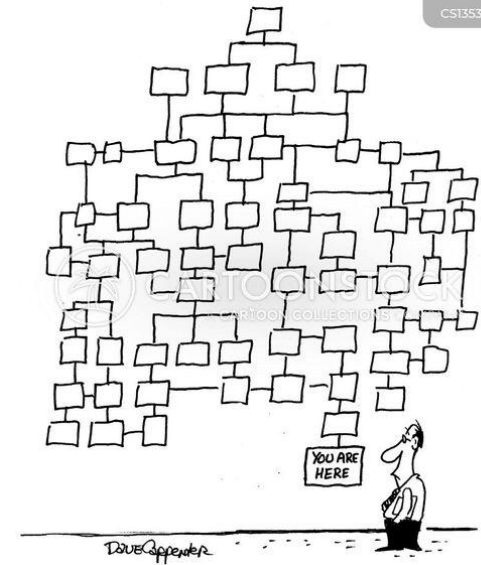


The Early Career Researchers' Input to the 2026 Update of the European Strategy for Particle Physics

@ 5th FCC / DRD – France / Higgs & ElectroWeak Factory workshop
Paris, 26–28 Nov 2025

Abdelhamid Haddad (LPCA, CNRS/IN2P3)
on behalf of the ECR White Paper team
eppsu-ecr-organisers@cern.ch



ECRs: (non-perm or < 10 a after PhD,
at European institutes)

Shaping the Future of Particle Physics

<https://europeanstrategy.cern/>



- ❖ **CERN Council:** The highest authority of CERN, overseeing its activities and strategic direction.
- ❖ Mandating two key bodies:
 - **PPG:** Physics Preparatory Group
 - **ESG:** European Strategy Group
- ❖ In **March 2024**, the CERN Council launched the process for the 3rd **European Strategy Update**.



Context / 2020 ESPPU

— Previous updates!

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.***

Ref: [CERN-ESU-015-2020](#)

A group of Early-Career Researchers (ECRs) has been given a mandate from the European Committee for Future Accelerators (ECFA) to debate the topics of the current European Strategy Update (ESU) for Particle Physics and to summarise the outcome in a brief document [1]. A full-day debate with 180

This report aims to provide input from the ECR community on the ESU scheduled to be approved by the CERN Council in 2020.

This initiative was started towards the end of the consultation period for the ESU, which has taken place throughout 2019. A total of 180 ECRs from institutes across Europe were invited to a plenary debate on 15th November 2019. The broad range of possible topics was subdivided into several areas with common physics or themes to streamline the discussion:

Ref: [CERN-OPEN-2020-006](#)

The Early-Career Researchers (ECR) panel of the European Committee for Future Accelerators (ECFA) [1] formed in January 2021, following the recommendations of an initial ECR debate in November 2019 [2], which aimed to provide ECR input to the 2020 update to the European Strategy for Particle Physics [3]. Following this, the panel aims to continue to provide ECR input to ECFA, and to the 2026 update to the European Strategy for Particle Physics.

Ref: [ArXiv: 2407.12761 \[acc-ph\]](#)



Context / 2026 ESPPU



This time, the ECR community is aiming to do better:

- ❑ Initiated by the ECFA ECR panel, as an open, community-driven effort,
- ❑ Have a concrete and unified input to the ongoing ESPPU.



What's for ?

- ❑ Document the challenges faced by ECRs and ensure they are taken into account when shaping the future of the field,
- ❑ Filling the gap, address topics not (necessarily) covered in other inputs, but of critical importance to ECRs & to the future of the field !
- ❑ Recommendations for institutes, senior scientists, and funding agencies.

Timeline



10 October 2024

ECR session @ 3rd ECFA Workshop in Paris

First working groups (WGs) established

Discussions among WGs,
first draft statements

ECR Workshop
on EPPSU @ CERN

14 November 2024



Presentation of final
results (open to all)

Open Seminar on the
White Paper @ CERN

27 May 2025



20th February 2025

Open ECR Symposium
@ CERN

Discussion of survey results
and first full White Paper draft



Timeline

[Link](#)



10 October 2024

[ECR session @ 3rd ... Workshop in Paris](#)

First working group (WGs) established



presentation of final results (open to all)

[Seminar on the Paper @ CERN](#)

May 2025



Final White Paper draft

The White Paper and ESPPU Input

Early Career Researcher Input to the European Strategy for Particle Physics Update: White Paper *Fifty-five recommendations for the future of our field*

