Women in Fluid Dynamics UK National Survey: Summary of Results

Women in Fluid Dynamics UK: UK Fluids Network Special Interest Group

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Introduction

The newly established UK Fluids Network Women in Fluid Dynamics UK Special Interest Group (SIG) commissioned a survey through an external provider (Agenda Consulting). This aimed to understand the experiences of women working in fluid dynamics (academia and industry) in the UK and how the SIG could best support them. The survey fieldwork was undertaken between 27th August and 29th September 2024, a time lapse of 4 weeks.

101 people responded to the survey: 78 women and 23 men/other. See the Appendix for survey data.

Key findings

Q1-5 Engagement

Respondents were positive about working in the field of fluid dynamics and there was a fairly positive expectation of continuing to work in this area in the next 1-5 years and working in fluids at their institution (80-97% positive responses).

There is some discrepancy between positivity of experience of fluid dynamics as a field (more positive) and experience of fluid dynamics within own institution (slightly less positive).

Survey comments: why women have left the field

Examples of why women left the field are: difficulty in securing permanent roles, finding it too competitive, too hard to keep a good work-life balance, better job security and pay outside of academia, location restrictions due to personal life, parenting responsibilities, lack of certainty with short-term contracts, lack of opportunity to progress.

Q6-33 Experience at Work – Roles and responsibilities

Colleagues felt generally positive about being treated equally with respect to gender in the field of fluids and at their institutions (63-75% post-doc upwards) and the order of authors on papers was felt to be relatively fair (87% positive including PhD students).

However, colleagues from post-doc position upwards felt the grant making process (33% positive) and and peer review process (51% positive) was not particularly fair for

women, and women are not particularly likely to be included in important decision making in their department (46% positive).

The outlier in the whole group was the senior lecturer level, where scores were up to 40% more negative across all questions with the exception of the allocation of authors to papers.

Women were more likely to be asked to:

- Sit on an internal committee (69%)
- Participate in an interview panel (90%)
- Support student welfare (88%)
- Organise social activities (85%)
- Deliver outreach (88%)
- Mentor others (80%)
- Take on roles such as EDI champion (93%)

But were less likely to be

- Named as PI/Director on a grant/project proposal (38%)
- Take on a departmental or institute leadership role (38%)
- A representative on funding bodies or other external organisations (46%)

Survey comments: additional responsibilities and tasks

Women would like a workload allocation model to ensure workload is properly accounted for including admin roles. This includes proper allocation of time distributed, so it's not only women giving up research hours for additional responsibilities and tasks.

It is felt that social activities and office admin often falls on women, without recognition. This is not unique to fluids. Having a rotational system would help people take on additional responsibilities so they do not fall on the same people.

Additional work should be counted for in workload allocation, e.g. sitting on interview panels, mentoring, EDI work, outreach activities (which often take place on weekends), and not just classed as “volunteering”.

People would like to see more men involved in EDI, outreach, etc.

Q6-33 Experience at Work – Treatment at work

In the last 12 months 18% of respondents experienced discrimination, bullying, harassment, sexual harassment, abuse of authority or ill treatment at work, this figure increased to 32% when the period was increased to the last five years. In comparison 18% of women had experienced these issues in the last five years when in the context of external fluids events.

Of particular concern were the combined 4% of reported experiences of sexual violence or sexual assault at work and at external events in the last five years. While this appears to be a small percentage, any experience of sexual violence or sexual assault is unacceptable.

Survey comments: discrimination, harassment, etc.

There were quite high scores affirming the statements that women in fluids feel they are being judged for their appearance at work (54%) and assumptions are made that they are younger/more junior than they actually are (81%).

There is a strong sense of sexual discrimination and ill-treatment of women within the community, compared to the treatment of men.

This can be exhibited as physical harassment, verbal harassment, treating women differently during conferences, aggressive and bullying behaviour, men refusing to shake women's hands, being spoken to in a condescending manner, assuming women are less senior than their male counterparts, having their authority questioned or undermined.

Women also felt discriminated against due to their age and ethnicity.

Q35-37 Pay and reward

65% of women felt that they were fairly rewarded for their role, 56% felt they were rewarded fairly compared to men. When exploring demographics, senior lecturer roles were strongly negative on this point (38% and 54% more negative responses compared to the whole group). Respondents did not generally feel that they understood how decisions were made on pay in their institutions (only 38% felt they understood).

