

Early Career Researchers in Instrumentation

15th Pisa Meeting on Advanced Detectors

Armin Ilg

on behalf of the ECFA Early-Career Researchers Panel

Physik-Institut
University of Zürich

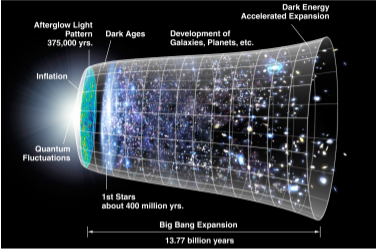
23.05.2022

ECFA

European Committee for Future Accelerators

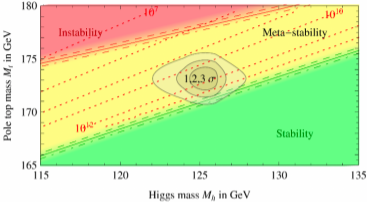
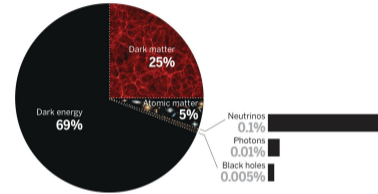


State of Particle Physics

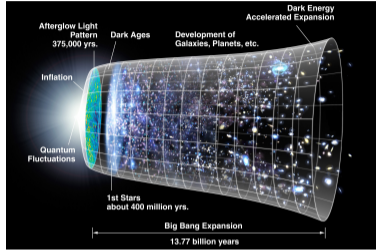


The multiple components that compose our universe

Current composition (as the fractions evolve with time)

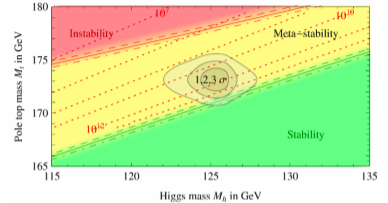
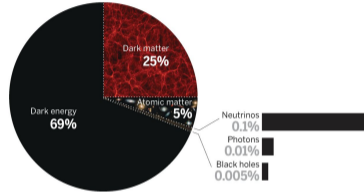


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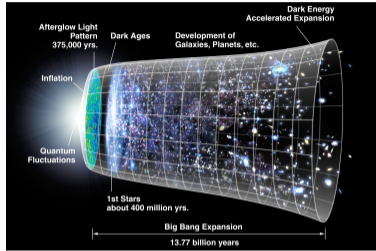
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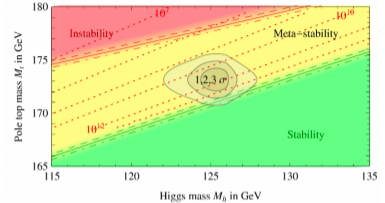
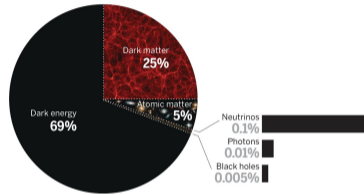
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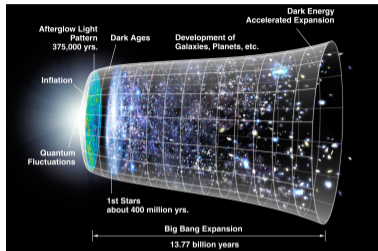
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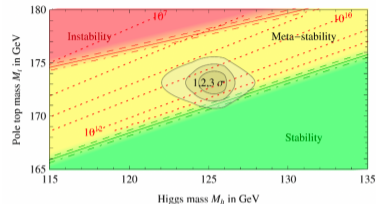
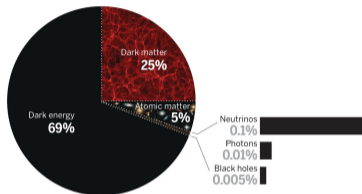
Long-term planning needed

State of Particle Physics



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Long-term planning needed

- European Committee for Future Accelerators (ECFA)
- Update of European Particle Physics Strategy in 2020

