EARLY CAREER PERSPECTIVES

Presented by

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DISCLAIMER

We have attempted to summarise the views of ECRs from a diverse range of sources, but may not capture everything.

We are influenced by our own perspectives:

- We are all originally from Europe
- We all contribute to large collaborations
- We all volunteered to coordinate this talk

Here, we attempt to provide a broad overview.

Throughout this talk, we use the acronym 'ECR' to refer generally to 'Early Career Researchers'

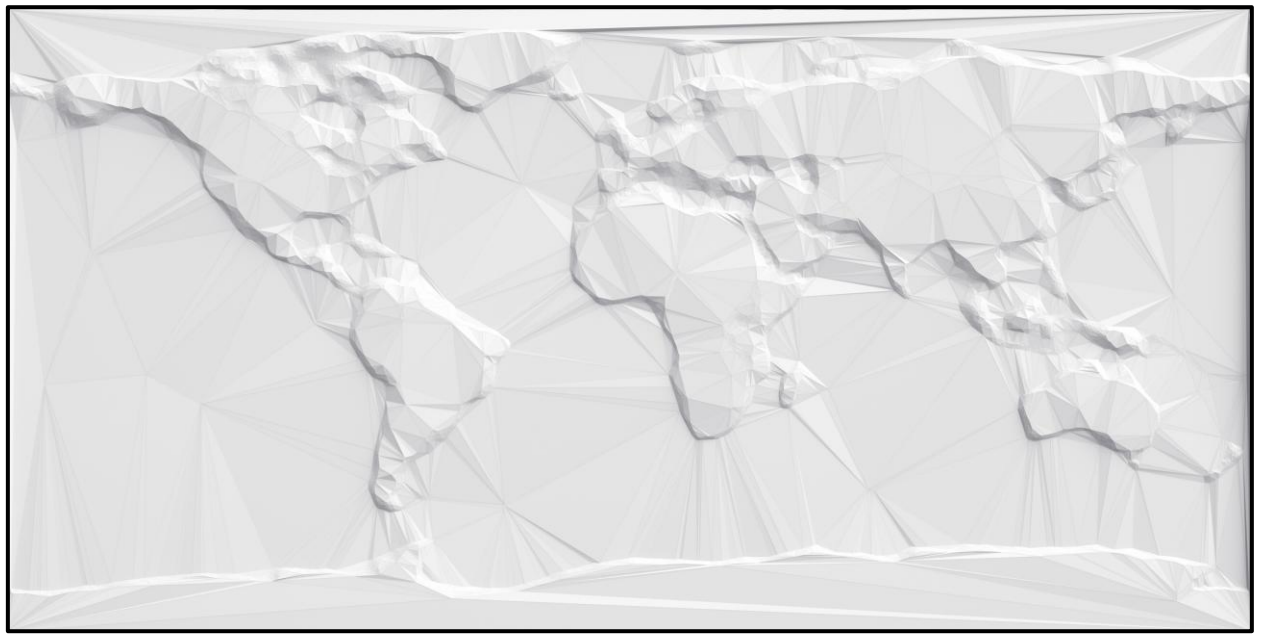
Where early career means within ~10 years of most recent degree

DATA SOURCES

We have drawn from existing data: no new survey has been performed

Europe:
ECFA Panel Survey on Career Prospects and Diversity (2022)
ECR input into the ESPPU, endorsed by ECFA (2025)

USA:
Snowmass Early Career Organization Strategy (2021)
US ECR input into the ESPPU (2025)



ECR *PERSPECTIVES*

'Many questions had significant heterogeneity in the responses'

'Perspective' depends on where you look from:

- US ECRs favour a muon collider
- Europe ECRs favour FCC-ee
- No **strong** consensus in either case
- Some concern about length of project timescales

ECRs agree on some key desires:

- For **clear strategy** with timely decisions
- For **sustainability** of projects and careers
- For **diversity** of people and projects
- For **opportunities** to get involved
- To do **innovative and ambitious research**

Demographics
What is an ECR?

AI
Early Experiences

Careers
Facing Insecurity and Uncertainty

Advocacy
As Leaders and Communicators

Diversity
Needs Structure for Support

Health
For People and Teams

Demographics
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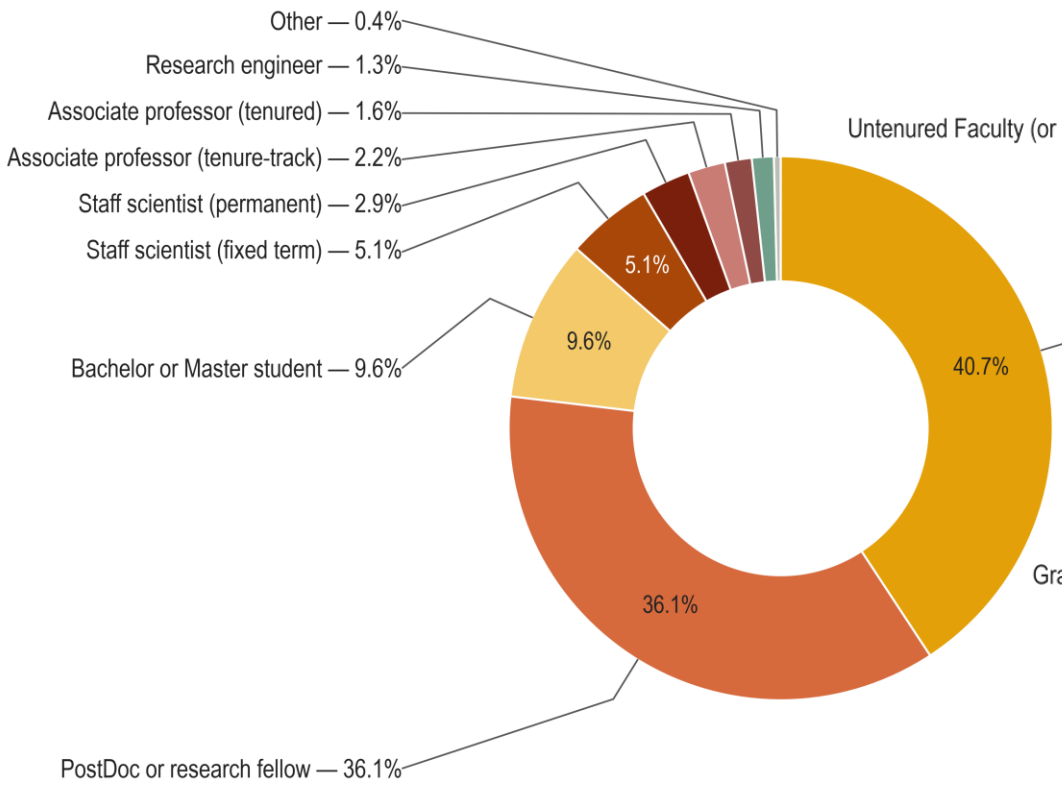
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DEMOGRAPHIC OVERVIEW