Q38-40 The Impact of Work in Fluids

64% of women felt they had made sacrifices in their personal life for their career in fluids and 49% of women felt they had made sacrifices to their career for their personal life. Only 36% of women felt able to maintain a good work life balance. When exploring demographics this figure is reported at the lowest for PhD level (28% felt they had good work life balance).

Q41-45 Career Progression and Promotion

Overall women felt that their training and career development was well supported (62-76% positive), however senior lecturers again did not feel as positively about this (-53%), and professors were less likely to have a mentor (-44%).

PhD students (-27%) and experienced technical specialists in industry (-8%) are less clear about what they need to do to progress in their career.

Overall women do not feel they see many women in senior roles in fluids (44%) with lower scores at post-doc (-15%), senior lecturer (-26%) and professor level (-13%). Scores are similar for whether colleagues see many women in senior roles in fluids in their own institution.

Women feel they are actively encouraged to submit their work to journals for publication, attend and present work at conferences, to access relevant training and engage with external activities e.g. membership of professional institutions (51-72%). Women were less likely to be encouraged to be the co-investigator or director on a grant or project proposal (38-42%) or to talk about their work in public fora (33%).

Q52-55 Barriers and Enablers

The biggest barriers identified by women in fluids are

- Short-term contracts (44%)
- Challenges securing grant project income (40%)
- Lack of role models (35%)

It is fair to say that the first two points are likely common across the discipline, but the lack of role models is certainly worth consideration.

The biggest enablers identified by women in fluids include

- Flexibility around requirements for career progression (47%)

- Opportunities to network with other women (46%)
- Support for grant/fellowship/proposal writing (41%)
- Access to careers support and advice for women (36%)

Survey comments: barriers impacting career

There is a sense that a lot of women lack confidence and feel like they suffer with imposter syndrome. More support is needed from colleagues, mentors, line manager, etc.

Earlier career female scientists need role models, mentoring and shared paternity leave and carers responsibilities between parents. Having good male and female role models is important, as well as a supportive and friendly community.

Balancing a career and personal life is hard. Some women choose to stay in the same position rather than moving around because of this, and this should not be looked down upon. Moving to a part-time role is difficult, especially after maternity leave. More career advice and mentorship in this area would be beneficial. There should be more support for those that choose to have children and take a break from work or take on reduced hours.

Women would like to see a shift from primarily using publications as metrics of success, and using other activities as valuable assets for hiring for lectureship roles, e.g. outreach, mentorship, giving talks, teaching, etc.

Women would like to see dedicated funding routes for women and more support in applying for funding. More support is needed for grand writing.

Q58, 61 Women in Fluids

Overall, 48% of colleagues estimate that their department constitutes of approximately 0-20% women and 36% estimated 20-40% women in their department.

When filtered by demographic the % estimate in academia is more heavily weighted towards the 0-20% bracket (56%) and industry is more weighted towards the 20-40% bracket (46%).

It is important to note that this is as observed by staff and is therefore not a completely reliable measure of the balance of women in fluids in institutions. Data should be sought at source.

Men are more likely to have acted as a mentor (65%) than women (35%) which is likely a reflection in the numbers of men vs women in senior roles. The more senior the colleague the more likely they have acted as a mentor.

Survey comments: representation of women

Survey respondents do not see a big improvement in the number of female academics. There seem to be more women doing PhDs and ECR roles, but not senior academics and professors – this continues to be primarily male dominated.

Open Questions

Support and encouragement

Some examples of schemes to support women include EDI committees/networks, microaggressions training, recruiting from schools, good maternity policies, mentoring, Women in Engineering networks/societies, lunch groups and coffee mornings, Returning Careers scheme, hybrid working schemes, leadership schemes for women, nursery salary sacrifice scheme, celebrating INWED, Athena Swan awards.

What is available for women needs to be promoted more as some people are not aware of all the support schemes on offer.

SIG priorities

Respondents would like to see the SIG establish itself and reach out to as many women as possible across institutions in the UK, with SIG reps at each university. Enhancing the visibility of the network is key.

Women would like to see mentoring schemes for all career stages, career guidance, as well as a network and community bringing women together.

Women would like to see guidance on promotions, grant writing, research funding or professional membership/chartership that directly support career progression, as well as raising the profiles of women in the sector.

