

About Careers in Math

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UD Math 268

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This talk will

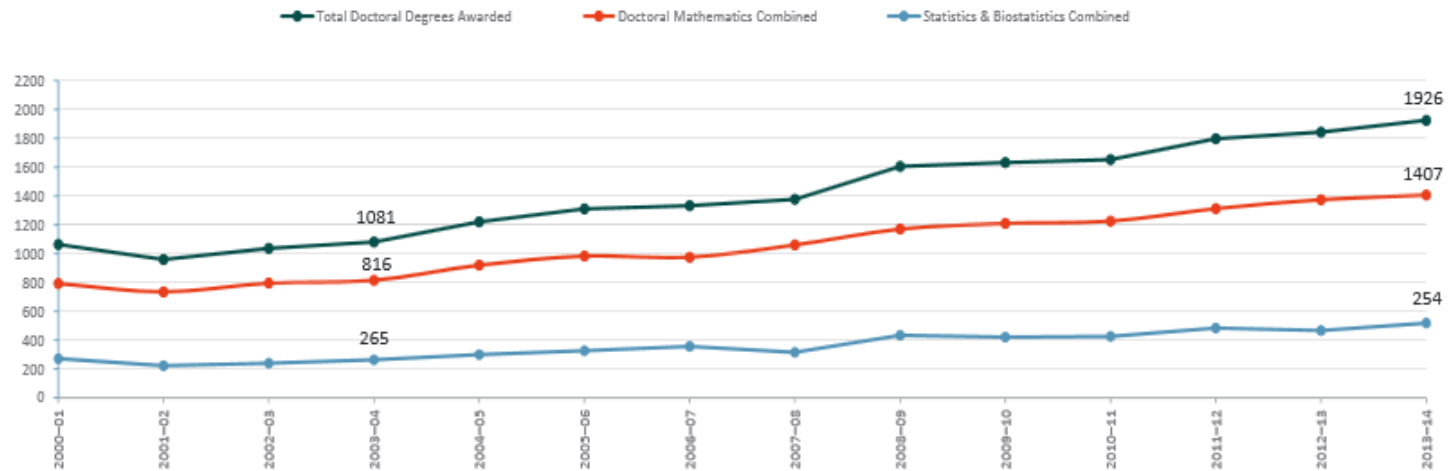
- Be partial answers to important questions that you should be asking
- Give a picture of recent job markets for PhDs
- Include information that many students wish they were told early in their studies
- Include skills and traits that a number of industrial mathematicians, scientists and engineers said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

Professional orgs

- Society for Industrial and Applied Mathematics (SIAM, www.siam.org)
- Association for Women in Mathematics ([AWM website](#))
- American Mathematical Society (AMS, www.ams.org)
- Mathematical Association of America (MAA, www.maa.org)

PhD numbers

Figure A.2: New PhDs Awarded by Group



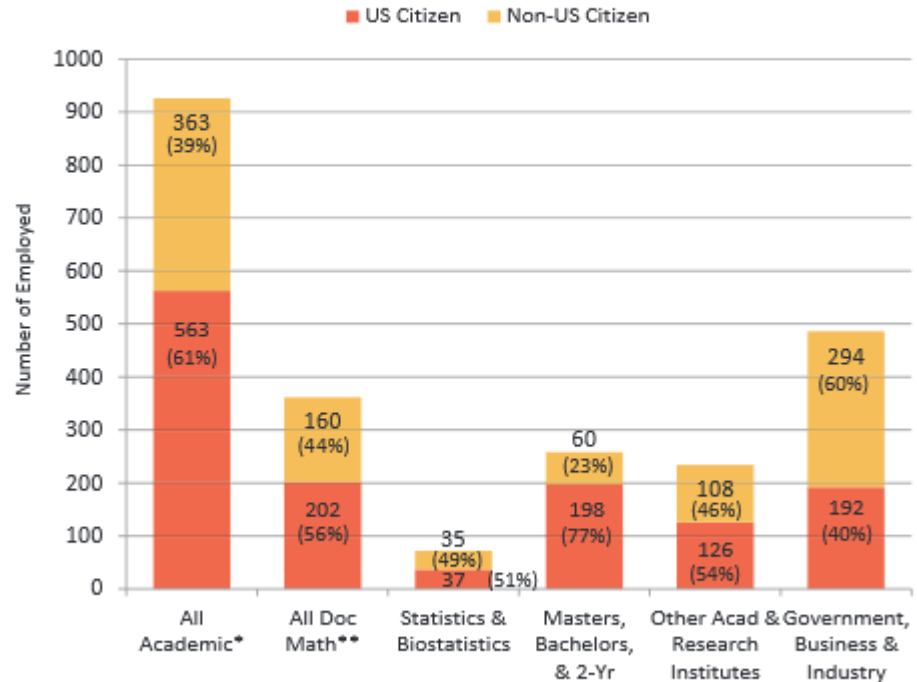
Comparing PhDs awarded this year with those awarded in 2003-2004:

- PhDs awarded have increased more than 78% over the last 10 years.
- Degrees awarded by Doctoral Mathematics combined and by Statistics & Biostatistics Combined have increased 72% and 96%, respectively. Some of this latter increase is due to the increase in response rate among the Statistics & Biostatistics departments and an increase in the number of biostatistics programs included in the Annual Survey over the last 3 years.

Where do those Drs go?

- These are *new* PhDs
- Most go to academia
- There are several categories there
- Note that there are many non-US people hired: your competition is from around the world, even if not PhD!

Figure E.3: Employment in the US by Type of Employer and Citizenship
Total: 1,412

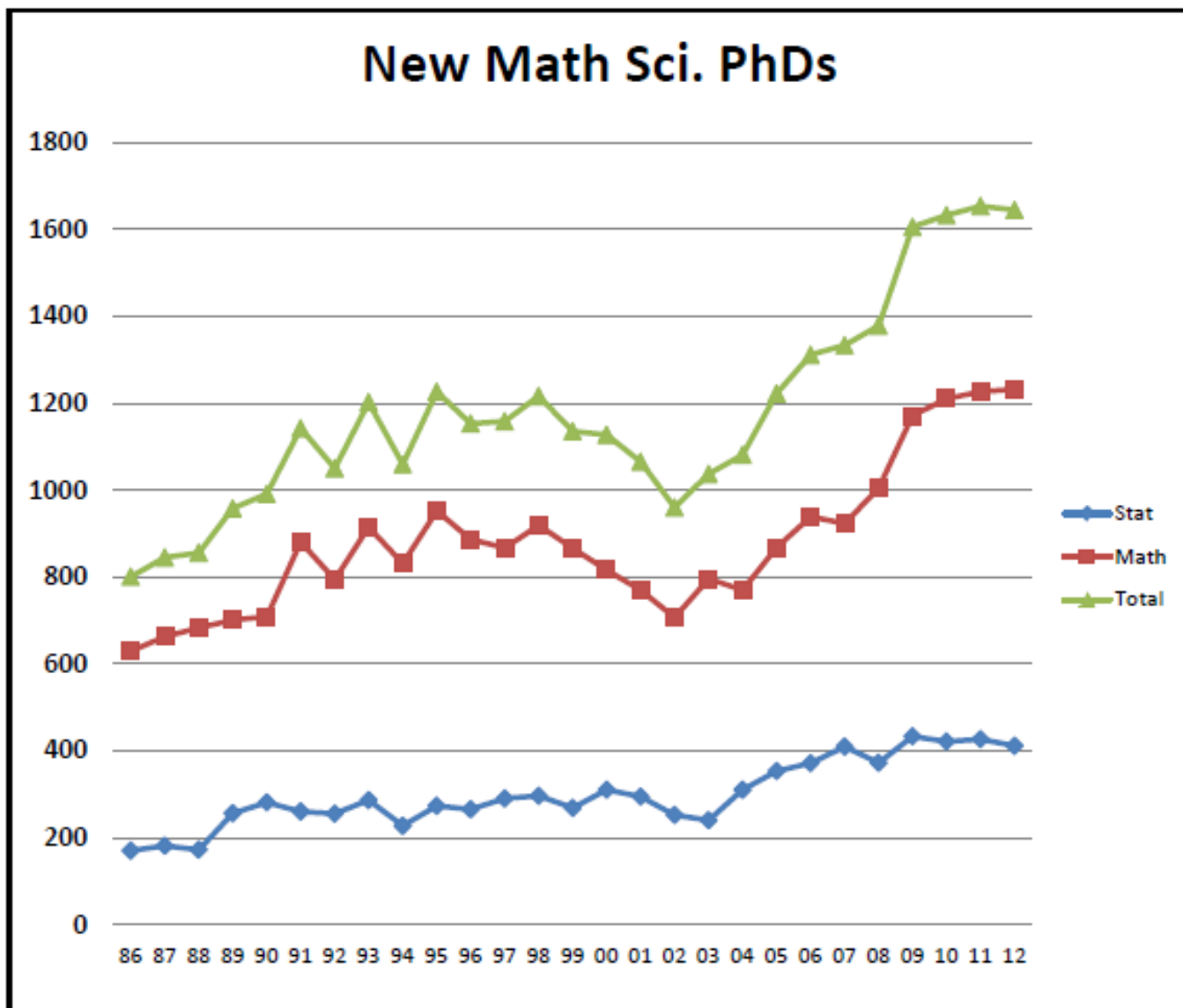


* Includes all Math sciences departments plus other academic and research institutes/nonprofit.
** Includes all Math Public, Math Private, and Applied Math departments.

