

Federico Leo Redi

Tenure-Track Assistant Professor of Physics

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Research positions

- 10.23–09.26 **Tenure-track assistant professor**, *Department of applied sciences*, U. of Bergamo and National Institute for Nuclear Physics (INFN), Milan, IT
- Principal Investigator of a research group focusing on searches for new physics at the LHC. Secured international competitive funding (>380 kEUR) for projects in high-energy physics and interdisciplinary applications of machine learning to biomedical imaging.
- As convenor of the LHCb 'QCD, Electroweak, and Exotica' working group (01.22–04.24), I supervised 30 active analyses spanning BSM searches for direct Dark Matter and exotic signatures, as well as electroweak and QCD precision measurements including the W boson mass. Reported directly to the physics coordinator and managed the full analysis approval process, ensuring timely publication of high-quality results. This role resulted in the comprehensive electroweak programme detailed in my selected publications.
- Serve as technical coordinator of the LHCb Editorial Board (2021–present), overseeing the publication process for approximately 12 papers per year. Developed and maintain technical infrastructure including \LaTeX templates, analysis preservation tools, and the central publications database. This role ensures quality assurance across all LHCb publications.
- Course convenor and lecturer for undergraduate physics (Physics I & II, 300 students annually), supervising 3 teaching assistants. Designed and launched a new interdisciplinary course on Physics of Climate Change (grant-supported, 50 students annually).
- 10.21–09.23 **Senior research fellow**, *Experimental physics department*, European Organisation for Nuclear Research (CERN), Geneva, CH
- Led the LHCb central offline selection framework (stripping) as project leader (01.21–04.23), coordinating the pre-selection infrastructure serving approximately 1500 collaborators. Managed bi-yearly production campaigns with 20+ developers, designed the final trigger stage specifications, and reported to the operations coordinator. This work ensures continued scientific productivity from the full Run 1 & 2 legacy dataset.
- As co-coordinator of the LHCb offline Data Processing & Analysis working group (01.21–04.23), maintained and enhanced the legacy software infrastructure for Run 1 & 2, providing technical support to analysts across the collaboration. Simultaneously served on the Operations planning group, developing operational procedures for data taking, processing, and long-term data accessibility.
- 10.17–09.21 **Postdoctoral researcher**, *High energy physics laboratory*, Swiss Federal Institute of Technology (EPFL), Lausanne, CH
- Co-convenor of the LHC-wide long-lived particles working group (10.19–01.22), advising other physicists across ATLAS, CMS, and LHCb on search strategies. Led the sterile neutrino programme by coordinating simulation efforts across experiments, organising the reinterpretation forum, and developing new triggering strategies. Co-authored comprehensive white papers and organised dedicated workshops that shaped the field's experimental strategy.

Convenor of the LHCb 'Exotica and Higgs physics' sub-working group (10.19–10.21), managing the collaboration's BSM search programme. This included the semileptonic long-lived particle search I pioneered, which required developing innovative triggering algorithms and implementing the material veto methodology that opened a previously inaccessible search channel.

Responsible for the test-beam programme for SND@LHC (10.17–10.19), conducting experimental campaigns at CERN and DESY to characterise detector performance. This work directly contributed to the successful detector proposal.

Grants, fellowships, and competitions

- 07.22 **Ramón y Cajal fellowship**, 236.4 kEUR; success rate $\sim 10\%$
Agencia Estatal de Investigación, ES
- 10.21 **Beatriu de Pinós fellowship**, 144.3 kEUR; success rate $< 10\%$
U. of Barcelona, ES
- 2021 & 2022 **National Scientific Habilitation for associate professor**
Experimental physics; obtained in IT and ES
- 2013–2017 **STFC PhD studentship**
UK Science and Technology Facilities Council, GB
- 2014–2017 **STFC Long Term Attachment to CERN, CH**
Competitive funding for overseas fieldwork awarded quarterly; obtained for 2.5 years

Education

- 10.13–09.17 **PhD in fundamental physics**, Imperial College London, GB
Supervisor: Prof *Andrey Golutvin*
Thesis – *Searching for Heavy Neutral Leptons at LHCb and SHiP*
Co-coordinated the simulation software for the SHiP collaboration (10.14–10.17), developing the Monte Carlo framework for the experiment's sensitivity studies. Served as co-liaison for Particle Identification software in LHCb (10.14–10.15).
- 10.09–09.13 **BSc; MSc in physics**, Imperial College London, GB, highest grade
Supervisor: Prof *Ulrik Egede*
Thesis – *Measurement of the D^0 production asymmetry in 7 TeV pp collisions*

