First Year Graduate Student Seminar

March 19, 2014

Today:
Jobs in the profession

Next meeting:
Apr. 2, 2014. Panel discussion: advice from graduating students
Jobs in Mathematics

- Types of jobs in mathematics
- Trends in academic employment
- Data on salaries
- Preparing for the job search
Job Forums

Frank Sottile typically organizes a forum on the job search process each spring.
Types of Jobs in Mathematics

• New Graduate Program for MS graduates
• Business/Industry
• Government
• Teaching Professor
  – Liberal arts colleges
  – Branch campuses of state universities or colleges
  – Community colleges
• Post-doc
  – University
  – Research Institute
• Research Professor

Teaching Load increases
PhD Options for MS Graduates

• Statistics
• Engineering
• Management Science/Operations Research
• Finance
• Economics
• Life Sciences
Business/Industry (from SIAM)

• Manufacturing
  – Digital preassembly (design or prototype)
  – Process optimization (reducing time to market)

• Product design
  – Shape optimization
  – Simulation of functionality

• Materials
  – Predicting damage and degradation of polymers
  – Nondestructive testing
  – Simulation of material properties

• Environmental Management
  – Modeling to guide decisions about hazardous products and processes

• Information Science
  – Optimization, neural networks, Markov models, dynamical systems
Government

• National Security Agency (NSA)
  – Employs more mathematicians than any other US employer
  – Cryptography, design and analysis of complex algorithms

• Department of Defense
• Social Security Agency
• Internal Revenue Service
• Census Bureau
Academic Categories

• The main source of data on jobs in the mathematics profession is compiled by the AMS, and in order to understand this data, you need to know how the AMS categorizes academic institutions. This was changed in 2013.

• More complete information about the categorizations can be found on the AMS website www.ams.org.
Doctoral-Granting Mathematics Departments

- **Public Large** is composed of 26 departments.
- **Public Medium** is composed of 40 departments.
- **Public Small** is composed of the remaining 64 US mathematics departments at public institutions that include a doctoral program.
- **Private Large** is composed of 24 departments.
- **Private Small** is composed of 27 departments.
Additional Doctoral-Granting Departments

• **Applied Mathematics** is composed of 30 US departments in applied mathematics and/or applied science that report a doctoral program.

• **Statistics** is composed of 58 US statistics departments.

• **Biostatistics** is composed of 44 US biostatistics departments.

• **Master's group** is composed of 182 US departments granting only up to a Master’s degree.

• **Bachelor's group** is composed of 904 US departments granting only up to a Bachelor’s degree.
AMS Employment Data 2011-2012

AMS Data
Aside on Job Contentment

- Studies suggest that people with PhD’s are generally more content with their occupations than people without PhD’s.
- Curiously, people with PhD’s who work outside the academy are generally more content with their occupations than people with PhD’s in academic positions.
Trends in Academic Employment
# Total (math) Faculty profile 2012-2013

<table>
<thead>
<tr>
<th>Institution\Faculty</th>
<th>Tenured, tenure-track</th>
<th>Post-doc</th>
<th>Non-tenure-track</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public large</td>
<td>1,367</td>
<td>370</td>
<td>266</td>
</tr>
<tr>
<td>Public medium</td>
<td>1,365</td>
<td>178</td>
<td>450</td>
</tr>
<tr>
<td>Public small</td>
<td>1,526</td>
<td>82</td>
<td>545</td>
</tr>
<tr>
<td>Private large</td>
<td>648</td>
<td>295</td>
<td>206</td>
</tr>
<tr>
<td>Private small</td>
<td>553</td>
<td>79</td>
<td>141</td>
</tr>
<tr>
<td>Applied</td>
<td>380</td>
<td>93</td>
<td>91</td>
</tr>
<tr>
<td>MS, BS</td>
<td>10,562</td>
<td>44</td>
<td>2,979</td>
</tr>
</tbody>
</table>
Math PhDs Awarded in the US

2011-2012
2010-2011
2009-2010
2008-2009
2007-2008
2006-2007
2005-2006
2004-2005
2003-2004
2002-2003
2001-2002

Without stat/biostat
Total number of PhDs
Number of Post-docs Hired

Excluding stat/biostat

Total number of postdocs (includes postdocs at international universities, research centers, etc.)
Number of Tenure-Track Jobs Filled

- 2011-2012
- 2010-2011
- 2009-2010
- 2008-2009
- 2007-2008
- 2006-2007
- 2005-2006
- 2004-2005
- 2003-2004
- 2002-2003

