• Demographics of Planetary Sciences
  - What are the implications for future planetary scientists?
  - What are implications for academia? NASA labs? Industry?

http://lasp.colorado.edu/mop/resources/links/PlanetaryScienceWorkForceSurvey2011/ Reports, summaries for both studies

Also – DPS Surveys http://dps.aas.org/reports
Demographics of Planetary Sciences

Purpose: To understand the broad, diverse community of planetary scientists in the US.

• PART A: Survey of Departments
  Spring 2011

• PART B: Survey of active scientists
  (members of AGU, DPS, LPSC attendees)
  Fall 2011
53 Departments
233 Tenured/tenure-track faculty
105 in 6 biggest depts.
11 left, 23 recruited – past 2 years
131 PhDs – past 2 years
74 from biggest 6
Let’s check some numbers....

• 11 faculty left over 2 years, 23 new faculty appointed

• 131 PhDs over 2 years

• This means there are faculty positions for 18% of graduating PhDs (1 in 5.7)
Part B: 2011 Survey of 4,252 on mailing lists of potential planetary scientists associated with the LPSC, AGU and DPS  
2,622 (62%) respondents

<table>
<thead>
<tr>
<th></th>
<th>LPSC</th>
<th>AGU</th>
<th>DPS</th>
<th>All Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPSC</td>
<td>1280</td>
<td>345</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>AGU</td>
<td>264</td>
<td></td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>DPS</td>
<td></td>
<td></td>
<td>358</td>
<td></td>
</tr>
<tr>
<td>All Three</td>
<td></td>
<td></td>
<td></td>
<td>161</td>
</tr>
</tbody>
</table>

The numbers in the highlighted cells on the diagonal belonged to that group only, except the bottom right cell that shows 161 respondents belong to all 3 groups.

• The off-diagonal numbers refer to the number of respondents belonging to two groups
• A total of 1,876 were associated with the LPSC; 894 were members of AGU; and, 733 belonged to DPS.
Note: The University sector includes university affiliated observatories and research institutes. FFR&DCs include JPL, APL, and LPI. Non-profit includes SwRI, SSI, and PSI.
• Of the 2,622 respondents, 1,518 (58%) have PhDs and live in the US
  – the population we targeted for this survey

• Of the 1,518 PhDs in US 1018 (i.e. 2/3) call themselves planetary scientists

• Of these 741 are planetary scientists whose job is primarily planetary science

• Since response rate was 62% we can estimate that total working planetary scientists in US

• 741/0.62 = 1200 professional planetary scientists

Probably over-estimate since perhaps working planetary scientists are more likely to respond
Source of Funds to Support Research

Legend:
- NASA only
- Both NASA & NSF
- NSF only
- Other Source
- No Funding
- Not Engaged in Research

53%: NASA only
16%: Both NASA & NSF
15%: NSF only
6%: Other Source
6%: No Funding
4%: Not Engaged in Research
2010 DPS Survey

- 40% response of 1290 members
- 419 responded are employed at an organization as a planetary scientist
- 54% permanent, tenured/tenure-track civil servant or equivalent
- 46% soft-money or fixed-term post-doc
2010 DPS Survey - Institutions

- 55% at college or university
- 15% at FFRDC (SwRI, PSI, etc)
- 13% at NASA + JPL
- 10% other Govt./National Observatory
- 8% industry or other

Pretty much consistent with larger survey
Total Soft-money Funding

Let’s do some rough numbers.....

- Total professional planetary science workforce ~1200
- 46% are on soft-money = 550 people
- Say cost/person ~$80k/yr x 2 (that’s 100% overhead)
- Total ~ $80 million / yr
- Basic research R&A budget ~$180 million / yr

Does not include faculty, civil servants, students....
Variations with Time?

• DPS membership
  – 1995 = 831
  – 2005 = 1300
  – 2010 = 1290

• No significant change in past 10 years?
What Next?

• What questions are not answered?
• What should be followed up?
  – Reporting on grad students and UGs from major universities – get numbers right!
  – Update faculty numbers
• Ask employers for their opinion of workforce?
• What do you think?
• Questions?
WHY are women not applying for faculty positions?

- Men tend to apply for more positions than women do
- Women tend to be more likely to have a 2-body problem
Spouse’s or Partner’s Current Employment Status by Sex of the Respondent

The 2-body problem!

- Does not work
- Works in non-sci. field
- Works in another sci. or math or eng.
- Works in planetary science

Women (n=215) vs Men (n=728)
Bachelor Degrees with a concentration in Planetary Science awarded in AY 2008/9 & 2009/10

Men  Women
<table>
<thead>
<tr>
<th>Age</th>
<th>Men Respondents</th>
<th>Women Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower quartile</td>
<td>38</td>
<td>33</td>
</tr>
<tr>
<td>Median</td>
<td>48</td>
<td>38</td>
</tr>
<tr>
<td>Upper quartile</td>
<td>58</td>
<td>48</td>
</tr>
</tbody>
</table>

Female population is a little younger
Undergraduate Major by Self-Identification & Job Description
Field of Doctorate by Self-Identification & Job Description

- Planetary Scientists in PS
- Planetary Scientists in S&E
- Non-Planetary Scientists in S&E

Legend:
- Other
- Engineering
- Earth Science
- Chemistry
- Physics
- Geology & Geophysics
- Planetary Science
Respondents Ratings of How Well their Doctoral Program Prepared Them

- Establish contacts in plan. sci.: Not Covered, Weak, Fair, Good, Very Good
- Proposal writing skills: Not Covered, Weak, Fair, Good, Very Good
- Managing projects: Not Covered, Weak, Fair, Good, Very Good
- Lab equipment skills: Not Covered, Weak, Fair, Good, Very Good
- Managing people: Not Covered, Weak, Fair, Good, Very Good
- Non-academic career info.: Not Covered, Weak, Fair, Good, Very Good
- Public outreach: Not Covered, Weak, Fair, Good, Very Good
- NASA mission: Not Covered, Weak, Fair, Good, Very Good

Legend:
- Not Covered
- Weak
- Fair
- Good
- Very Good
Areas in Which My Career Could Have Benefitted from More Training in Doctoral Program
Post-Doc Experience by Self-Identification & Job Description

- **Planetary Scientists in PS**: 66% Did a Post-doc, 20% Currently a Post-doc, 14% Never did Post-doc
- **Planetary Scientists in S&E**: 61% Did a Post-doc, 10% Currently a Post-doc, 29% Never did Post-doc
- **Non-Planetary Scientists in S&E**: 58% Did a Post-doc, 12% Currently a Post-doc, 30% Never did Post-doc
From Mark Sykes:

PSD Research Proposal Success Rate (%)

Program Average
Overall Proposal Average

ROSES Year

2004  2008  2012
Number of Proposals Submitted

% Acceptance Rate

2006-2011: By year

2006 Dark -> light 2011