She is an Astronomer

Jocelyn Bell Burnell

University of Oxford Astrophysics
&
Mansfield College
Caroline Herschel

- Born 1750 Germany
- Died 1848 Germany
- Lived in Bath and Slough
- RAS Gold Medal (age 78)
- RIA Member (age 87)
- King of Prussia Gold Medal (age 96)
Some data

- Physics (and astronomy) undergraduates in the UK are 20 - 25% female
- About 15% of all physics staff are female
- Physics Professors
  - 1991: from 1 to 2 female
  - 2005: about 24 female (out of 150 - 200)
  - Larger departments have higher % of their professoriate female
More statistics (mostly 2004)

• 22% A-level physics students are female
• 17% applicants for physics courses (30% for astro) are female. Acceptances very similar.
• 22% u/g and p/g physics students are female (30% for astro).
• 10% lecturers, 8% senior lecturers and 4% profs are female
**% of astronomers who are female**

<table>
<thead>
<tr>
<th>Country</th>
<th>% Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentine</td>
<td>35.2</td>
</tr>
<tr>
<td>France</td>
<td>25.7</td>
</tr>
<tr>
<td>Italy</td>
<td>20.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>19.7</td>
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<tr>
<td>Ukraine</td>
<td>19.4</td>
</tr>
<tr>
<td>Russia</td>
<td>17.9</td>
</tr>
<tr>
<td>Spain</td>
<td>17.8</td>
</tr>
<tr>
<td>Mexico</td>
<td>16.5</td>
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<tr>
<td>Finland</td>
<td>13.2</td>
</tr>
<tr>
<td>Sweden</td>
<td>13.0</td>
</tr>
<tr>
<td><strong>IAU Average</strong></td>
<td><strong>12.8</strong></td>
</tr>
<tr>
<td>Greece</td>
<td>12.6</td>
</tr>
<tr>
<td>Belgium</td>
<td>12.4</td>
</tr>
<tr>
<td>Denmark</td>
<td>12.1</td>
</tr>
<tr>
<td>Turkey</td>
<td>11.8</td>
</tr>
<tr>
<td>China (Nanjing)</td>
<td>11.7</td>
</tr>
<tr>
<td>South Africa</td>
<td>11.1</td>
</tr>
<tr>
<td>Egypt</td>
<td>10.5</td>
</tr>
<tr>
<td>USA</td>
<td>10.5</td>
</tr>
<tr>
<td>Poland</td>
<td>10.2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10.0</td>
</tr>
<tr>
<td>Australia</td>
<td>9.7</td>
</tr>
<tr>
<td>Canada</td>
<td>9.2</td>
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<tr>
<td>Netherlands</td>
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<td>Chile</td>
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<td>Czech Republic</td>
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<td>Switzerland</td>
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<td>Germany</td>
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<td>India</td>
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<td>Israel</td>
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<tr>
<td>Japan</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**IAU 2005**
Countries>50 members: % of membership that is female
So this tells us....?

• The issue is to do with CULTURE not BRAINS!
• Strong dependence on country
• Different reasons why different countries are high/low
Women in SET today

• Numbers are growing, % improving slowly!

• Largest increases at u/g (p/g) level

• Issues around work-life, family-career to be addressed

• More subtle issues around ‘climate’ in the work-place to be addressed
Cecilia Payne Gaposchkin

- Born UK 1900
- Died USA 1979
- First person to recognise that stars were made largely of hydrogen.
‘Women as deficient’

• Many programmes to get more women into science assume that it is women who need to change.
• Why should women do all the changing?
• Science should move towards women as much as women change, move towards it.
• Long term, ‘climate’ of science needs to change.
Unconscious Bias and Prejudice

- Steinpreis et al., *Sex Roles*, 41, 7/8, 509, ’99
- Heilman et al., *Journal of Applied Psychology* 89(3), 416, 2004
Beatrice Tinsley

- Born UK 1941
- Died USA 1981
- Pioneered the study of the evolution of galaxies
Meanwhile....!

- Educate and sensitise men and women to the gender differences and the unconscious prejudices
- Role models, mentoring, networking, girl-only classes
- Single sex schools and colleges let girls experience female leadership
NSF ADVANCE Program

• $150 000 max to each institution p.a. for 5 years.
• To promote **institutional** transformation in SETM in Universities
• To increase participation and advancement of women in academic SETM.
Good for all...

• Good management benefits all, but seems to benefit women more.
• Bad management affects all, but seems to affect women more.
• [Poor physics teaching seems to affect girls more]
Sensing the ambiance

• Women are the ‘canaries in the coal mine’
• More sensitive to the friendliness of a Dept
• Lack of (the success of) women may imply an issue that needs attention.
Advancing women’s careers

• An IOP initiative to help University Physics departments ensure they are:
  • welcoming, open, inclusive places where all can flourish and enjoy doing physics.

Prof Lene Hau
IoP ‘site visits’

• The visits often led to a first consideration of gender issues by a Department.
• Found the same issues coming up repeatedly
• Set up Project Juno to encourage Departments to address those issues
Some good practices (general)

• Collect data *and look at it!*
• Harassment policy + *implementation!*
• Regular appraisal *by trained appraisers!*
• Exit interviews
• HoDs set example – work-life balance
• Female-friendly social atmosphere – *not football + pub*
Further good practice (general)

- Transparent, well-publicised management
- Childcare facilities
- Fair % seminar/colloquia speakers female
- Appoint a diversity officer

- And similarly for u/g issues, p/g issues, research and academic staff issues
Other Developments

• Athena SWAN Charter and Awards – a recognition scheme for Universities and SET Departments
• Similar structure to Project Juno
Vera Rubin

- Through the study of the rotation curves of galaxies predicted the existence of dark matter