accelECR: THE EARLY CAREER RESEARCHER NETWORK IN ACCELERATOR SCIENCE AND TECHNOLOGY

L. Wroe, L. Valle*, P. Desiré Valdor[1], P. Martinez Reviriego, R. Taylor, I. Valencia Ruiz [2]
CERN – European Organization for Nuclear Research, Geneva, Switzerland
[1]also at PARTREC, UMCG, University of Groningen, Groningen, The Netherlands
[2]also at Université Paris-Saclay, Paris, France

Abstract

Early-career researchers (ECRs) are central to the advancement of accelerator science and technology, contributing across all areas - from R&D, theory, and design to experiment, commissioning, and operation - at all scales, from small medical accelerators to large colliders. While accelerator projects are often high-cost, long-timescale, and resource-intensive, ECR perspectives are underrepresented in strategic planning and decision-making. Following the example of particle physics (ECFA ECR) and nuclear physics (NuFFER), the accelerator science and technology community now has its own ECR network: accelECR. Through regular seminars and community-driven events, accelECR fosters knowledge exchange, promotes inclusivity, and improves skill transferability across the field. It also serves as a collective platform through which accelerator ECRs can engage with high-level strategy and decision-making in the field. The motivation, organization, and framework of accelECR are presented in this contribution.

MOTIVATION

Early-career researchers (ECRs) have historically been excluded from institutional, national, and international strategic decision-making. One study, for example, highlights that ECRs hold fewer than 2% of leadership positions across 20 scientific societies in the UK and US [1]. This is despite the critical role of ECRs as future leaders, a source of diverse perspectives and fresh approaches, hands-on contributors, and representatives of the majority of the workforce [2].

Such under-representation is particularly resonant in the field of particle accelerators, where projects can cost several billion US dollars, require more than a decade to construct, and involve thousands of scientists and technicians [3]. The FCC-ee, CERN's preferred option for its next large-scale collider [4], illustrates this starkly: with commissioning proposed for 2045 and an experimental run of 15 years, the project would span the majority of a current ECR's entire career [5].

Neighboring communities have already recognized this need for ECR representation and coordination. For example, the ECFA Early-Career Researcher Panel [6] was established in July 2020 to represent particle physicists (experimentalists, theorists, and phenomenologists) across Europe within the ECFA framework, while NuFFER was formed in October 2024 to serve the European nuclear physics ECR community within the framework of NuPECC [7]. Early-career structures are also maintained within individual collaborations, for example: the ATLAS Early Career Scientist Board [8], CMS Young Scientist Committee [9], Young DUNE [10], and the FCC Early Career Forum [11]. The accelerator science and technology community, however, has lacked a project-agnostic equivalent.

* accelECR-organizers@cern.ch

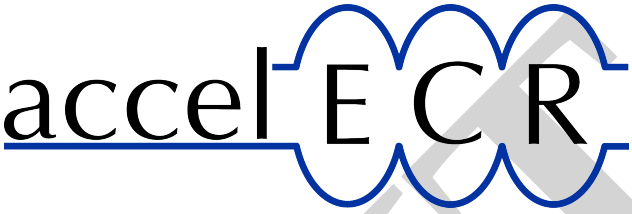

Figure 1: The accelECR logo.

This contribution introduces accelECR (Figure 1), a project-agnostic ECR[1] network for accelerator science and technology. The network has two aims: first, to build community by fostering knowledge exchange, promoting inclusivity, enhancing skill transferability, and expanding professional networks; and second, to act as a collective platform through which accelerator ECRs can engage with high-level decision-making, strategy, and leadership.

GOALS AND ORGANIZATION

The idea for accelECR was conceived following discussions around the *Early Career Researcher Input to the European Strategy for Particle Physics Update: White Paper*, released in March 2025 [12]. This paper analyzes survey responses from 804 European ECRs with a stake in the 2026 update of the European Strategy for Particle Physics (ESPPU) [13]. Of these, only 62 responses were obtained from those working in accelerator science and technology — a significant underrepresentation of the accelerator ECR community and too small a sample to draw any meaningful conclusions. This highlighted a real missed opportunity to incorporate accelerator ECR perspectives into strategic decision-making.

