Piscopia initiative

What Can You Do?

A practical guide for those wishing to improve gender diversity in mathematical research

Written by

The Piscopia Initiative in collaboration with How to Train Your Allies



This booklet is designed to give some practical guidance on how staff and students can act as allies within their departments. It is primarily based on individual experience and is by no means the whole picture. A lot of the advice overlaps across sections, so please take a look at most of the chapters and take what fits with your role.

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...for a student

This section is primarily based on activities we have run at Piscopia events aiming to encourage undergraduates to pursue a PhD. Our events are run by PhD students, who can usually relate to undergraduates more like a peer.

"I'm not good enough to do a PhD"

One of the main worries we hear from women undergraduates when talking about PhD studies is the fear that they are not good enough (despite having sufficient grades and research interest). In our events we try to debunk this fear. We ask all attendees to stick a post-it on a wall with their reasons for not applying. We can then highlight how so many of them have the same worries. We also have PhD students talk from their own experiences about having the same worries! Realising that everyone is feeling the same goes a long way in making students feel confident that they are capable of doing a PhD.

Breaking Barriers

Another common stumbling block for prospective PhD students is not actually understanding what a research career can look like, and we like to provide the opportunity for students to find out. We have previously invited staff to attend our smaller events (e.g., 1 visiting member of staff at a student coffee morning) to informally chat about their career path. We found that this gives undergraduates the chance to ask questions that they wouldn't feel confident doing without this introduction and acts as an icebreaker.

You could also recommend students to our online seminar series, PiWORKS, which gives them a flavour of maths research!



Reflections

	How can you show undergraduates what a research career involves?
	How do we help all genders feel like ney belong in the maths community?
Think about when in the academic ye best to host certain events, for ex	ample
hosting coffee mornings before stu need to choose their masters pro	

...for a member of staff



It's not what you know, it's who

As much as we all like to believe in the myth of meritocracy (Perez, C.C., 2019), finding opportunities in academia can often come about because of the circles you work in, who you are introduced to at a conference, etc. Here are our recommendations for helping underrepresented genders reach the networks that suit them.

- Our first recommendation is to keep tabs on networks set up for underrepresented genders so that you can recommend them to colleagues or mentees.
- Similarly, there are mentoring schemes for specific groups that can support early career researchers. Not all mentoring relationships need to be with someone of the same gender, but they can help with certain queries or sensitive topics.
- Often people hear about certain scholarships that are available for people in specific circumstances because they happen to speak to someone who has also been impacted by those circumstances. Being aware of more niche grants means that you can recommend them when the circumstances arise.

For all the points above, it is worth noting that opportunities should be shared thoughtfully. Just because something is "for women" does not mean it will be helpful for every woman in the department!

Networks & More

Use this template to record networks, grants and scholarships and who they could be relevant to.

Name	What is it?	Website/Contact	Notes
Dorothy Hodgkin Fellowship (The Royal Society)	8-year fellowship worth up to £1.87 million	https://royalsociety. org/grants/dorothy- hodgkin-fellowship/	Helpful for those with caring responsibilities and/or health- related conditions
WISE Network	Organisation aiming to improve the workplace for women in STEM	https://www.wisecam paign.org.uk/	Annual awards for those contributing to equity in STEM
Think al	bout the stepping sto	nes between	

career stages, and recommend relevant grants that will help members of staff to get there.

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The Invisible Workload

There is extensive research showing that women in academia spend more time on service tasks for the university than the men in the department, meaning that they have less time to spend on research. Promotions are heavily based on research output, so this disproportionate distribution of service labour negatively impacts women's career progression.

Why?

Babcock et al. (2022) found that women are more likely to be asked to do service tasks, and they are less likely to say no when asked. The authors suggest that there is more of an expectation for women to do this non-promotable work and if a woman does not volunteer, someone will often volunteer her anyway or she will be shamed into volunteering.

Think about tasks that are not explicitly assigned around the department but are done without recognition. For example, is there a member of staff who is the 'go to' whenever a student has a sensitive or personal issue that they need to discuss? If you're not sure who this is, ask some students. How much time commitment do you think this involves for the member of staff?

Suggestions

- Institutions should clarify what comes under the category of non-promotable tasks and keep tabs on how this work is distributed. Tally the time commitment of service tasks alongside research tasks to identify any uneven distribution.
- If gender diversity is required for a task, e.g. needing a woman on an interview panel, split the preparation work so that if a woman has to do multiple panels, the time strain is reduced by someone else doing some of the background prep.



Recognise and reward service contributions that are vital to the university in promotion and pay.