It would be beneficial to have a meeting for everyone to put together ideas for what they would like to get out of the SIG. There should be regular SIG meetings; some in person and some online. Online meetings would benefit people who cannot attend face-to-face networking opportunities.

There needs to be support and guidance for women who return to work after a career break, e.g. maternity leave. There should be training for people in supervisor and leadership positions, about how to support female academics.

There should be activities to try to initiate long-term culture changes in the field to make it more inclusive. Girls in school should be encouraged to take an interest in STEM subjects, and we should look at how these subjects are being taught.

What you would like to see from the SIG

Short term, a stronger voice and recognition of the achievements of women. Long term, a change in the gender balance in more senior roles.

The SIG will lead to a better connection of women and opportunities to learn from senior women in the field. It is important to see more women (and other underrepresented groups) in senior positions.

The SIG can help women feel more supported and give a better understanding of the challenges that women face. It is crucial to improve the visibility and representation of women in the field.

There needs to be lobbying for changes at a high level, e.g. job contracts, hiring and retention of staff. As well as changes in funding schemes and more inclusive grant award discussion making. Ideally, we can influence policymakers.

We need to shift the culture to support flexible learning and improve work-life balance. We need to recognise that that true equality will only be achieved if carers and parents' responsibilities are shared and supported by the system.

We need to raise awareness of systemic issues, especially with harassment and abuse of power which might lead to a higher retention of female academics.

More support and mentoring for different career paths, and increased awareness of the difficulties with academic career progression. Sharing experiences and providing role models.

To strengthen the network, the SIG could be linked to Athena Swan.

Key recommendations from the survey

1. The SIG needs to lobby for changes and highlight issues women face at a high level (e.g. inclusive grant application and award processes; harassment and abuse of power; better representation of women in senior roles; metrics of success to acknowledge “extracurricular” responsibilities)
2. The SIG should launch a cross-institutional mentoring scheme for women which includes support for a range of career pathways and returning from career breaks (e.g. maternity leave) from other women who can act as mentors and role models
3. The SIG should coordinate training sessions for women such as writing grant proposals and tackling imposter syndrome
4. Research culture needs to change to accommodate more flexible working and work life balance to retain women (and men) in the discipline
5. Senior leaders should engage in training to support female colleagues and their progression/be allies for women
6. The STEM pipeline should be addressed to engage more women from an earlier stage

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Appendix: Survey Data

1 Engagement (Women only)

Please note respondents were given the following guidance: "Throughout this survey, **institution** refers to the organisation that employs you e.g. your university department or company"

Key

		2024 Overall Positive %	No. Res
1. I would recommend Fluids to other women as a good field to work in	26 / 55 / 17 / 3	**81**	78
2. I intend to be working in Fluids in 12 months' time	74 / 23 / 3	**97**	78
4. I intend to be working in Fluids for the next 5 years or more	55 / 31 / 12 / 1 / 1	**86**	78
5. I would recommend my institution to other women as a good place to work	29 / 50 / 18 / 3	**79**	78

2 Experience at Work (Women only)

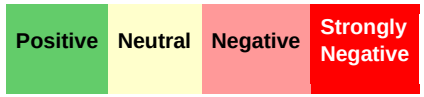
Please note respondents were provided with the following guidance: "Throughout this survey, **institution** refers to the organisation that employs you e.g. your university department or company. For these questions, please consider your experience as a *woman* in Fluids"

Please note the following questions included an N/A option: Q8, Q9, Q10. These responses are not shown.

Key

		2024 Overall Positive %	No. Res
6. In the field of Fluids, I feel I am treated equally, irrespective of my gender	17 / 44 / 19 / 19 / 1	**60**	78
7. At my institution, I feel I am treated equally, irrespective of my gender	29 / 46 / 12 / 13	**76**	78
8. The order of authors has been allocated fairly – irrespective of gender – in research papers I have been involved with	51 / 38 / 5 / 6	**89**	65
9. As a woman, I have found the grant-making process fair	9 / 26 / 47 / 15 / 4	**34**	47
10. As a woman, I have found the peer-review process fair	16 / 41 / 31 / 12	**57**	58
11. Women are included in important decision making that impacts my Fluids department	17 / 37 / 32 / 12 / 3	**54**	78

Key



		2024 Overall Positive %	No. Res
12. Others take credit for my research/work	33 44 21 3	33	78
13. Others assume I am younger or less senior than I am	5 22 33 40	5	78
14. I am judged for my appearance rather than my work	18 31 45 6	18	78

Please note, Q12-14 were asked on the following scale: Never / Rarely / Sometimes / Often. Overall Positive % refers to those who responded ‘Never’.