European ECR'25



US ECR ESPPU

DEMOGRAPHIC OVERVIEW

European ECR'25 (~750 responses)

Undergraduate:	10%
PhD Student:	41%
Postdoc:	36%
Other:	13%

US ECR ESPPU (~100 responses)

Undergraduate:	N/A
PhD Student:	33%
Postdoc:	43%
Other:	24%

The European contributors skew younger*

In both cases, ~75% are PhD or Postdoc

Differences due to definitions:

- Europe and US usually 'people within 10 years of their most recent degree'
- US ECR ESPPU input was a broader survey

*The Snowmass ECR report (1000 responses) says most contributors are PhD or Postdocs

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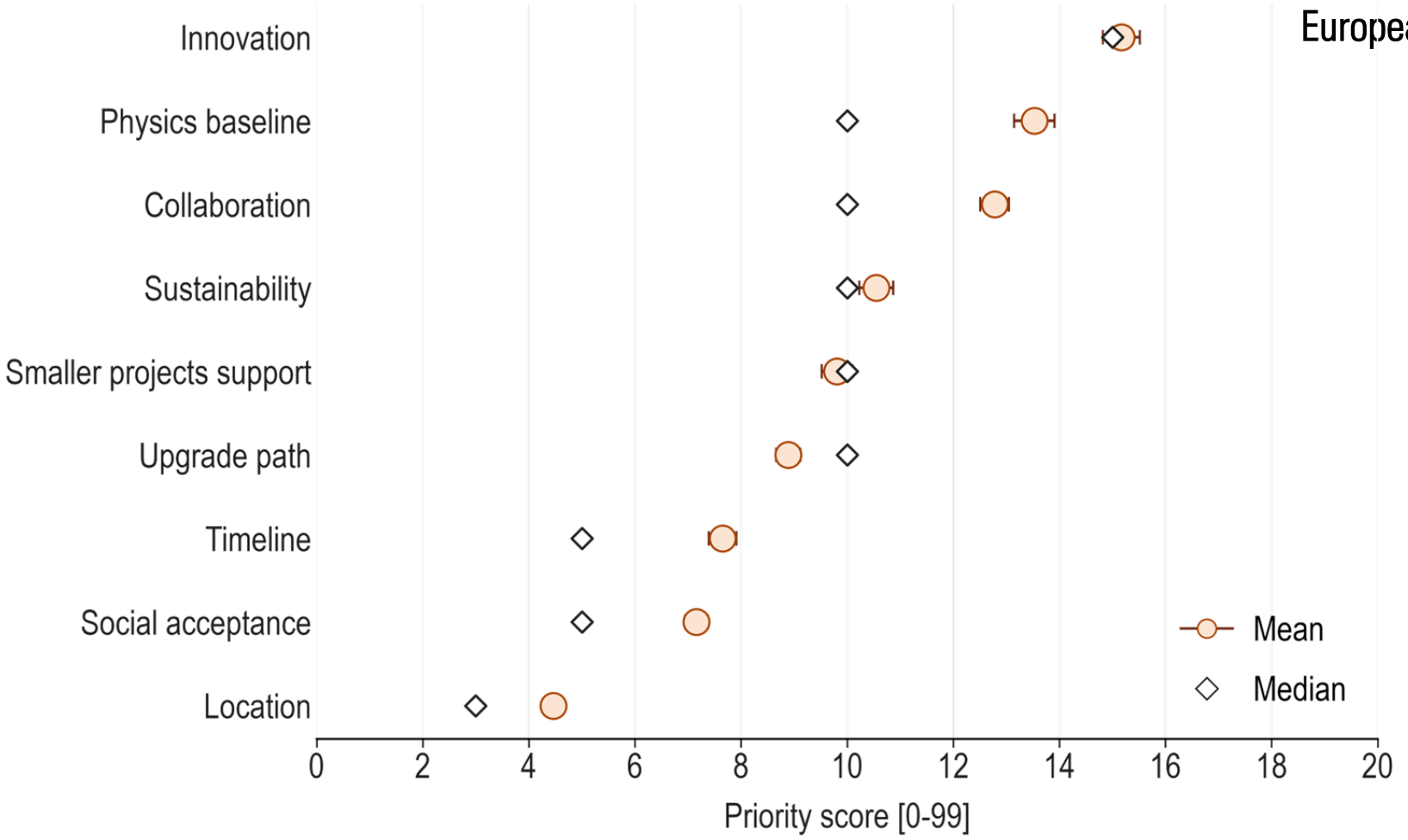
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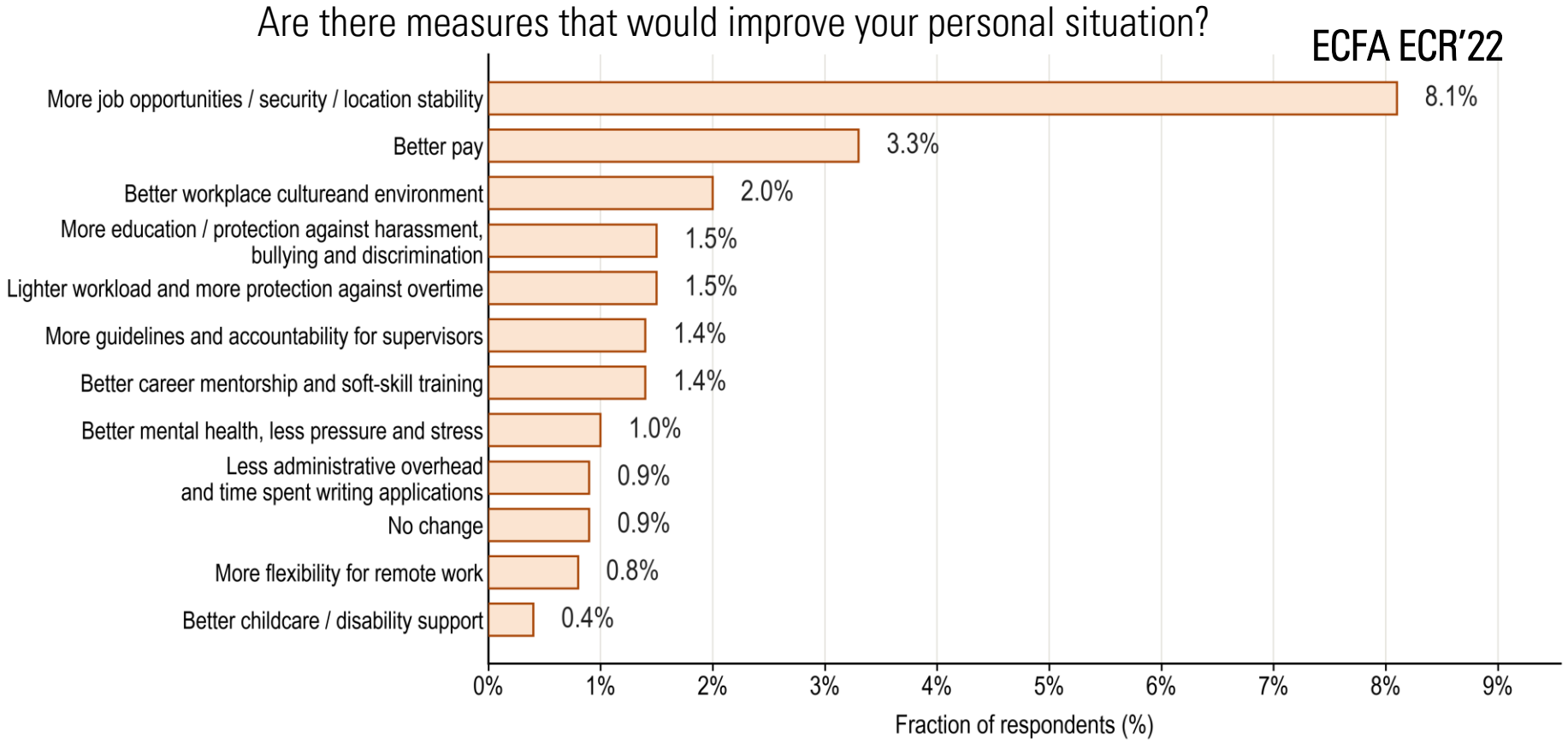
PRIORITIES



