IOP Project Juno

“A reflection of over a decade of equality and diversity work within the UK”

Dr Tracey Berry
Royal Holloway, University of London

Lepton Photon 2021, Manchester
Overview

IoP Project Juno

What?
Where?
Why?
How?
What? In more detail

• Six Principles
  • In Practice: what can Universities do

Reflection & Outlook

What next?

“Physicists Version”

• Abstract
• Introduction/Theory
• Experimental Method
• Results
• Conclusion/Outlook
Project Juno is the IOP’s flagship *gender equality award*

Where?
for
university physics departments
schools of physics, and
related organisations.
Why? Women In University Physics

IOP Statistical Digest 2010
How Juno was created

IOP undertook a study of university physics departments around the UK over a two-year period (from 2003-2005). We wanted to find out what issues students and staff might be facing, and to understand how we could help. The issue cited most often by all the institutions surveyed was the lack of recruitment, retention and progression of women, an issue also prevalent in the broader world of physics. As a result of this research, Project Juno was created.
Six principles those joining agree to progress towards meeting:

• Principle 1: Organisational Framework
• Principle 2: Appointment and Selection
• Principle 3: Career Progression and Promotion
• Principle 4: Working Culture and Workload Allocation
• Principle 5: Flexible Working
• Principle 6: Professional Conduct, Harassment and Bullying
Project Juno

3 levels

- Supporter
- Practitioner
- Champion

IOP | Institute of Physics
Juno Practitioner

IOP | Institute of Physics
Juno Supporter

IOP | Institute of Physics
Juno Champion
There are **five principles** and key actions that form the criteria against which applications for Juno champion status are assessed.

To achieve the **Juno Practitioner** award:

- need to **establish and evidence** where you currently are in relation to embedding the principles and meeting the key criteria in each.
- Be able to demonstrate how you meet **Principle 1**.

To be recognised as a **Juno Champion**:

- need to **embed the six Juno Principles throughout your department**.
- Have to demonstrate how you meet all principles and key criteria in each.
Project Juno

3 levels

• Supporter
• Practitioner
• Champion

38 UK Universities involved
Juno Champions

2012

Physics, University of Cambridge
Physics and Astronomy, University of Glasgow
Physics, Imperial College London
Physics, Royal Holloway University of London
Physics, University of Warwick
Physics, University of York

2022

• Physics and Astronomy, University of Birmingham
• Physics, University of Cambridge
• Physics and Astronomy, Cardiff University
• Physics, Durham University
• Physics and Astronomy, University of Edinburgh
• Physics and Astronomy, University of Exeter
• Physics and Astronomy, University of Glasgow
• Physics, Astronomy and Maths, University of Hertfordshire
• Physics, King’s College London
• Physics and Astronomy, University College London
• Physics, University of Lancaster

• School of Physics and Astronomy, University of Manchester
• Physics and Astronomy, University of Nottingham
• Physical Sciences, The Open University
• Physics, University of Oxford
• Physics and Astronomy, Queen Mary University of London
• Mathematics and Physics, Queen’s University Belfast
• Physics, Royal Holloway University of London
• Physics and Astronomy, University of Southampton
• Physics and Astronomy, University of St Andrews
• Physics, University of Warwick
• Physics, University of York
Juno Practitioners

2012

Physics and Astronomy, University College London
Physics and Astronomy, University of Edinburgh
Physics, University of Lancaster
**Physics and Astronomy, University of Manchester**
Physics and Astronomy, The Open University

........

2022

• Armagh Observatory and Planetarium
• Physics, University of Bristol
• Institute of Astronomy, University of Cambridge
• Physics, University College Dublin
• Physics, National University of Ireland Galway
• Physical Sciences, University of Kent
• Physics and Astronomy, University of Leeds
• Physics and Astronomy, University of Leicester
• Physics, University of Limerick
• Astrophysics Res. Institute, Liverpool John Moores Univ.
• Physics, Imperial College London
• Space and Climate Physics, UCL Mullard Space Sci. Lab.
• Physics, Loughborough University
• The National Physical Laboratory (NPL)
• Institute of Physics
• School of Computing, Sciences and Engineering, University of Salford
• Physics and Astronomy, University of Sheffield
• Physics, University of Surrey
• Physics, Swansea University
Juno Supporters