The goals and organization of accelECR were subsequently developed throughout 2025, with the network for-

[1] While there is no universal definition of an ECR, accelECR defines an ECR as a researcher working on their Bachelor's, Master's, or PhD thesis, or within 10 years of completing their most recent degree in accelerator science and technology (excluding parental leave or other personal breaks from the 10-year limit).

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mally launched at a kick-off event at CERN in November 2025 [14].

accelECR Goals

accelECR pursues two main goals:

- **Build Community by:**
  - Uniting the diverse community of ECRs in accelerator science and technology,
  - Supporting ECRs in their professional and personal development, including career and research opportunities,
  - Organizing workshops on topics of broad interest and of value for long-term development,
  - Promoting accelerator science and R&D as a legitimate research field of its own merit, independent of its widespread use as a research tool.
- **Provide a Platform for:**
  - Representing ECR perspectives in strategic and institutional decision-making,
  - Engaging with long-term planning processes that will shape the future of the field,
  - Coordinating with existing ECR platforms in neighbouring communities.

Currently, accelECR's core activities and organizing committee are based at CERN. To facilitate broader growth of the accelerator science and technology ECR community, accelECR supports regional, project-based, or local antenna initiatives by acting as a central hub for coordination and knowledge exchange.

Organizing Committee

To pursue its goals, accelECR is led by an organizing committee, currently composed of this contribution's authors. The committee covers a diverse range of accelerator expertise, from beam dynamics to RF systems, as well as different types of accelerator, from medical applications and storage ring light sources to colliders. The committee currently lacks engineering expertise, however, and aims to attract collaborators from disciplines such as electrical engineering, power electronics, and mechanical engineering.

The committee follows the CERN Diversity & Inclusion programme, making conscious choices of speakers, topics, and event formats to provide a platform for all. Additionally, accelECR events are open to any interested participants, from early-career to senior researchers.

ACTIVITIES

In its six months of existence, accelECR has focused on hosting seminars and networking events at CERN.

Seminars

accelECR has organized four different types of seminar:

- **Dual Series Seminar:** A project overview is presented by a senior researcher, followed by an ECR presentation on their contribution to the project.
- **ECR Seminar:** Talks presented exclusively by ECRs.
- **Round Table Seminar:** Presentation of a transverse topic related to accelerator science, technology, or operation, with a live Q&A session.
- **Industry Seminar:** Talks given by companies employing people with accelerator expertise, with Q&A and discussion of career opportunities.

All seminars are held in a hybrid format, to enable remote participation and accommodate work-life balance. A dedicated coffee break follows each event to extend discussion and encourage informal exchanges between participants.

So far, accelECR has hosted five seminars:

- *Kick-off Event:* A general overview of accelECR and its goals, followed by an overview of wakefield accelerations and the AWAKE experiment at CERN [15].
- *Focus on CLIC:* Our first Dual Series Seminar, featuring a 40-year overview of CLIC by a senior researcher, followed by an overview of current radiofrequency research directions by an ECR [16].
- *AI for Accelerators:* Our second Dual Series Seminar, featuring an overview of AI applications in accelerators by a senior researcher, followed by an ECR focus on beam control experiments [17].
- *Challenges of Fourth Generation Light Sources:* Our first ECR Seminar, featuring two talks introducing lattice design and operational challenges of fourth generation storage ring light sources, through the upgrade of SOLEIL II and PETRA IV [18].
- *Sustainability in Particle Accelerators:* Our first Round Table Seminar, introducing the case for sustainability in the field with a dedicated live Q&A [19].

