on the road to equality

dr jess wade (@jesswade)

imperial college london

workshop on high energy theory + gender, cern

outline

- education
- academia
  - juno + athena swan
  - mentors + advocates
  - mental health
  - harassment + bullying
- imperial college london

a-level participation

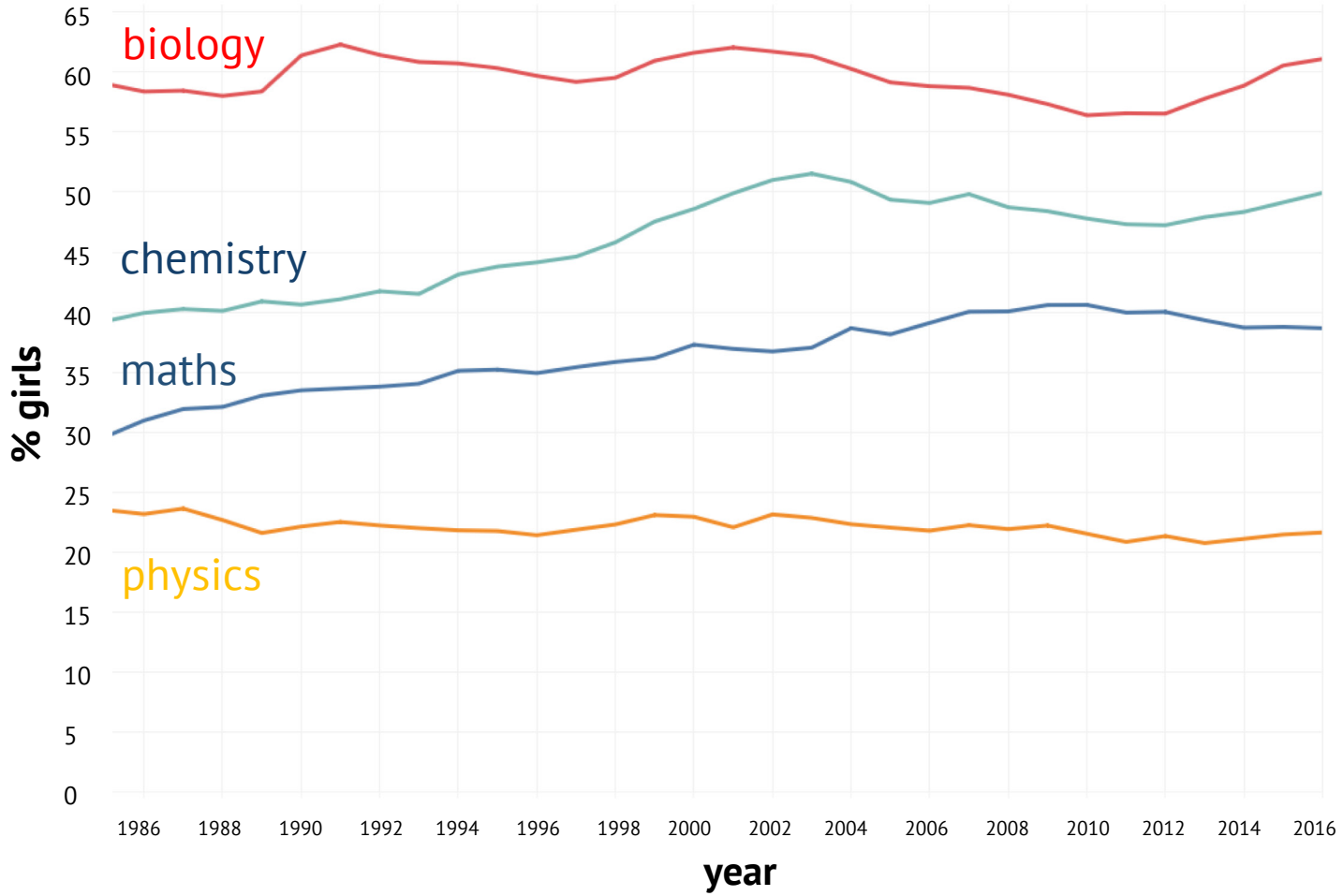
Male students

1	Mathematics	56774
2	Physics	28500
3	Chemistry	26771
4	History	26181
5	English	25173
6	Biology	24955
7	Economics	18651
8	Geography	18348
9	Business studies	16209
10	Psychology	13758
11	Media / film / TV studies	12379
12	Mathematics (further)	10816
17	Design and technology	7884
18	Physical education	7874
19	Sociology	7569
20	ICT	5870
21	Computing	4927
27	French	3176
28	Spanish	2897
35	Critical thinking	115
36	Irish	91

Female students

1	English	64326
2	Psychology	43256
3	Biology	38320
4	Mathematics	35937
5	Art and design subjects	34219
6	History	29667
7	Chemistry	25873
15	Economics	8924
16	Physics	7787
17	French	7152
21	Spanish	5797
22	Other modern languages	5381
23	Design and technology	5356
24	Physical education	4531
25	Mathematics (further)	4177
26	Classical subjects	3856
27	Music	3266
28	ICT	3254
34	Computing	456
35	Irish	239
36	Critical thinking	121

this has not changed for 30 years.



hundreds of millions of pounds

awards, grants, shouting

focus groups, conferences, workshops

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this has NO biological origin

https://www.nature.com/articles/s41467-018-06292-0

nature COMMUNICATIONS

ARTICLE

DOI: 10.1038/s41467-018-06292-0 OPEN

Gender differences in individual variation in academic grades fail to fit expected patterns for STEM

R.E. O'Dea [1,2], M. Lagisz[1], M.D. Jennions [2] & S. Nakagawa [1]

Fewer women than men pursue careers in science, technology, engineering and mathematics (STEM), despite girls outperforming boys at school in the relevant subjects. According to the 'variability hypothesis', this over-representation of males is driven by gender differences in variance; greater male variability leads to greater numbers of men who exceed the performance threshold. Here, we use recent meta-analytic advances to compare gender differences in academic grades from over 1.6 million students. In line with previous studies we find strong evidence for lower variation among girls than boys, and of higher average grades for girls. However, the gender differences in both mean and variance of grades are smaller in STEM than non-STEM subjects, suggesting that greater variability is insufficient to explain male over-representation in STEM. Simulations of these differences suggest the top 10% of a class contains equal numbers of girls and boys in STEM, but more girls in non-STEM subjects.

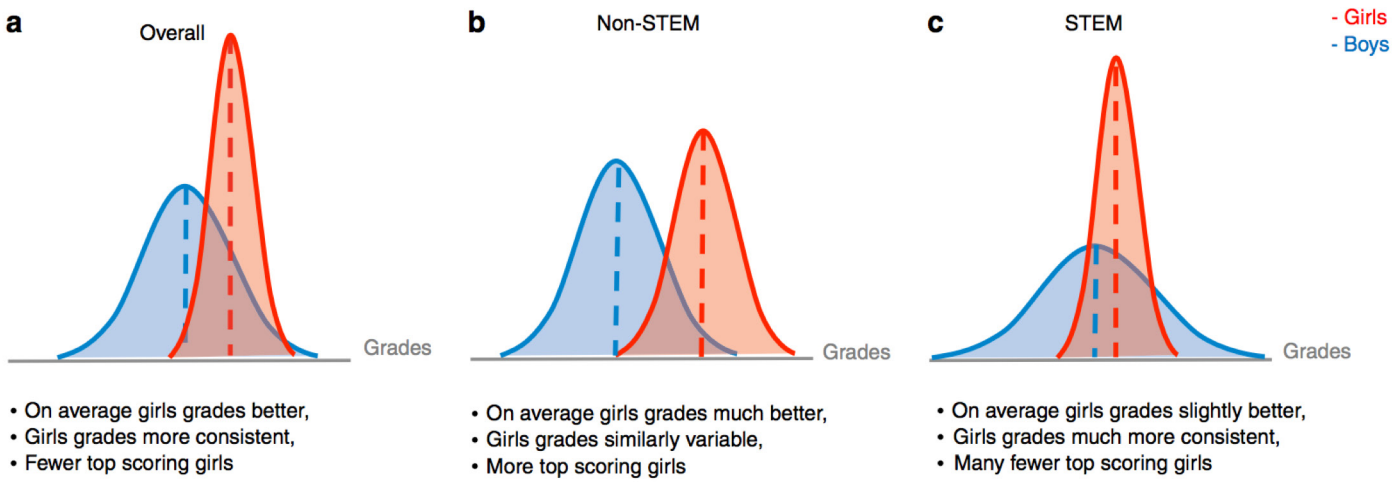

Fig. 1 Predicted distributions of school grades of girls (red) and boys (blue). **a** The grade distribution overlaps represent the prediction that, when all grades are considered, girls on average earn higher grades and are less variable than boys, although there are more highly performing boys than girls at the upper end of the achievement distribution. **b** In non-STEM subjects, the difference in mean grades between girls and boys may be even more pronounced in favour of girls, which, coupled with similar variability, should result in many more highly performing girls than boys at the upper end of the achievement distribution. **c** In contrast, for STEM grades, we expected less difference between boys and girls mean grades and more grade variability for boys, resulting in boys dominating at both the top and bottom of the achievement distribution

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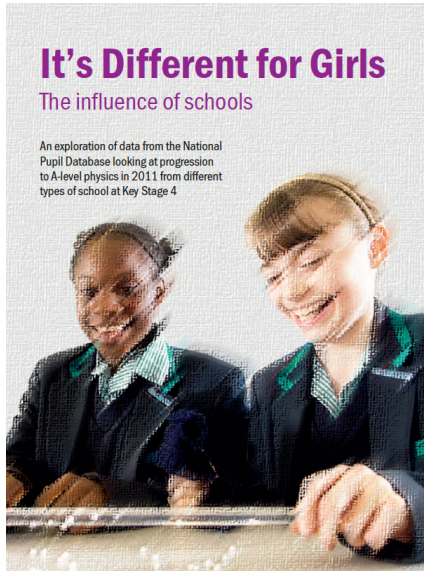
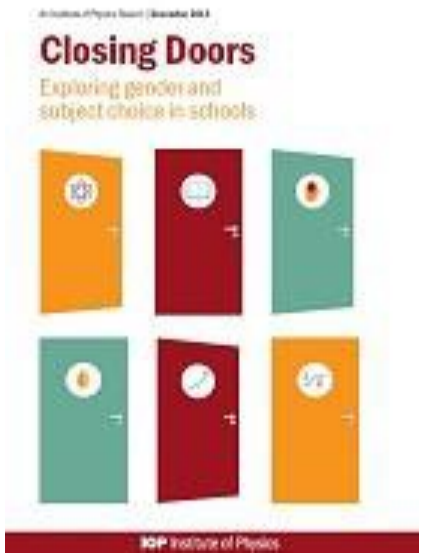
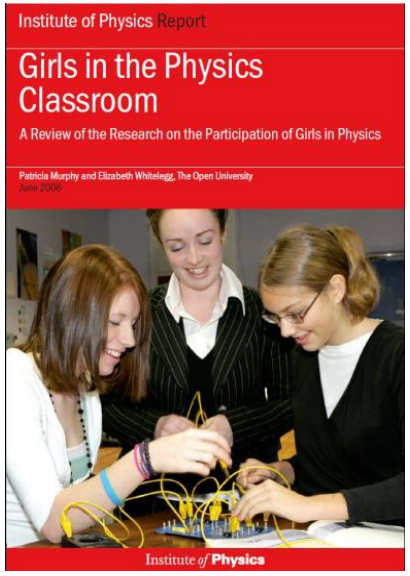
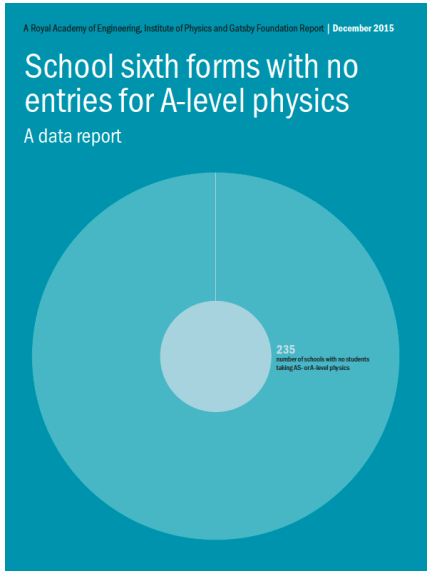
institute of physics: girls in physics research









Reports

The Institute has published several reports investigating the gender imbalance of physics A-level and on issues around equality of education.