Motivation: 2020 European Strategy Update

European Particle Physics Strategy Update in 2020: [20 Strategy Statements](#)

- e^+e^- Higgs factory as highest-priority next collider with long term ambition for proton-proton collider at the highest achievable energy

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Action point 7.B

Particle physics, with its fundamental questions and technological innovations, attracts bright young minds. Their **education and training** are crucial for the needs of the field and of society at large. For **early-career researchers to thrive**, the particle physics community should place strong emphasis on their **supervision and training**. Additional measures should be taken in large collaborations to **increase the recognition of individuals developing and maintaining experiments, computing and software**. The particle physics community commits to placing the principles of **equality, diversity and inclusion** at the heart of all its activities.

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ECFA Early-Career Researchers (ECR) Panel

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Goals

- What is the ECFA ECR panel?
- What issues do young researchers in instrumentation face?
- What can be done to help them/us?

Disclaimers

- Huge topic, quickly becomes quite political
- Can be large differences between countries

Follow-up of ECFA Early-Career Researchers input to the 2020 strategy update ([2002.02837](#))

The objective of the [ECFA Early-Career Researchers \(ECR\) Panel](#) is for its members to discuss all aspects that contribute in a broad sense to the future of the research field of particle physics. In its advisory role to ECFA, the panel reports to ECFA on a regular basis. An annual report of the ECFA ECR Panel is added as a standing item to the agenda of Plenary ECFA meetings.

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- 75 delegates, 3 from each ECFA country and each major laboratory
- 5 delegates in Plenary ECFA, 1 delegate in Restricted ECFA
- From PhD students to young assistant professors
- Theoreticians, phenomenologists and experimentalists

→ Diversity in cultural background, career and research

Working groups so far: Career Prospects, Diversity in Physics, Electron-ion colliders, Detector R&D Networking, Instrumentation R&D

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Original idea: Collecting **ECR input on training in instrumentation**

- Direct input from ECFA ECR panel
- Open [Townhall meeting](#) with interesting discussions in April 2021
- Survey filled by 473 ECRs from all over Europe (and beyond). Closed and open questions

ECFA ECR Detector R&D WG

Jan-Hendrik Arling, Liron Barak,
Katie Dunne, A.I, Adrián Irles,
Magdalena Kuich, Predrag Milenovic,
Steven Schramm, Mariana Shopova,
Sarah Williams,
ecfa-ecr-detector@cern.ch

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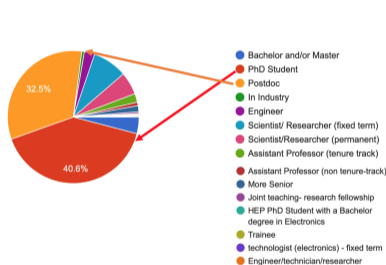
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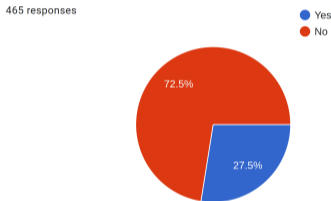
Results were presented in [ECFA Detector R&D Roadmap Symposium on Training](#) and are summarised in [2107.05739](#) ← check out for details!

Participant Profile

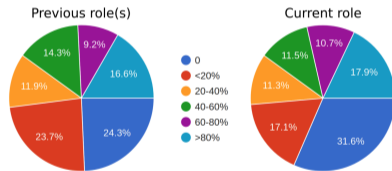
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- We're not social scientists, survey questions definitely not perfect
 - Lots of qualitative data and individual replies about how ECRs in instrumentation are doing!



