew we had these options”
What Industrial reps said:

• “Programming in a real language is a must, e.g., C or C++, a scripting language, etc”
• “I wouldn’t hire anyone who didn’t know optimization”
• “Get an internship”
• “Know something about the business”
The Industry job search now

- Network, network, network, repeat
- Electronic applications are it
- The time scale for industry job changes is weeks.
- Electronic ad appears, and after a wk or two (& 100s of apps), interviews may start
- Within a week of interviewing, offer(s) may be made
Getting a job in a Natl Lab

• Resource rich and sometimes political missions
• Postdoc programs are a main mechanism for hiring for permanent positions
• Identify potential mentors, develop proposals in cooperation with them
• Often, computing important for labs
Getting a job in Academia

- Write papers
- Finish thesis
- Get out and talk about your work, a lot
- Postdoc – more years for higher ranking, generally
- Get out and talk about your work, a lot
- Network, network, network, repeat
- Did mention publishing?
Industry vs Academia or Labs

• Picking one or the other because it seems safe “would be a mistake”
• “Pick something you really want to do and make a career out of it”
• Communication with non-math people critical
• Ability to work in teams is critical
• Seeing how to contribute to company and industry is vital
Industry vs Academia or Labs

• Summaries: Grandine and Kolata videos
• Workshop videos on these environments: Calderbank and Saltzman
• Entrepreneurship is possible (panel video excellent with diverse views)
• Data driven industry case studies: Codenotti, Sharp, Lurati
• more
What do the Orgs say? Reports etc

- SIAM 2012 Math in Industry (www.siam.org/reports)
- Mathematics Sciences in 2025 (search for it, www.nrc.org, free pdf)
- INGenIOuS report (www.maa.org, may be hard to find, I can send it to you)
- “Do Babies Matter?” by Mason, Wolfinger and Goulden
NSF Math Institutes

• Eight of them
• www.mathinstitutes.org
• UD is member of IMA and MSRI
• All have many resources: video, talk, materials
The Career Center

• Use it for help with resume writing for industry or vita for academia/labs
• Interviewing practice and filming
• Help arrange interviews etc
• Resources about companies
• Advice