Improving Gender Balance - Reflections on the impact of interventions in schools (2017) Findings from the Improving Gender Balance and Drayson pilot projects and recommendations for good practice

Improving Gender Balance - Results and recommendations from the IOP's work in schools (2017) A summary of the Improving Gender Balance and Drayson pilot projects, ahead of the full report launch in March 2017

Opening Doors: A guide to good practice in countering gender stereotyping in schools (2015) Case studies and key recommendations of how schools can explore equality issues across the whole school.

Closing Doors: Exploring gender and subject choice in schools (2013) An exploration of national data on progression to A-level in selected subjects, including physics. The report draws attention to the gender imbalances that exist on A-level courses.

It's Different for Girls: The influence of schools (2012) uses data from the National Pupil Database to explore how uptake by girls onto A level physics courses varies in different types of schools.

Girls into Physics: Action research (2009) is the evaluation report from our 2008 school-based action research programme, including recommendations for classroom practice.

Girls in the Physics Classroom: A review of the research on girls' participation in physics (2006) a summary of the existing research on girls' participation in physics, highlighting common threads and suggesting effective strategies.

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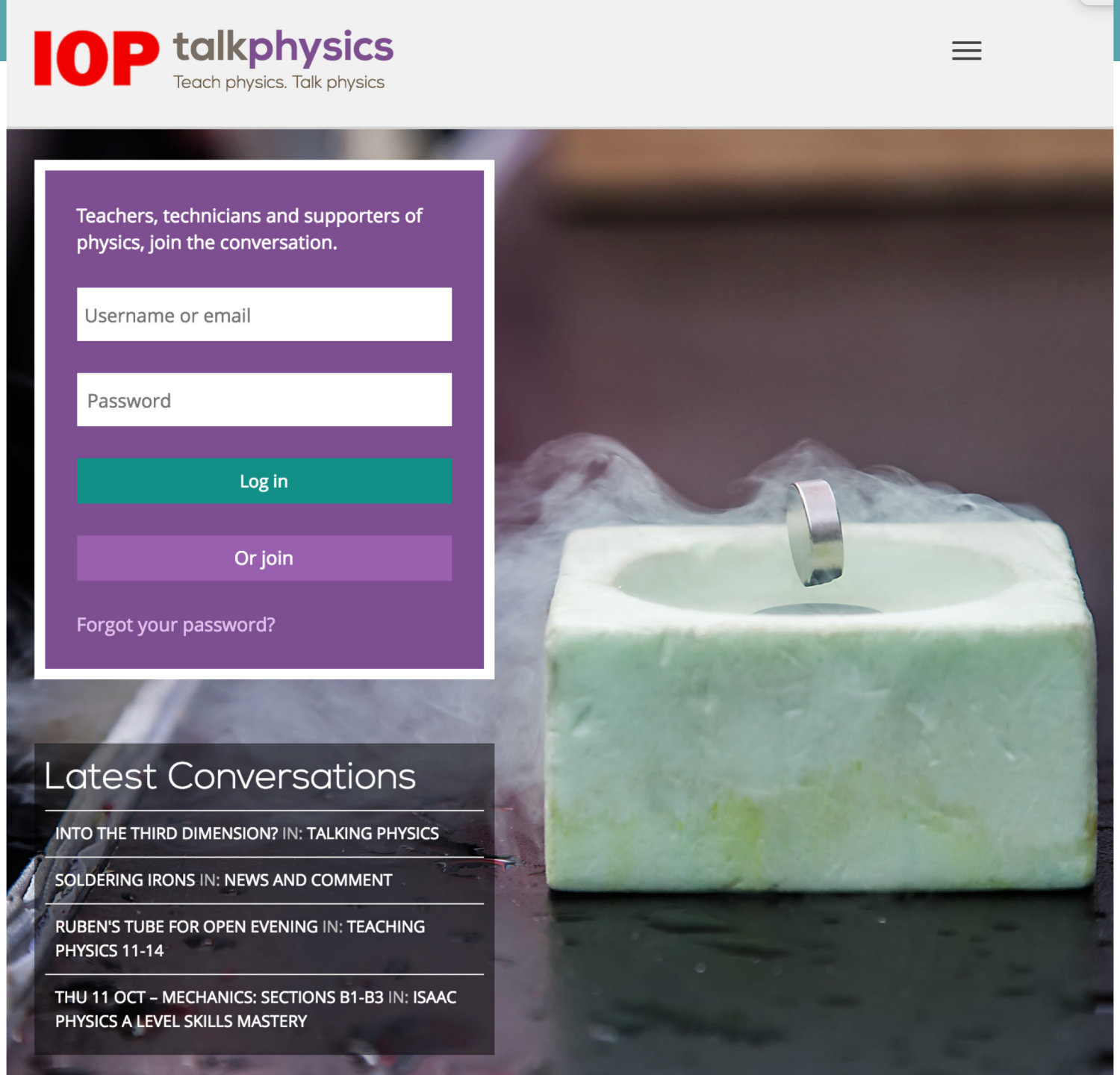

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Essential features of good practice in countering gender stereotyping in schools

Based on the discussions and observations that took place within the site visits and subsequent recommendations given to schools, the following are the essential features of a school that is actively addressing gender equity. The next section explores these, and other, aspects of good practice in more detail.

1 Senior gender champion

Senior Leadership Teams identify one of their number as a gender champion whose role includes bringing together the whole school in a coherent campaign to challenge gender stereotypes. Governors are involved in the campaign in order to reinforce the message that this activity is a priority.

2 Training

Staff attend gender awareness and unconscious bias training, whether as part of their induction to the school or their ongoing professional development.

3 Sexist language

Sexist language is treated as being just as unacceptable as racist and homophobic language. Teachers receive training on unconscious bias and equality and diversity awareness.

4 Use of progression data

Gender-disaggregated data on both achievement and progression are collected for all subjects and discussed formally at whole-school level, using benchmark data for comparison. Where there are issues to be addressed, actions are generated, including targets where appropriate.

5 Initiatives

Initiatives are introduced and developed on the basis of what works and in a way that shows how they address a problem identified in the school data. Carefully planned external visits encourage students to challenge stereotypical views as do role models who commit to developing sustainable relationships.

6 Subject equity

There is a strict policy that all subjects are presented equally to students in terms of their relative difficulty and teachers refrain from making any remarks about how difficult they find particular subjects. The emphasis is on working to the best of one's ability rather than seeking to find subjects where one has innate talents.

7 Careers guidance

Careers guidance starts an early stage. It focuses on the next educational phase, emphasises keeping options open and actively challenges gender stereotypes.

8 Student ownership

Students are at the heart of any campaign to counter gender stereotyping. They are made aware of the issues and be encouraged to think of ways of combatting them.

9 Personal, social, health and economic education

Regularly timetabled PSHE sessions are regarded as a high-value activity that can have a positive impact on students' lives, teachers delivering content are provided with resources and activities. Sessions on equality and diversity form the basis of a wider school campaign and discussions on these themes continue through other topics.

improving gender balance

- engage with science
- engage with the issues

- **made an impact** with the girls we worked with
- need to start younger

girls' confidence & resilience

physics classroom

teacher reflection

- data analysis
- unconscious bias training
- lesson observations

- increased use of **inclusive teaching** techniques
- more equitable practical management
- **careers integration**

whole school

whole school reflection

- data analysis, school survey, environment and policy audit

student empowerment

- assemblies, tutor time, pshe, student voice

options overview

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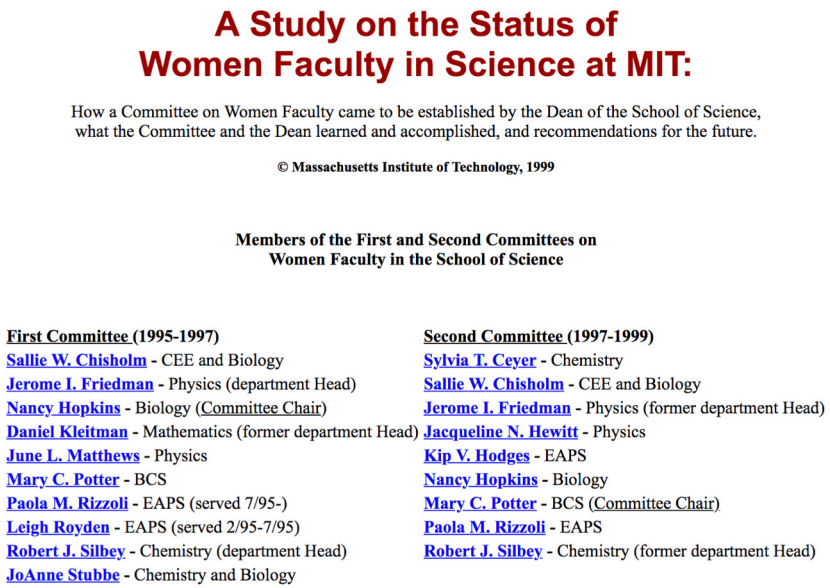
MIT



A Study on the Status of Women Faculty in Science at MIT:

How a Committee on Women Faculty came to be established by the Dean of the School of Science, what the Committee and the Dean learned and accomplished, and recommendations for the future.

Members of the First and Second Committees on Women Faculty in the School of Science

First Committee (1995-1997)
Sallie W. Chisholm - CEE and Biology
Jerome I. Friedman - Physics (department Head)
Nancy Hopkins - Biology (Committee Chair)
Daniel Kleitman - Mathematics (former department Head)
June L. Matthews - Physics
Mary C. Potter - BCS
Paola M. Rizzoli - EAPS (served 7/95-)
Leigh Royden - EAPS (served 2/95-7/95)
Robert J. Silbey - Chemistry (department Head)
JoAnne Stubbe - Chemistry and Biology

Second Committee (1997-1999)
Sylvia T. Ceyer - Chemistry
Sallie W. Chisholm - CEE and Biology
Jerome I. Friedman - Physics (former department Head)
Jacqueline N. Hewitt - Physics
Kip V. Hodges - EAPS
Nancy Hopkins - Biology
Mary C. Potter - BCS (Committee Chair)
Paola M. Rizzoli - EAPS
Robert J. Silbey - Chemistry (former department Head)

- advise department heads to **place senior women faculty** on **appropriate search committees**.
- when hiring faculty **do not overlook women candidates from within mit**, particularly in the fields of mathematics and chemistry where the number of women candidates is small.
- inform department heads each year that **conscious effort** is needed to identify and **recruit** outstanding junior and senior **women faculty from outside mit**.
- **address the family-work conflict** realistically and openly, relying on advice from appropriate women faculty, in order to make mit more attractive to a larger pool of junior women faculty, and to encourage more women students and postdocs to continue in academic science.