Results are shown as follows: **Positive %** = Never %; **Neutral %** = Rarely %; **Negative %** = Sometimes %; **Strongly negative %** = Often %.

Key

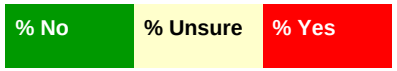
For each of the following activities, please indicate whether you feel you are more likely, equally likely or less likely to be asked to take on the responsibility because you are a woman.

Please note Q15-27 included an N/A option. These responses are not shown.

		2024 No Difference %	No. Res
15. Sit on an internal committee	18 / 51 / 18 / 13	18	67
16. Be a representative on funding bodies or other external organisations	32 / 14 / 26 / 28	32	57
17. Participate in an interview panel	32 / 58 / 6 / 4	32	69
18. Speak at a conference	49 / 25 / 12 / 14	49	77
19. Support student welfare	29 / 59 / 12	29	66
20. Organise social activities	19 / 66 / 1 / 13	19	77
21. Outreach	22 / 66 / 12	22	77
22. Mentoring others	29 / 51 / 6 / 13	29	78
23. Be named as PI/Director on a grant/project proposal	38 / 37 / 25	38	60

24. Participate in a promotions panel/process	33 16 20 31	**33**	55
25. Take on roles such as EDI champion	15 78 1 6	**15**	67
26. Take on a departmental or institute leadership role	36 2 41 22	**36**	64
27. Represent your organisation at external events	42 23 14 20	**42**	69

Key



		2024 Overall Positive %	No. Res
29. In the last 12 months, I have experienced discrimination, bullying, harassment, sexual harassment, abuse of authority or ill treatment at work	74 8 18	**74**	78
30. In the last 5 years of my career in Fluids, at work, I have experienced discrimination, bullying, harassment, sexual harassment, abuse of authority or ill treatment	53 15 32	**53**	78
31. In the last 5 years of my career in Fluids, at work, I have experienced sexual violence or sexual assault	96 1 3	**96**	78

32. In the last 5 years of my career in Fluids, at an external event e.g. a scientific conference, I have experienced discrimination, bullying, harassment, sexual harassment, abuse of authority or ill treatment		**73**	78
33. In the last 5 years of my career in Fluids, at an external event e.g. a scientific conference, I have experienced sexual violence or sexual assault		**97**	78

Please note responses to Q29-33 are reversed for reporting. **Overall Positive %** refers to those who responded 'No'.

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3 Pay (Women only)

Please note respondents were given the following guidance: "Throughout this survey, **institution** refers to the organisation that employs you e.g. your university department or company"

Key

		2024 Overall Positive %	No. Res
35. I am rewarded fairly for the contribution I make in my role	13 45 24 15 3	**58**	78
36. I am rewarded fairly for the contribution I make in relation to men in a comparable role to me	15 38 24 21 1	**54**	78
37. I understand how decisions about pay are made in my organisation/institution	6 31 23 36 4	**37**	78

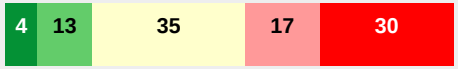
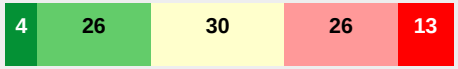
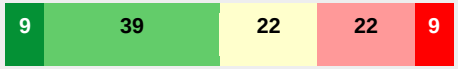
4 The Impact of Work in Fluids (All respondents)

Key

Women only

		2024 Overall Positive %	No. Res
38. I have made significant sacrifices in my personal life to pursue a career in Fluids	1 14 21 37 27	15	78
39. I have made significant sacrifices in my career in Fluids to pursue the personal life I want	5 21 26 35 14	26	78
40. I feel able to have a good work life balance	1 32 31 24 12	33	78

Men/Other only

		2024 Overall Positive %	No. Res
38. I have made significant sacrifices in my personal life to pursue a career in Fluids		**17**	23
39. I have made significant sacrifices in my career in Fluids to pursue the personal life I want		**30**	23
40. I feel able to have a good work life balance		**48**	23

Please note responses to Q38-40 are reversed for reporting. Overall Positive % refers to those who responded ‘Strongly disagree’ or ‘Disagree’