Networking and Career development

Two networking formats are organized:

- **Formal Networking:** Annual poster sessions dedicated to the ECR research, allowing participants to present recent work presented at international conferences (or otherwise) while gaining an overview of projects across the community.
- **Informal Networking:** Monthly lunches are held at CERN and additional events throughout the year to strengthen connections within the network.

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Future Activities

accelECR is organizing two industrial seminars for mid-2026 and aims to host seminars every two-months, with future topics targeting technical and technological challenges such as magnet design and field measurement, vacuum characterization, cryogenics, beam diagnostics, and radiation protection. Our first poster session is planned for late summer 2026. accelECR also plans to develop a dedicated website to centralize information and increase visibility within the accelerator science and technology community.

GETTING INVOLVED

Joining accelECR

The accelECR network maintains several communication channels, described below.

Mailing List: The accelECR mailing list can be subscribed to via the QR code in Fig. 2. The mailing list is used to send invitations to seminars and networking events.

Figure 2: Link to subscribe to the accelECR mailing list [20].

Mattermost platform: accelECR manages a Mattermost platform with channels for updates, event reminders, monthly lunches, social discussion, and job openings [21].

LinkedIn: The Accelerator Early Career Community LinkedIn page [22] has around 160 followers and shares the activities of the network, wider accelerator science and technology content, and supports ECR endeavors. Figure 3 displays the follower statistics of their followers, showing the page reaches a wider audience from other large-scale institutes beyond CERN.

Anonymous Feedback Form: An anonymous feedback form is available for submission of talk or event suggestions and general feedback, to reduce the barrier between participants and the organizing committee.

Joining the accelECR Organizing Committee

The organizing team is open to any ECR volunteering time to help define and develop accelECR's programme, organize networking events, or maintain the network's social accounts. For other institutes, the accelECR committee is available to discuss and help establish local antenna communities to extend the network's geographical reach.

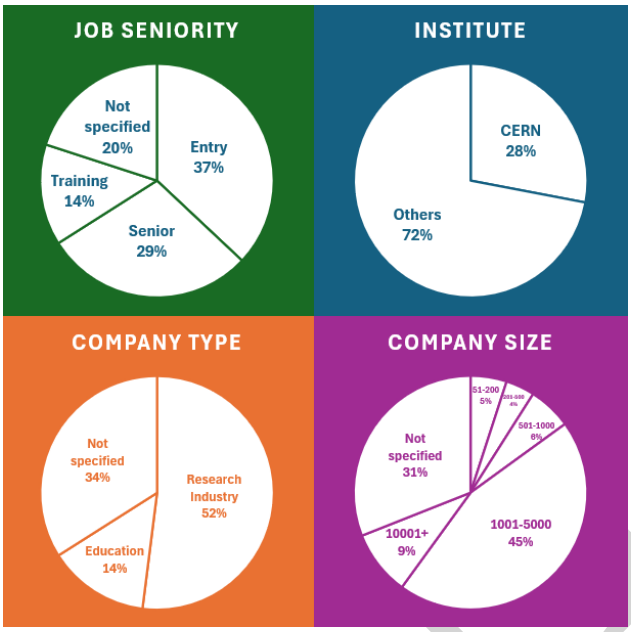

Figure 3: The accelECR LinkedIn built-in followers statistics [22].

SUMMARY

This paper has presented accelECR, a new network dedicated to building community among accelerator science and technology early career researchers and promoting their perspectives in high-level decision-making. In its six months of existence, accelECR has established its core activities at CERN, with over 100 members subscribed to its mailing list and approximately 50 attendees per event. Over the coming year, accelECR aims to formalize its structure, broaden its geographical reach, and grow into a recognized voice for the accelerator ECR community.