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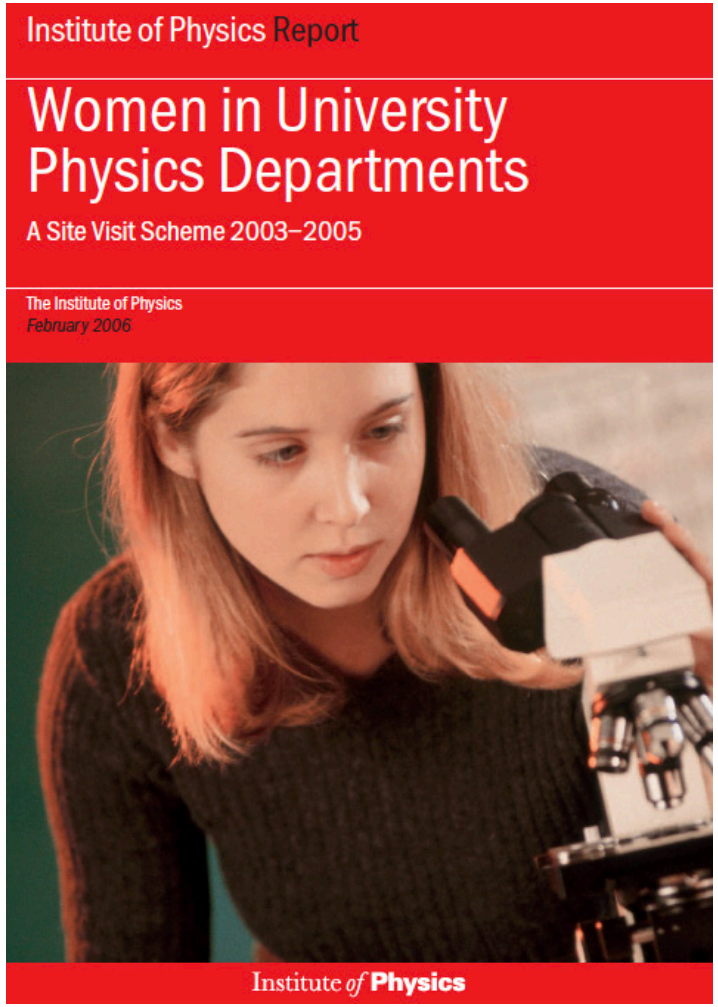
http://web.mit.edu/fnl/women/women.html

institute of physics: juno award

Table 1: Physics students and staff by gender

	Men	Women	Women (% total)	Notes and data sources: Subject	Year	Country	Source
Physics A-level	22293	6405	22.3%	physics	2004	UK	JCQ
UCAS applicants for physics courses	2364	495	17.3%	physics	2004	UK	UCAS
	89	38	29.9%	astronomy			
Acceptances for physics courses	2223	448	16.8%	physics	2004	UK	UCAS
	120	50	29.4%	astronomy			
Undergraduates and postgraduates	9140	2525	21.6%	physics	2003/4	UK	HESA
	1520	640	29.6%	astronomy			
Research assistants	1795	330	15.5%	physics	2002/3	UK	UKRC & HESA
Lecturers	366.25	41	10.0%	physics	1 March 2004	UK	IOP
Senior lecturers and readers	395.5	33.5	7.9%	physics	1 March 2004	UK	IOP
Professors	412	17	4.0%	physics	1 March 2004	UK	IOP



juno award (2007)

four levels of award:

- juno supporter
- practitioner
- champion
- excellence (2017)

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Juno Champion

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JUNO framework

1. a robust organisational framework to deliver equality of opportunity and reward
2. appointment and selection processes and procedures that encourage men and women to apply for academic posts at all levels
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
4. departmental organisation, structure, management arrangements and culture that are open, inclusive and transparent and encourage the participation of all staff
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
6. an environment where professional conduct is embedded into departmental culture and behaviour.

juno #1: organisational framework

- head of department leads and champions good practice for women in science initiatives and programmes
- structures for management, organisation, operations and decision-making are transparent
- allocation of resources to support its women in science initiatives
- the department collects, monitors and reports data by gender:
  - differential representation / progression of men and women
  - qualitative data gained from staff surveys, discussions, focus groups

juno #2: appointment and selection processes

- clear policy on how career breaks are considered in appointments/ promotions
- all staff who interview have undertaken appropriate equality and diversity training (aware of unconscious bias).
- encourage both women and men to apply internally
- actively identifies and attract appropriate external male and female candidates

juno #3: career progression

- all staff regularly appraised, aware what follow-up action should be taken
- career development/**mentoring** scheme in place – all encouraged to apply
- staff understand responsibilities towards providing career advice for research staff
- encourage all staff to access careers advice
- monitors appropriateness, value and uptake
- **promotion processes and criteria** for nominating and supporting candidates for promotion are well communicated, transparent, consistent and **fair**

mentors + advocates

Nevertheless She Persisted? Gender Peer Effects in Doctoral STEM Programs

Valerie K. Bostwick, Bruce A. Weinberg

NBER Working Paper No. 25028
Issued in September 2018
NBER Program(s):Economics of Education, Labor Studies

We study the effects of peer gender composition, a proxy for female-friendliness of environment, in STEM doctoral programs on persistence and degree completion. Leveraging unique new data and quasi-random variation in gender composition across cohorts within programs, we show that women entering cohorts with no female peers are 11.9pp less likely to graduate within 6 years than their male counterparts. A 1 sd increase in the percentage of female students differentially increases the probability of on-time graduation for women by 4.6pp. These gender peer effects function primarily through changes in the probability of dropping out in the first year of a Ph.D. program and are largest in programs that are typically male-dominated.

isolated women:

16 % less likely to complete phd

18 % more likely to drop out in their first year

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https://physicsworld.com/a/isolated-female-students-more-likely-to-drop-out-of-phd-programmes/

how to be a good mentor

- enthusiasm
- sensitivity
- the ability to appreciate mentees' individual differences
- respect
- unselfishness
- availability
- the ability to inspire and create optimism
- providing support without micromanaging
- asking insightful questions while being a patient listener
- being widely read and open-minded
- helping to identify the right initial project
- rewarding success

https://www.nature.com/naturejobs/science/career_toolkit/mentoring

promotions ‘fair’ : bias in student surveys

nature astronomy
LETTERS
PUBLISHED: 26 MAY 2017 | VOLUME: 1 | ARTICLE NUMBER: 0141

Quantitative evaluation of gender bias in astronomical publications from citation counts

Neven Caplar*, Sandro Tacchella and Simon Birrer

Numerous studies across different research fields have shown that both male and female referees consistently give higher scores to work done by men than to identical work done by women[1–3]. In addition, women are under-represented in prestigious publications and authorship positions[4,5] and women receive ~10% fewer citations[6,7]. In astronomy, similar biases have been measured in conference participation[8,9] and success rates for telescope proposals[10,11]. Even though the number of doctorate degrees awarded to women is constantly increasing, women still tend to be under-represented in faculty positions[12]. Spurred by these findings, we measure the role of gender in the number of citations that papers receive in astronomy. To account for the fact that the properties of papers written by men and women differ intrinsically, we use a random forest algorithm to control for the non-gender-specific properties of these papers. Here we show that papers authored by women receive 10.4 ± 0.9% fewer citations than would be expected if the papers with the same non-gender-specific properties were written by men.

We consider a complete sample of >200,000 publications from 1950 to 2015 from five major astronomy journals: *Astronomy & Astrophysics*, *Astrophysical Journal*, *Monthly Notices of the Royal Astronomical Society*, *Nature* and *Science*. We used the Smithsonian Astrophysical Observatory (SAO)/National Aeronautics and Space Administration (NASA) Astrophysics Data System (ADS) and the arXiv database to gather the following information about these papers: the names and number of authors; the number of references; the year of publication; the journal of publication; the abstract; and the name of the first author's institution. We determine the gender of the first author by matching their name to a number of different publicly available databases. We clean the sample by removing entries for which we are not able to determine the gender of the first author. We also remove entries without references or citations. Our final dataset contains 149,741 papers. Further details about this procedure are available in the Methods.

Throughout the study we assume that men and women should receive the same number of citations for papers that have the same non-gender-specific properties. Any difference in the citation counts between papers led by men or women with matched non-gender properties is labelled as 'gender bias'. For all practical purposes, the phrases 'women' and 'men' are to be understood as 'first authors that we deduced to be women in this analysis' and 'first authors that we deduced to be men in this analysis', respectively. Gender identities outside the male/female binary are not considered in the analysis.

We first examine whether there is a difference between men and women in terms of the number of citations. Papers written by men and women have different properties in the sample (see Methods). As the citation count is expected to correlate with certain non-gender-specific properties of the papers (such as seniority or number of references), we have to be careful when interpreting the quoted difference in the number of citations. We attempt to separate the gender bias effect from the effect caused by non-gender-specific properties of the papers.

Figure 1 shows the mean number of citations received by men divided by the mean number of citations received by women in a given year. We see a large difference between men and women in the early years of this study, with men receiving between 50 and 100% more citations than women. In this early period, the errors are large due to the small number of papers in total and even smaller numbers of papers authored by women. Overall, the difference has been decreasing over time. We also show the results of fitting the data with the functional form of $a_2 e^{a_1(y-y)} + a_3$, where y is the year. The best-fit parameters are $a_1 = 0.06 \pm 0.02$, $a_2 = 0.38 \pm 0.24$, $a_3 = 1.00 \pm 0.04$ and $y_* = 1974 \pm 12$. When written in this form, a_3 can be interpreted as the value of gender difference in the far future when the first term of the equation becomes negligible.

To quantify the difference in a single number, we introduce the variable, b_y, defined as a constant fit to the data presented in Fig. 1 after a certain year. In this work, we use 1985 as the cutoff year—that is, b_y is obtained by fitting the data with a constant from 1985 to 2015. Thus we search for the value of b_y that minimizes

$$\sum_{y>(y_{min}=1985)} \frac{(d_y - b_{y_{min}})^2}{\sigma^2_{d_y}} \quad (1)$$

where d_y is the gender difference measured in a given year and σ_{d_y} is the estimated error of the measured gender difference. Using this definition we find $b_{1985} = 1.056 \pm 0.010$. This means men received around 6% more citations on average than wo Changing the cutoff year does not significantly change our re because the fit is always dominated by the data points in the l years as a result of their smaller errors. For example, when ta the cutoff year to be 2000, we find $b_{2000} = 1.046 \pm 0.009$.

It is complex to estimate the amount of gender bias given difference in the properties of papers written by men and wo Any difference that we see could just be a consequence of the that papers authored by men and women in the sample inhere differ in their properties and hence may receive fewer citations because of the authors' gender, but because of some other par eter. Given that there are many possible variables influencing citation number of papers, it is impossible to isolate or study a si variable (such as seniority or number of references) to capture full span of possibilities influencing our estimate of gender Therefore, we resort to machine learning techniques to correct estimate more accurately the amount of gender bias.

The main idea is to train the random forest algorithm[13] on sample of papers authored by men using all the non-gender-spe

Institute for Astronomy, Department of Physics, ETH Zurich, CH-8093 Zurich, Switzerland *e-mail: neven.caplar@phys.ethz.ch

NATURE ASTRONOMY 1, 0141 (2017) | DOI: 10.1038/s41550-017-0141 | www.nature.com/nastronomy

THE WORLD UNIVERSITY RANKINGS

PROFESSIONAL JOBS SUMMITS RANKINGS S

Growing evidence of anti-female bias in student surveys

Dutch researchers find female academics 11 percentage points less likely to hit promotion threshold in course evaluations

THE WORLD UNIVERSITY RANKINGS

PROFESSIONAL JOBS SUMMITS RANKINGS STU

Female lecturers ‘suffer from gender biases’ in student ratings

French research finds that undergraduates give higher scores to male teachers

August 14, 2015

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promotions ‘fair’ : bias in peer review

NEWS · 18 SEPTEMBER 2018

Huge peer-review study reveals lack of women and non-Westerners

Analysis of thousands of submissions to eLife journal shows that these groups are also under-represented as senior authors and editors.

Dalmeet Singh Chawla

Women are inadequately represented as peer reviewers, journal editors and last authors of studies, according to an analysis of manuscript submissions to an influential biomedical journal.

The study looked at all submissions made to the open-access title *eLife* from its launch in 2012 to 2017 — nearly 24,000 in total. It found that women worldwide, and researchers outside North America and Europe, were less likely to be peer reviewers, editors and last authors. The paper — which hasn't itself yet been peer-reviewed — was posted on the preprint server bioRxiv[1] on 29 August.

About 7,000 of the submitted studies went through the full submission process (at *eLife*, authors make a ‘pre-submission query’ before being invited by the journal to send a full paper — a relatively uncommon practice among journals). In all, the analysis covered the activity of about 7,000 referees, 890 reviewing editors and 57 senior editors.

The researchers found that women make up only around 20% of peer reviewers, and around one in four reviewing editors (see ‘Peer-review patterns’). Most reviewing editors and reviewers were in the United States — 62% and 56%, respectively — followed by the United Kingdom and Germany in second and third place. Less than 2% of peer reviewers were in developing nations — all in China, India or South Africa.