2012
School of Physics and Astronomy, University of Aberdeen
Department of Physics, University of Birmingham
Department of Physics, University of Bristol
Department of Physics, University of Dundee
School of Physics and Astronomy, University of Durham
School of Physics, University of Exeter
Department of Physics, Heriot-Watt University
Department of Physics, King’s College London
Department of Physics and Astronomy, University of Leicester
Department of Physics, University of Liverpool
School of Physics, National University of Ireland Galway
School of Physics and Astronomy, University of Nottingham
Department of Physics, University of Oxford
Department of Physics, Queen Mary University of London
School of Mathematics and Physics, Queen’s University Belfast
School of Physics and Astronomy, University of St Andrews
School of Computing, Science and Engineering, University of Salford
Department of Physics, University of Strathclyde
Department of Physics and Astronomy, University of Sussex
Department of Physics, Swansea University
Physics Subject Development Group, University of the West of Scotland

2022
• Department of Physics, Aberystwyth University
• EPSRC C. for Doct. Training in New and Sustainable Photovoltaics (comprised of seven universities)
• School of Physical Sciences, Dublin City University
• Dublin Institute for Advanced Studies, and its School of Cosmic Physics and Theoretical Physics
• Fraunhofer UK Research Ltd and Fraunhofer Centre for Applied Photonics
• School of Chemical and Physical Sciences, Keele University
• School of Mathematics and Physics, Univ. of Lincoln
• Department of Physics, University of Liverpool
• Physics, National University of Ireland Maynooth
• Instit. of Cosmology and Grav., Univ. of Portsmouth
• School of Maths and Physics, Univ. of Portsmouth
Six Principles

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• Principle 1: Organisational Framework
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• Principle 4: Working Culture and Workload Allocation
• Principle 5: Flexible Working
• Principle 6: Professional Conduct, Harassment and Bullying
Six Principles

1. A robust organisational framework to deliver equality of opportunity and reward
   1.1. Establish organisational framework
   1.1.1. Evidence of senior management commitment
   1.1.2. Effective consultation, communication, monitoring, evaluation and reporting mechanisms
   1.1.3. Clear accountability for implementation and resources allocated (time and money)

1.2. Monitoring and evidence base
   1.2.1. Monitor over time, quantitative data by gender: All student admissions and performance
           All staff applications, shortlists, appointment and promotion, looking at the proportion of women at each stage
   1.2.2. Obtain qualitative data from staff
   1.2.3. Identify any discrepancies in gender representation and/or progression and identify factors that might be causing them
Six Principles

2. Appointment and selection processes and procedures that encourage men and women to apply for academic posts at all levels

2.1. Ensure that processes and procedures are fully inclusive

2.1.1. Ensure career breaks are taken into consideration

2.1.2. Gender awareness included in training for all staff who interview

2.1.3. Provide induction for all new staff, including research assistants, on appointment

2.2. Take positive action to encourage under-represented groups to apply for jobs

2.2.1. Monitor applications, shortlists and appointments, looking at the proportion of women (internal and external) at each stage

2.2.2. Identify any discrepancies and investigate why this might be the case, taking action as necessary
Six Principles

3. **Departmental structures and systems which support and encourage the career progression and promotion of all staff and enable men and women to progress and continue in their careers**

3.1. **Transparent appraisal and development**
   3.1.1. Appraise all staff, including researchers and PDRAs
   3.1.2. Mentoring scheme in place with training and guidance available for both mentors, mentees
   3.1.3. Ensure all staff, including PDRAs, have access to impartial career guidance

3.2. **Transparent promotion processes and procedures**
   3.2.1. Ensure promotions process is transparent and fair to all staff at all levels, including those who have had a career break
   3.2.2. Ensure all staff are aware of promotion criteria and process and the support available to them throughout the process
   3.2.3. Take steps to identify and encourage potential candidates for promotion
Six Principles

4. Departmental organisation, structure, management arrangements and culture that are open, inclusive and transparent and encourage the participation of all staff