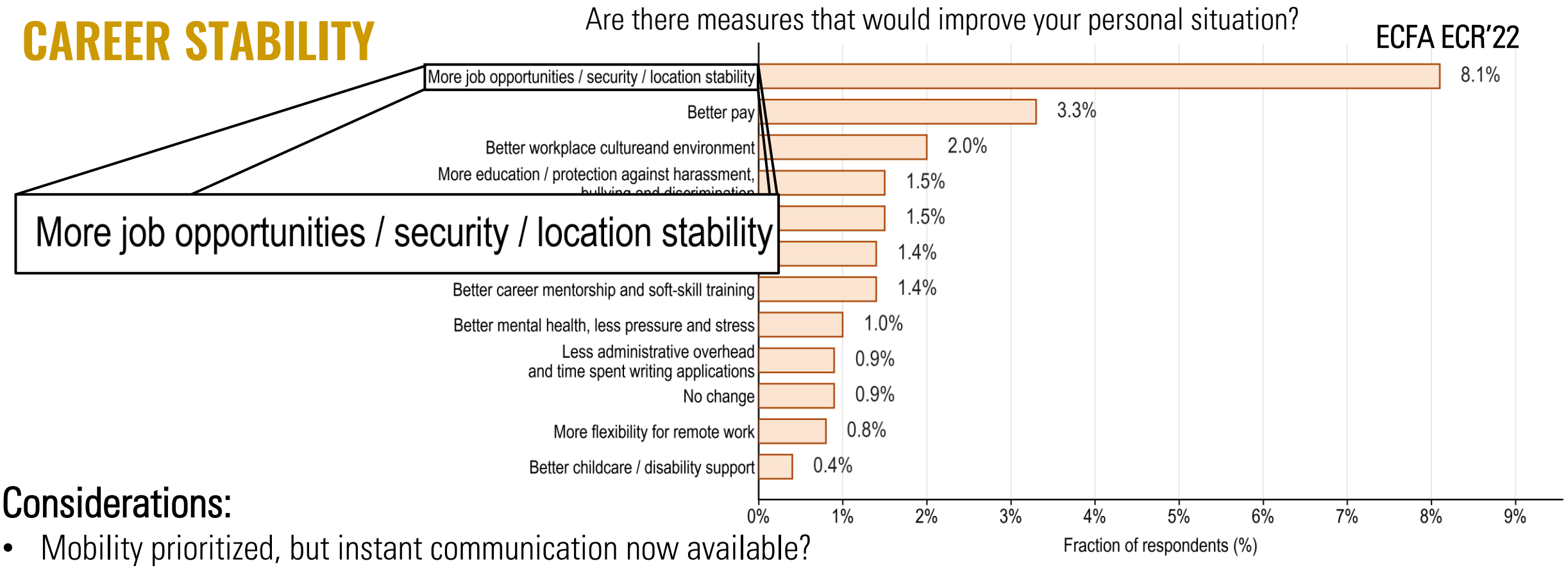
European ECR'25

- ECRs are looking for **innovative** projects
- ECRs care about the **physics case**
- **Collaboration** is valued
- Timeline concerns are a lower priority
- People are **willing to move**