International responsibilities

Physics

- 01.22–04.24 **LHCb convener of the ‘QCD, Electroweak, and Exotica’ working group**
- 10.19–01.22 **LHC-wide co-convenor of the ‘long-lived particles working group’**
- 10.19–10.21 **LHCb convener of the ‘Exotica and Higgs physics’ sub-working group**

Technical

- 2021–present **LHCb Editorial Board member and technical coordinator**
- 01.21–04.23 **Member of the LHCb Operations planning group**
- 01.21–04.23 **LHCb project-leader of the central offline selection (stripping)**
- 01.21–04.23 **LHCb co-coordinator of offline Data Processing & Analysis working group**
- 10.17–10.19 **Responsible for test-beam programme, SND@LHC collaboration, at CERN and DESY (DE)**
- 10.14–10.17 **Co-coordinator of simulation software, SHiP collaboration**
- 10.14–10.15 **Co-liaison for Particle Identification software, LHCb collaboration**

Academic service

- 2025–present **Member of the faculty PhD Selection Committee, UNIBG, Bergamo, IT**
- 2022–present **External Reviewer** for the National Science Foundations of CH, ES, and GR
- 2024–present **Reviewer** for *Physics Letters B*
- 2022–present **Reviewer** for *SciPost Physics Core*
- 2021–present **Associate Editor** for *Frontiers in Physics*
- 2021–present **Reviewer** for *The European Physical Journal C*

Institutional

- 08.20–01.22 **Young scientist representative, Swiss Institute of Particle Physics**
- 2015–present **Responsible for institutional review** of LHCb papers

Selected publications

Due to the very large collaborations in High Energy Physics, small-author papers are uncommon and bylines are typically alphabetical. As a member of the LHCb Collaboration and the SHiP Collaboration for several years, I am a co-author of numerous publications, which can be found at INSPIRE.

Teaching

Classroom teaching

- 2022–present **Lecturer, U. of Bergamo, IT**
Physics I & II (300 students annually; supervise 3 teaching assistants)
- 2024–present **Course designer and lecturer, U. of Bergamo, IT**
Developed complete course *Physics of Climate Change* (grant-supported, 50 students annually; supervise 2 TAs)
- 01.20 **Invited lecturer, Young Experimentalists and Theorists Institute, Durham U., GB**
Winter school for PhD students and early postdocs (50 attendees)

- 2018 **Course organiser and lecturer**, *NUST MISIS*, Moscow, RU
Developed and delivered course *Search for new phenomena at the intensity frontier*; organised international speaker series (200 students total)
- 2014–2021 **Teaching Assistant**, *Imperial College London (GB)*, *EPFL (CH)*
Computational Physics (MSc); Particle Physics I & II (MSc)
- PhD Student supervision**
- 2024–present **Member of the PhD Faculty Board**, *U. of Bergamo*, IT
Contribute to PhD program curriculum, teaching, and supervision in Physics.
- 2019–2022 **S. Cholak**, *EPFL*, CH
Thesis: *Searching for HNLs at LHCb* (currently holds a postdoctoral position)
- 2019–2022 **S. A. Bouchiba**, *EPFL*, CH
Thesis: *Simulating inclusively produced polarised HNLs*
- MSc Student supervision**
- 2024–2025 **M. Grassi**, *UNIBG&INFN*, Bergamo, IT
Thesis: *Adapting Particle Physics Methodologies for Precision Biomedical Imaging via Deep Learning*
- 2024–2025 **R. Pozzi**, *CERN*, Geneva, CH
Thesis: *Upgrade of the LHCb simulation framework with advanced particle event generators* (currently holds a doctoral position)
- 2019–2020 **A. Mascellani**, *EPFL*, CH
Thesis: *Deep learning for particle tracking in high-density environments* (currently holds a doctoral position)
- 2019 **S. A. Bouchiba**, *EPFL*, CH
Thesis: *Monte Carlo generator for heavy flavour decays to HNLs* (continued to PhD)
- 2018 **A. Grandchamp**, *EPFL*, CH
Thesis: *EM shielding optimization for SHiP* (presented at conference)
- BSc Student supervision**
- 2017–2021 **Multiple students**, *EPFL*, CH
Test-beam data analysis projects (semester-long, undergraduate level)

