



ECFA

European Committee for Future Accelerators

Towards an ECR White Paper for EPPSU

Overview of ECFA-ECR panel efforts
for the ESPPU

Patrick Dougan (University of Manchester)
ECR ESPPU open meeting

24th October 2024

Introduction to the ECFA ECR

Origins of ECFA ECR

- After the 2020 Update of the European Strategy for Particle Physics, Early-Career Researchers formulated a [follow-up report](#)
- In response, the [ECFA Early-Career Researchers \(ECR\) Panel](#) was formed

*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.*

- Each ECFA member country 3 ECR representatives (+1 if LDG lab in country)
UK: [Julia Allen](#), PD, [Atanu Modak](#), [Holly Pacey](#)
- The ECFA ECR has since sought to survey European ECR community opinions on the future of the field, provide information on topics such as future colliders and communicate our findings to the main ECFA panels (P-ECFA & R-ECFA)

Recent Activities

Designed a survey to collect information about...

- The impact of the collaboration and institute work environments on ECRs
- Assess the career prospects of ECRs: how can our panel help, what are the main problems?

Circulated to ECR community -> **760 responses!**

- ~ 50% of the respondents were employed in Northern Europe , ~ 25% in Mediterranean Europe and ~ 15% in Central and Eastern Europe
- ~ 1/3 of the respondents were Mediterranean, ~ 1/3 from Northern Europe and ~ 1/5 from Central and Eastern Europe
- ~50% on 36–47 months or 24–35 months contracts
- Almost half were aged between 26 and 30
- Responses have been analysed and written report published [arXiv:2404.02074](https://arxiv.org/abs/2404.02074)

UK-Specific ECR Survey has been conducted this year, including questions on Future Colliders

- Preliminary results presented by [Holly Pacey](#) at [RECFA UK Visit](#)

Results of the 2022 ECFA Early-Career Researchers Panel survey on career prospects and diversity

The ECFA Early-Career Researchers Panel: Career Prospects and Diversity in Physics Programmes Working Groups

April 3, 2024

This document presents the outcomes of a comprehensive survey conducted among early career researchers (ECRs) in academic particle physics. Running from September 24, 2022, to March 3, 2023, the survey gathered responses from 759 ECRs employed in 39 countries. The study aimed to gain insights into the career prospects and experiences of ECRs while also delving into diversity and sociological aspects within particle physics research. The survey results are presented in a manner consistent with the survey choices. The document offers insights for the particle physics community, and provides a set of recommendations for enhancing career prospects, fostering diversity, and addressing sociological dimensions within this field.

Recent Activities

- [Future colliders for early-career researchers](#) town hall at CERN, 27th of September 2023
Proceeded by and partly based on [UK Future Collider Event](#)
- Goal: Inform ECRs about future collider options and development, enabling them to shape their own vision on future collider
 - Almost one hundred in-person participants, > 100 on Zoom
 - Written report ([arXiv:2407.01852](#)) summarising topics involved, consequences for ECRs and key messages from discussion



Early-career researchers perspective on future colliders

The ECFA Early Career Researcher's (ECR) Panel

July 3, 2024

Since its inception, the Large Hadron Collider (LHC) has significantly advanced particle physics and will continue to do so in the context of the High Luminosity LHC (HL-LHC) program to collect 3000 fb^{-1} by the end of 2041. The particle physics community worldwide is discussing which future collider could follow in the footsteps of the LHC and uncover yet inaccessible phenomena.

To foster the discussion on this important topic among the young particle physicist community, the Early-Career Researchers (ECR) panel of the European Committee for Future Colliders (ECFA) has organized the *Future Colliders for Early-Career Researchers* workshop at CERN in September 2023. This document aims to summarise this event and present the ECR perspective, outline the key questions that came up during the discussions, and explore how ECRs can influence the decision process of future colliders community and beyond.

Letter to CERN Council from ECFA ECR

Appendix A

Dear CERN Council,

In the 70 years since its founding, CERN has not only established itself as the global centre of particle physics research but as a powerful symbol of international collaboration and scientific excellence. This would never have been possible without the unfaltering support offered by the CERN member states.

As a community, we feel immense pride and gratitude that we are part of this journey of scientific exploration and opportunity which CERN has pioneered. While the High-Luminosity LHC constitutes a much-anticipated and necessary advance in the LHC program, a clear path beyond it for our future in the field must be cemented with as little delay as possible. For the field to sustain the population, expertise, and enthusiasm required to overcome the challenges of what CERN's next major project/accelerator will present, the ECR community needs certainty without delay that High Energy Physics has an immediate future beyond HL-LHC, and that funding and positions required to realise our future will grow rapidly.

We, the ECFA Early-Career Researchers Panel, on behalf of the ECR community, would like to strongly urge the Council to make every effort to ensure that the process of evaluating, selecting and implementing potential future projects, which will define this century of High Energy Physics for Europe and the World, proceed with as quick a pace as possible, accelerating its time frame to start the European strategy process as early as possible and conclude by early 2026. This will go some way in helping further secure CERN's unique position in science, technology and international cooperation for the next 70 years and beyond.