CAREER STABILITY



CAREER STABILITY



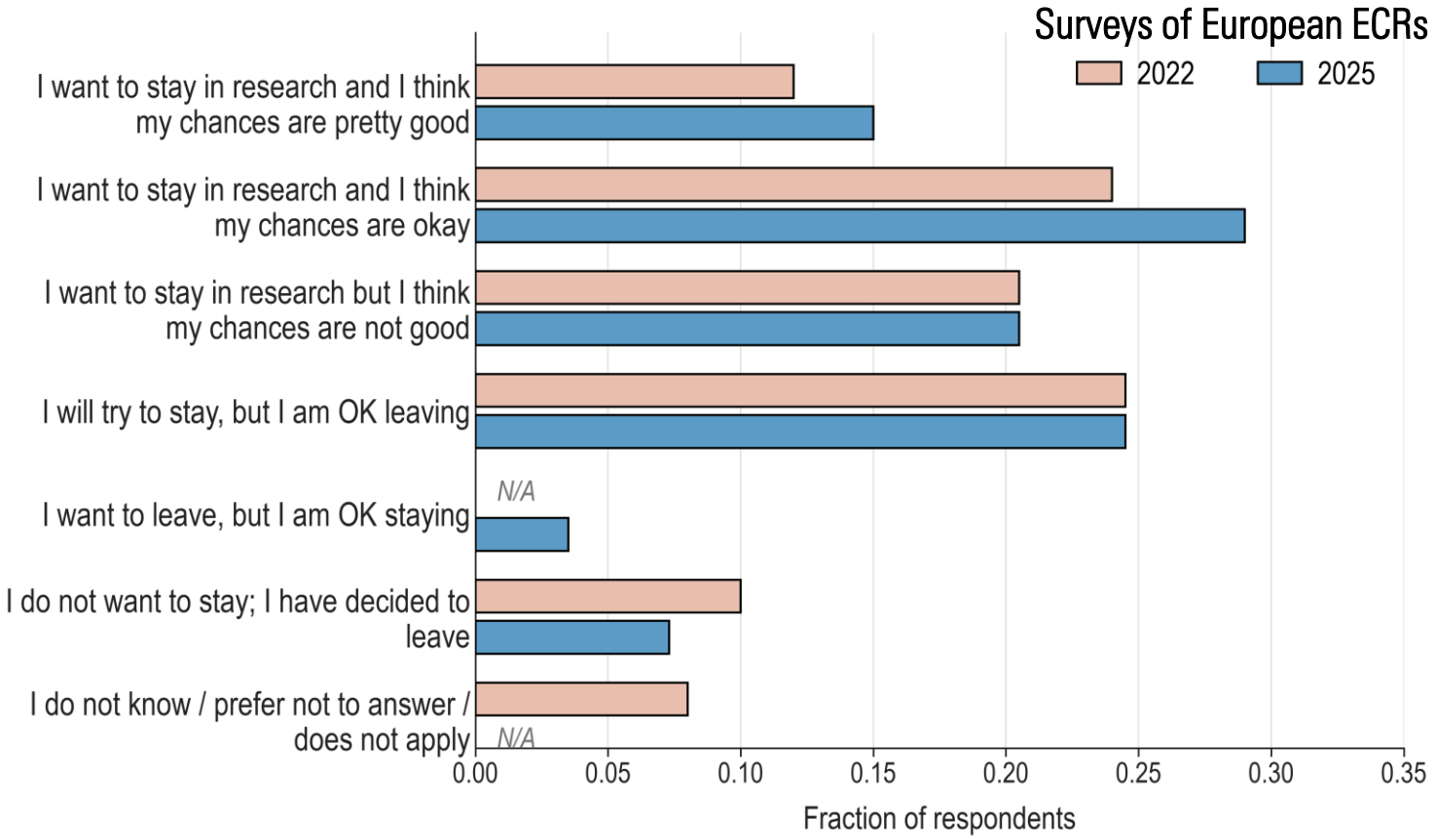
Considerations:

- Mobility prioritized, but instant communication now available?
- Short-term contracts offered, but not in other industries?
- Many junior staff, many senior staff, but a 'missing middle'?
- Not just researchers: drying-up of technical staff?

There is evidence of positive progress

CAREER STABILITY

Are you considering leaving HEP after your current position?



Suggestions from all surveys:

- Raise pay and increase funding
  - With reference to industry equivalents
- Increase support for caregivers
- Extend contract durations
- Ease long-term mobility expectations
- Career guidance and skills training
  - Relevant to academia **and** industry
- Enable **varied research interests**
  - Avoid **single-experiment careers**

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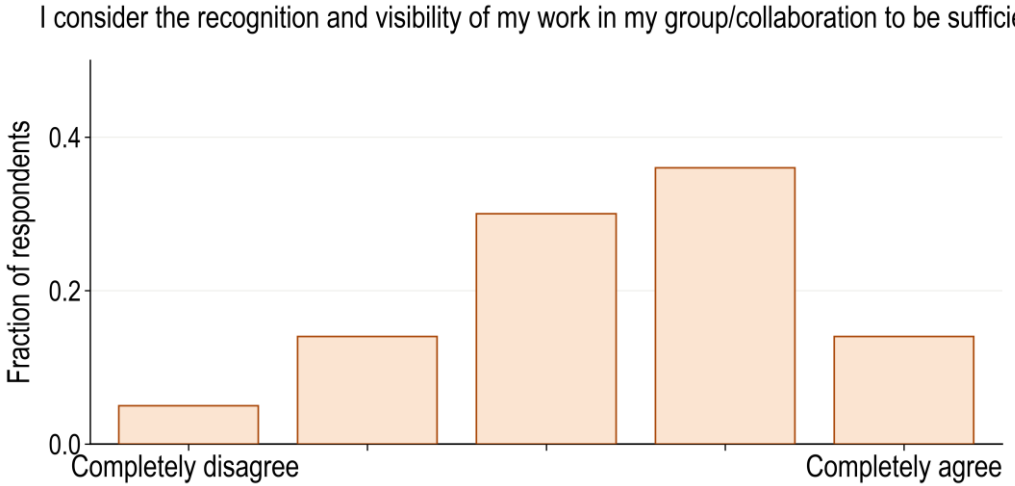
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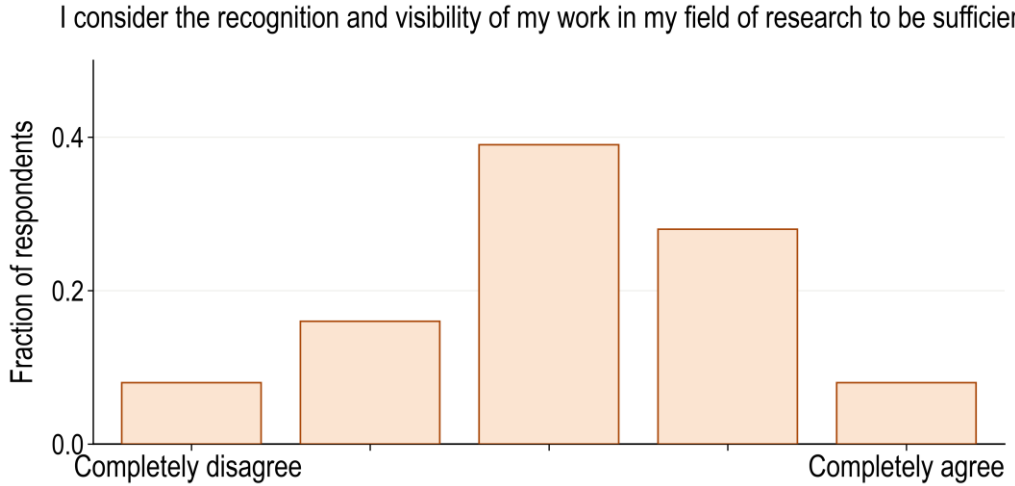
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For People and Teams