PDF version

LATEST NEWS ARTICLES

Big-data project aims to transform farming in world's poorest countries

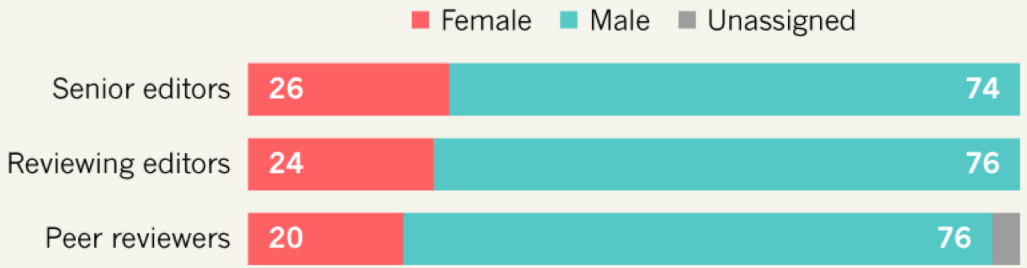
Discovery of Galileo's long-lost letter shows he edited his heretical ideas to fool the Inquisition

Discovery of vibrant deep-sea life prompts new worries over seabed mining

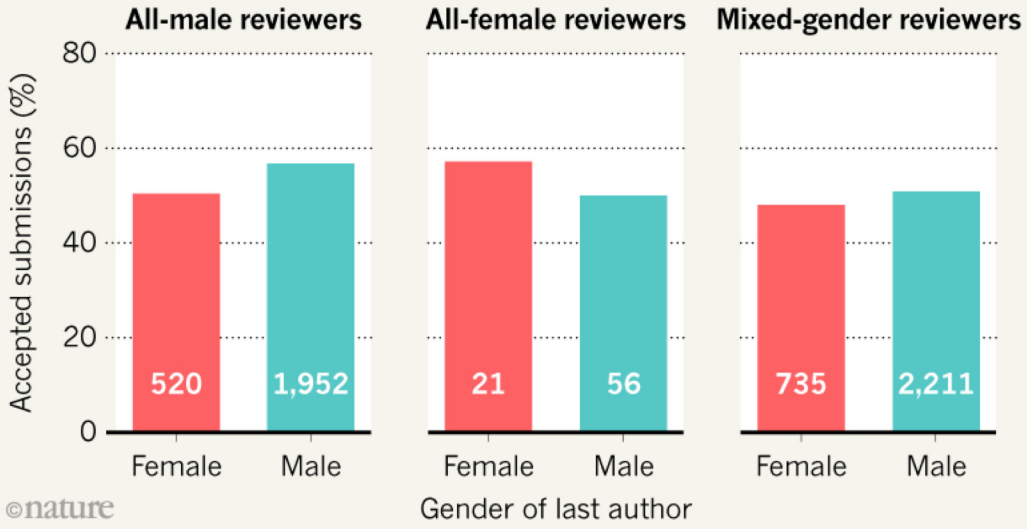
University says prominent food

PEER-REVIEW PATTERNS

In an analysis of thousands of submissions to the journal *eLife*, only one-fifth of peer reviewers, and about one-quarter of editors, were women.



The analysis also found that all-female reviewing panels accepted more manuscripts with female last authors than did all-male panels.



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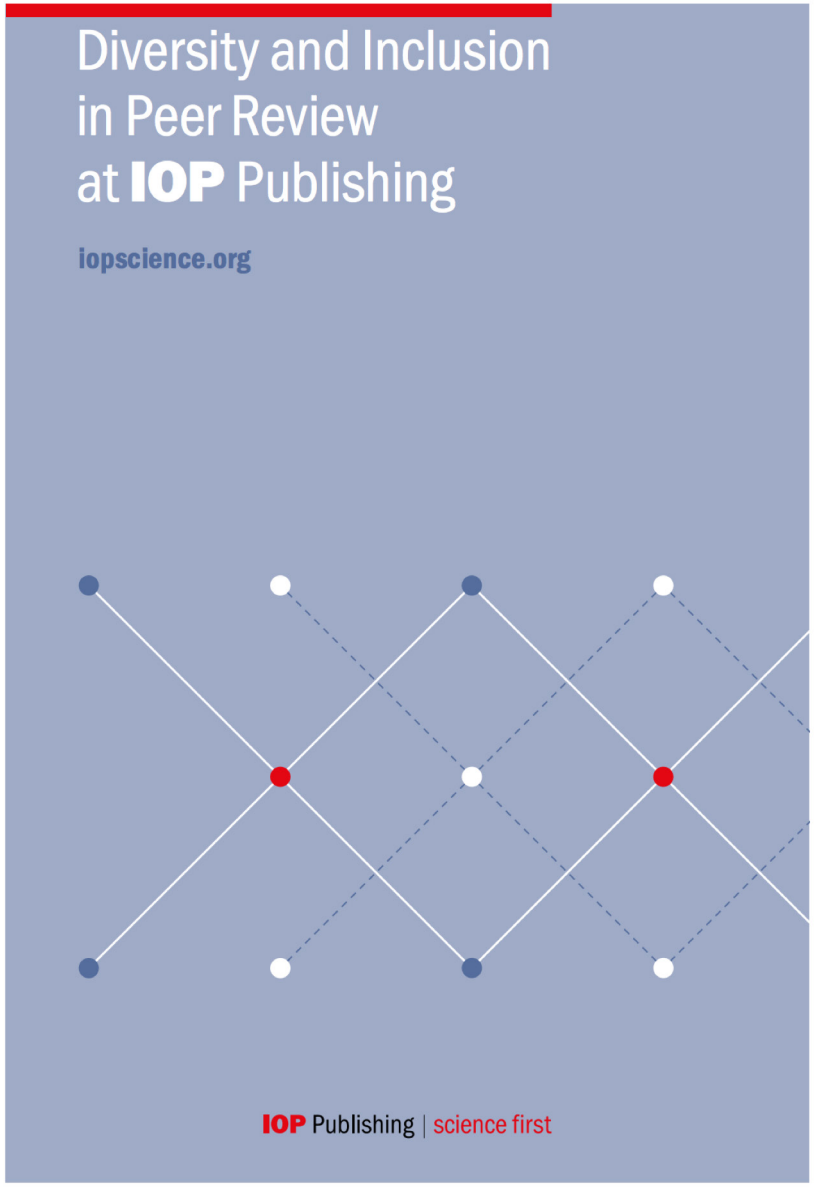
promotions ‘fair’ : bias in peer review



https://genderize.io/

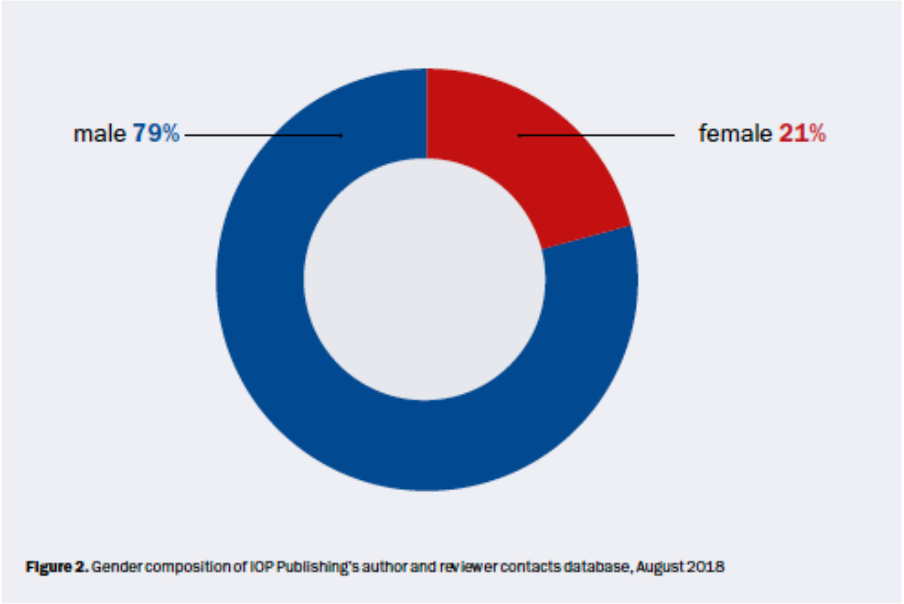


Figure 2. Gender composition of IOP Publishing's author and reviewer contacts database, August 2018

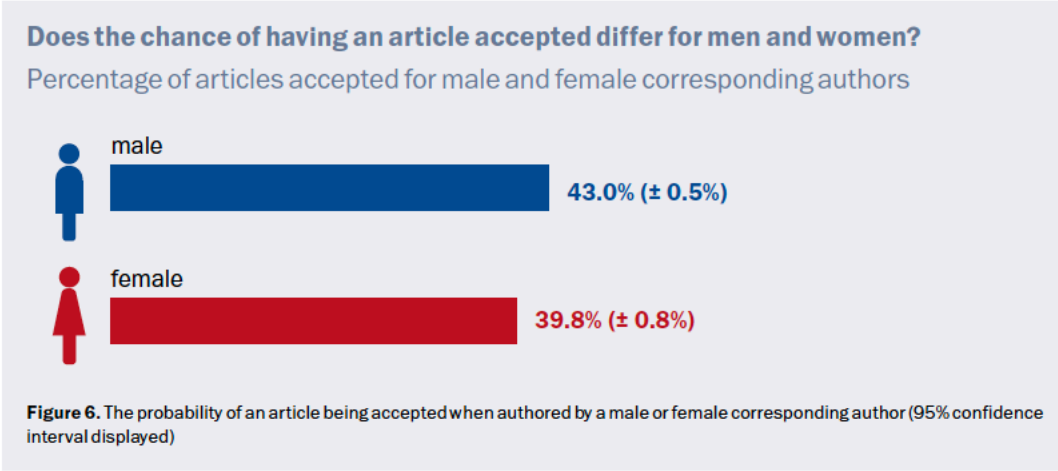


Figure 6. The probability of an article being accepted when authored by a male or female corresponding author (95% confidence interval displayed)

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http://ioppublishing.org/about-us/diversity-inclusion-peer-review-iop-publishing/

https://doi.org/10.1371/journal.pbio.2004956

https://lukeholman.github.io/genderGap/

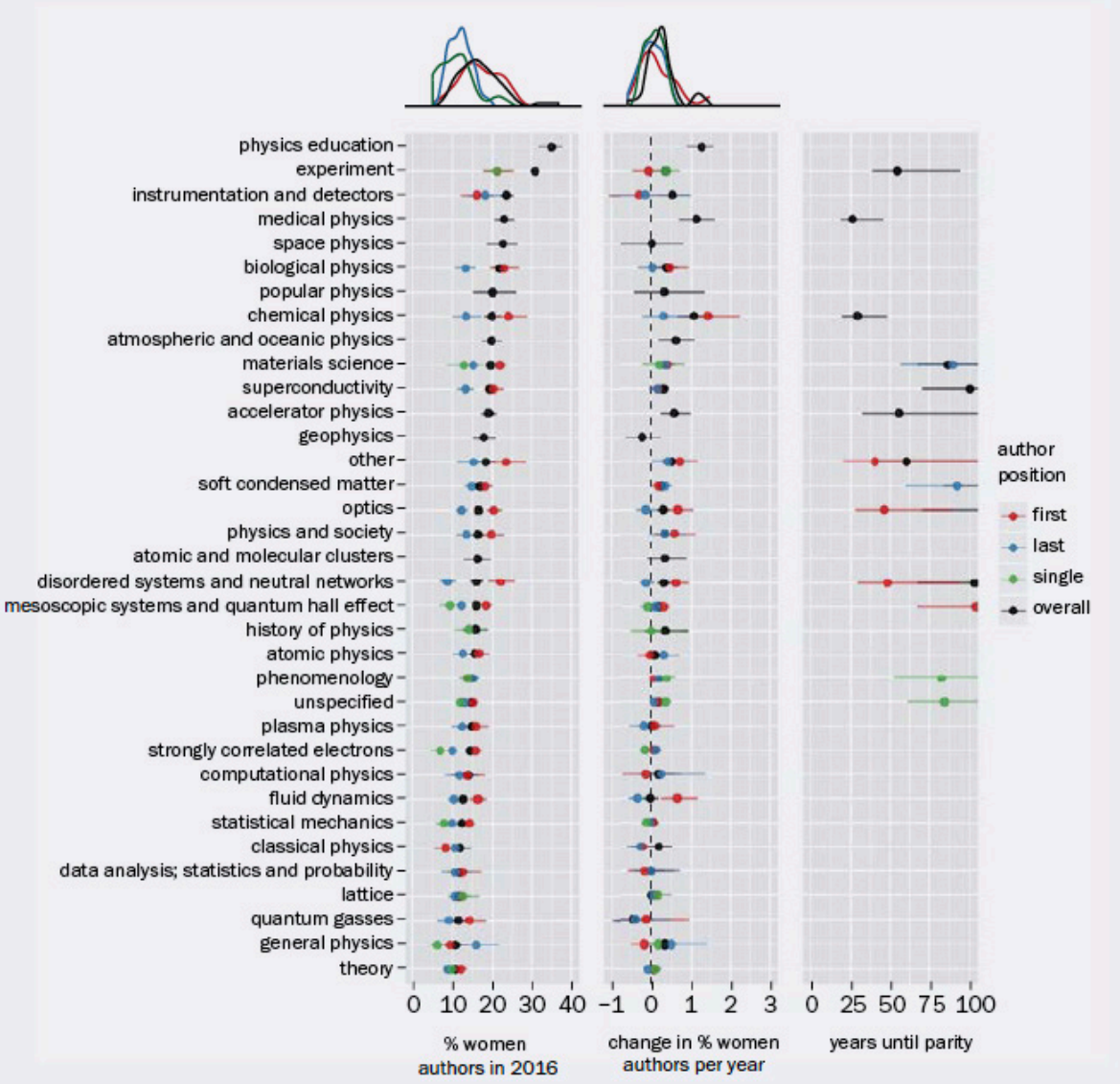

Figure 1. 2016 author gender ratio for physics subdisciplines, its rate of change per year, and the estimated number of years until the gender ratio comes within 5% of parity (Holman, Stuart-Fox and Hauser, 2018)

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promotions ‘fair’ : bias in reference letters

Avoiding gender bias in reference writing

Got a great student? Planning to write a super letter of reference?
Don’t fall into these common traps based on unconscious gender bias.