Results are shown as follows: **Strongly Positive %** = Strongly disagree %; **Positive %** = Disagree %; **Neutral %** = Neither agree nor disagree %; **Negative %** = Agree %, **Strongly Negative %** = Strongly Agree %

5 Career Progression & Promotion (Women only)

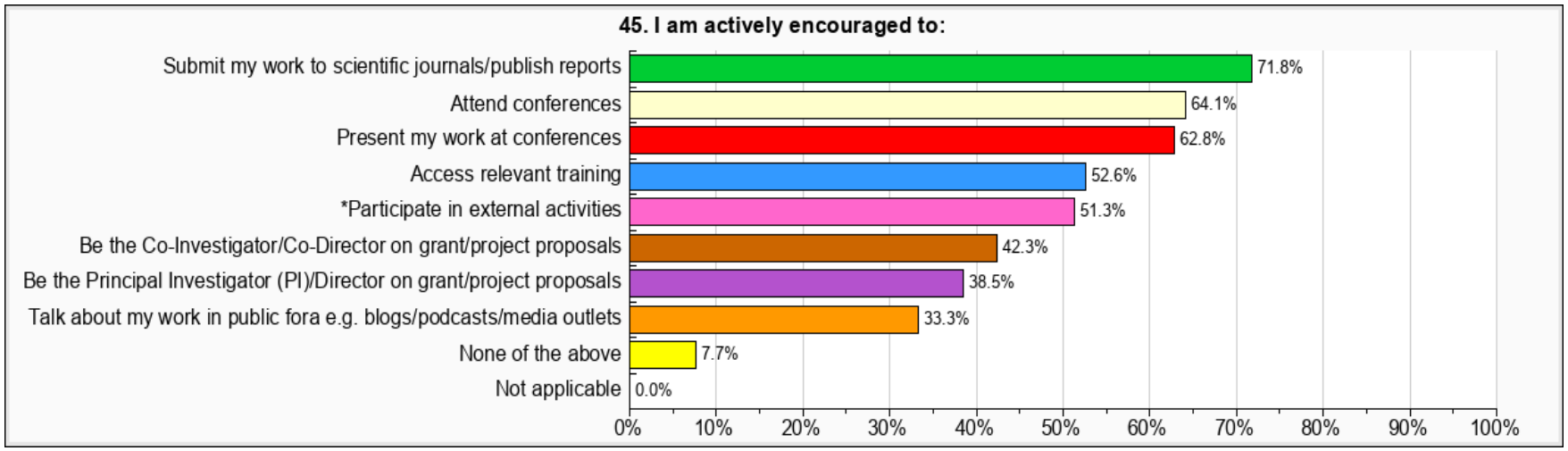
Please note respondents were given the following guidance: "Throughout this survey, **institution** refers to the organisation that employs you e.g. your university department or company"

Please note, Q47 included an N/A option. These responses are not shown.

Key

		2024 Overall Positive %	No. Res
41. My institution supports and encourages my career development	17 56 17 10	**73**	78
42. I regularly have conversations with my supervisor/manager about my career progression	18 44 12 17 10	**62**	78
43. I have a mentor who helps me with my career progression	13 31 18 26 13	**44**	78
44. I have access to training to help me develop	17 59 14 9 1	**76**	78
46. I am clear about how to progress in my career	12 46 23 15 4	**58**	78
47. I would feel confident to put myself forward for promotion	4 21 23 41 10	**26**	70
48. I can see opportunities to progress my career in my institution	5 40 23 19 13	**45**	78

49. I feel able to follow a career pathway that works for me	4	41	36	15	4	**45**	78
50. I see women like me in senior roles in Fluids	10	36	23	21	10	**46**	78
51. I see women like me in senior roles in my institution	8	37	18	26	12	**45**	78