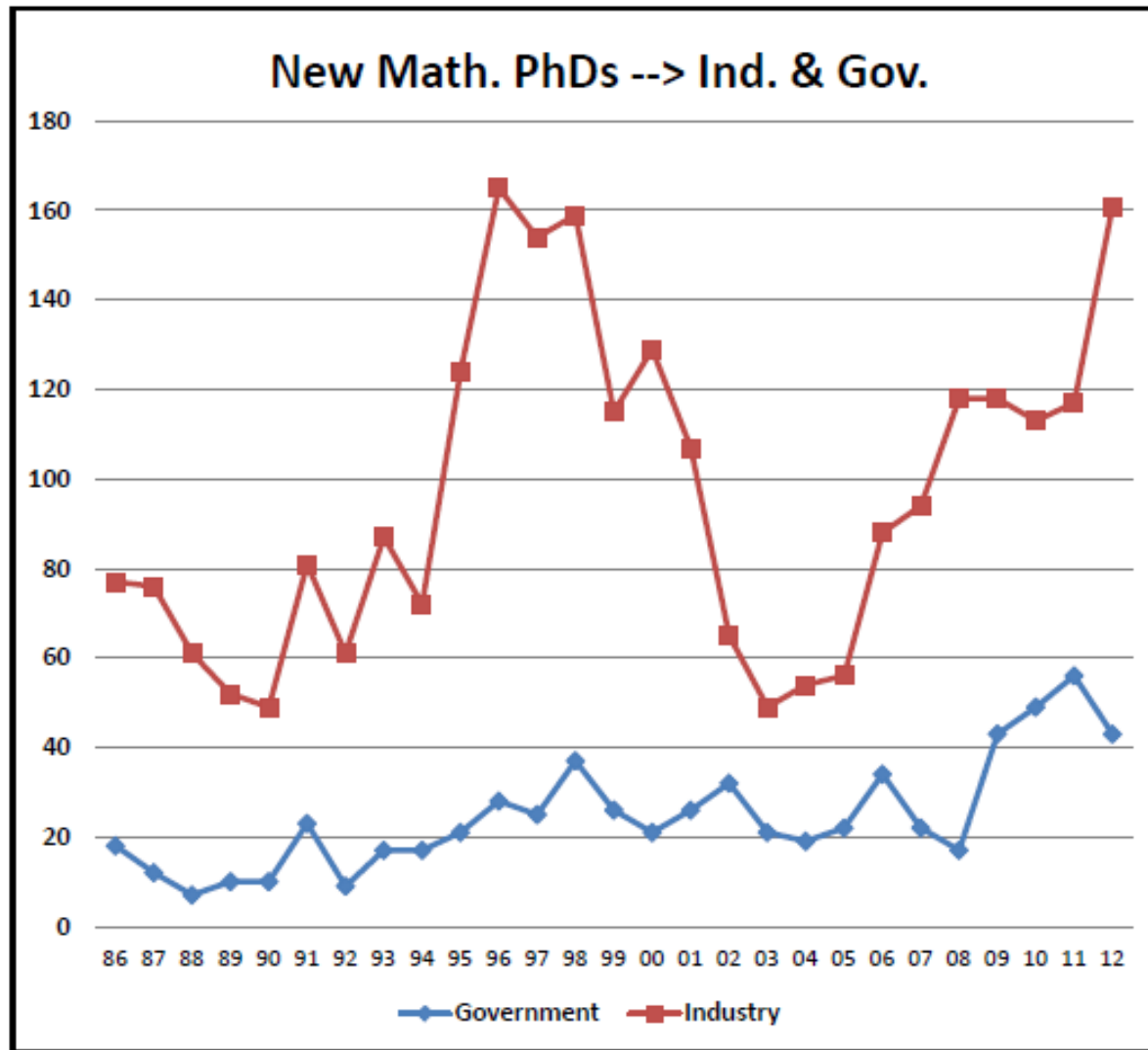
Recent job market data

- Based on AMS data and other sources ([AMS annual survey](#))
- SIAM Report on Mathematics in Industry 2012 (www.siam.org/reports/) [link](#)
- Slides on job data from Bill Kolata's talk at a workshop I helped organize (www.ima.umn.edu/2013-2014/SW4.7-9.14/)