The Invisible Workload

department. How is this work distributed? Is it proportional? Is it rewarded? Think about some of the non-research tasks that have to be done in your

Task	Who does this task?	Time commitment	Promotable work?	How was this job assigned?
Sit on EDI committee				
Organise the Christmas party				
Make sure kitchen is maintained				
Is the 'go to' person for student worries and issues			Does y	Does your department have an official health and
Sit on interview panels (tally per person)			wellbein	wellbeing academic team? If not, can it?

This section covers actions you can implement at any stage in your career.

...for a peer or friend



Modelling behaviour

Here we list some easy wins that you can implement straight away. We consider allyship an ongoing practice, so remember to return to this list regularly/research other allyship advice to action throughout your career. Your sphere of influence will change depending on your role, so think about how and who your actions could benefit in each.

- Making sure everyone is invited to study groups, post seminar discussions, lunches, etc. Often, exclusion can happen informally over time. Think about whether the location of discussion is inviting for everyone (for example, catering to dietary restrictions).
- An oldie but a goodie. And you can support in more ways than just forwarding emails. If you have an event (e.g. a careers fair or staff training day), organise a rep from one of these initiatives to visit! Similarly, reach out to the initiative to tell them that you are promoting them locally, as this recognition is really valued by small initiatives.
- If you hear about a prize, think about whether anyone in your department might be appropriate for nomination.

 Even if they don't win, passing the info on or saying that you nominated them is a good confidence boost for anyone!

Reflections

could go to if you wing creating a 'safe' environment where	within your department that you tness unacceptable behaviour. By group, you are supporting an you feel confident in reporting aviour without repercussions.
Specify your pronouns in email signatures, online calls and public profiles so that it becomes more normalised.	

...as a lecturer



Contextualising the maths

Lots of maths modules have some reference to the mathematicians that contributed to that particular area of maths. Here are a few suggestions on how to contextualise the maths in your course.

Firstly, collate information about which mathematicians are referenced in your course. There is a template on the next page to aid with this. Then consider the following...

- Are the mathematicians predominantly one gender or nationality? If one group dominated an area of research, you can acknowledge this at the start of the course.
- If there are mathematicians from underrepresented groups responsible for findings in your module, make sure to highlight this! If not, are there opportunities to include some?

Read about the QMUL booklet in our hall of fame as a starting point!

- Was any research wrongly attributed to another mathematician? Were certain groups excluded from mathematical circles at the time?
- Give a few facts about the mathematicians, which could be fun or sometimes gruesome! It makes the content memorable but also opens up discussion about the ethical considerations of the field.

Thinking about context

Thinking about the mathematicians highlighted in a module you teach on, use the template below to explore the wider context.

Any surrounding controversy?	Often referred to as "Miss Sanderson's Theorem". Discussion around qualifiers on women's work at the time and "male default" pronouns.			Are there any patterns in the mathematicians listed?	
Brief History	Developed theorem concerning modular invariants. Died age 25 of TB.				
Nationality	American				
Pronouns	She/Her (assumed)				
Name	Mildred Leonora Sanderson 1889-1914				

This section is primarily based on positive experiences that PhD students have had with supervisors.

...as a PhD supervisor



Informal Check-Ins

You are likely to be the person with the most contact with a PhD student. Therefore, an unprompted email about their welfare can go a long way. For example, for prospective students, **you could reach out beforehand to check in** on how they are getting on ahead of their start date (especially if they are relocating). The additional contact fosters a relationship whereby students will feel more comfortable coming to you if they have a problem.



Talk about Social Etiquette

Another conversation to help students feel like they belong is talking about the social etiquette for conferences/summer schools. This chat could be particularly useful for first-gen students and **insider knowledge can go a long way in making someone feel like they belong**. For example, how the contributed talk sessions might work or what to wear. You could also tell them about any icebreakers or put them in touch with other PhD students who will be in attendance.

Possible pitfall: Similarity/Affinity bias

Supervisors might unconsciously favour the students that have more social interests in common with them, leading to more networking and job recommendations.

Reflections

These ideas seem like they would be good for any student, how might they be more significant to a student from an underrepresented group?



Making a Researcher

Make sure to talk to your student about what they want out of a PhD early on and allow them to change their mind by reviewing regularly. Do they want to stay in academia, move to industry, something else?

By knowing what they want, you can tailor your advice accordingly, so that you can be proactive in suggesting relevant conferences, thinking about people you could introduce them to and other recommendations for their career (acknowledging that their career goals may not align with your own).

Positive outcomes from these types of conversations:

- As the supervisor, you can advise them about specific fellowships/opportunities and the timescale for these to reduce stress at the end of the PhD.
- As we said previously, these conversations also allow for the student to see you as a person they can talk to should they have any issues during the PhD, such as money worries if they have a funding deadline.
- If you can lay out the pathway to their next role, your student knows which tasks to prioritise for their own professional development. Earlier we discussed how women do a disproportionate amount of service work in academia, so learning when and how to say no to certain volunteering requests is a skill that is useful to develop early on.*

*There is a lot of value in postgraduate students from underrepresented genders attending undergraduate information events, and this should be recognised as a vital contribution and rewarded as such.