Mention research & publications

Letters of reference for men are 4x more likely to mention publications and twice as likely to have multiple references to research. Make sure you put these critical accomplishments in every letter!

Don’t stop now!

On average, letters for men are 16% longer than letters for women and letters for women are 2.5x as likely to make a minimal assurance (‘she can do the job’) rather than a ringing endorsement (‘she is the best for the job’).

Emphasize accomplishments, not effort

Letters for reference for men are more likely to emphasize accomplishments (‘his research’, ‘his skills’, or ‘his career’) while letters for women are 50% more likely to include ‘grind-stone’ adjectives that describe effort. ‘Hard-working’ associates with effort, but not ability.

We all share bias

It is important to remember that unconscious gender bias isn’t a male problem. Research shows that women are just as susceptible to these common pitfalls as men.
This is a problem for all of us - let’s solve it together!

Keep it professional

Letters of reference for women are 7x more likely to mention personal life - something that is almost always irrelevant for the application. Also make sure you use formal titles and surnames for both men and women.

Stay away from stereotypes

Although they describe positive traits, adjectives like ‘caring’, ‘compassionate’, and ‘helpful’ are used more frequently in letters for women and can evoke gender stereotypes which can hurt a candidate. And be careful not to invoke these stereotypes directly (‘she is not emotional’).

Be careful raising doubt

We all want to write honest letters, but negative or irrelevant comments, such as ‘challenging personality’ or ‘I have confidence that she will become better than average’ are twice as common in letters for female applicants. Don’t add doubt unless it is strictly necessary!

Adjectives to avoid:	Adjectives to include:
caring	successful
compassionate	excellent
hard-working	accomplished
conscientious	outstanding
dependable	skilled
diligent	knowlegeable
dedicated	insightful
tactful	resourceful
interpersonal	confident
warm	ambitious
helpful	independent
	intellectual

brought to you by:
THE UNIVERSITY OF ARIZONA
Commission on the Status of Women

Research from Trix, F & Psenka, C. Exploring the color of glass: Letters of recommendation for female and male medical faculty. Discourse & Society, 2003; and Madera, JM, Hebl, MR, & Martin, RC. Gender and letters of Recommendation for Academia: Agentic and Communal Differences. Journal of Applied Psychology, 2009.

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Follow us at: www.facebook.com/uacsw

For an electronic copy of this graphic, see:
www.csw.arizona.edu/LORbias

Imperial College London

IOP Institute of Physics

https://csw.arizona.edu/sites/default/files/avoiding_gender_bias_in_letter_of_reference_writing.pdf

http://gender-decoder.katmatfield.com/

Gender Decoder for Job Ads

Without realising it, we all use language that is subtly ‘gender-coded’. Society has certain expectations of what men and women are like, and how they differ, and this seeps into the language we use. Think about “bossy” and “feisty”: we almost never use these words to describe men.

This linguistic gender-coding shows up in job adverts as well, and research has shown that it puts women off applying for jobs that are advertised with masculine-coded language.*

This site is a quick way to check whether a job advert has the kind of subtle linguistic gender-coding that has this discouraging effect. Find out more about how this works.

Paste your job ad here

Check this ad

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IOP Institute of Physics

juno #4: culture

- equality and diversity training mandatory for all staff
- departmental image reflects the contribution of under-represented groups.
- agreed targets for women seminar speakers.
- junior staff, women and under-represented groups, encouraged to raise their profile internally
- a transparent work allocation model inclusive and fully recognises and rewards all types of contributions (including administration, mentoring, pastoral work and outreach).

When to be an Active Bystander

- Bullying
- Harassment
- Micro-inequities/Micro-aggressions [1]Small events which are hard to prove, often unintentional and frequently unrecognised by the perpetrator and occurs wherever people are perceived to be different (race/gender, etc.). Individuals may be singled out or overlooked
- Interrupting a person mid-sentence constantly
- Taking more questions from men than women
- Rolling eyes at meetings
- Sighing loudly
- Consistently ignoring emails for no good reason
- Inappropriate or offensive behaviour
- Raising voices in anger and frustration, or losing temper
- Rude, mean, inconsiderate, or unprofessional/ unacceptable behaviour
- Swearing in a professional environment
- Disrespectful or derogatory comments about others, or spreading rumours
- Violation of ethical standards
- Threats or potential violence
- Practices and procedures that may be deemed unfair or have detrimental impact
- Sending aggressive emails or emails sent unnecessarily to large groups with the aim of embarrassing or belittling the target

[1] Rowe, Mary, 'Barriers to Equality: the Power of Subtle Discrimination' The Employee Responsibilities and Rights Journal, June 1990, Vol. 3, No. 2, pp. 153-163

transparent work model: lab manual

WORLD VIEW · 05 SEPTEMBER 2018

The key to a happy lab life is in the manual

A well-crafted set of guidelines and advice can save time, reassure trainees and promote a positive lab culture, argues Mariam Aly.

Mariam Aly

A year and a half ago, as I was preparing to launch my own laboratory studying cognition at Columbia University in New York City, I kept returning to a particular concern: I would soon be responsible for the scientific advancement of trainees. How could I help them be the best scientists they could be, while also protecting their well-being?

I found the answer on Twitter. Two principal investigators in my field, Jonathan Peelle at Washington University in St Louis, Missouri, and Maureen Ritchey at Boston College in Massachusetts, shared their lab manuals. These laid out expectations for themselves and their trainees, as well as resources and tips to guide trainees through their time in the lab. I decided to follow in their footsteps by writing a lab manual to introduce my trainees to my philosophy for research and work–life balance. This required a great deal of time and thought, but it is something I would recommend to anyone leading a research group.

In the final few months of my postdoctoral studies, I thought about what had worked well and not so well for me as a trainee, and how to create best practices for my lab. Then I put into writing things that are usually

PDF version

LATEST WORLD VIEW ARTICLES

Reboot undergraduate courses for reproducibility

Post-crash economics: have we learnt nothing?

Research is set up for bullies to thrive

university of columbia

ALY LAB

Lab Manual

Table of Contents

go.nature.com/2c1dxdt

juno #5: flexibility

- policy and practice on flexible working transparent
- understanding of a good work-life balance for all
  - department meetings are timed to take account of caring/family responsibilities
  - work allocation discussions are held with new staff
  - changes in caring responsibilities are dealt with in a supportive and practical way.
- all arrangements in before/ after during career breaks or shared parental leave well managed
- support is provided to allow returners to get back up to speed.

work-life balance: mental health

Students

The rise in student mental health problems – 'I thought my tutor would say: deal with it'

Students starting university face different pressures from earlier generations. What are the potential troubles and how can young people be prepared?

- Expert tips: what you can do now to help you start with confidence

97 107

Donna Ferguson

Tuesday 29 August 2017 07.00 BST

After months feeling depressed and alone, student Nicola Gee finally so
Sarah Lee for the Guardian

Freshers

How to prepare for university: dos and don'ts

Lecturers, tutors and doctors give their expert tips on what students need to know to get off to a stress-free start

- Student mental health – 'I thought my tutor would say: deal with it'

36 0

Donna Ferguson and Pragya Agarwal

Tuesday 29 August 2017 07.00 BST

Ensuring time to socialise and make friends helps increase resilience. Photograph: SWNS.com

Imperial College London

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work-life balance: mental health

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work-life balance: mental health

EDITORIAL · 29 MARCH 2018

Time to talk about why so many postgrads have poor mental health

An outpouring on Twitter highlights the acute pressures on young scientists.

Don't feel alone: share your stories of mental-health issues and help *Nature* to tackle the problem. Credit: Getty

Poor mental health is an issue for many of our readers. That fact is underscored by the response to a tweet sent by @NatureNews earlier this week, which highlighted that rates of depression and anxiety reported by postgraduate students are six times higher than in the general population (T. M. Evans *et al. Nature Biotechnol.* **36,** 282–284; 2018), and asked what should be done to help. The figures are a shock, but it was the reaction that blew us away: more than 1,200 retweets and

PDF version

LATEST EDITORIAL ARTICLES

Filthy air is a global disgrace

Austrian agency shows how to tackle scientific misconduct

Clever chemistry offers new source of jet fuel

The earliest known drawing in history sends a message through 73,000 years

Celebrate the mathematics of Emmy Noether

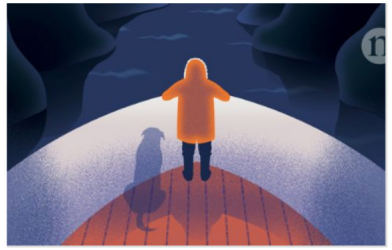
Articles

Nature | Editorial

What to do to improve postgraduate mental health

Greater awareness must be matched with steps such as better training for supervisors.

Nature | Comment



I'd whisper to my student self: you are not alone

Twenty years on, Dave Reay speaks out about the depression that almost sunk his PhD, and the lifelines that saved him.

Dave Reay

Nature | Career Feature

How to handle the dark days of depression

Mental illness can be devastating — but there are ways to fight it, say four researchers who have known those bleak times.

Emily Sohn

Nature | Career Feature

Feeling overwhelmed by academia? You are not alone

Five researchers share their stories and advice on how to maintain good mental health in the hyper-competitive environment of science.

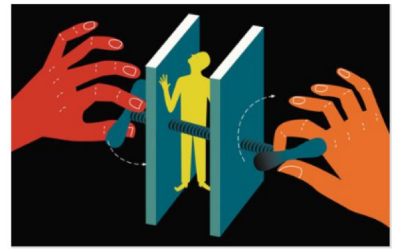
Chris Woolston

Nature | Editorial

Time to talk about why so many postgrads have poor mental health

An outpouring on Twitter highlights the acute pressures on young scientists.

Nature Jobs | Feature



Mental health: Caught in a trap

The pressures of a scientific career can take their toll on people's ability to cope.

Emily Sohn

All Articles »

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#6: professional conduct embedded in departmental culture

- clear values and expectations of the behaviour of individuals to each other (staff and students), communicated to all staff
- policy on harassment and misconduct covering staff, students and postdocs setting out clear guidance on how to make a complaint and how it will be addressed
- system for recording confidential complaints of harassment, bullying or misconduct

harassment

News › UK › Home News

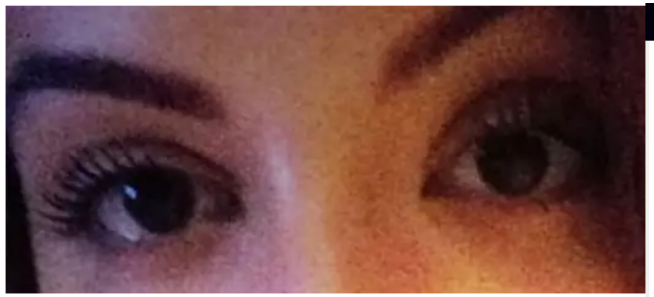
Sussex University failed duty of care to student assault victim, inquiry finds

Sussex University 'failed to follow its own safeguarding procedures' by allowing Dr Lee Salter to remain employed, despite gross physical and emotional abuse caused to Allison Smith

Rachael Pells Education Correspondent | @rachaelpells | Wednesday 18 January 2017 15:48 | 0 comments

1 share

Like Click to follow The Independent



THE TIMES SUBSCRIBE LOG IN

Sex harassment victims force University College London to end gagging orders

Katie Gibbons

July 28 2018, 12:01am, The Times

Law | Economics | Education

Emma Chapman claimed that she was a victim of verbal and physical harassment at UCL
TIMES PHOTOGRAPHER JACK HILL

A leading university has abandoned non-disclosure settlements in sexual harassment cases after the number of complaints made against staff more than doubled in a year.

