Professional Science Master’s Programs

*Enrollment and Degrees and Student Outcomes*

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Council of Graduate Schools
PSM Enrollment & Degrees

- Funded by the Alfred P. Sloan Foundation
  - FY 2011 and 2012

- Purpose is to collect:
  - First-year enrollment (fall 2010 & 2011)
  - Total enrollment (fall 2010 & 2011)
  - Degrees awarded (2009/10 & 2010/11)
PSM Enrollment & Degrees

- **Sample**
  - All CGS-recognized PSM programs (235 in 2009/10)

- **Design**
  - Review of 20+ existing surveys, reviewed by experts

- **Implementation**
  - Launched in April, closed in May
  - 209 usable responses, an 89% response rate
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- Limitations
  - Some categories were combined
  - Some data were necessarily suppressed
  - One institution has several large programs
  - 11% did not respond
PSM Enrollment & Degrees

- Of 209 usable responses …
  - 174 PSM programs enrolled students (fall 2010)
  - Among U.S.-based programs
    - 74% in public, 26% private, not-for-profit
    - 67% in doctoral, 37% master’s-focused or specialized
  - Among all programs
    - 29% Biology/biotechnology
    - 25% Environmental sciences
    - 10% Mathematics and statistics
    - 9% Computational sciences
PSM Enrollment & Degrees

- 4,396 applications received (fall 2010)
  - Among U.S. based programs:
    - 77% public, 23% private, not-for profit
    - 63% doctoral, 37% master’s-focused or specialized
  - Among all programs:
    - 34% for Biology/biotechnology
    - 23% Mathematics and statistics
    - 14% Computational sciences
    - 11% Environmental sciences
PSM Enrollment & Degrees

- 2,134 applications accepted
  - Among U.S.-based programs:
    - 76% public, 24% private, not-for-profit
    - 60% doctoral, 40% master’s-focused, specialized
  - Among all programs (U.S. and non-U.S.):
    - 33% Biology/biotechnology
    - 18% Mathematics and statistics
    - 16% Computational sciences
    - 15% Environmental sciences
PSM Enrollment & Degrees

Acceptance Rates in PSM Programs by Field of Study, Fall 2010

- Environmental Sciences: 65.6%
- Computational Sciences: 56.7%
- Other: 51.5%
- Comp. Molecular Biology/Bioinformatics: 49.0%
- Physics and Geological Sciences: 48.5%
- Total: 48.0%
- Biology/ Biotechnology: 46.0%
- Medical-Related Sciences: 43.8%
- Mathematics and Statistics: 37.7%

Source: Council of Graduate Schools, 2011

Represents U.S. and non-U.S.-based programs, except for two, which did not provide complete data.

Other includes chemistry, forensic sciences, nanoscience, and national defense.
PSM Enrollment & Degrees

- 1,471 first-time enrollees (fall 2010)
  - 56% men, 44% women
  - 41% part-time, 59% full-time
  - Among U.S.-based enrollments:
    - 17% international students
    - 69% Asian/Pacific Islander or White
    - 22% Underrepresented minorities
    - 9% Two or more races
PSM Enrollment & Degrees

Yield rates (fall 2010)

• 69% overall
• By field
  ▪ 93% Computational sciences
  ▪ 92% Medical-related science
  ▪ 86% Environmental sciences
  ▪ 45% Mathematics and statistics
  ▪ 44% Comp. molecular biology/bioinformatics
PSM Enrollment & Degrees

- 4,753 students enrolled in PSM programs (fall 2010)
  - 51% men, 49% women
  - 64% part-time, 36% full-time
  - Among U.S.-based enrollments
    - 13% international students
    - 64% Asian/Pacific Islander or White
    - 29% Underrepresented minorities
    - 7% Two or more races or unknown
Total Enrollment in PSM Programs by Field of Study and Race/Ethnicity, Fall 2010