RESEARCH ADVOCACY AND RECOGNITION

ECRs feel **well** valued in their local communities



ECRs feel **moderately** valued in their broader community



ECFA ECR'22

The **ECFA-ECR Panel** is a good example:

- Small core organizing committee for a large community
- Gathers useful data (such as for these figures)
- Encouraged and mandated by ECFA
- Self-sustaining through support
- Participation is worthwhile

Note: ICFA does not have any formal ECR representation

Considerations:

- Do ECRs have a **formal** place in decision making bodies?
- How can ECR communities be encouraged to **self-organize**?
- How do we **recognize and value** ECR contributions?
- What **funding** is available for ECR organization?

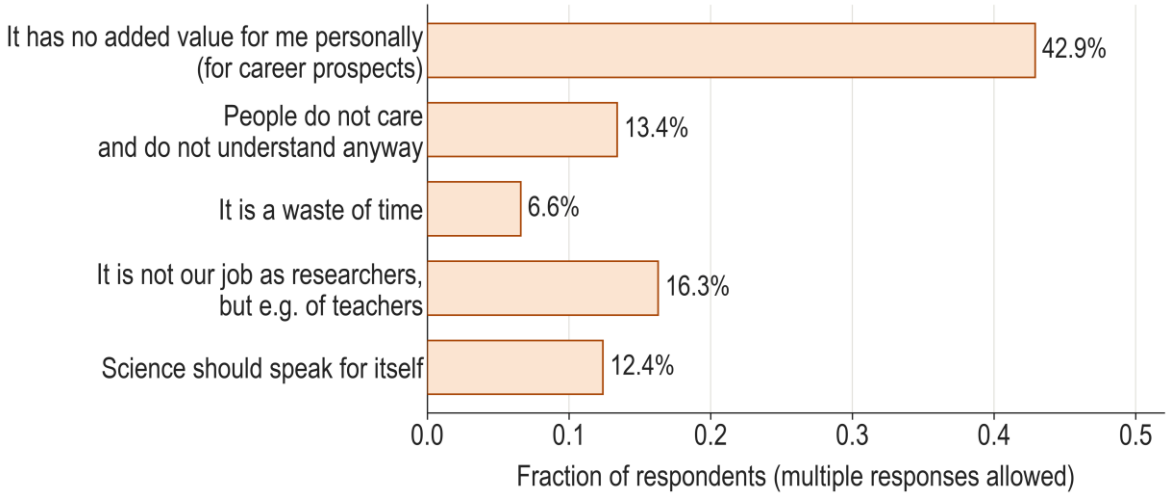
RESEARCH COMMUNICATION AND OUTREACH

ECRs **want** to be involved in outreach: **(European ECR'25)**

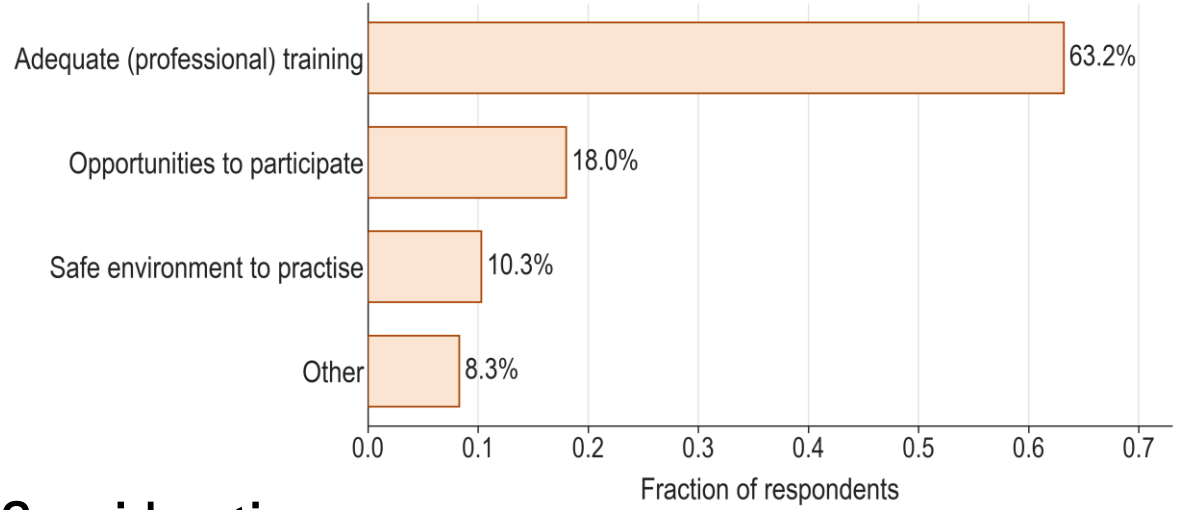
- 85% 'motivated to engage with the public'
- 59% 'participating in outreach activities'

The gap is due to lack of **incentive** and **training:**

Why **don't** you engage with the public?



What is the main factor holding back your outreach?



Considerations:

- Is science communication **valued** for career progression?
- **Should** outreach be a requirement for e.g. funding?
- What kind of **training** can institutions provide?
- What kind of **opportunities** can institutions provide?