Editors

Jan-Hendrik Arling^{1,1*,}, Alexandre Burgman^{2,*}, Christina Dimitriadis^{3,†}, Ulrich Ehlhaas⁴, Axel Gallit⁵, Abdelhamid Haddad⁶, Laura Hulst^{7,†}, Armin Ilg^{8,*}, Jan Klamka⁹, Elizabeth Long¹⁰, Thomas Madlener¹, Arnau Moracho Tardà^{11,†}, Emanuela Musumeci^{12,*}, Krzysztof Mękała^{13,*}, Elena Poma Pacchi¹⁴, Marvin Pfaff¹⁴, Daniel Reichelt¹⁵, Leonhard Reichenbach^{15,16,†}, Birgit Stapf¹⁵, Francesco P. Ucci^{17,18}, Erik Wallin^{19,†} and Harriet Watson^{20,1,*}

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‡: Past member of the ECFA ECR Panel

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Endorsed by the ECFA ECR Panel

27th of March, 2025

Abstract

This document, written by early career researchers (ECRs) in particle physics, aims to represent the perspectives of the European ECR community and serves as input for the 2025–2026 update of the European Strategy for Particle Physics. With input from a community-wide survey, it highlights key challenges faced by ECRs — career stability, funding access and long-term research opportunities — while proposing policy recommendations and targeted initiatives. It underscores the importance of practices fostering diverse, equitable, inclusive and healthy workplaces, as well as of stronger ECR communities, and highlights how effective communication and interdisciplinary collaborations reinforce the societal relevance of particle physics and promote continued support for large-scale and long-term projects. Finally, the future of both collider and beyond-collider experiments is addressed, emphasising the critical role of ECRs in shaping future projects.

The ECR contribution is formed of two parts: the ten-page executive summary submitted as input to the European Strategy for Particle Physics Update and, as backup document, this extended white paper providing additional context.

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Input to ESPPU / [ArXiv:2503.19862](https://arxiv.org/abs/2503.19862)

10 pages summary input + 100 pages backup

55 recommendations*, i.e. suggestions for Improvement + statements and examples

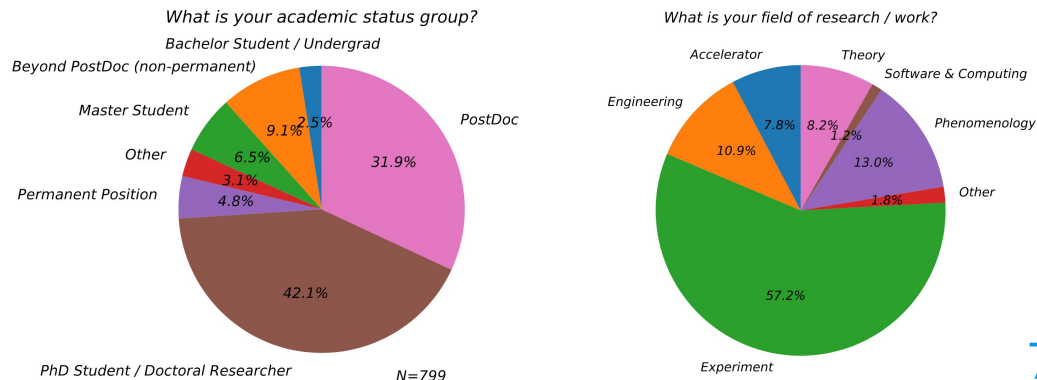
* Many recommendations were skipped for this talk.

800 survey replies from European ECRs

([zenodo link](https://zenodo.org/record/1444444))

& 2022 ECFA ECR Panel survey on career and diversity [ArXiv:2404.02074](https://arxiv.org/abs/2404.02074)

150 supporters so far (in addition to authors) & endorsed by the ECFA ECR panel



Outline

Part I:

1. Careers, wellbeing & DEI
2. Community building & leadership
3. Communication and outreach

Part II:

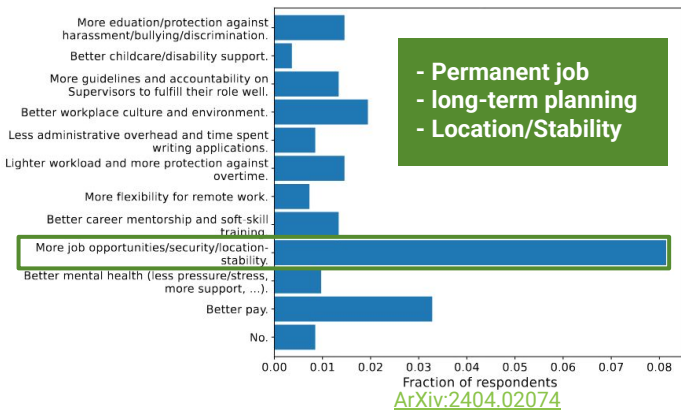
4. Future colliders
5. Beyond-collider projects



Career Prospects and wellbeing



Measures to improve your personal situation?