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Underrepresented minorities</th>
<th>Asian/Pacific Islander or White</th>
<th>Two or more races, or unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computational Sciences</td>
<td>42.6%</td>
<td>54.5%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Other</td>
<td>34.3%</td>
<td>58.2%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Comp. Molecular Biology/Bioinformatics</td>
<td>33.6%</td>
<td>59.9%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Environmental Sciences</td>
<td>23.0%</td>
<td>68.9%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Biology/Biotechnology</td>
<td>19.7%</td>
<td>68.1%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Mathematics and Statistics</td>
<td>19.0%</td>
<td>71.6%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Medical-Related Sciences</td>
<td>14.0%</td>
<td>81.2%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Physics and Geological Sciences</td>
<td>4.3%</td>
<td>92.8%</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

Source: Council of Graduate Schools, 2011

Represents only U.S.-based programs

Other includes chemistry, forensic sciences, nanoscience, and national defense
PSM Enrollment & Degrees

- 1,102 degrees awarded (2009/10)
  - 50% men, 50% women
  - Among U.S.-based programs
    - 24% international students
    - 70% Asian/Pacific Islander or White
    - 22% Underrepresented minorities
    - 7% Two or more races or unknown
PSM Enrollment & Degrees

PSM Degrees Awarded by Field of Study and Gender, 2009/10

- **Other**: 31.8% Men, 68.2% Women
- **Medical-Related Sciences**: 42.1% Men, 57.9% Women
- **Biology/Biotechnology**: 42.5% Men, 57.5% Women
- **Comp. Molecular Biology/Bioinformatics**: 48.1% Men, 51.9% Women
- **Environmental Sciences**: 48.8% Men, 51.2% Women
- **Total**: 50.0% Men, 50.0% Women
- **Computational Sciences**: 54.3% Men, 45.7% Women
- **Physics and Geological Sciences**: 56.0% Men, 44.0% Women
- **Mathematics and Statistics**: 67.5% Men, 32.5% Women

Source: Council of Graduate Schools, 2011
Represents U.S. and non-U.S.-based programs
Other includes chemistry, forensic sciences, nanoscience, and national defense
PSM Enrollment & Degrees

Next Steps

• Launch 2011 survey (October 18)
• Close data collection (November 15)
• Release final report (December 15)
  ▪ Differences between 2010 and 2011 will be noted
PSM Enrollment & Degrees

- **Highlights:**
  - 4,753 total enrollment (fall 2010)
  - 1,102 degrees awarded (2009/10)
  - Gender distribution generally even
  - Race/ethnicity generally consistent
  - Many large biology/biotechnology programs
  - Many small environmental science programs
  - A few large computer science programs
PSM Student Outcomes

- Funded by Alfred P. Sloan Foundation
  - FY 2011 and 2012
- Purpose
  - Capture initial hiring outcomes
  - Follow graduates for up to five years
  - Ascertain career placements and perceived satisfaction with the PSM degree
- AY 2010/11 and 2011/12
PSM Student Outcomes Survey

Conceptual Limitations

• Overwhelming array of inputs, outputs, outcomes
• Conceptual leap between education and employment
• We know little about knowledge transfer
• Outcomes take years to observe
PSM Student Outcomes Survey

- Operational Limitations
  - CGS cannot access to contact information
  - Incomplete contact information
  - Lack of relationship with the graduates
  - PSM is still new, lacks a “brand”
  - One institution with some very large programs
PSM Student Outcomes Survey

- Conceptual and Analytical Map
  - Need to keep the survey short and simple
  - Run as many respondents through the same questions as possible
  - Able to parse workers, students, and others
  - Capable of facilitating some comparisons
PSM Student Outcomes Survey

- Distribution by field of study
  - 46% enrolled in biology/biotechnology
  - 18% enrolled in environmental sciences
  - 12% computational sciences
  - 24% in eight other fields
PSM Student Outcomes Survey

- Young (presumably) respondent pool
  - 10% earned undergraduate degree in 2010
  - 60% earned undergraduate degree between 2007-2010
  - 79% earned undergraduate degree between 2003-2010
PSM Student Outcomes Survey

Reasons for Enrolling in PSM Programs by Status, 2011

- Acquire specific skills, knowledge: 68.6%
- Learn more about something of interest: 59.2%
- Increase opportunities for promotion, pay: 55.2%
- Facilitate a job/career change: 39.0%
- Stepping stone for further education: 28.3%
- Best option available at the time: 20.6%
- Meet requirements of a prospective employer: 7.6%
- Other: 2.2%
- Meet requirements of current employer: 2.2%