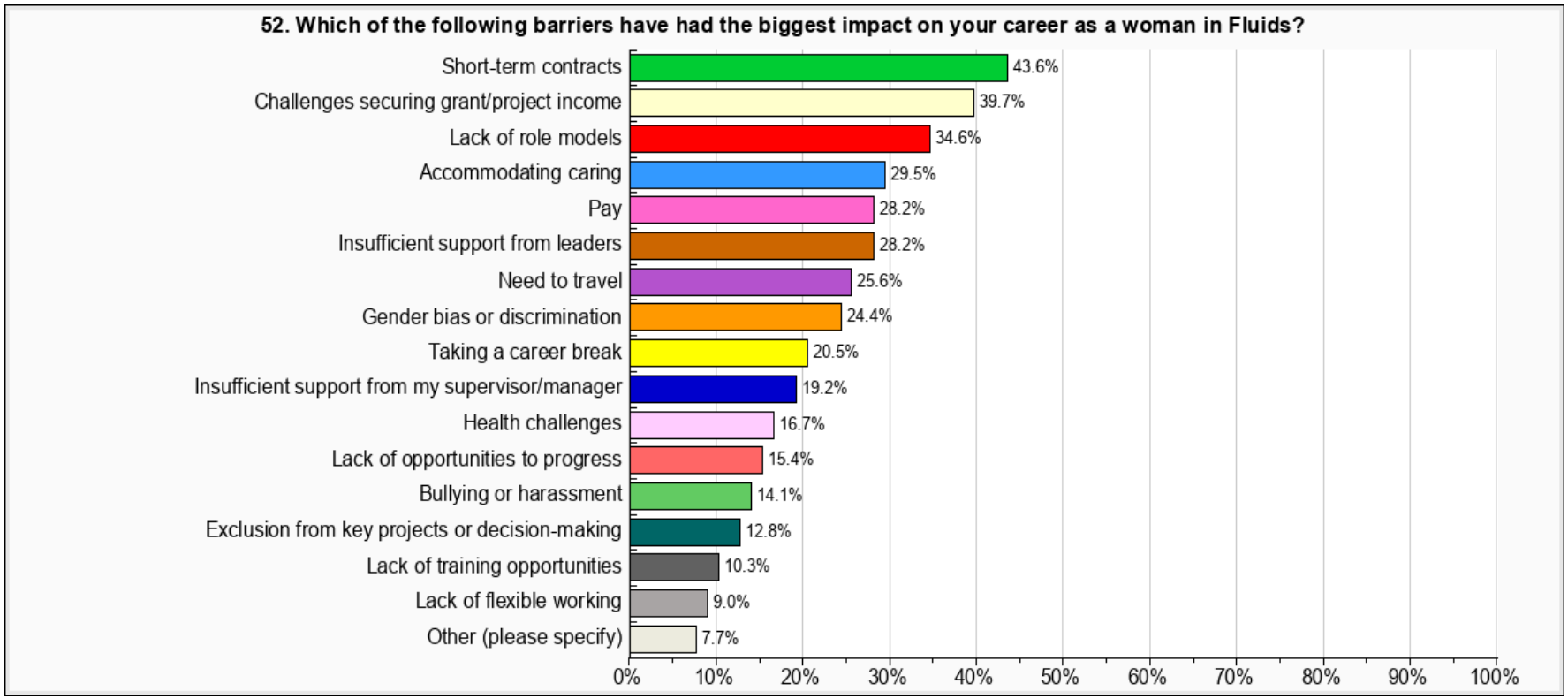


* Participate in external activities e.g. membership of committees or work with professional institutions