Current position



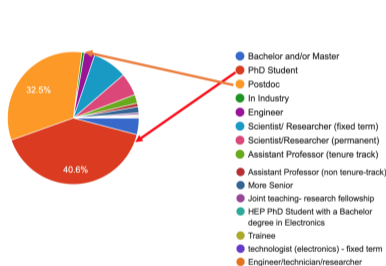
I identify as an underrepresented minority in my field



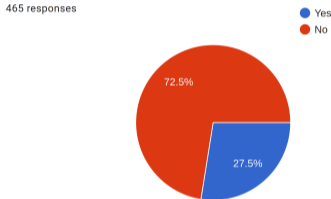
Fraction of time spent working on instrumentation

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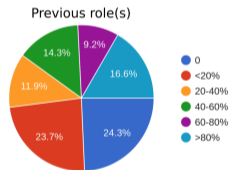
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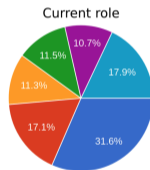
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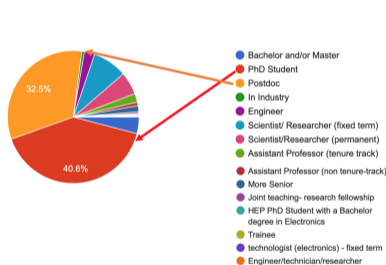
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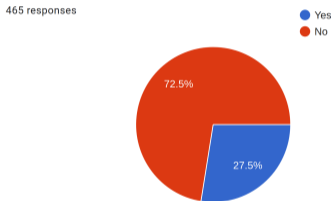
Large variety in survey respondents!

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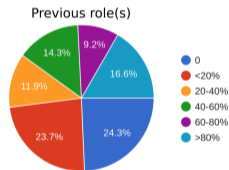
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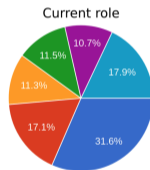
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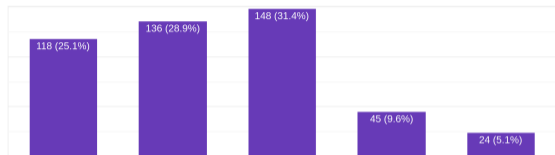
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Let's go through the most important points

Training in Instrumentation

30% had expressed an interest in instrumentation training but were **not able to access it**

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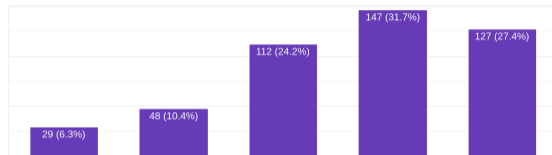
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Very uninformed

very informed

How informed do you feel about opportunities in instrumentation training?



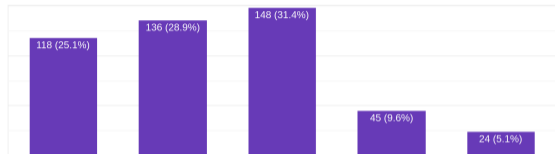
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I would be more willing/eager to take on inst. work if more training was available

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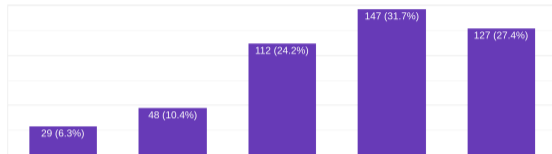
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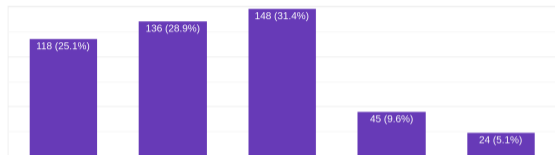
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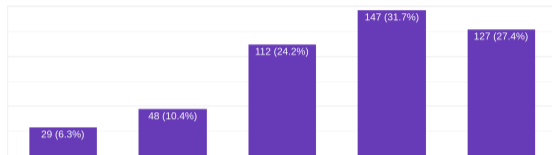
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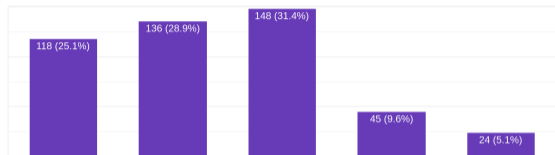
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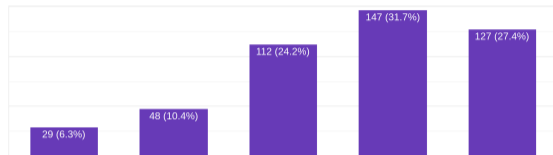
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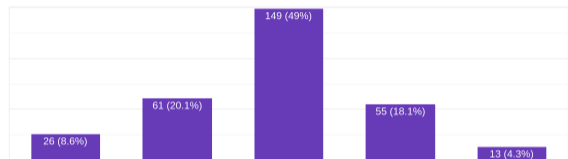
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ES