4.1. Promote an inclusive culture
4.1.1. Ensure departmental processes, procedures and practices are fully inclusive
4.1.2. Gender awareness included in the training for all staff and demonstrators
4.1.3. Promote inclusive social activities and other opportunities for mutual support and interaction
4.1.4. Use positive, inclusive images in both internal and external communications
4.1.5. Encourage and support female seminar speakers

4.2. Transparent work allocation model
4.2.1. Recognise the full range of types of contribution and departmental role, including administration, welfare and outreach activities
4.2.2. Ensure all staff are aware of the criteria used to develop the model and that the allocation is transparent
5. Flexible approaches and provisions that enable individuals, at all career and life stages, to optimise their contribution to their department, institution and to SET

5.1. Support and promote flexible working practices

5.1.1. Clear support from Head of Department for flexible and part-time working

5.1.2. Consistently applied policy on part-time and flexible working

5.1.3. Promote the benefits of flexible working for both men and women, particularly for those with caring responsibilities

5.1.4. Explicit support for those returning from career breaks or maternity leave

5.1.5. Encourage take up of paternity and other caring leave
Six Principles

6. Bully and Harassment: An environment where professional conduct is embedded into departmental culture and behaviour

6.1. Ensure that all staff and students are aware of expected professional conduct.

6.2. Address bullying, harassment and misconduct
   • 6.2.1. Ensure all staff and students are aware of how complaints of bullying, harassment or other misconduct will be dealt with through an enforceable formal policy.
   • 6.2.2. Ensure there is a transparent reporting mechanism within the department to address any complaints.
5 year reflection 2012 → 2017

- Students
- Staff
In 2017/18, a total of **24% of physics students were female**, up from **21% in 2012/13**.

A greater proportion of physics students from outside of the UK were female (31%) than their UK-domiciled counterparts (22%).

There were **38% more female physics undergraduate students** in 2017/18 than in 2012/13.

Female undergraduate physics students achieved marginally higher degree classes than their male counterparts.
Degree class achieved by graduates from undergraduate courses in 2017/18, by gender

Degree class achieved by graduates from undergraduate courses in 2017/18, by gender

- **Physics**
  - First class honours: 44% female, 43% male, 43% all students
  - Upper second class: 37% female, 36% male, 36% all students
  - Lower second class: 16% female, 15% male, 16% all students
  - Third/pass & unclassified: 3% female, 5% male, 5% all students

- **Electronic and Electrical Engineering**
  - First class honours: 42% female, 38% male, 39% all students
  - Upper second class: 36% female, 35% male, 35% all students
  - Lower second class: 17% female, 18% male, 17% all students
  - Third/pass & unclassified: 5% female, 9% male, 9% all students

- **Astronomy**
  - First class honours: 45% female, 35% male, 38% all students
  - Upper second class: 40% female, 39% male, 39% all students
  - Lower second class: 15% female, 19% male, 18% all students
  - Third/pass & unclassified: 5% female, 6% male, 9% all students

- **Mathematics**
  - First class honours: 42% female, 40% male, 41% all students
  - Upper second class: 34% female, 31% male, 32% all students
  - Lower second class: 18% female, 18% male, 18% all students
  - Third/pass & unclassified: 6% female, 10% male, 8% all students

- **Chemistry**
  - First class honours: 39% female, 37% male, 38% all students
  - Upper second class: 40% female, 38% male, 39% all students
  - Lower second class: 15% female, 18% male, 16% all students
  - Third/pass & unclassified: 5% female, 7% male, 6% all students
- Physics has had the largest increase in female UG students of the six subjects compared in UK universities since 12/13.

- 38% more female UG students in 17/18 than in 12/13.

- 29% increase in female PhD students over the same period.

- Number of female master’s students however fell by 4%.
• Physics has had the largest increase in female UG students of the six subjects compared in UK universities since 2012/13;

• 38% more female undergraduate students in 2017/18 than in 2012/13.

• 29% increase in female PhD students over the same period.

