

Curriculum vitae and Track record

Personal information

Family name, First name: **Bella, Federico**
 Researcher unique identifier: 55600535900 ([Scopus](#)) – F. Bella ([Google Scholar](#))
 Date of birth: 18/08/1987
 Nationality: Italian
 PI's team website: bella.polito.it



CV at a glance (quick facts)

- Full Professor of Chemistry at Politecnico di Torino (IT) - PI of ERC-StG "SuN₂rise" and ERC-PoC "GINNY", bridging fundamental electrochemistry and application-oriented innovation - PI of >€5M in competitive funding, including ERC, Horizon Europe, MSCA, and national flagship projects - Scientific leader in materials chemistry for energy conversion and storage, spanning batteries, photovoltaics, and electrochemical nitrogen fixation - Vice-President of the Italian Chemical Society, with long-standing roles in international scientific governance - Recipient of major international recognitions from RSC, ACS, ISE, ENI, EuChemS	Age 38 Publications 140 h-index 82 Without PhD/PostDoc supervisors 75%
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Education

PhD: in Electronic Devices @ Italian Institute of Technology & Politecnico di Torino

- Award ceremony: 10th Nov 2015 / Evaluation: excellent
- Supervisors: Prof. Roberta Bongiovanni and Prof. Elena Tresso
- Thesis: Photopolymers for dye-sensitized solar cells

MSc: in Industrial Chemistry @ Università di Torino

- Award ceremony: 11th Jul 2011 / Evaluation: 110/110 magna cum laude

Career

- Full Professor of Chemistry @ Politecnico di Torino, since 03/2022
- Associate Professor of Chemistry @ Politecnico di Torino, 03/2020-02/2022
- Assistant Professor of Chemistry @ Politecnico di Torino, 10/2016-02/2020
- Supervised 107 Thesis at BSc [55], MSc [40], and PhD [12] levels
- Supervisor of 4 Post-Doc researchers (+1 from the MSCA scheme)

International experiences

Massachusetts Institute of Technology (2018) [Prof. T. Buonassisi; 5 months]

- Visiting researcher*: as PI of a MITOR project on perovskites solar cell chemistry

Universitat Politècnica de València (2017) [Prof. A. Arques Sanz; 2 months]

- Visiting teacher*: as PI of an ERASMUS⁺ Staff Mobility for Teaching project

École Polytechnique Fédérale de Lausanne (2015) [Prof. M. Grätzel; 4 months]

- Visiting researcher*: unconventional electrolyte chemistries for hybrid solar cells

National University of Malaysia (2013) [Prof. A. Ahmad; 4 months]

- Visiting PhD student*: chemical functionalization of biopolymers

Universitat Politècnica de València (2011) [Prof. A. Arques Sanz; 3 months]

- Visiting MSc student*: sun-driven photocatalysts for water decontamination

Publishing record data from Scopus

- My **publications record** consists of **130 articles** in peer-reviewed, ISI international journals, counting **>12000 citations** and **h-index 80**.
- My **relevant contribution** as well as **group leader profile** is clearly highlighted considering that I am **first author of 34 articles**, **corresponding author of 73 articles**, **senior author of 23 articles**, and **1-time single author**.
- My **scientific independence** is demonstrated analysing my publication list, containing **75% articles without the PhD and PostDoc supervisors**.
- A further demonstration of the broad **impact of my work** is testified by a very low **self-citations degree (<5%)**.
- The **quality** of my scientific output is testified by **>80 articles in Q1**.

The 10 research outputs selected here (9 articles and 1 patent) define the conceptual backbone of my research agenda, rather than a retrospective collection of results. They illustrate how I have initiated new material paradigms – from polymer electrolytes to hybrid functional systems – and driven them from molecular design to device-level validation, across photovoltaics, batteries, and electrocatalysis. These works establish a coherent, risk-embracing trajectory that crosses disciplinary boundaries and anticipates application-relevant challenges. In all cases, I acted as corresponding or senior author, **setting the scientific direction and securing competitive funding in full scientific independence**.