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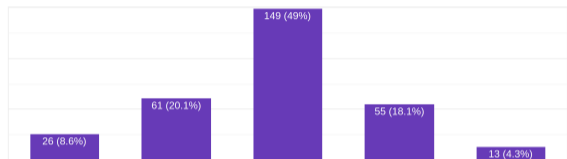
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Instrumentation Networks

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- More workshops/summer schools devoted to instrumentation to connect those working in different experiments/user facilities
- Having suited **channels to advertise networking and training opportunities** is as crucial as actually organising them!

Diversity and Inclusion

Only covering some key points (check [symposium on training slides](#) and [report](#) for more)

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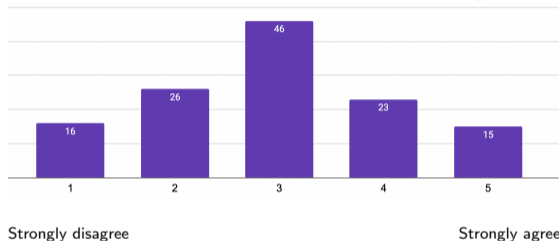
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42 out of 126 respondents say that there was an impact on their training experience!

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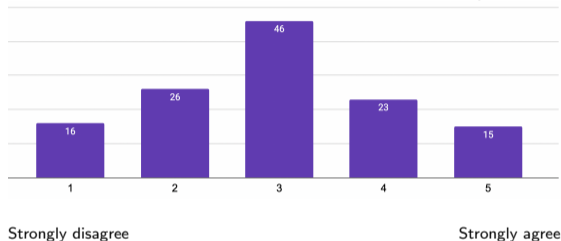
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Remote training is an opportunity to lower barriers due to e.g travel, financial or care-related constraints!



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Ideas for Action and Discussion Points

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Identified schools

- More
→ E
- Lackin
→ W
H

CERN Accelerating science

Sign in Directory

Early Career instrumentation resources

HOME

Collection of Schools for Early Career Researchers in Particle Physics Instrumentation

Your school is missing, there is a mistake in the table or you have a suggestion? [Contact me](#) and I'll apply the change in the next ~1-3 days.

2022

Date	Event name	Location
Nov 2022 or Feb/Mar 2023	XV ICFA Instrumentation School	Tata Institute of Fundamental Research, Mumbai, India
13-24.06	GRIDS2022: Graduate Instrumentation and Detector School	TRIUMF, Canada
13-23.06	ISOTDAQ 2022: International School of Trigger and Data Acquisition	Catania, Italy
01-03.06	EIROforum Topical Workshop on Robotics & Remote Operation	remote

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e a series

[abpage on](#)

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Possible discussion topics during the week

- Inter-experimental networking opportunities
- Collecting initiatives relevant for ECRs in instrumentation and make them known widely
 - Instrumentation R&D e-group?
- Recognition of instrumentation work

Some correlated efforts:

- AIDAinnova [Task 2.3](#)
- ECFA-ECR Survey on career perspectives

Thank you and enjoy this networking opportunity

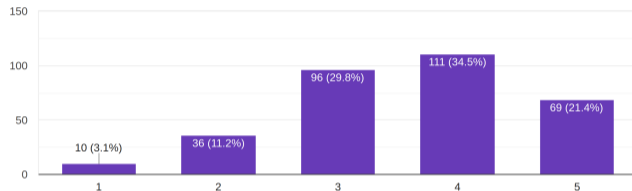
Thank you and enjoy this networking opportunity
(and the island!)