- MS, BS
- Doctoral, excluding stat, biostat
Data on Starting Salaries
Starting Salaries

Median Salary, Postdoctorates Only, Constant (thousand) 2012 dollars, 9-10 month contract

- 2012
- 2011
- 2010
- 2009
- 2008
- 2007
- 2006
- 2005
- 2004

44 46 48 50 52 54 56

Median Salary, Postdoctorates Only, Constant (thousand) 2012 dollars, 9-10 month contract
Starting Salaries

Median Salary, Teaching/Teaching and Research, Constant 2012 (thousand) dollars, 9-10 month contract
Starting Salaries

Government Median Starting Salaries, constant 2012 dollars, 11-12 month contracts
Starting Salaries

Business and Industry Median Starting Salaries, Constant 2012 Dollars, 11-12 month contracts

2012
2011
2010
2009
2008
2007
2006
2005
2004

90 92 94 96 98 100 102

Business and Industry Median Starting Salaries, Constant 2012 Dollars, 11-12 month contracts
Long-Term Academic Salaries

2012-2013 Faculty Salaries Report:

AMS salaries reports
More Information

Most of this data is available under the tab labeled *The Profession* on the American Mathematical Society’s web site

[www.ams.org](http://www.ams.org)
Preparing for the Job Search
Self-Assessment and Re-assessment

• You need to decide as early as possible what your goal is. Research professor? Teaching professor? Government or Industrial employee? Don’t worry about what you or anyone else thinks you might be capable of. Decide what you want to do, and aim for it.

• But:

• When you start your job search you need to re-assess your goal, and this time you must base your decision on your record.
General Preparation for the Job Search
(i.e., all Job Types)

• Start a folder (NOW!) keeping a record, including documentation when applicable, of all your activities that *might* later contribute to your application file.

• For example: awards, named scholarships or fellowships, invitations to give talks, summer programs you participated in, participation in outreach activities, unsolicited (positive) comments from your students, etc.
General Preparation for the Job Search (i.e., all Job Types)

• Impress your professors with both your abilities and your professionalism. Some of your professors may write letters of recommendation for you, and most will have connections with at least some of the places you apply.

• Think about it this way: imagine the place you would most like to work (as a post-doc etc.), and imagine that every professor you have is going to get a call from someone at that place asking, “What can you tell me about this kid?”
General Preparation for the Job Search (i.e., all Job Types)

• Attend conferences. The more people you know (and impress!), the better your chances are.
• (Sottile-ism) Any talk you give between now and the time you achieve your professional goal is a job talk.
• The department will reimburse you up to $400 for two conference trips while you’re at A&M. You must be giving a talk or poster presentation for at least one of them.
• Introduce yourself to seminar and colloquium speakers visiting our department (in your area).
Preparation for the Academic Job Search

• Get excellent reviews on your TA duties. Especially for academic jobs in the US, emphasis on this is increasing.

• Give talks in department seminars such as the GSO seminar and AMUSE (Applied Math Undergraduate SEminar).

• The department will try to arrange for you to be Instructor of Record at least once while you’re here, and you should take this assignment very seriously.
Post-docs

• Decisions about post-docs are based primarily on research. You need:
  – A very solid dissertation, which leads to one or two good papers
  – A strong recommendation from your advisor
  – Outside letters of recommendation (i.e., letters from professors outside the department)
  – To fit in well with the department you’re applying to
• Clearly, you need to be especially attentive to your TA duties.
• Get involved with some of the department’s outreach programs:
  – See-Math: Summer Educational Enrichment in Math (for middle school honors math students)
  – Smart Camp: Summer Math Research Training (for high school students)
  – Math Minifair: The math department’s annual celebration of math awareness month (April) (for K-12)
  – Brazos Valley Math Teachers’ Circle (for K-12 teachers)
Academic Teaching

• Especially for liberal arts colleges, experience with undergraduate mentoring is important. Possibilities include:
  – Working with our summer REU program
  – Working with your advisor or another professor on an undergraduate research project (M491)
  – Assisting with an undergraduate research course (M442, M469, M482)
Business/Industry Jobs

• Students interested in getting a job in industry should begin looking into summer internships with relevant companies.

• Students can earn academic credit for internships if appropriate. Register for M684: Professional Internship.

• Students on an F-1 visa need to apply for Curricular Practical Training (CPT) through ISS.