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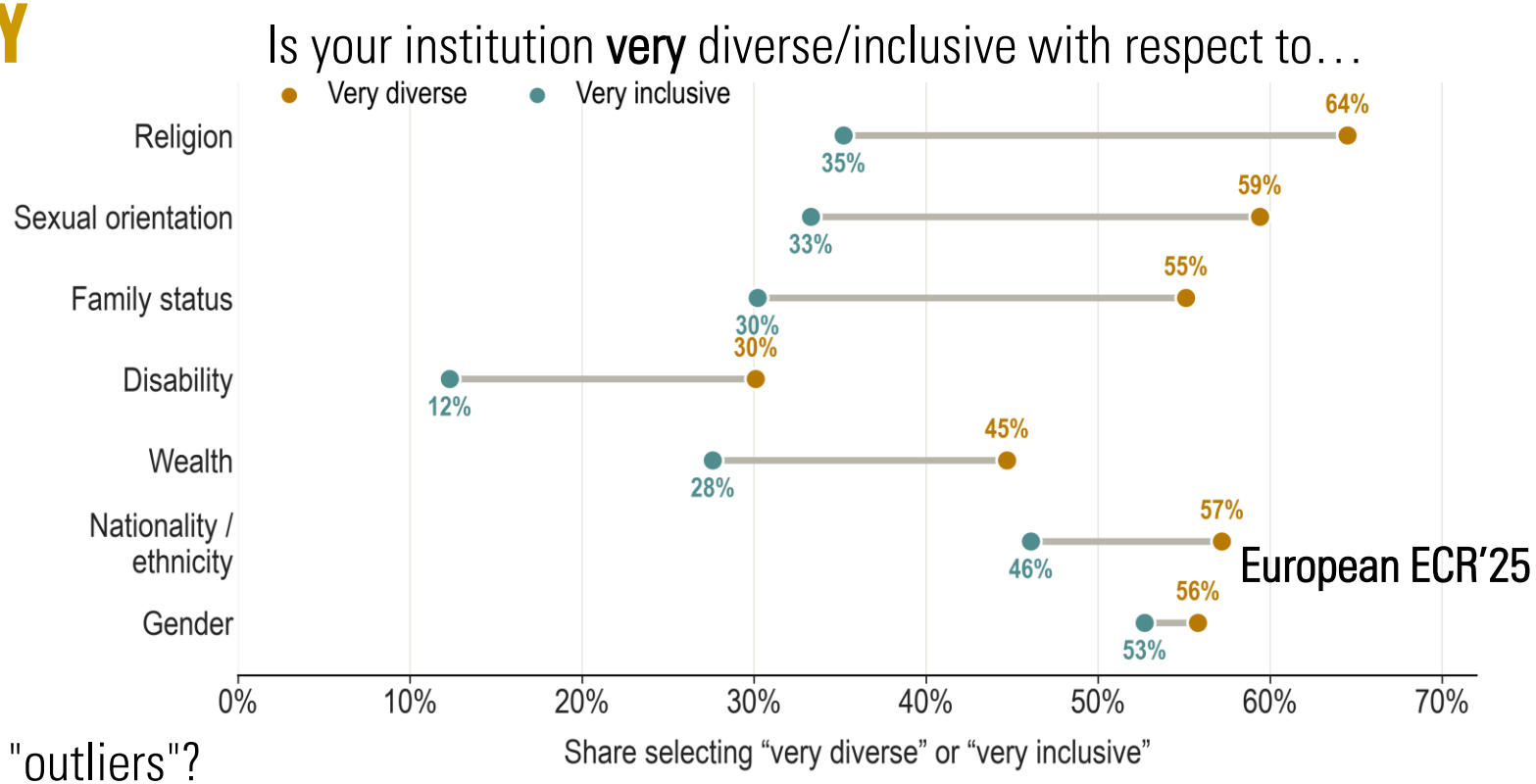
DIVERSITY AND INCLUSIVITY

Diversity:

- Varied composition of an environment
  wrt. all the characteristics on the right
- Also: Experiments, expertise, experience, career pathways, viewpoints, personnel, etc.

Inclusivity:

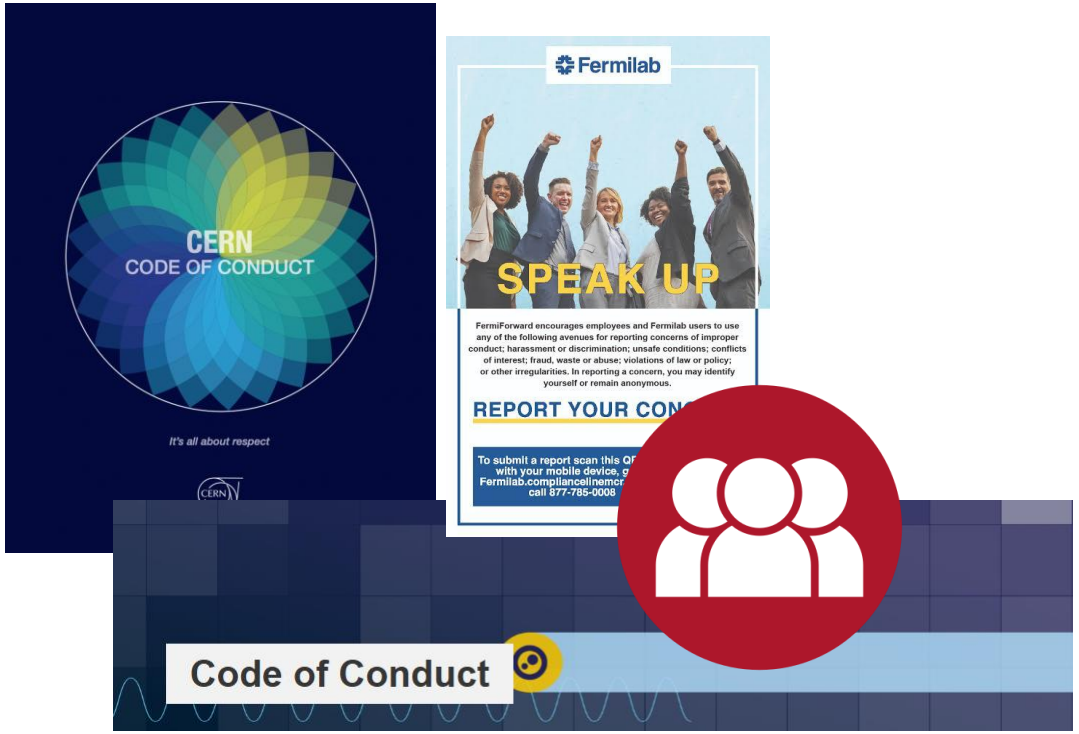
- How welcoming is the environment to "outliers"?
- Are there equal opportunities (**equity/equality**)?