- ❑ Mandatory supervision training to help staff align expectations and understand supervisee needs
 - ❑ 80% support mandatory supervision training
 - ❑ 59% report that no such training exist locally
- ❑ Provide information and career paths guidance to early-ECRs
- ❑ Promote at least 2 years postdoc contracts, and more structured path to permanent positions (whenever possible)
- ❑ Skills training relevant to academia and industry (mentorship)
- ❑ Recognise 2nd & non-research contributions in evaluations and institutional benchmarks.



Great science only happens with great scientists—and careers that retain them

Diversity, Equity & Inclusion (DEI)

Related input: [DEI \[259\]](#)



Talent knows no gender, background, or identity—our policies shouldn't either.



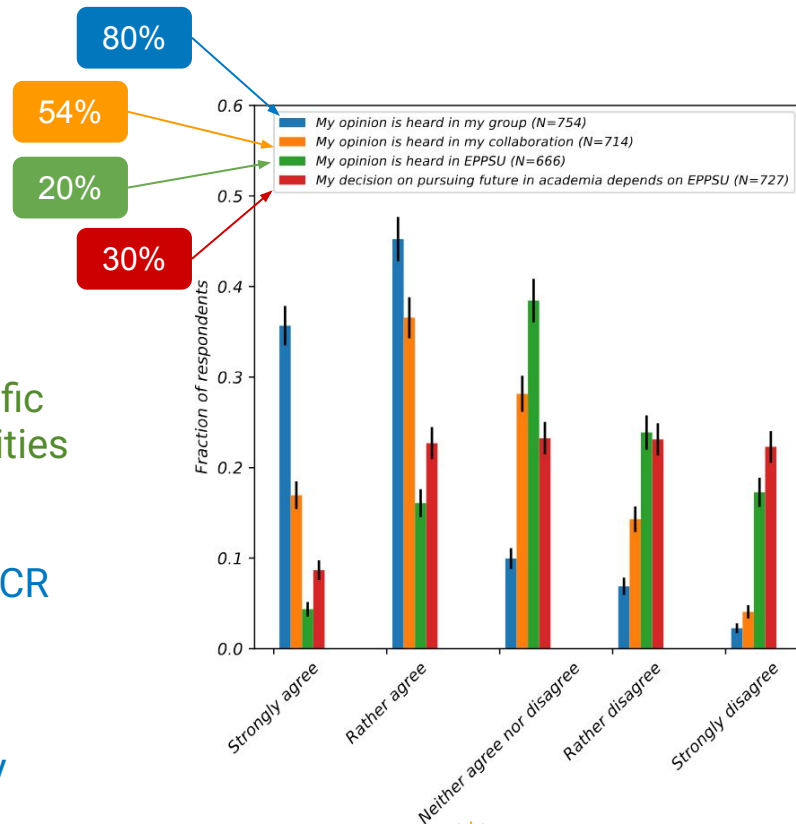
- ❑ 57% struggled at a certain degree with their mental health
 - ❑ 80% of them (143 total) suffered discrimination or harassment
- ❑ Fund institutional mental health services, specially ECRs
- ❑ Establish DEI offices in all institutions, labs and research centers
- ❑ Provide mandatory DEI training and safe spaces
- ❑ Ensure diversity in hiring panels and leadership roles
- ❑ Guarantee anonymity and discretion in complaint

Enforce Zero-tolerance for harassment and discrimination



Leadership, recognition & ECRs community building

- ❑ Include ECRs in executive boards, topical WGs and conferences organization & ECR sessions
- ❑ Ensure transparency in the selection of PPG scientific secretaries, clearly define their role and responsibilities toward the community
- ❑ Democratic ECFA ECR selection & Mandate ECFA ECR panel to send an ECR delegation to the ESG
- ❑ Dedicated funding to organise events (e.g. national forums) and activities to strengthen the community



ECRs need a stronger voice in strategic roles and leadership



Communicating the importance of PP

(public acceptance...)

Several of our recommendations align with input from
IPPOG [60], EPPCN [144] and INFN Communication Office [66]
& a collaboration is foreseen (in the near future) !