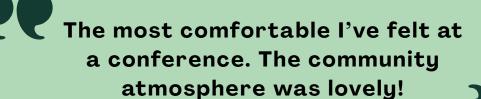
Reflections

Are there ways in which you can help your student(s) feel part of the mathematical community, both within your university and more broadly?

This section is primarily based on how we have run previous PiFORUM conferences.

...as a conference organiser

Our overarching ethos with PiFORUM is to celebrate collaboration and cooperation over competition. We recommend reading Eugenia Cheng's book "x+y: A Mathematician's Manifesto for Rethinking Gender" (2020), which talks in more detail about what she coins as "congressive" and "ingressive" behaviours.



Often conferences will boast a 50/50 split of women and men speakers, but we believe that a lot of the feeling of belonging is in the smaller details of a conference. A lot of our attendees have given us positive feedback on the organisation of our conferences and how that has helped them feel at ease and really welcome.

Below we talk about some "easy wins"; they are all simple measures that have had a positive impact on our conferences. All but one are free to implement (and the remaining one is very cheap)!

If your event is inclusive by design, it will encourage a more diverse audience. See our further reading list for more suggestions.

Before the Conference...



Provide Facilities Info

We provided details on **where to find toilets** (including gender-neutral ones) and booked a spare room as a **quiet space** that people could use if they needed. We provided all these details beforehand via email and in a conference booklet so attendees didn't have to ask!



Dress Code

On our website and via email, we provided recommendations for what to wear. On social media we shared pictures of what we were wearing as organisers, meaning attendees could see an actual face before they arrive which made things more welcoming too.



Caring Costs

Make sure to include caring costs when you apply for funding for an event, and that this is then advertised when you promote your event! As an idea of the amount, for PiFORUM24 we requested a few hundred pounds for an approximately 60-person, 2-day event.

Ask your peers/colleagues what they wish they had known before attending their first conference, so that you can ease potential worries for first time attendees.

During the Conference...



Optional Pronoun Stickers

We bought pronoun stickers (they are very cheap) that attendees could add to their name badge upon arrival should they wish to. This allowed people to choose on the day, it made registration more welcoming and friendly and people can update their choice throughout the conference (as they may not feel comfortable to do so initially).



Preferred Names

We asked all attendees if they had a preferred name and how to pronounce their name so that chairs would introduce speakers correctly.



Question Time

We asked all speakers to hang back at the end of their session so that attendees could ask them questions individually instead of in front of a crowd. This measure also encourages more meaningful interactions for speakers.



Social Activity

We also have a (sober) social activity at the same venue as the conference to allow for more people to attend and network which accommodates for those with caring or other responsibilities and limits worries about travelling home late in an unfamiliar area.

During the Conference...



Doing Prizes Differently



We awarded lots of prizes at PiFORUM that rewarded collaborative and inquisitive behaviours. For example, we gave out a prize to someone for asking the most interesting questions, another for networking the most with multiple groups, another for enthusiastic participation in the workshops and another for particularly clear figures in a presentation.

Checklist

Use the template below to document congressive practices you can implement when you next organise an event.

Suggestion	Done (x)
Provide information on available facilities	
Book a quiet space	
Include caring costs in funding application	
Buy pronoun stickers (optional for attendees)	
Include preferred name section in sign-up form	
Sober networking event at conference venue	
Include prizes that reward congressive practice	

How else can you make everyone feel like they belong at your event?

Finally, we spoke to our community about their experiences. Here, we cover some general themes that were frequently mentioned, mainly centred around the PhD experience.

...thoughts from our community



"Everyone else just gets it"

Lots of our community said that they wish they had known sooner that it is ok to not understand everything, to feel overwhelmed, and to feel lost listening to conference talks. There is still very much an assumption that academics "know everything".

What can you do?

The good news here is that most of the time students feel more included just by hearing that academics/other students are feeling lost too. Be open in talking with students about how they are not expected to understand everything, especially at conferences where talk topics can be very varied.

Students said that their sense of belonging was helped by the informal conversations they had with other academics. Being invited to coffee mornings and having lunches in a department means that there is more opportunity for these chats and overall improves a student's feeling of being a part of the team.

What can you do?

Make sure to communicate expectations with your students, e.g. the expected frequency of meetings and how you like to give feedback. Again, being open about how you work allows students to develop a routine that works for them and advocate for themselves about their needs. For example, talking about a feedback structure opens the conversation for any accessibility concerns.