Kind regards,

The ECFA Early-Career Researchers panel

Letter to CERN Council from ECFA ECR

Appendix A

CERN COURIER.COM

OPINION INTERVIEW

Steering the ship of member states

CERN Council President Eliezer Rabinovici tells the *Courier* that CERN's member states are demonstrating unity, resilience and farsightedness as they chart CERN's role in the future of fundamental exploration.

CERN turns 70 at the end of September. How would you sum up the contribution the laboratory has made to human culture over the past seven decades?

CERN's experimental and theoretical research laid many of the building blocks of one of the most successful and impactful scientific theories in human history: the Standard Model of particle physics. Its contributions go beyond the best-known discoveries, such as of neutral currents and the seemingly fundamental W, Z and Higgs bosons, which have such far-reaching significance for our universe. I also wish to draw attention to the many dozens of new composite particles at the LHC and the incredibly high-precision agreement between theoretical calculation performed in quantum chromodynamics and the experimental results obtained at the LHC. These amazing discoveries



Untangling strings A professor at the Hebrew University of

the HL-LHC constitutes a much-anticipated and necessary advance in the LHC programme, a clear path beyond it for our future in the field must be cemented with as little delay as possible." It can be daunting for young people to speak out on strategy and the future of the field, given the career insecurities they face. I am very encouraged by their willingness to put out a statement calling for immediate action.

At its March 2024 session, Council agreed to ignite the process of selecting the next flagship project by going ahead with the fourth European Strategy for Particle Physics update. The strategy group are charged, among other things, with recommending what this flagship project should be to Council. As I laid down the gavel concluding the meeting I looked around and sensed genuine excitement in the Chambers – that of

What's your vision for CERN's future?

As CERN Council president, I have a responsibility to be neutral and reflect the collective will of the member states. In early 2022, when I took up the presidency, Council delegates unanimously endorsed my evaluation of their vision: that CERN should continue to offer the world's best experimental high-energy physics programme using the best technology possible. CERN now needs to successfully complete the High-Luminosity LHC (HL-LHC) project and agree on a future flagship project.

I strongly believe the format of the future flagship project needs to crystallise as soon as possible. As put to me recently in a letter from the ECFA early-career researchers panel: "While

the HL-LHC constitutes a much-anticipated and necessary advance in the LHC programme, a clear path beyond it for our future in the field must be cemented with as little delay as possible." It can be daunting for young people to speak out on strategy and the future of the field, given the career insecurities they face. I am very encouraged by their willingness to put out a statement calling for immediate action.

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The ECFA Early-Career Researchers panel

ECFA ECR Input to EPPSU

European Particle Physics Strategy Update

28th March, mail by Eliezer Rabinovici, President of CERN Council

“On 21 March 2024, the CERN Council decided to launch the process for updating the European Strategy for Particle Physics. I am pleased to announce that the **deadline for submitting written** input has been set for **31 March 2025**, with a view to **concluding the European Strategy update process in June 2026 ...**”

Earlier start and end than what was previously expected

Scope?

“... develop a visionary and concrete plan that greatly advances human knowledge in fundamental physics through the **realisation of the next flagship project at CERN**. This plan should attract and value international collaboration and allow Europe to continue to play a leading role in the field.

... The Strategy update should include the **preferred option for the next collider at CERN** and **prioritised alternative options** to be pursued if the preferred plan turns out not to be feasible or competitive. The Strategy update should also indicate areas of priority for **exploration complementary to colliders and for other experiments** to be **considered at CERN** and **at other laboratories in Europe**, as well as for participation in projects outside Europe.”

EPPSU timeline and structure

Timeline for the update of the European Strategy for Particle Physics



9 topical WGs:

- EW/Higgs Physics
- Strong Interaction
- Flavour Physics
- BSM
- Neutrino Physics and Cosmic Messengers
- DM and Dark Sector
- Accelerator Science and Technology
- Instrumentation
- Computing

1 ECR scientific secretary for each WG

- Anyone can submit input to the strategy (31st of March)
 - Future collider communities
 - E.g. ECFA countries, collaborations, ... And us -> **ECR White Paper**

ECR White Paper input to EPPSU

Initiated by ECFA ECR panel, but open to all European* ECRs†

Thus far:

- (Since PECFA Meeting July 2024) Preparatory meetings within ECFA ECR panel and with other ECR representatives
- [3rd ECFA Workshop on e+e- Higgs, Electroweak and Top Factories: \(9–11 Oct 2024\)](#)
 - ECR discussion sessions (~55 participants) about topics of importance for white paper
 - Formation of Working Groups around highlighted topics
 - Some questions from discussion around Higgs factory vs further downstream decisions, CEPC participation, role of sustainability, etc
- Since event ~120 ECRs have joined a dedicated [Mattermost Channel](#)