Effective Science
communication and
Outreach



Inspire the next gen of physicists

Secure support and funding

Give back to society

Disinformation

Excessive
simplification

~60%

Of ECRs already active in outreach

Outreach culture

Promote outreach as an **integral part of science**, sustaining motivation amongst ECRs

40%

*Do not feel adequately valued
for their outreach work*

Recognition

Recognise and reward outreach and communication efforts, and integrate them into institutional benchmarks

40%

*Of ECRs do not feel adequately trained
to do science communication*

Training & Resources

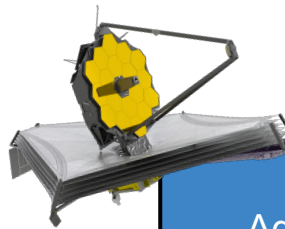
The community should develop standardised training and provide a centralised outreach platform

A lot of material already available!

(IPPOG is working on a centralised platform)

85%

*Are motivated to engage with
the public on topics of future
projects in particle physics*



Future discoveries can be limited by several factors



Storytelling

Advertize the role of future experiments as observatories, rather than discovery machines

Christophe Grojean, Patrick Janot, Guy Wilkinson
(on behalf of the PED coordination group)
Fifth FCC/DRD France Workshop – 26 November 2025

Deliverables for PED priority items #6 (worldwide theory community)

- Initiate dedicated (annual) **training schools** for PhD students and young postdocs.
- Organise Les Houches-style **workshops** to draw the wish lists of the needed computations and event generators, and to establish a development strategy in the short and long term.
- Establish an **exchange programme for PhD** students among key institutions (CERN, U. Zurich, KIT, Durham, UC Louvain, DESY, LPTHE/IPhT...).
- Secure a **FCC fellowship** and **visitor** programme at **CERN**.
- Propose a coordinated **resource plan** for the next 20 years to develop and reinforce the theory community.
- Create an **Early Career Researcher** forum to discuss job opportunities and to stir up community engagement thanks to appropriate accolades.
- Participate to **ECOI** activities and contribute to the composition of **FCC narratives**.
- Elaborate on the **synergy** FCC-ee/FCC-hh

Deliverables for PED priority items #8 (Edu/Comm./OutReach/InReach)

- Compose **narratives** for funding agencies and governmental authorities.
- Instigate a **communication program** targeting the broader scientific community and the neighbouring fields.
- Prepare **general talks for science festivals and public events**; train a pool of (young) physicists to deliver these talks and represent FCC.
- Edit **pitches** accompanying scientific publications / studies.
- Redesign the **PED web page** and launch a resource portal with updates plots / tables.
- Organise a contest to redefine the meaning of the **FCC acronym**.