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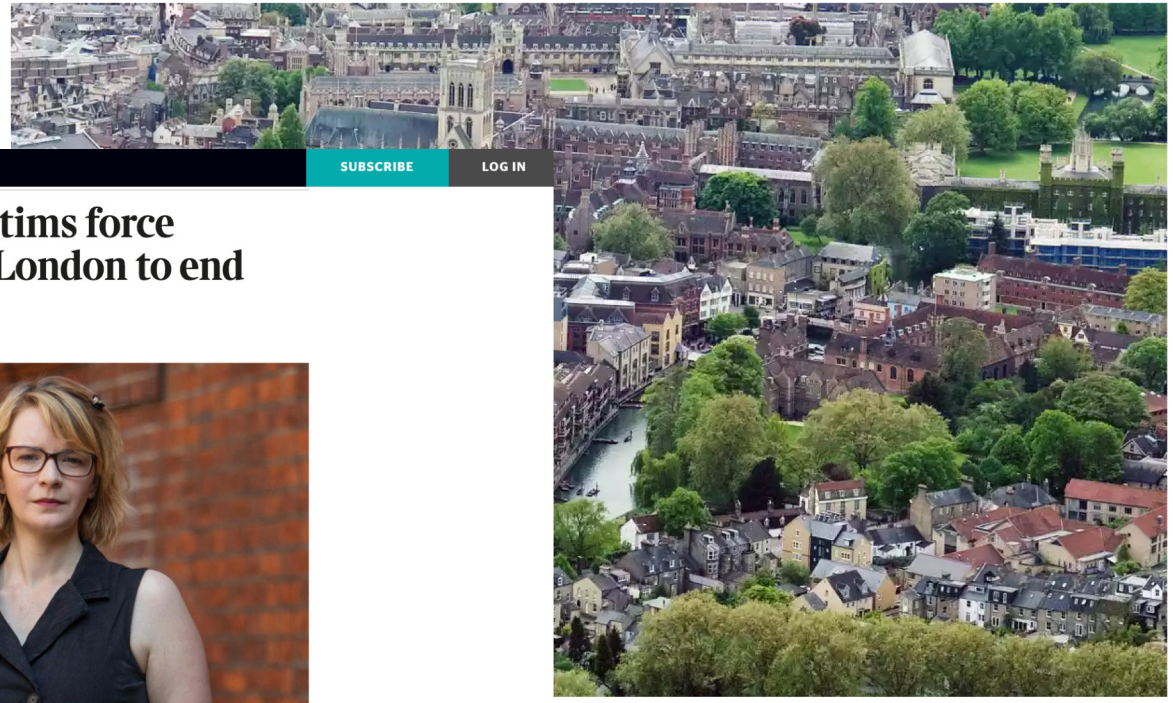
University of Cambridge

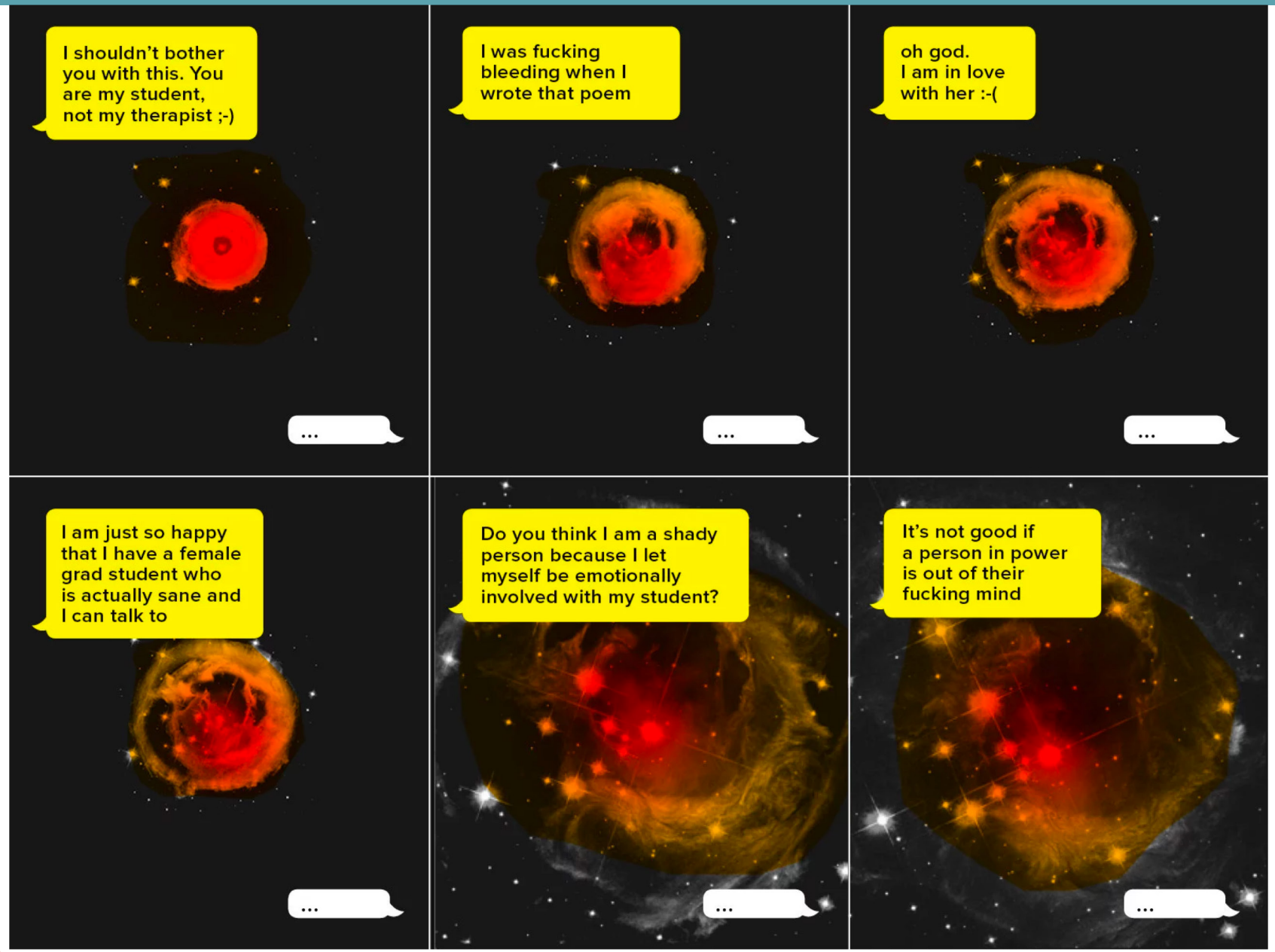
University of Cambridge admits significant sexual misconduct problem

Institution receives 173 complaints of improper behaviour in nine months



of complaints received through its anonymous sexual
Photograph: Geoff Robinson Photography/REX

harassment


I shouldn't bother you with this. You are my student, not my therapist ;-)
...
I was fucking bleeding when I wrote that poem
...
oh god. I am in love with her :-(
...
I am just so happy that I have a female grad student who is actually sane and I can talk to
...
Do you think I am a shady person because I let myself be emotionally involved with my student?
...
It's not good if a person in power is out of their fucking mind
...

harassment

BuzzFeed News
REPORTING TO YOU

TRENDING Brett Kavanaugh Allegations Rod Rosenstein Beto O'Rourke And Ted Cruz

SCIENCE

Astrophysicist Christian Ott Was Just Fired From His New Job In Finland After Harassment Scandal

The decision came after Finnish astronomers circulated an open letter. "Harassment or discrimination threaten our community and our way of working together. They have no place here," it said.

harassment + bullying

- **enabling cultures**
  - power imbalance / lack of professionalism
  - culture of alcohol/ office extensions (conference culture)
  - loud voices dominate over better ideas
- **perpetrators protected**, damages victims, perps and team
- **junior scientists carry disproportionate load** (reporting + educating senior colleagues – effort they could be putting in to their work)
- **culture of silence** perpetuates abuse
- senior scientists have power to professionalise + enhance openness + enforce procedures

role of institutions

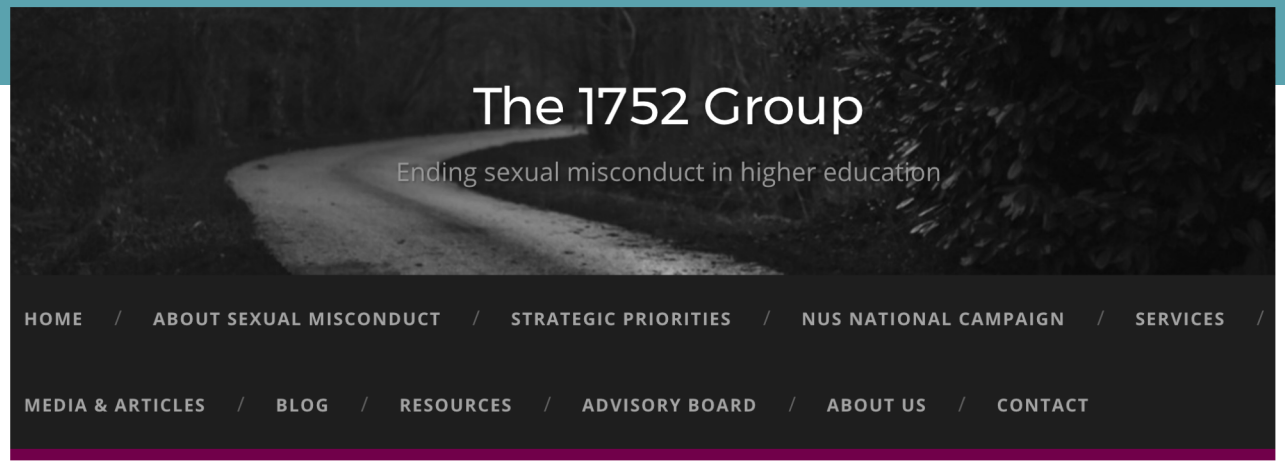
- lack of transparency
- lack of clear implementation
- competing interests:
  - hr / org / alleged perp/ alleged victims (hr protect org from employees)
  - timescales (phd/ postdoc contract)
  - use of NDAs
  - role of HoD
- PhD students particularly vulnerable (status student < > employee)
- fragmented support across sector

why we need to challenge bad behaviour

- It is the law + the right thing to do
- **scientific research is a privilege**
- collective + individual responsibility
- alternative is wasteful + expensive
- professionalism is productive

diversity will come as an outcome, not tokenism

1752 group



guardian freedom of information act (120 universities): 300 claims in 6 years

national level:

- research on impact / prevalence
- national awareness campaign
- independent national office for sexual misconduct prevention
- binding code for university staff

institutional level:

prevention

policies, codes of conduct, cultural change

improved institutional responses

independent advisors, external investigations, risk assessments, support for students

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1752 group

- 2015 (student – student), 1993
- fewer than **1 in 10 victims** reported to institution
- **1/3 of british universities** have no staff-students relationships policy
- **80 % of students are uncomfortable** with staff-student sexual or romantic relationship

---

- awareness-raising activities should take place only after policies and training have been implemented, in order to be sure that it is safe to encourage students to report
- public/visible information both online and offline should be made available, including in induction packs, on what behaviours will and will not be should not be tolerated

nus national union of students

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http://the1752group.wikidot.com/

The 1752 Group Wiki

Knowledge-sharing on Staff-to-Student Sexual Misconduct

Search this site | Search

About | Layout | Membership | User Guide | Help Docs | Contact

Home

Welcome to The 1752 Group Wiki

The 1752 Group

Welcome to the 1752 Group wiki, a knowledge sharing platform surrounding the issue of staff-to-student sexual misconduct in UK higher education. We hope the information here will enable and support activism in this area but this is not intended to be legal advice. Other legal advice should always be sought.