The Invisible Workload starts small



We spoke previously about the disproportionate amount of service work that women do in a department, and PhD students report the same issue. Always being the one asked to volunteer to work at the careers fair, organising student welcome events, sound familiar? If it's already trained in and accepted as the norm at PhD level, how do we expect it to be any different when moving up the chain? We recommend departments track service jobs done at PhD level and highlight any discrepancies.

A ton of feathers is still a ton

All of these tiny jobs, booking the meeting room, taking meeting minutes, spending half an hour talking to a student who wants to drop out, accumulate and take away significant time from research.

Lots of students report feeling like their service jobs to the university are worthwhile and fear that if they did not volunteer, no-one would.



The Academic Lifestyle

Many have worries around starting a family when there is frequently the need to move with an academic career. This problem is amplified if you have a partner who is also an academic.

What can you do?

We do not have a simple answer here, and this issue goes beyond improving gender diversity. The main recommendation we have would be to support your students in planning what they want from their career, and help them to lay out the specific steps to get there.

A Word on Accessibility

Now there is definitely a whole booklet's worth of content that we could write on accessibility. We note a few starting points here.



Lecture Notes

See the resource list in our hall of fame for help with this!



Mathematical notes (particularly those written in LaTeX) are very difficult for screen readers to interpret. Try to have all materials available in both PDF and HTML format in advance of the lectures so that students can adapt them for their own needs (for example, increasing or changing the font). Also make sure text is left-aligned for readability.



Where possible, include a range of resource types such as physical models and videos as well as lecture notes. Use highly contrasting colours for slides and diagrams.



On lecture capture, make sure there are transcripts or closed captions. Similarly, have alt text on pictures and make sure links in notes are descriptive.



Extra Support



Provide platforms for students to anonymously and privately ask questions. For example, hand out small pieces of paper for people to write questions on during a lecture. You can then identify common problems and hear from students who wouldn't be able to raise their hand in lectures.





Hall of Fame



Here we highlight some useful resources and systems that have already been made to help you implement some of our suggestions.



Diversifying the Maths Curriculum

A project at Queen Mary University of London led by Dr Claudia Garetto created a document containing 56 biographies of prominent mathematicians with an emphasis on mathematicians from minority groups. The booklet has a handy contents page which organises the biographies by topic for easy navigation. Make sure to consider this as a starting point for your research and analyse how much you should take as 'fact'. After all, history is often written by the winners!



DBS: Disclosure and Barring Service

Some roles, such as those involving outreach activities in schools or with young people, may require a DBS check. Transgender applicants can **contact the DBS Sensitive Team** (0300 131 2784) **before submitting an application** to choose not to have any gender or name information disclosed on their DBS certificate or to their employer, that could reveal their previous gender identity.



PDF to HTML

Some helpful tools for LaTeX to HTML converting include pandoc, LatexML and BookML. Information on BookML installation and usage is at https://vlmantova.github.io/bookml/ and there is a how to video at

https://talmo.uk/2025/accessible-mathematics.html

The advice in this booklet should only be treated as a starting point and will also need updating in the future. We like to think of allyship and this booklet as a collaborative effort, so if you have any suggestions for us, we ask you to get in touch at:

<u>howtotrainyourallies@gmail.com</u> and <u>piscopiainitiative@gmail.com</u>

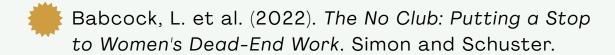
Suggestions could include updating wording, "easy wins" you have implemented at your institution, or a whole section we've not covered yet!

Please appreciate that both initiatives that worked to create this booklet are made up of volunteers and so our response may be slow.



References





- Cheng, E., (2020). x + y: A Mathematician's Manifesto for Rethinking Gender. Hachette UK.
- Perez, C.C., (2019). Invisible Women: Exposing Data Bias in a World Designed for Men. Abrams.

If your institution's library does not have these books available, could you suggest them for purchase?



A note on us



- The Piscopia Initiative is a nationwide network encouraging women and underrepresented genders to pursue a PhD in Mathematics and offering support for students and researchers in mathematics and related disciplines. Find out more about what we do at http://www.piscopia.co.uk.
- How to Train your Allies is a website created by PhD students at the University of Birmingham, which provides resources for running your own workshop on allyship for gender diversity:

 https://sites.google.com/view/how-to-train-your-allies.





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With thanks to...

Dr Elizabeth Dombi, University of Strathclyde
Dr Sebastian Gilbert, University of Birmingham
Dr Jamie Mason, Durham University
Dr Alberto Paganini, University of Leicester
Prof Gwyneth Stallard, The Open University
Dr Brigitte Stenhouse, The Open University
Dr Laura Wadkin, Newcastle University

And... All of the attendees of PiFORUM25.