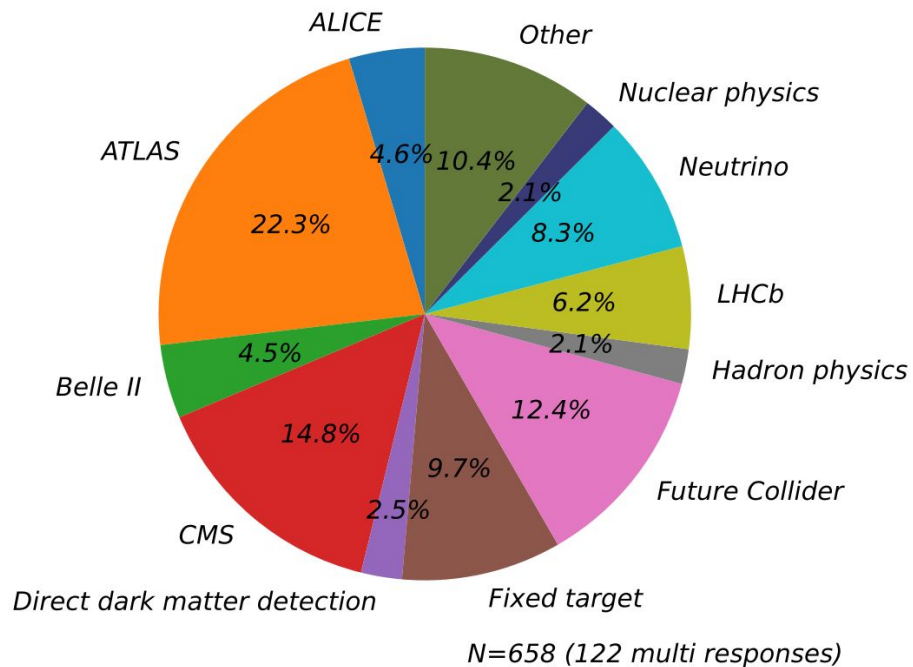
Part II

Future Experiments Colliders and Beyond

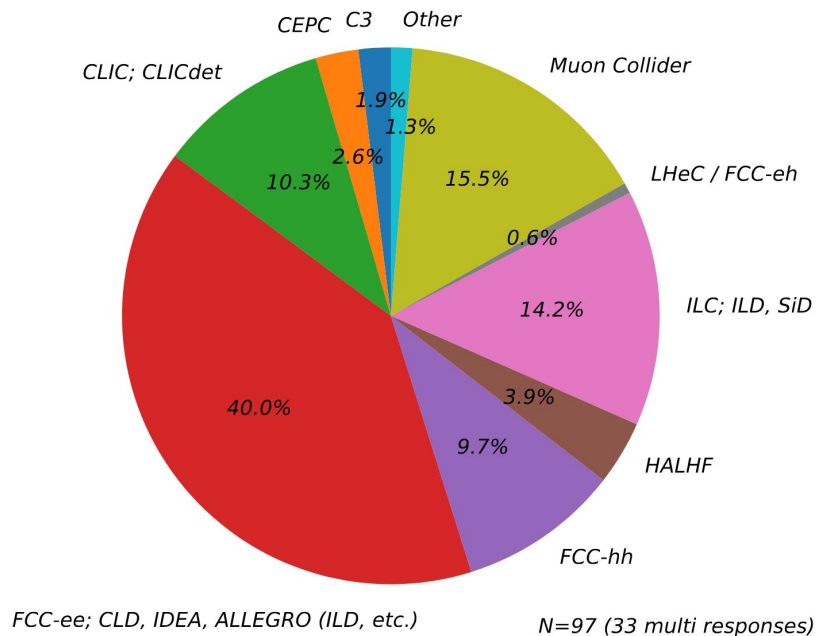
Adapted from A. Burgman (Stockholm
Univ.) slides at EPS-HEP 2025

[\(link\)](#)

If applicable, what experiment are you working on?



Which future collider project are you working on?



Criteria for a future collider

80%

want a future flagship collider

28% *circular e^+e^-*

15% *muon collider*

14% *hadron collider*

8% *linear e^+e^-*

9% *any collider ASAP*

23% *no strong opinion/don't know*

-> FC-active ECRs: ~ 60% voted for "their" project,
second most common is *any collider ASAP*

Sustainability and **social acceptance** are necessary conditions, but not driving factors.
Priority for an ambitious project, technologically and scientifically

84% of ECRs are willing to **support the ESPPU outcome**, even if their preferred collider option is not prioritised.

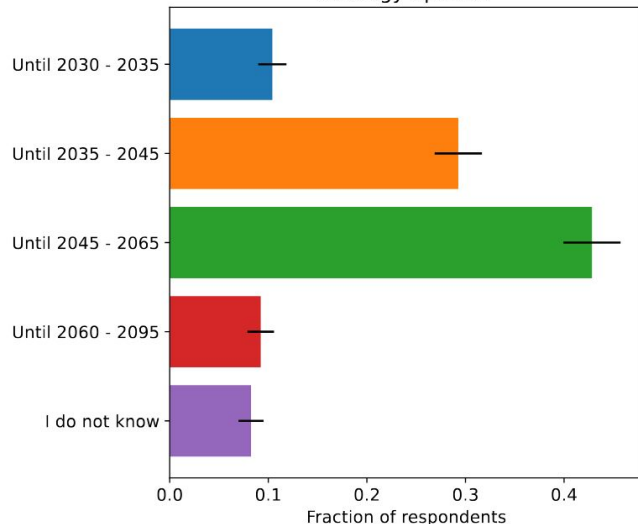
Decision and time coverage

A **fair and inclusive decision process** is essential to create acceptance for the decision among proponents of future collider alternatives.

Call for a **timely decision** — avoids uncertainty

- **Career planning**, motivation for **funding bodies**
- Not fastest project, but **fast decision**

How far into the future should the particle physics community make plans with this strategy update?



The ESPPU should **urge the CERN Council** to make a **timely decision** on the next flagship.

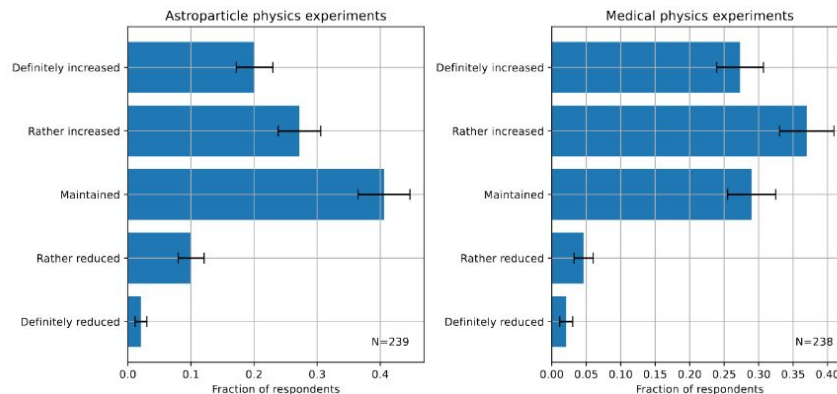
Beyond colliders

Beyond-collider experiments and activities should maintain a prominent role in the European particle physics landscape, both as **groundbreaking activities in their own right** and as **pathfinders** for collider searches.