Recognition of instrumentation work

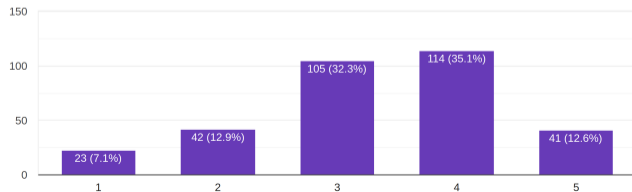
I feel the work I do/did in instrumentation is acknowledged in my immediate working group

322 responses



I feel the work I do/did in instrumentation is acknowledged in my collaboration/experiment /broader working group

325 responses



Recognition: Individual replies

In general, there is a tendency in the comments to mention the underestimation of the complexities of the instrumentation work by the non-experts of the group, and it is even in some cases belittled (sic) or taken for granted. One respondent indicated they are not seen as real physicists.

Instrumentation has a smaller rate of publications than other areas (i.e. theory or experiment data analysis). This can result in instrumentation having a smaller specific weight in the group, especially in terms of recognition.

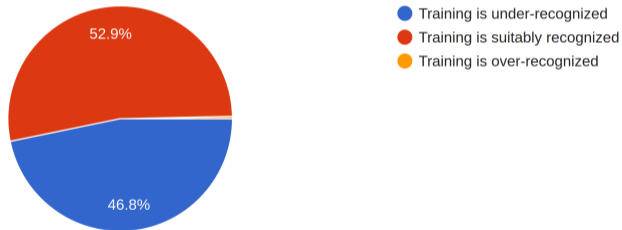
There is a lack of permanent positions for detector physicists. One respondent indicated that they were given feedback they had done too much instrumentation work and not enough analysis in a post-interview follow up. At the Training symposium, it was brought up that tracking data on the number of permanent positions that are allocated for work primarily or exclusively related to instrumentation would provide useful insight.

There is a lack of opportunities for leadership experience for junior members. Comments in this regard mentioned that presentations are often given on behalf of a working group, so individual contributions are not visible. Junior members are not usually invited to organise workshops, with these tasks being relegated to senior members.

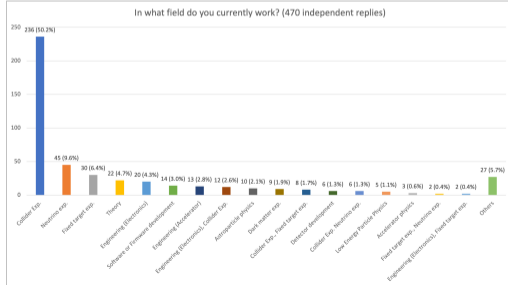
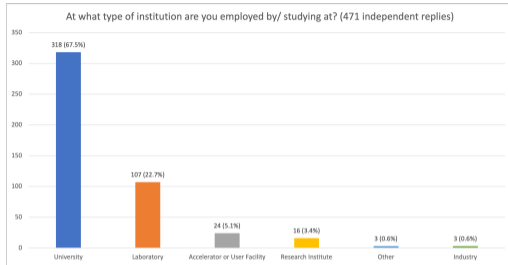
Recognition of giving instrumentation training

Do you feel that work relating to training is properly recognized and rewarded in your instrumentation group?