Institutions **perceived** to be more diverse than they are inclusive and a majority even as **very diverse** in many parameters, but the gap also means that there is work left to do to make everyone feel welcome and equally worthy.

STRUCTURE FOR EQUITY

Equity does not happen by accident



CERN, Fermilab, JLab, and TRIUMF shown for example

Suggestions from all surveys:

- Establish **DEI offices** where possible
- Create **policies** about diversity and equity
  - Both codes of conduct, and 'consequences'
- Ensure **accountability** and support
- Back up policy with action – and **money**
  - Such as ECR-specific funding pots
- See **equity as opportunity**
  - E.g. in talent acquisition and retention

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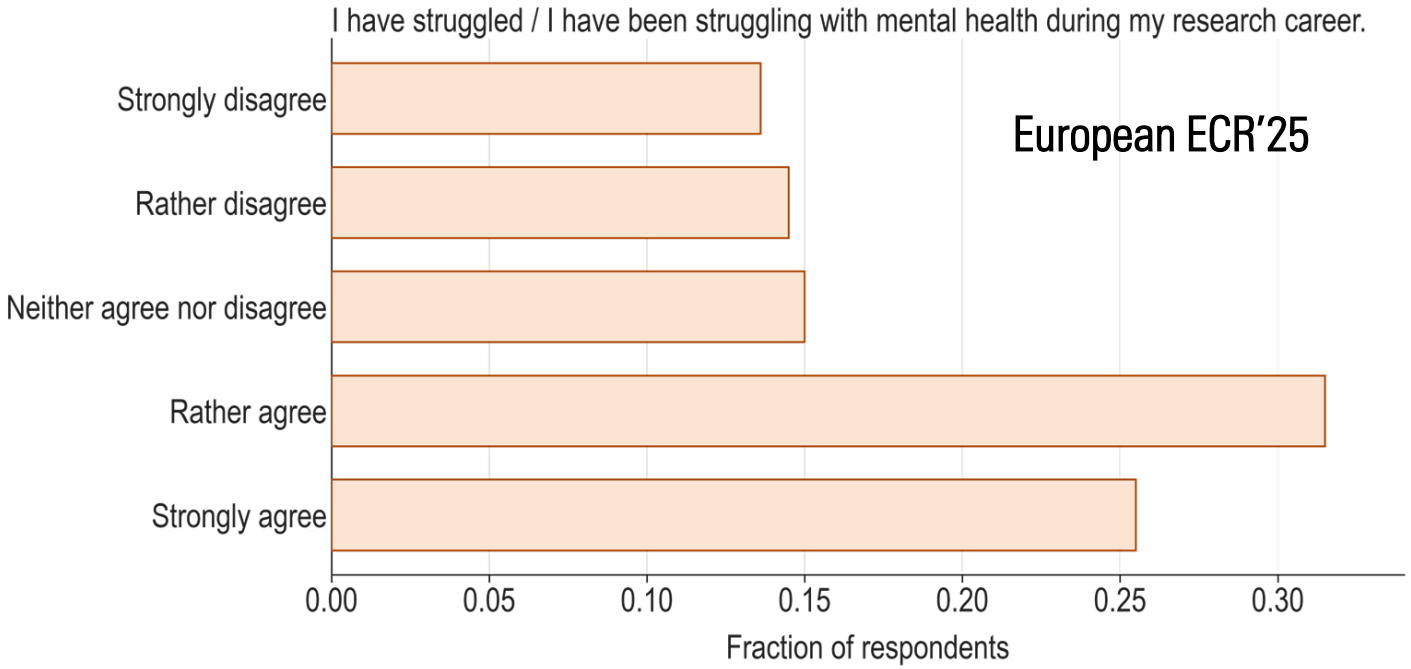
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PERSONAL WELLBEING



Large number of ECRs have struggled with mental health, increased numbers in under-represented groups and people who have faced discrimination or harassment.

Suggestions across surveys:

- **Mental health support** should be funded **institutionally**
- **Emotional support**, **flexibility** and **constructive feedback** in supervision
- **Mandatory supervisor training can** make a difference, focused on aligning expectations between supervisor and the ECR

Support allows people to reach their full potential

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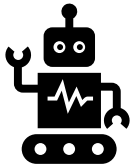
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ARTIFICIAL INTELLIGENCE

Note: existing survey data does not cover this area.