ESPPU should include **concrete recommendations for beyond-collider** particle physics

- Forum for beyond-collider researchers: **collaboration & coherence**
- **Easier transition/synergy** between collider and beyond-collider
- A dedicated **ECFA panel & funding**

To what extent should CERN participate in beyond-collider physics and in its different subfields, e.g. fixed target, nuclear physics, astroparticle physics, etc.? Compared to the current level, the activity should be:



Latest news

Work after the ESPPU input

- Ongoing collaboration with the White Paper (WP) editors to advance the recommendations outlined in the WP
- As a first step we worked on a condensed and prioritized list of recommendations
 - About 17 recommendations, taken from the original contribution
 - Prioritized based on their short-, medium-, and long-term applicability
 - Work done in conjunction with the editors/authors of the WP
 - Sent from the ECFA ECR Panel to ESG Working Group 6 (Public Engagement, Education, Communication & Social and career aspects for the next generation)
 - Via email to Pierre Van Mechelen, and also Karl Jakobs (ESPPU Chair)
- Stay tuned!
 - With the latest message to ESG WG6 the ECR panel has taken ownership of the WP, as agreed by all involved parties
 - Further implementation and work with the recommendations will soon be carried out within our panel

**Report from ECFA ECR panel
@ 117th Plenary ECFA Meeting**
[\(link\)](#)



ESG WG6 Report
Public engagement, education, communication
Social and career aspects
Pierre Van Mechelen (University of Antwerp)

23-27 JUNE 2025 Lido di Venezia



University of Antwerp
Particle Physics Group

ESG WG6 Report

Public engagement, education, communication
Social and career aspects

Pierre Van Mechelen

Plenary ECFA meeting, November 21, 2025

Summary

- Investing in ECRs is to invest in the future of particle physics
- Great science only happens with great scientists—and careers that retain them
- Inclusion needs structure:
 - DEI offices — mentorship
- Value all contributions: analysis, software, R&D, outreach and comm.
- ECRs need a stronger voice in strategy and leadership

Flagship collider:

- Ambitious flagship
 - technologically — scientifically
 - collaborative — sustainable
- No majority for single project: openness to harmonization
- Timely decision
- Fair and transparent process

Beyond colliders:

- Retain budget balance
- Dedicated forum
- Concrete ESPPU recommendations

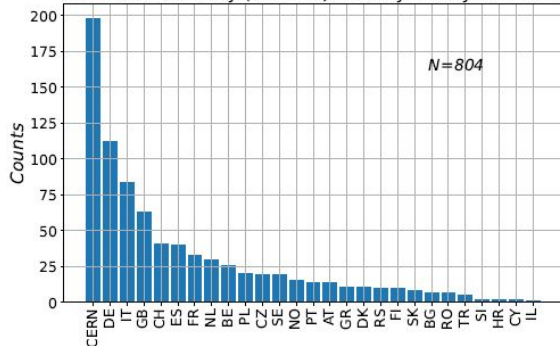
Thank you

BACKUP

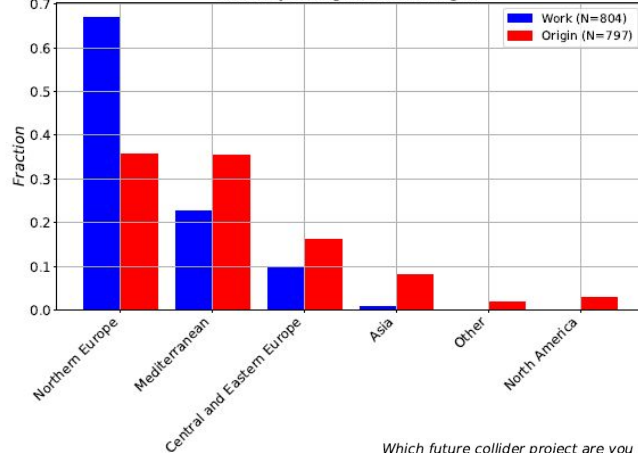


Survey demographics

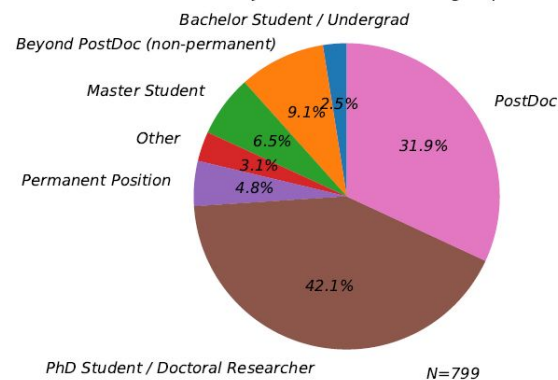
What is the country (or CERN) where you do your work?



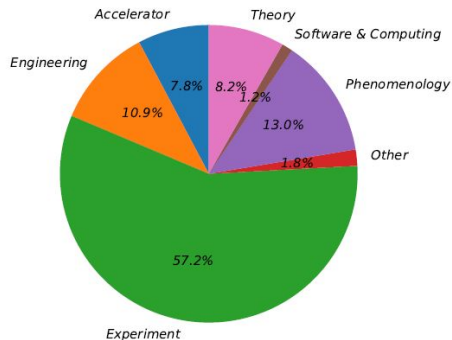
What is your region of work/origin?



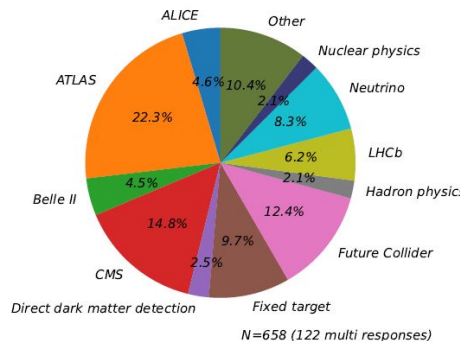
What is your academic status group?



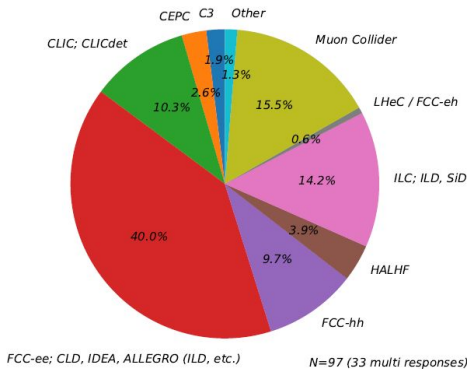
What is your field of research / work?



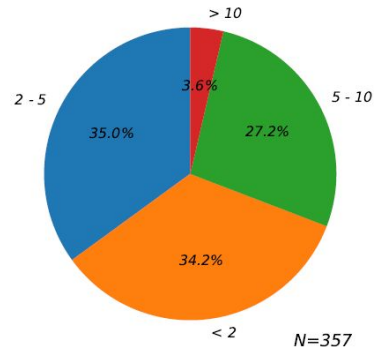
If applicable, what experiment are you working on?



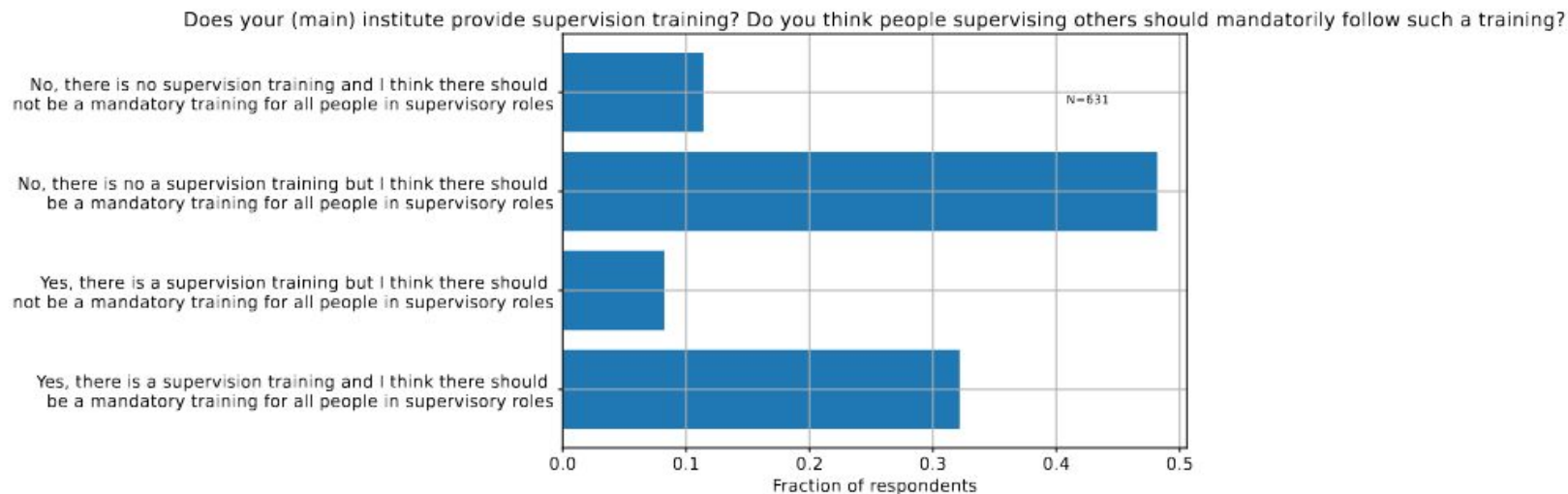
Which future collider project are you working on?