REFERENCES

[1] A. Bankston, S. M. Davis, E. Moore, C. A. Niziolek, and V. Boudreau, "Research culture: why scientific societies should involve more early-career researchers", *eLife*, vol. 9, e60829, Sep. 2020. doi:10.7554/eLife.60829

[2] B. A. Kent *et al.*, "Recommendations for empowering early career researchers to improve research culture and practice", *PLoS Biol.*, vol. 20, no. 7, pp. 1–19, Jul. 2022. doi:10.1371/journal.pbio.3001680

[3] J. Butler, R. S. Chivukula, A. de Gouvea, T. Han, Y.-K. Kim, and P. Cushman, "How high-energy physics plans its future", *Nat. Rev. Phys.*, vol. 4, no. 9, pp. 565–567, Jul. 2022. doi:10.1038/s42254-022-00493-9

[4] European Strategy Group, "The european strategy for particle physics: 2026 update – recommendations by the European Strategy Group", CERN, Geneva, Switzerland, Rep. CERN-ESU-2025-002, Dec. 2025. doi:10.17181/CERN.423R.S20Z

PREPRINT

[5] F. Zimmermann, "FCC-ee status and overview", *arXiv*, Apr. 2023. doi:10.48550/arXiv.2305.06913

[6] ECFA ECR, https://ecfa.web.cern.ch/mandate-ecfa-early-career-researcher-panel/

[7] A. Thiel and M. Athanasakis-Kaklamanakis, "NuFFER: a NuPECC forum for early-career researchers", *Nucl. Phys. News*, vol. 35, no. 1, pp. 3–3, 2025. doi:10.1080/10619127.2025.2454212

[8] C. Appelt, "How to support early career scientists in a large collaboration such as ATLAS", ATLAS Outreach Slides, Report No. ATL-OREACH-SLIDE-2025-490, presented at EPS-HEP 2025, Marseille, France, Accessed: 2026-05-12, 2025, https://cds.cern.ch/record/2942584,

[9] "CMS Young Scientists Committee", https://www.instagram.com/cms_ysc/, Accessed: 2026-05-12,

[10] "Young DUNE", https://atwork.dunescience.org/organization/young-dune/, Accessed: 2026-05-12,

[11] S. Fenkart, A. Ilg, J. Keintzel, L. Reichenbach, and S. L. Williams, FCC Early Career Forum, events, https://indico.cern.ch/category/19266/

[12] J.-H. Arling *et al.*, "Early career researcher input to the european strategy for particle physics update: white paper", *arXiv*, Sep. 2025. doi:10.48550/arXiv.2503.19862

[13] J. de Blas *et al.*, "Physics briefing book: input for the 2026 update of the european strategy for particle physics", *CERN Yellow Rep. Monogr.*, vol. 8, 2025. doi:10.23731/CYRM-2025-008

[14] L. Valle, L. Wroe, and M. Turner, accelECR kick-off event, https://indico.cern.ch/event/1608129/

[15] M. Turner, Overview of wakefield accelerators and the awake experiment, https://indico.cern.ch/event/1608129/contributions/6777802/attachments/3173269/5644141/2025-11-14%20AccECRCERNv3.pdf

[16] L. Valle, L. Wroe, W. Wuensch, and P. Martinez Reviriego, accelECR: Focus on CLIC, https://indico.cern.ch/event/1617024/

[17] L. Valle, L. Wroe, V. Kain, and M. Schenk, accelECR: AI for accelerators, https://indico.cern.ch/event/1617032/

[18] P. Desire Valdor *et al.*, accelECR : challenges of fourth generation light sources, https://indico.cern.ch/event/1672251/

[19] P. Desire Valdor, P. Martinez Revirigieo, I. Valencia Ruiz, L. Valle, L. Wroe, and H. Wakeling, accelECR: Sustainability in particle accelerators, https://indico.cern.ch/event/1681362/

[20] accelECR mailing list, https://gms.web.cern.ch/group/accelerator-ecr/details

[21] accelECR Mattermost channel, https://mattermost.web.cern.ch/signup_user_complete/?id=wnrgi5dpgirjxe748qqfryqeba&md=link&sbr=su

[22] accelECR LinkedIn, https://www.linkedin.com/in/acceleratorecr/

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