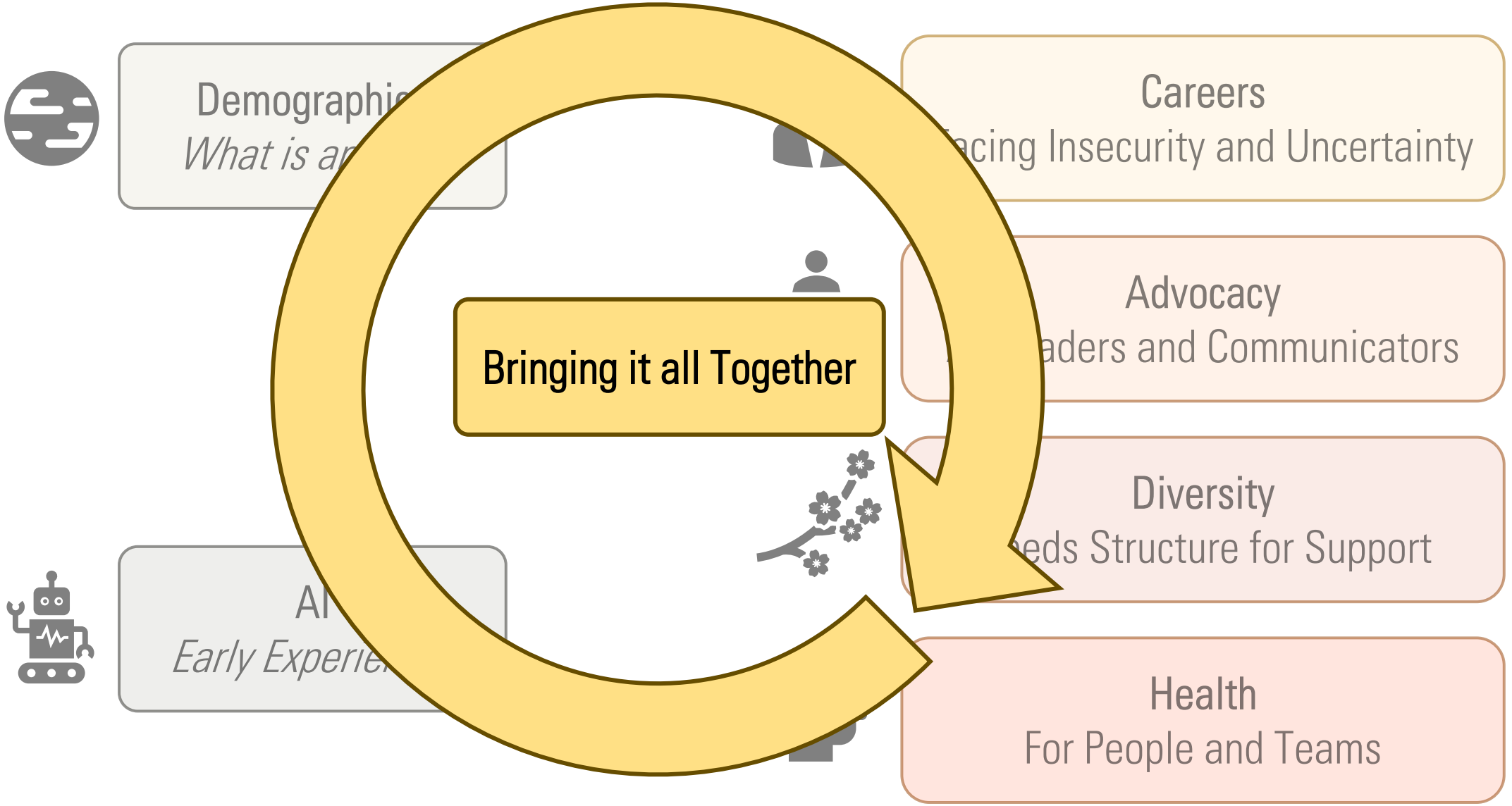
Considerations:

- What does it mean for how we **choose projects**?
  - How can we encourage **deep thinking?**
- How do we prevent **de-skilling**?
  - How to train and keep essential skills to be/become a good researcher?
- How should we treat **AI 'co-authorship'**?
  - Can we ensure **accountability**?

Suggestions:

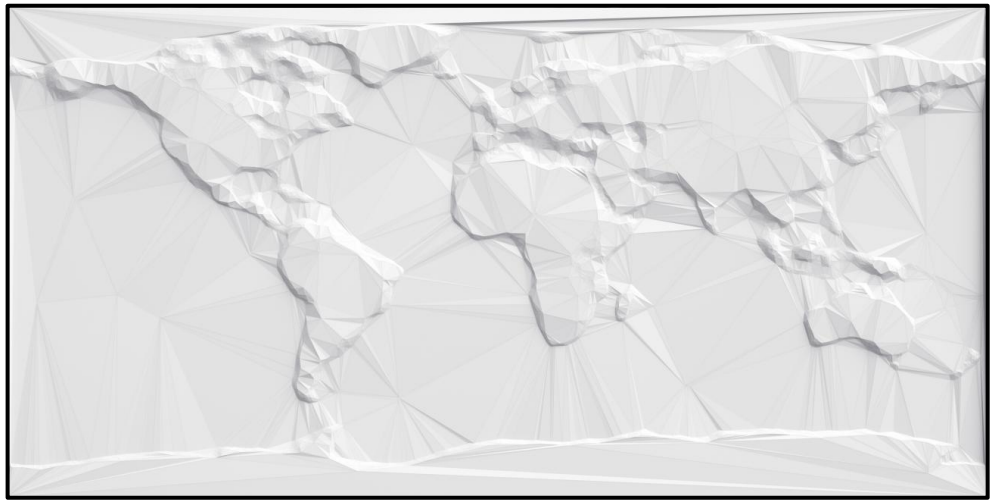
- Personal:
  - **Need strong ability to judge output** and steer the models, students needs **strong supervision** and **guidance**
  - AI-heavy preparation leads to **poor presentation**
  - **Automate the boring stuff** – but not research, use it to leverage well
- Institutional:
  - Provide access to **frontier models**
  - Take the chance to reduce the **publish or perish pressure**
  - Give meaningful training **at all levels**

AI was used extensively in this talk to (re-)produce the graphs


Demographic
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Bringing it all Together
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THE IMPORTANCE OF NETWORKS

Limited perspectives due to limited representation



No input from other regions due to lack of organized ECR communities

- This presentation was only possible due to data from ECR networks
- What can ICFA do to help coordinate ECR activities?
  - Organizing events at conferences?
  - Keeping records of different ECR networks?
  - Including ECR-representation on ICFA panels?

ICFA is well-placed to encourage global ECR activities

CLOSING THOUGHTS

ECRs want to be involved, they just need the opportunity

Careers
How do we ensure sustainability?

Advocacy
How do we enable representation?

Diversity
How do we encourage equity?

Health
How do we build a flourishing culture?

By supporting Early Career Researchers, you are supporting the future of High Energy Physics!

REFERENCES

J. Allen et al. "Results of the 2022 ECFA Early-Career Researchers Panel survey on career prospects and diversity." *arXiv preprint arXiv:2404.02074* (2024)

J.-H. Arling et al. "Early Career Researcher Input to the European Strategy for Particle Physics Update: White Paper." *arXiv preprint arXiv:2503.19862* (2025)

G. Agarwal et al. "Snowmass Early Career." *arXiv preprint arXiv:2210.12004* (2022)

O. Amram, and G. Cummings. "United states early career researchers in collider physics input to the european strategy for particle physics update." *arXiv preprint arXiv:2503.22834* (2025).

Note: AI (GPT 5.6 Luna) was used in this talk to (re-)produce the graphs, using data from the above sources.