Source: Council of Graduate Schools, 2013
# PSM Student Outcomes Survey

## Topics Covered by PSM Programs of Study, 2011

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical and/or scientific</td>
<td>86.1%</td>
</tr>
<tr>
<td>Research and development</td>
<td>69.1%</td>
</tr>
<tr>
<td>Project management</td>
<td>60.5%</td>
</tr>
<tr>
<td>Ethics</td>
<td>54.7%</td>
</tr>
<tr>
<td>Communications</td>
<td>48.9%</td>
</tr>
<tr>
<td>Leadership</td>
<td>43.9%</td>
</tr>
<tr>
<td>Regulatory affairs</td>
<td>39.9%</td>
</tr>
<tr>
<td>General management</td>
<td>39.5%</td>
</tr>
<tr>
<td>Patents, licensing, trademarks</td>
<td>36.8%</td>
</tr>
<tr>
<td>Computer programming, analysis, design</td>
<td>30.9%</td>
</tr>
<tr>
<td>Production and/or quality control</td>
<td>30.5%</td>
</tr>
<tr>
<td>Public policy</td>
<td>29.6%</td>
</tr>
<tr>
<td>Marketing and/or sales</td>
<td>22.4%</td>
</tr>
<tr>
<td>Teaching and/or training</td>
<td>11.2%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

Source: Council of Graduate Schools, 2011
PSM Student Outcomes Survey

- Percent “very” or “generally” satisfied with:

  Quality of scientific and/or mathematical training  82%
  Distinctive nature/reputation of program  82%
  Quality of non-scientific professional training  79%
  Internships and “real world” experiences  78%
  Post-graduation employment prospects  74%
  Networking opportunities  71%
PSM Student Outcomes Survey

- Current situation
  - 82% are working. Of those:
    - 88% are working in a job that is “closely” or “somewhat” related to their field of study
    - 36% working in the same job
    - 45% working in a different job
    - 19% not working prior to starting
  - 5% students
  - 12% not working and seeking work
  - 1% not working and not seeking work
PSM Student Outcomes Survey

Salary Distribution Among PSM Graduates Working Full-Time, 2011

Source: Council of Graduate Schools, 2011
Represents only respondents who were working during the week of June 20, 2011
PSM Student Outcomes Survey

Reasons for Enrolling and Benefits of Degree Comparison, 2011

- Acquire skills and knowledge: 73.5% of benefits, 68.6% of reasons
- Personal interest: 52.9% of benefits, 59.2% of reasons
- Increase opportunities for advancement: 41.7% of benefits, 55.2% of reasons
- Facilitate job/career change: 31.4% of benefits, 39.0% of reasons
- Basis for further education: 27.8% of benefits, 28.3% of reasons
- Best available option: 16.1% of benefits, 20.6% of reasons
- Meet requirements of prospective employer: 7.6% of benefits, 25.1% of reasons
- Other: 1.3% of benefits, 2.2% of reasons
- Meet requirements of current employer: 2.2% of benefits, 11.7% of reasons

Source: Council of Graduate Schools, 2011
PSM Student Outcomes Survey

Mean Satisfaction and Value Ratings for PSM Program Attributes, 2011

- Quality of scientific and/or mathematical training: 3.12, 3.24
- Distinctive nature/reputation of program: 3.10, 3.09
- Internships and "real world" experiences: 3.05, 3.07
- Quality of non-scientific professional training: 3.00, 3.11
- Post-graduation employment prospects: 2.93, 3.10
- Networking opportunities: 2.92, 3.00

Mean satisfaction rating
Mean value rating
PSM Student Outcomes Survey

- Highlights:
  - 82% of PSM graduates are working
  - Of those, 88% are working in their preferred field
  - Satisfaction ratings are high, value ratings are higher
  - Most frequently cited reason for enrolling in PSM:
    - Impart scientific/technical skills/training
    - Fulfill personal interest
    - Increase opportunity for advancement/pay
PSM Student Outcomes Survey

Next steps

• Survey 2011/12 graduates (June 2012)
• Survey 2010/11 graduates (June 2012)
Questions/Comments?

www.sciencemasters.com

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