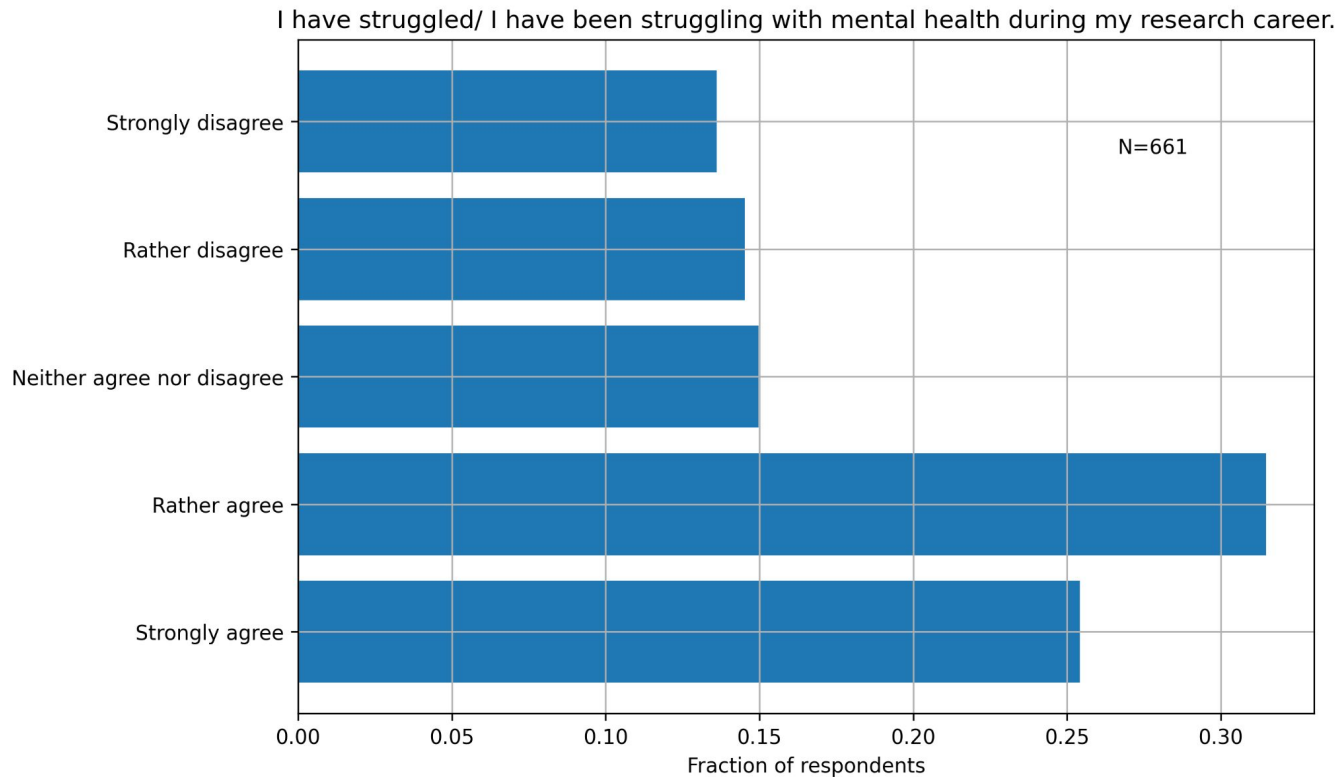
How many years ago did you finish your PhD?



Career



Wellbeing



Communication