You can search for specific topics using the search box or you can start with the most popular articles:
Advice for complainants/witnesses
Advice for supporters
Advice for institutions
Advice for conference organisers
Advice for activists
Advice for sector

The 1752 Group is a UK-based research and lobby organisation working to end staff-to-student sexual misconduct in higher education.

Nowhere in the world is there adequate knowledge and research on the prevalence and impact of staff sexual misconduct in higher education.

We work at a national level to educate and lobby for change in the UK higher education sector by drawing attention to the complexity and impact of staff sexual misconduct and proposing solutions to address these issues.

The group forms partnerships and works in collaboration with academics, student unions, support services experts, universities and national organisations to conduct research that will lead to the development of best practice guidelines for the higher education sector.

Maturity Matrix - EChapman - 5 Jul 2018, 12:40

Advice for Activists - EChapman - 5 Jul 2018, 12:39

Gender Schemes - EChapman - 27 May 2018, 21:49

Funding Scheme Actions - EChapman - 27 May 2018, 21:49

Guidance for Conferences - EChapman - 27 May 2018, 21:45

Guidance for Supporters - EChapman - 27 May 2018, 21:44

Guidance for the Sector - EChapman - 27 May 2018, 21:42

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University Sexual Misconduct Response & Prevention Maturity Matrix

A self-assessment tool to measure the progress of university institutional responses to sexual misconduct.
To complete the assessment, in each row, select the box that most represents the current practice of your university.
Then on the next page, outline further details about current practices and future actions.

	1. INITIAL	2. REACTIVE	3. PROACTIVE	4. INNOVATIVE	5. OUTSTANDING
STRATEGIC LEADERSHIP	There is no formal sexual misconduct working group.	There is a formal sexual misconduct working group.	There is a joint university & students' union sexual misconduct working group.	There is a joint university & students' union sexual misconduct working group that is embedded into the university's governance structure	There is a working group with members from the university, students' union and local external partners that is embedded into the university's governance structure.
POLICY	There are no formal policies that outline conduct and behaviour expectations.	There are formal policies that outline conduct and behaviour expectations.	There are specific policies that address sexual misconduct.	There are specific policies that address sexual misconduct and student and staff relationships.	There are specific policies that address sexual misconduct, including relationships and sexual misconduct between students and staff.
PROCESS	There are no formal procedures for investigating sexual misconduct.	There are formal procedures for investigating sexual misconduct.	There are formal procedures for investigating sexual misconduct, which are in line with UUK guidelines.	There are formal procedures for investigating sexual misconduct, including misconduct between students and staff.	There are formal procedures for investigating sexual misconduct, including misconduct between students and staff, which do not require the implementation of non-disclosure agreements.
DATA	There are no formal procedures for reporting sexual misconduct.	There are formal procedures for reporting sexual misconduct.	There is a centralised system for reporting sexual misconduct.	There is a centralised online system for reporting sexual misconduct.	There is a centralised online system for formal reporting and anonymous disclosures of sexual misconduct.
TRAINING	There are no sexual misconduct awareness training or resources available for staff	There are online information pages on sexual misconduct available for staff.	There is a sexual misconduct awareness training programme available for staff.	There is a multi-tiered sexual misconduct training programme available for staff.	There is a multi-tiered sexual misconduct training programme that has been integrated into the core mandatory training programme for staff.
EDUCATION	There are no educational initiatives for students that address sexual consent.	There are online information pages on sexual consent available for students.	There is a voluntary sexual consent education programme for students.	There is a voluntary sexual consent education programme for students, which is embedded into student induction/enrollment.	There is a mandatory sexual consent education programme for students, which is embedded into student induction/enrollment.
SUPPORT SERVICES	There are no university support services or resources available for people who have experienced sexual misconduct	There are online information pages available for people who have experienced sexual misconduct	There are generic university support services available for people who for people who have experienced sexual misconduct	There are university support services with specially trained staff for supporting people who have experienced sexual misconduct	There are bespoke university support services for people who have experienced sexual misconduct

Imperial C
London

*All statements refer to both students and staff unless stated otherwise. Alternatively, users can choose to focus on students or staff separately.

Sexual harassment

Universities failing to tackle sex harassment by staff, says report

Only one sexual misconduct case out of 16 led to a staff member losing their job

▲ Women in British universities have been targeted by members of staff, finds the 1752 Group. Photograph: Alamy

Sally Weale *Education correspondent*

Wed 26 Sep 2018 00.01 BST

150

A number of UK universities are failing to tackle sexual predators on their staff as a due to shortcomings in complaints and disciplinary processes, finds a new report.

UNIVERSITY OF PORTSMOUTH

1752 the 1752 group

SILENCING STUDENTS: INSTITUTIONAL RESPONSES TO STAFF SEXUAL MISCONDUCT IN UK HIGHER EDUCATION

ANNA BULL,
UNIVERSITY OF PORTSMOUTH/THE 1752 GROUP

RACHEL RYE, INDEPENDENT RESEARCHER

SEPTEMBER 2018

Imperial College London

IOP Institute of Physics

France Córdova ANNE K. DU VIVIER/NSF

NSF spells out new sexual harassment policy: Talk to us

By **Jeffrey Mervis** | Sep. 19, 2018 , 12:00 PM

Starting next month, universities must tell the National Science Foundation (NSF) in Alexandria, Virginia, if any faculty members with NSF grants have been found guilty of sexual and other forms of harassment, or if they have suspended them for any reason. But NSF won't pull its funding if institutions can assure the agency that another faculty member can take over the research project.

Those new requirements are part of changes to NSF's grantmaking process that will go into effect on 21 October. They are essentially what NSF proposed in March, after Director France Córdova **responded to rising concern over sexual harassment in science** by promising to provide a "safe, productive research and education environment" at institutions it funds.

Impe
Lonc

Home / News & Opinion

Petition Asks AAAS to Remove Fellows With Sexual Harassment Records

The request is similar to one made of the National Academy of Sciences.

Jul 12, 2018
KERRY GRENS

111 24

Update (September 17): AAAS announced September 15 that it has adopted a new revocation policy for elected fellows "in cases of proven scientific misconduct, serious breaches of professional ethics, or when the Fellow in the view of AAAS no longer merits the status of Fellow."

A petition by members of the scientific community asks the American Association for the Advancement of Science to remove fellows who have been found guilty of sexual harassment or assault.

"This is a no-brainer," says BethAnn McLaughlin, a neuroscientist at Vanderbilt University who started the petition. "This is something the world's largest science organization should have done when title IX came out."

	Number of Physics Departments
Supporter	17
Practioner	14
Champion	18
Total	49

"juno is run by physicists for physicists"

apply for award
→ assessed by panel of independent physicist who work on equality and diversity
→ buddying, mentoring

Timeline

2007: Project Juno is introduced
2008: 19 departments in "Supporter" category
2009: First Juno Champions are awarded – Warwick and Imperial College
2017: Current status: 58 departments offering undergraduate courses in physics, 49 are currently engaged with Juno.

equality challenge unit: athena swan

- 2005, ten principles
- three levels of award: **bronze**, **silver** and **gold** based on 10 principles
- to receive an award, the institution must have at least an athena swan bronze

Current Athena SWAN awards holders (April 2018)

All awards currently held:

731	Total awards
617	Department awards
96	University awards
18	Research institute awards

These visuals present Athena SWAN data and refer to UK awards. Data include both Pre-May and Post-May criteria awards and submissions. Information correct as of 30 April 2018.

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imperial culture review

- how do we assess and understand institutional culture as it impacts on gender equality?
- how do we evolve our culture to promote gender equality?

- **first phase:** documentary analysis, in depth and more informal interviews, focus groups, an open-text survey, participant and non-participant observation, and an anonymous wordpress blog.
- **second phase:** action inquiry process
- **themes**: empathy, authority, silence/dissent and failure.
- 249 students + staff

imperial cultural review

- lack community spirit
- hiding perceived vulnerability
- all consuming focus on academic performance
- many examples given to the researchers of bullying and discriminatory behaviour towards staff and students
- staff and students feeling afraid to speak up about issues

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professor stephen curry

ED&I strategy 2018

"we recognise the important of equality and that diversity is a strength"

"a culture that values difference is fairer and enhances the day-to-day experiences of everyone"

"people do better work when they are not stressed by discrimination or harassment"

"organisations that value all people will recruit and retain the best of them"

@stephen_curry

athena journey

2005 – founding member of charter
2006 – first institutional award
2009 – first departmental award (now 16)
2016 – first award in uk on new criteria
2017 – all 21 departments entered

ongoing projects

- have your say: anonymous harassment and bullying reporting
- annual athena lecture
- women @ imperial week
- **unconscious bias training**
- **active bystander training**
- **mind, student minds**
- **sexual harassment working group**
- research around **bias** on **student surveys**
- research around experience of **bme staff** and **students**

networks

- able@imperial,
- imperial 600
- women' s engineering society
- women in physics society
  - lunches, networking
  - talks, sponsors
- women in science & engineering campaign

diversity @ imperial

recruitment

- know your pool
- targeted job adverts
- inclusive language

training and support

- learning and development centre
- **postdoc development centre**
- educational development unit
- **equality, diversity & inclusion centre**
- 50 courses, including springboard
- **workshop on job level review process**
- **tailored departmental induction packs for postdocs**

other awards

- juno champion status (iop)
- stonewall diversity champion
- disability confident employer
- time to change mental health action plan

maternity & returnships

- nurseries on main campuses
- childcare vouchers for all
- return to work plan pre-maternity leave
- short-term funding to accommodate maternity leave /grant proposals

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if you are still not convinced

Gender Stereotypes

Annual Review of Psychology
Vol. 69:275-298 (Volume publication date January 2018)
First published as a Review in Advance on September 27, 2017
https://doi.org/10.1146/annurev-psych-122216-011719

Naomi Ellemers
Faculty of Social Sciences, Utrecht University, 3508 TC Utrecht, Netherlands; email: N.ellemers@uu.nl

Sections

Abstract

There are many differences between men and women. To some extent, these are captured in the stereotypical images of these groups. Stereotypes about the way men and women think and behave are widely shared, suggesting a kernel of truth. However, stereotypical expectations not only reflect existing differences, but also impact the way men and women define themselves and are treated by others. This article reviews evidence on the nature and content of gender stereotypes and considers how these relate to gender differences in important life outcomes. Empirical studies show that gender stereotypes affect the way people attend to, interpret, and remember information about themselves and others. Considering the cognitive and motivational functions of gender stereotypes helps us understand their impact on implicit beliefs and communications about men and women. Knowledge of the literature on this subject can benefit the fair judgment of individuals in situations where gender stereotypes are likely to play a role.