• Number of female master’s students however fell by 4%. 
### Gender of students by subject and level of study, 2017/18

<table>
<thead>
<tr>
<th>Subject</th>
<th>Undergraduate</th>
<th>Postgraduate Master's</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics</strong></td>
<td>34,140</td>
<td>2,120</td>
<td>2,055</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td>19,360</td>
<td>1,295</td>
<td>4,025</td>
</tr>
<tr>
<td><strong>Biology</strong></td>
<td>26,380</td>
<td>2,895</td>
<td>2,960</td>
</tr>
<tr>
<td><strong>All other subjects</strong></td>
<td>1,503,325</td>
<td>333,175</td>
<td>85,790</td>
</tr>
</tbody>
</table>

- **Physics**
  - Undergraduate: 17,440
  - Postgraduate Master’s: 865
  - PhD: 3,735

<table>
<thead>
<tr>
<th>Gender &amp; Level of Study</th>
<th>Undergraduate</th>
<th>Postgraduate Master's</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>77%</td>
<td>73%</td>
<td>75%</td>
</tr>
<tr>
<td>Female</td>
<td>23%</td>
<td>26%</td>
<td>25%</td>
</tr>
</tbody>
</table>

No loss in number of females from UG to PhD
Academic Staff

- Postdoctoral research staff: 79% male  21% female
- Academic staff in physics: 82% male  18% female
- Professors: 89% male  11% female

Up from 5.4% in 2010
Comparison with other subjects

- Gender split in physics for postdoctoral researchers is similar to undergraduate, master’s and PhD students.
- Gender split is wider for professors than for all academic staff in physics and for all subjects as a whole.
What can we do?

• Minorities are more disadvantaged by bad practice
• Follow Juno Principles
• Create support groups: Women, Postgraduate, Research Fora
• Support minority staff to attain positions of esteem
• Ensure fair and transparent workload model
• Females sometimes seen as good citizens/ admin overload
• Encourage females to stand for leadership positions
• Encourage Females to carve out time for research and grants
• Ensure promotion criteria are clear and transparent
• Advertise role models/visibility
• Beware of unconscious bias in e.g. recruitment/promotion
What a Physicist Looks Like and Diversity

Studying here

Department Physics

Why choose physics?
Conclusion

- Numbers and % of female physics students have increased
- Still progress to be made in increasing % of female professors

Support and encourage everyone, especially minority groups who may feel more isolated
References


Thanks for listening - any questions?
Academic Staff

• 18% of professors in UK physics departments are from the EU and 10% are from outside the EU
• Less than 40% of postdoctoral research staff are from the UK: 31% are from non-UK EU countries and 30% are from outside the EU
• Across all subjects, 50% of postdoctoral research staff are from the UK, 27% from non-UK EU countries, and 23% from outside the EU
Comparison with other subjects

All academic staff in UK universities by subject and domicile

- **Physics**: 56% UK, 26% non-UK EU, 18% non-EU
- **Mathematics**: 56% UK, 25% non-UK EU, 19% non-EU
- **Biosciences**: 65% UK, 22% non-UK EU, 13% non-EU
- **Chemistry**: 63% UK, 22% non-UK EU, 15% non-EU
- **Electrical, Electronic and Computer Engineering**: 58% UK, 25% non-UK EU, 17% non-EU
- **All subjects**: 72% UK, 16% non-UK EU, 12% non-EU
Comparison with other subjects

Domicile of postdoctoral research staff in UK universities by subject

<table>
<thead>
<tr>
<th>Subject</th>
<th>UK</th>
<th>non-UK EU</th>
<th>non-EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>physics</td>
<td>39%</td>
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<td>mathematics</td>
<td>34%</td>
<td>34%</td>
<td>33%</td>
</tr>
<tr>
<td>biosciences</td>
<td>45%</td>
<td>33%</td>
<td>21%</td>
</tr>
<tr>
<td>chemistry</td>
<td>44%</td>
<td>32%</td>
<td>24%</td>
</tr>
<tr>
<td>electrical, electronic and computer engineering</td>
<td>33%</td>
<td>21%</td>
<td>47%</td>
</tr>
<tr>
<td>all cost centres</td>
<td>50%</td>
<td>27%</td>
<td>23%</td>
</tr>
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