Conferences and seminars

Selected high profile contributions

- 08.25 'Unusual signatures at ATLAS, CMS, and LHCb' [on behalf of ATLAS, CMS, and LHCb] and 'Recent results on EW physics at LHCb' at Lepton Photon 25 (LP25), U. of Wisconsin–Madison, US [**plenary**]
- 03.24 'EW physics and LLPs with LHCb' at La Thuile 2024, La Thuile, IT [**plenary**]
- 09.23 'Searching for BSM physics (with displaced signatures) at LHCb' at DMNet International Symposium, Padova, IT [**plenary**]
- 06.23 'LHCb upgrade and review of LLP experiments' [on behalf of LHCb, FASER, SND@LHC, and MoEDAL] at FPCP 2023, Lyon, FR [**plenary**]

- 12.22 '(Re)interpretation of the LHCb results for new physics' at LHC Reinterpretation Workshop, CERN, Geneva, CH [**plenary**]
- 09.22 'Searching for BSM physics with displaced signatures at LHCb' at 2nd Workshop on Electromagnetic Dipole Moments, Gargnano del Garda, IT [**plenary**]
- 01.22 'Searches for long-lived particles' [on behalf of LHCb, CMS, and ATLAS] at LP21, Manchester, GB [**plenary**]
- 06.21 'Long-lived particle searches at LHCb' at SUSY Conference, Beijing, CN [**plenary**]
- 06.21 'Dark Photon @ ATLAS/CMS/LHCb' [on behalf of LHCb, CMS, and ATLAS] at LHCP, Paris, FR [**plenary**]
- 02.21 'Review of recent searches for long-lived particles at the LHC' [on behalf of LHCb, CMS, and ATLAS] at LHC Reinterpretation Workshop [**plenary**]
- 02.20 'The future of LHCb' at STEALTH physics conference, Santiago, ES [**plenary**]
- 08.19 'Results of direct dark sector searches' at DarkMatter@LHC, Seattle, US [**plenary**]
- 12.18 'Results of direct searches for long-lived particles' at Heavy Ions and Hidden Sector conference, Louvain-la-Neuve, BE [**plenary**]
- 06.19 'The SHiP experiment' and 'Results of direct searches for exotic Higgs-like boson decays' at WIN workshop, Bari, IT
- 06.18 'Results of direct searches for dark photons' at LHCP, Bologna, IT

Selected seminars

- 05.25 'Is LHCb finally ready to tackle direct searches of physics beyond the Standard Model?' at the U. of Cyprus, Nicosia, CY
- 02.24 'Is LHCb finally ready to tackle direct searches of physics beyond the Standard Model?' at the U. of California, Davis (PEX seminar), Davis, US
- 11.20 'The world of exotics at LHCb and beyond' at the U. of Geneva, Geneva, CH
- 10.20 'Feebly interacting particles at LHCb and beyond' at Monash University, Melbourne, AU
- 08.19 'The SHiP experiment' at the U. of California, Santa Barbara (UCSB), Santa Barbara, US

Additional contributed talks available upon request.

Organisation of conferences and seminars

- 2020–present **Scientific committee member** of the ‘workshop of the Long-Lived Particle Community’ (annual; ~150 attendees)
- 05.22 **Co-convenor** of the ‘Beyond the Standard Model’ stream at LHCP; Paris, FR
- 01.22 **Co-convenor** of the ‘Beyond the Standard Model’ stream at LP22; Manchester, GB
- 10.20 **Co-convenor** of the Exotica stream at the LHCb ‘Implications Workshop’ (300 attendees); CERN, Geneva, CH
- 05.19 **Convenor** of the HNL stream at ‘Searching for long-lived particles at the LHC’ workshop (50 attendees); CERN, Geneva, CH
- 01.19–09.21 **Main organiser** of institutional seminars (6 speakers per semester); EPFL, CH

Outreach

- 2024–present **Member, IPPOG Steering Board (LHCb representative)**, *CERN, CH*
Represent LHCb in the International Particle Physics Outreach Group governance.
- 2015–present **Head, LHCb Masterclass; Member, IPPOG Masterclass Steering Group**, *CERN, CH*
Lead the largest LHCb outreach program and represent LHCb in the IPPOG Masterclass Steering Group.
- 2020 **Royal Institution Conference Organiser**, *London, GB*
Future of the LHC; ~400 attendees.
- 2019–2021 **Founding Convenor, LHCb Outreach Working Group**, *CERN, CH*
Coordinated ~100 members.

Legal

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