295 responses

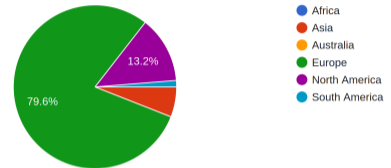


Participant profile: Further details



Region of Employment/Current Education

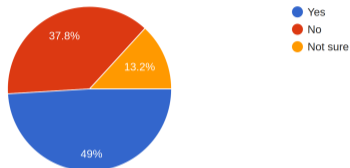
471 responses



Training: Availability and impact on views on instrumentation

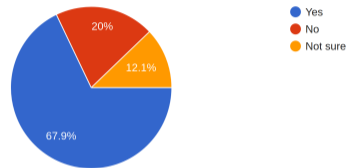
Training in instrumentation was available in my undergraduate institution (Bachelor's)

471 responses



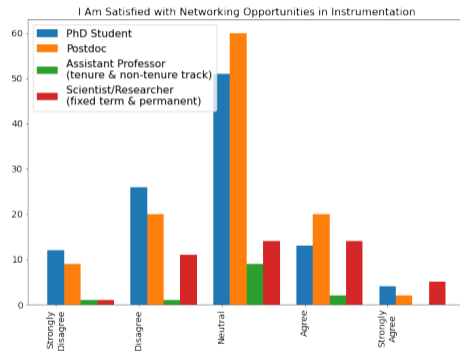
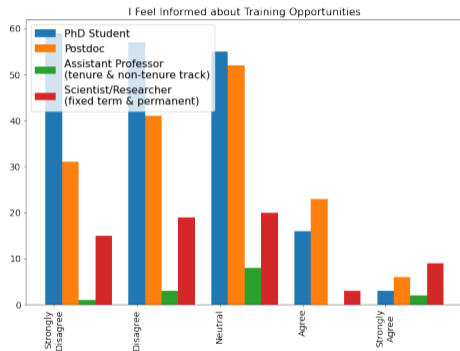
Training in instrumentation was available in my postgraduate institution (master's, PhD)

470 responses



I view work in instrumentation as...	...something I don't think about	...a liability to my career	...something I would rather avoid	...something I enjoy	...a benefit to my career
Total responses	65	67	34	242	307
Had instrumentation training in MSc./PhD.	21 (32%)	42 (63%)	9 (26%)	155 (64%)	190 (62%)
No instrumentation training in MSc./PhD.	44 (68%)	25 (37%)	24 (70%)	84 (35%)	114 (37%)

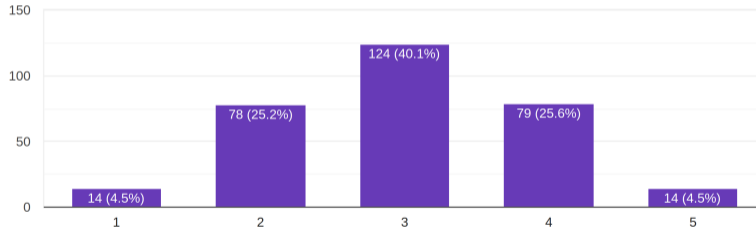
Training and networking depending on career stage



Sharing of expertise

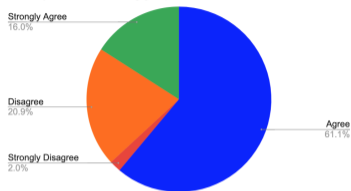
I feel that expertise within my field is accessible and easily shared

309 responses

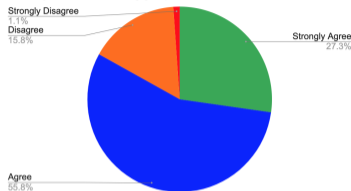


Diversity and inclusion: Further pie charts

I see my immediate working group as diverse

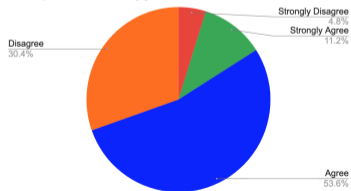


I see my immediate working group as diverse

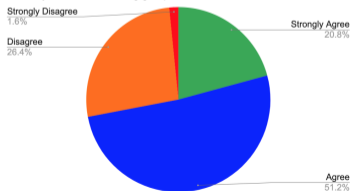


Everyone

I see my immediate working group as diverse



I see my immediate working group as diverse



- 22%/17% disagree or disagree strongly overall
- 35%/28% disagree or disagree strongly for minority

Respondents that identify as an underrepresented minority in their field