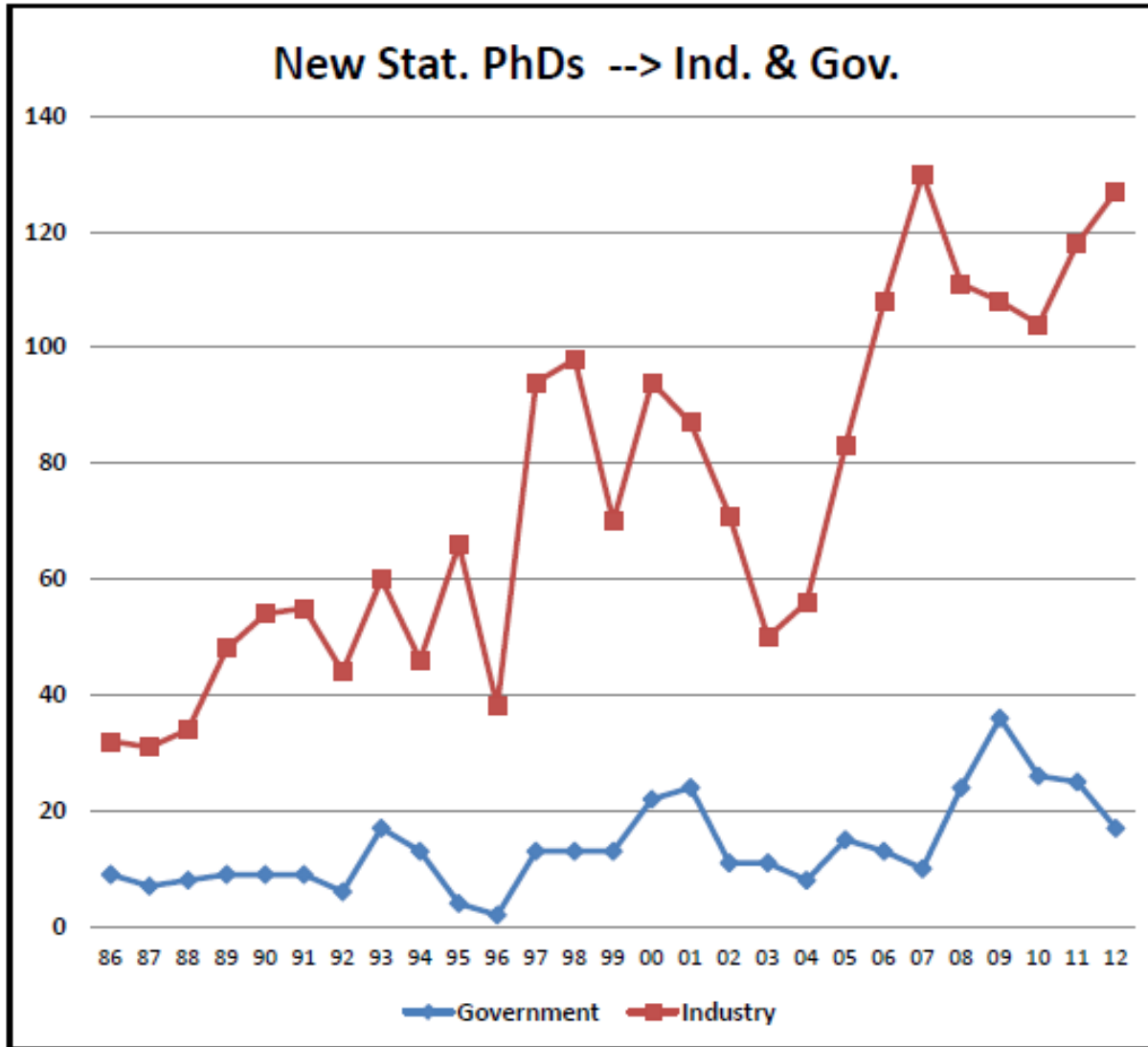
Phd job data



PhD job data

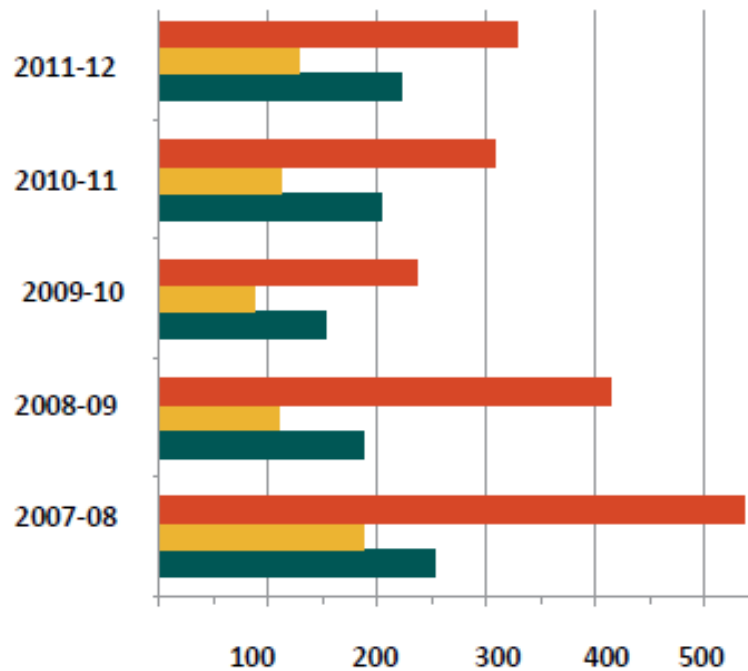


PhD job data



TT job data

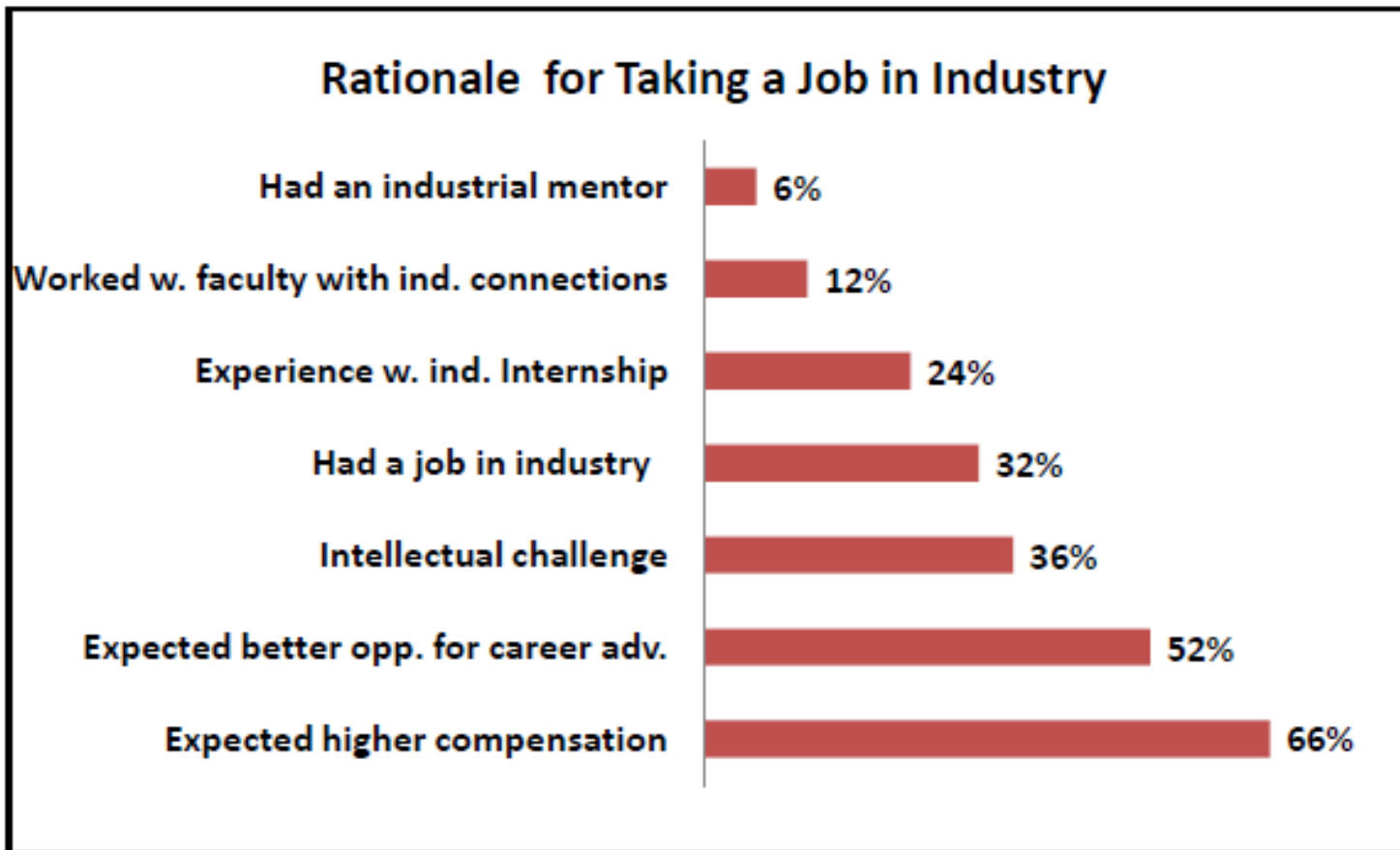
Tenure Track Positions Filled in Math Departments by Highest Degree Offered



→ Bachelors Degree; → Masters Degree; → Doctoral Degree

Why Industry?

Why Industry?



"PhDs tend to underestimate the quality of science done in industry. You will get to solve challenging problems"

UD activities

- SIAM, AWM chapters
- IMA, MSRI membership (institutes): many activities
- REU projects associated with NSF grants
- Math Modeling in Industry workshop (not every year)
- SIAM and AWM speakers
- Organizing workshops, such as COIMS at IMA

From the COIMS workshop at the IMA, 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 school, generally
- Get out and talk about your work, a lot
- Network, network, network, repeat
- Did I 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)
- SIAM Careers in Math (2008) and in Applied
Math (2013)
- “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