6 Barriers and Enablers (Women only)

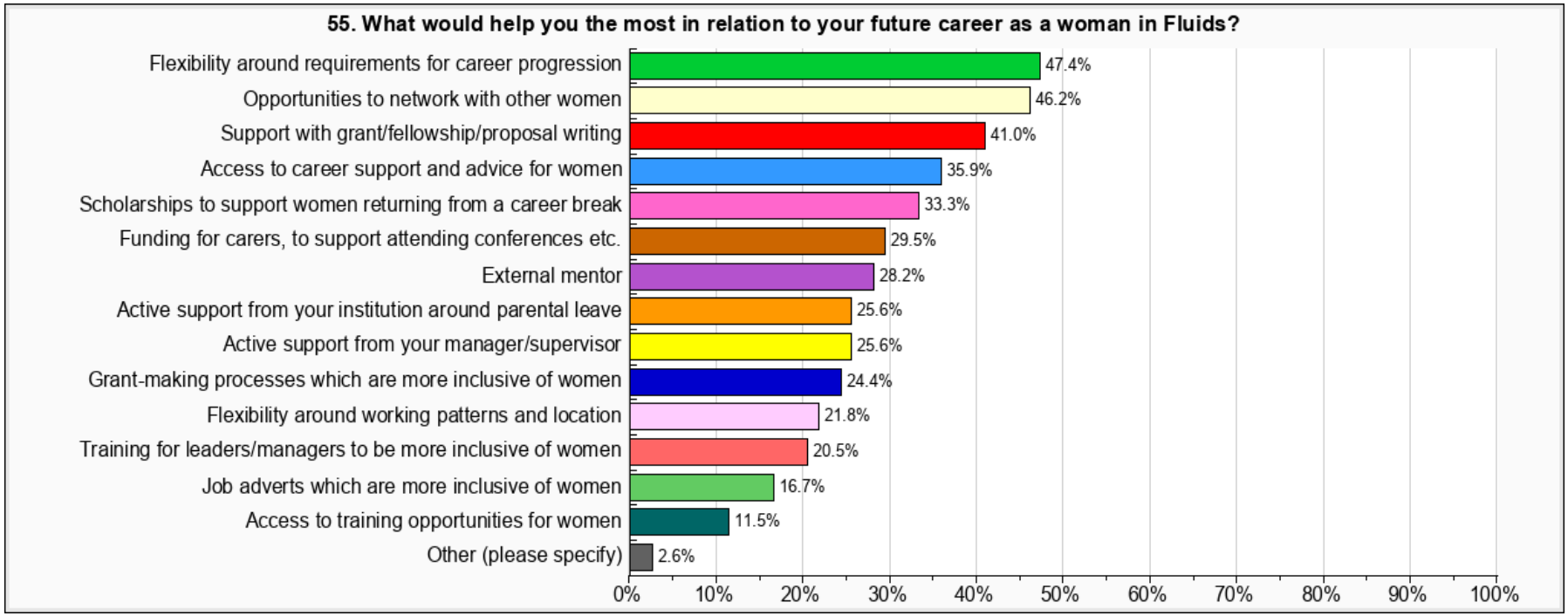
52. Which of the following barriers have had the biggest impact on your career as a woman in Fluids?

Respondents were given the following guidance: Select the most important, up to 5.



55. What would help you the most in relation to your future career as a woman in Fluids?

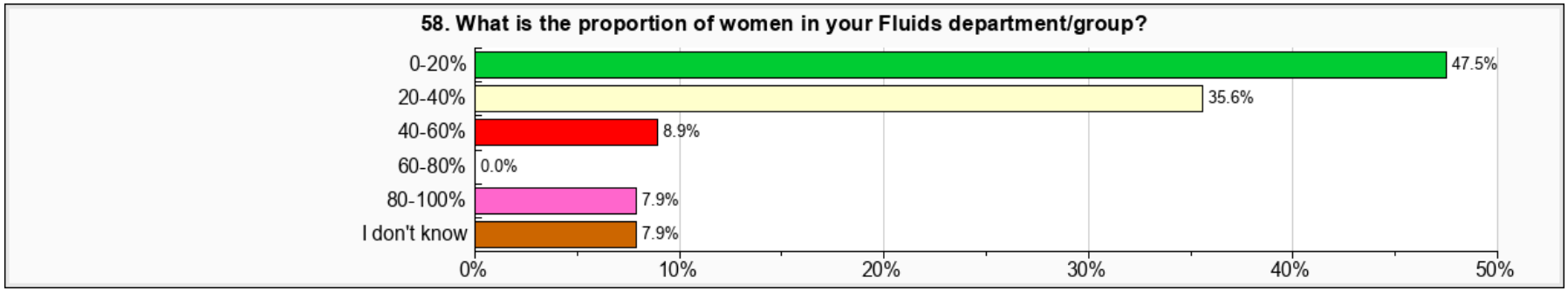
Respondents were given the following guidance: Select the most important, up to 4.



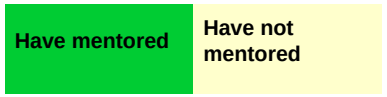
7 Women in Fluids (All respondents)

Please note respondents were given the following guidance: "Throughout this survey, **institution** refers to the organisation that employs you e.g. your university department or company"

58. What is the proportion of women in your Fluids department/group?



Key



Women only

		2024 Mentored %	No. Res
61. Have you mentored any women in Fluids?		**36**	78

Men/Other only

		2024 Mentored %	No. Res
61. Have you mentored any women in Fluids?		**65**	23

Please note that text responses have been excluded from the survey data shared here in order to preserve anonymity of respondents.