*: Focus on ECRs employed/hired in European institutes, but input beyond Europe appreciated

†: Non-permanent position or <10 years after PhD

The European Particle Physics Strategy Update and the role of Early-Career Researchers (talk)	Armin Ilg
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	13:15 - 13:30
Who are we? (interactive)	Emanuela Musumeci et al.
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	13:30 - 13:45
What is important to us for the future of particle physics in Europe? (discussion)	Emanuela Musumeci et al.
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	13:45 - 14:10
Further topics for ECR White Paper input? (discussion)	Leonhard Reichenbach
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	18:30 - 18:40
Ranking of topics (interactive)	Emanuela Musumeci et al.
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	18:40 - 18:55
Potential statements (discussion, if time allows)	Armin Ilg
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	18:55 - 19:05
Formation of Working Groups	Armin Ilg
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	19:05 - 19:15
Summary and next steps towards ECR White Paper input to EPPSU (talk)	
<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	19:15 - 19:30

ECR White Paper WGs

Newly created Working Groups:

- **Future colliders - Sustainability, priorities, timeline...** ([First meeting](#): 28/11, 16:00-17:00 CET)
- **Future particle physics experiments beyond colliders** ([First meeting](#): 30/11, 15:00-16:00 CET)
- **Interplay of particle physics with neighbouring fields** ([First meeting](#): 25/11, 11:00-12:00 CET)
- **Career prospects and ECR leadership** ([First meeting](#): 28/11, 15:00-16:00 CET)
- **Communicating the importance of particle physics** ([First meeting](#): 29/11, 11:00-12:00 CET)

All welcome to join, just in time for defining WG conveners (1-3 per WG) and first discussions. Going forward WG meetings will be self-organised

Going forward

[Subscribe](#) to the **esppu-ecr@cern.ch** e-group
[Join](#) the Mattermost channel (**ECRs for EPPSU 2024**)

- WGs self-organise and assign 1-3 convenors
 - Guide the discussions and summarise the findings into the White Paper
 - Join in time for [first online meeting\(s\)](#)
- Next general meeting: **14th November** in the morning at CERN (and Zoom), adjacent to [\(Open\) Plenary ECFA meeting](#)
 - Will create a Mattermost channel for the organisation – please help
 - Discuss first WG results, are important topics unaddressed?
- Meeting to agree on White Paper draft contents (location/format TBD)
- Endorsement of White Paper by ECFA ECR panel and submission to EPPSU by **31st of March 2025**
- Follow-up e.g. at [Open Symposium in Venice](#), **23-27th June 2025**

Backup

CERN event: Conclusions

“Specifically for ECRs, the future HEP machine should emphasize the **continuity of the physics program**, to **bridge the gap to HL-LHC** and provide exciting project **opportunities to younger scientists**. Transferability of skills and knowledge, as well as expertise across the field, should be encouraged both at the scientific and political levels, in connection also to **improving the current status of very short-term jobs and positions for young researchers**. Moreover, an **early, clear, and determined decision** regarding which future machine will be built can only have positive effects on the ECRs community as well as on the whole field of particle physics as it will give a strong incentive to work towards a project that has high chances of being realized. ... We, therefore, believe that the **highest priority and importance** has to be given to the **choice of the future HEP machine**, that this choice has to be made **as soon as possible in the most informed way to minimize the negative impacts on ECRs careers and maximize the physics and discovery opportunities**, thereby providing a **clear direction for the future of our field.**”

(See [Report](#))

ECFA ECR panel

Keep in touch with us

- Our [webpage](#) to find your country ECR representative
- Contact us: ecfa-ecr-organisers@cern.ch
- [Subscribe](#) to ecfa-ecr-announcements e-group to get notified about our activities!

Aiming to represent the European early-career particle physics community

- From PhD students to young assistant professors
- Theoreticians, phenomenologists, experimentalists, ...
- 3 members per country (+1 if LDG lab in country)
- Organization Committee (Marko Pesut, Jan-Hendrik Arling, Arnau Morancho Tarda)
- 5 delegates in Plenary ECFA, 1 delegate in Restricted ECFA

ECR session at LCWS24

- [Agenda](#) with summary



FCC Week 2024 ECR session

- Agenda and Summary



Early Career Researchers & Muon Colliders event

- Agenda

Early Career Researchers
& Muon Colliders

Wed 28th August 2024 - Via Zoom
14:00-18:00 (CEST) & 08:00-12:00 (EST)

Q&A

Discussions

Design Overview

Call for External Speakers

Open to:

- Undergraduates
- Masters
- PhDs
- Postdocs
- Students etc.

Interested in:

- Physics
- Engineering
- Computing
- Mathematics
- Communication etc.

International Muon Collider Collaboration

MuCol

Funded by the European Union

Recent CERN Courier ECR Opinions

- [ECR Opinions CERN Courier piece on future of the field, pages 46-50](#)