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angela saini, inferior

"I certainly think that women though generally superior to men [in] moral qualities, they are inferior intellectually," Charles Darwin, 1882

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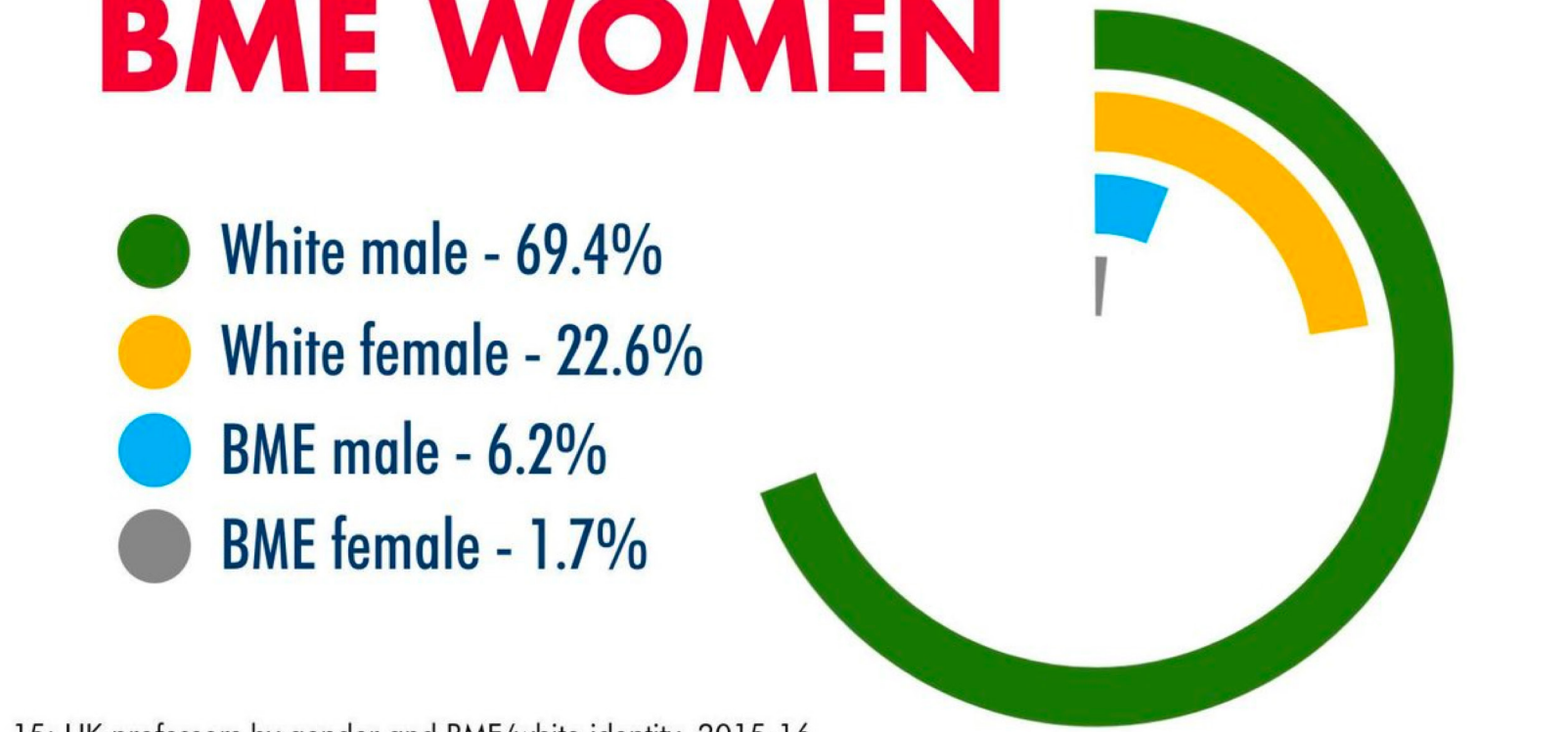
1.7% OF UK PROFESSORS WERE BME WOMEN



15: UK professors by gender and BME/white identity, 2015-16

Equality Challenge Unit

#ECUstats

ECU (2017) Equality in higher education statistical report 2017 - weighted by full person equivalent

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LGBT network

Sexual orientation

- bisexual **5.2%**
- gay man **3.4%**
- gay woman **0.9%**
- heterosexual **83.5%**
- other **2.5%**

IOP diversity survey

Every four years, the IOP carries out a diversity survey with more than 35,000 UK and Ireland members. Participation is voluntary, and in the July 2015 survey 13% of the membership responded. Included for the first time in the 2015 survey was a question about sexual orientation.

Results are based on 5,219 [illegible]15,273. 4.29% preferred not to answer.

How to be an LGBT+ Ally

by Joseph Razzell Hollis
@Jobium

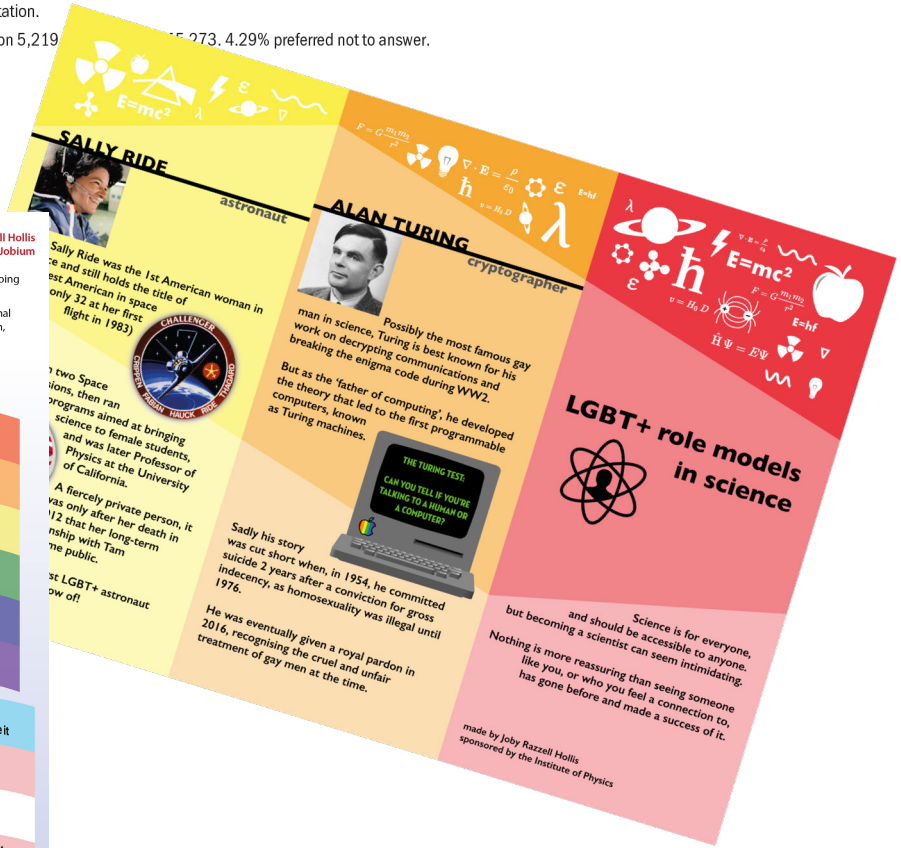
More than 50% of LGBT+ scientists are still in the closet to most people they work with,[1] and that's not going to change unless there's a concerted effort to make science more inclusive at every level.

The fear of a negative reaction or an adverse impact on their career leads to LGBT+ people hiding personal relationships and screening behaviour. The stress involved can have a profound impact on mental health, and when LGBT+ scientists are out, they report being happier and more productive.

Even if you're not LGBT+, you can still make your lab a friendlier, more welcoming place by following our beginner's guide to being an ally

Learn about LGBT+	What does it stand for? Each letter is a community with its own issues. Stonewall provide free resources about LGBT+ issues[2]
Think before you assume	Let people come out on their own terms Use gender-neutral language until you know for sure
Be open about your support	If you're an ally, don't be afraid to show it! Fly the flag, celebrate LGBT+ History Month, etc.
Challenge discrimination	If you hear or see something offensive, make it clear you find it offensive too
Look out for role models	Role models like Sally Ride, Tim Cook & Lynn Conway show that LGBT+ people can be successful in STEM. Talk about them!
Support networks	These networks provide specialist support for LGBT+ people Find out which network covers your organisation[3] and advertise it
Push for inclusivity	Change is rarely achieved without the support of the majority Help us fight for more inclusive policies
Unconscious bias	Discrimination isn't always a conscious decision Take an implicit association test to look at your own biases[4]
Accept your limitations	Understanding take time, you may not always get it right Listen to what LGBT+ have to say

1. Queer in STEM. DOI: 10.1080/00918369.2015.1078632
2. https://www.stonewall.org.uk/sites/default/files/straight_allies.pdf
3. http://www.iop.org/policy/diversity/lgbt-network/page_68474.html
4. https://implicit.harvard.edu/implicit/uk/selectatest.jsp



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disability support

An Institute of Physics Report | **May 2017**

Building momentum towards inclusive teaching and learning

A good-practice guide for undergraduate physics

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Strong and effective leadership

- Engagement of senior management in discussions on the need to take more strategic approaches to inclusive learning, including the consideration of anticipatory approaches
- Regular discussions and sharing of expertise to embed good practice and to document support strategies for future provision
- A named, visible champion for disabled students, acting as the focal point of contact for support and reporting into departmental decision-making structures

Clear and consistent policies and practices

- Consistently applied policies and practices on inclusive learning, such as the use of lecture capture, provision of lecture notes, attendance policies that support the identification of student health or mental-health issues
- Assessing the impact of policies and practices on disabled students during review processes, such as peer review, programme review, or curricula or assessment review
- Encouraging feedback specifically from disabled students

Ongoing training and development

- Training, development
students and opportu
- Appropriate disability
processes, such as in

Encouraging disclo

- A positive culture of d
with ongoing opportu
- Clear processes on di

Engagement with c

- Understanding the ne
reasonable adjustme
- Good communication
central disability offic

Communicating d

- Clear process for dis
those involved in tea
need to make adjust

Ensuring adjustm

- Understanding the n
departmental asses

Lab accessibility

- Offering flexible lear
- Communication to te
disabled students an

A Short Good Practice Guide | **April 2017**

Supporting Students in STEM with Colour Vision Deficiency

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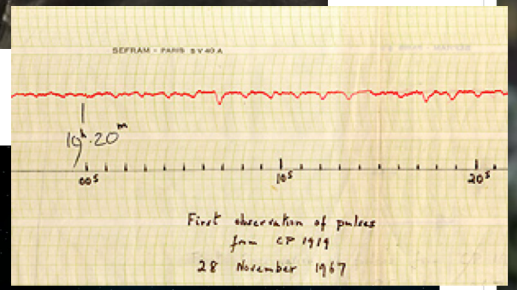
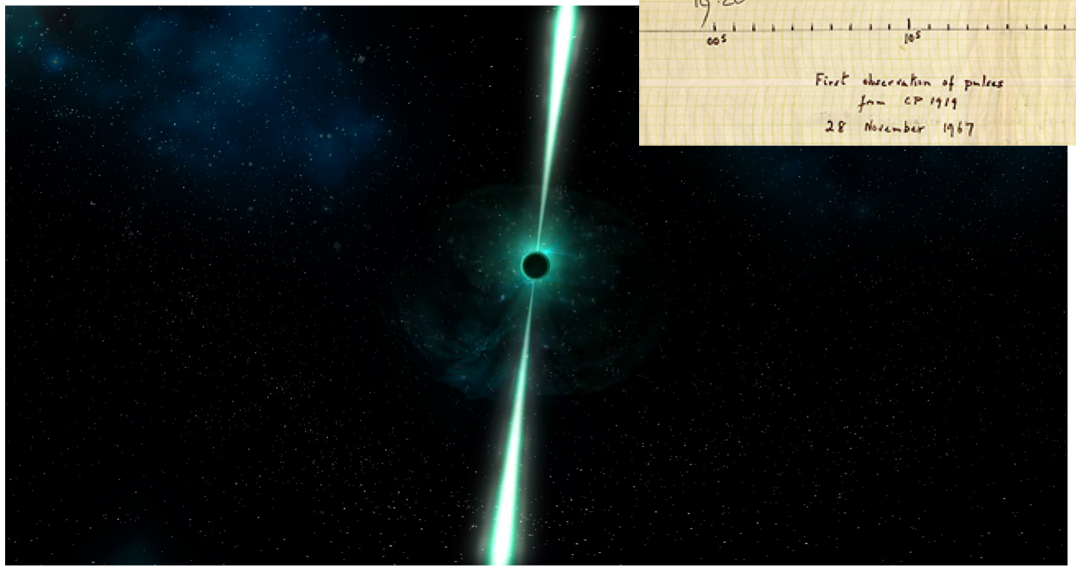
jocelyn bell-burnell





British astrophysicist overlooked by Nobels wins $3m award for pulsar work

Dame Jocelyn Bell Burnell will donate the money to help students underrepresented in physics

▲ 'I've done very well out of not getting a Nobel prize' ... Dame Jocelyn Bell Burnell. Photograph: DAVID HARTLEY/REX/Shutterstock

A British astrophysicist who was passed over for the Nobel prize for her discovery of exotic cosmic objects that light up the heavens has won the most lucrative award in modern science.

Dame Jocelyn Bell Burnell, a visiting professor at Oxford University, was chosen by a panel of leading scientists to receive the $3m (£2.3m) special Breakthrough prize in fundamental physics for her landmark work on pulsars and a lifetime of inspiring leadership in the scientific community.

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thank you

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