- F. Elizalde, S. Trano, J. Ayestarán, X. Lopez de Pariza, R. Aguirresarobe, C. Francia, D. Mecerreyes, H. Hardon, F. Bella, “A light-mediated, 3D-printable, and self-healable polymer electrolyte for lithium batteries”, *Adv. Funct. Mater.* 35 (2025) 2419034 [IF 19 – cit. 15] Introduced an unconventional fabrication paradigm for solid-state energy materials, enabling simultaneous processability and electrochemical robustness.
- A. Mangini, J. B. V. Mygind, S. Garcia-Ballesteros, A. Pedico, M. Armandi, I. Chorkendorff, F. Bella, “Multivariate approaches boosting lithium-mediated ammonia electrosynthesis in different electrolytes”, *Angew. Chem. Int. Ed.* 64 (2025) e202416027 [IF 17 – cit. 25] First systematic multivariate study disentangling electrolyte-dependent effects in Li-mediated ammonia electrosynthesis. Established strategies to handle strongly coupled variables in complex electrochemical systems.
- B. Bertoncini, A. Taddeucci, S. Trano, S. Raviolo, I. Valdrighi, F. M. Vivaldi, V. Mattoli, F. Bella, M. Carlotti, “A multipotent precursor approach for the preparation of high-molecular weight conjugated polymers with redox active units”, *Small Methods* 9 (2025) 2500488 [IF 9.1 – cit. 5] Introduced a multipotent precursor strategy enabling access to redox-active conjugated polymers otherwise inaccessible via conventional synthetic routes. Demonstrated how synthesis pathways can unlock new functional regimes.
- G. Pascuzzi, S. Trano, C. Francia, S. Turri, F. Bella, G. Griffini, “Elucidating the interplay between structure and electrochemical behavior in lignin-based polymer electrolytes for potassium batteries”, *Battery Energy* 4 (2025) e70002 [IF 9.9 – cit. 15] One of the first mechanistic analyses of K-ion electrolyte behavior, combining electrochemical response with structural evolution. This work establishes K-based systems as chemically rich yet underexplored platforms.
- F. Bella, G. Griffini, J. P. Correa-Baena, G. Saracco, M. Grätzel, A. Hagfeldt, S. Turri, C. Gerbaldi, “Improving efficiency and stability of perovskite solar cells with photocurable fluoropolymers”, *Science* 354 (2016) 203 [IF 46 – cit. 830] Showed that irreversible transformations during solar cell fabrication critically determine long-term operational stability. This work provides conceptual precedent for treating fabrication as a chemically active step.
- L. Fagiolari, F. Bella, “Carbon-based materials for stable, cheaper and large-scale processable perovskite solar cells”, *Energy Environ. Sci.* 12 (2019) 3437 [IF 31 – cit. 320] Provided a comprehensive materials chemistry strategy for scalable and low-cost perovskite photovoltaics, influencing industrially relevant device architectures and processing routes.
- T. N. Huan, D. A. Dalla Corte, S. Lamaison, D. Karapinar, L. Lutz, N. Menguy, M. Foldyna, S. H. Turren-Cruz, A. Hagfeldt, F. Bella, M. Fontecave, V. Mougél, “Low-cost high-efficiency system for solar-driven conversion of CO₂ to hydrocarbons”, *Proc. Natl. Acad. Sci. U. S. A* 116 (2019) 9735 [IF 9.1 – cit. 150] Led a multidisciplinary effort integrating catalysis, materials science, and device engineering, demonstrating ability to coordinate complex cross-disciplinary research.
- F. Colò, F. Bella, J. R. Nair, C. Gerbaldi, “Light-cured polymer electrolytes for safe, low-cost and sustainable sodium-ion batteries”, *J. Power Sources* 365 (2017) 293 [IF 7.9 – cit. 125] Demonstrated that electrochemical performance can diverge despite nominally identical formulations when fabrication pathways differ. This early observation motivates central questions on whether functional properties can be encoded during processing.
- F. Bella, S. Galliano, M. Falco, G. Viscardi, C. Barolo, M. Grätzel, C. Gerbaldi, “Unveiling iodine-based electrolytes chemistry in aqueous dye-sensitized solar cells”, *Chem. Sci.* 7 (2016) 4880 [IF 7.4 – cit. 105] Revealed previously unrecognized chemical equilibria governing electrolyte behavior, highlighting the limits of conventional descriptors in electrochemical systems.
- E. Molena, C. Hamon, S. R. Petricci, G. Piana, F. Bella, C. Gerbaldi, “Solid electrolyte composition”, *Patent* WO2020099261A1. Solid electrolyte IP developed with Solvay, evidencing capacity to translate insights into industrial technology.

Research projects as a PI

- **SuN₂rise** – Solar driven electrochemical nitrogen fixation for ammonia refinery
ERC-StG project (948769), 1.5 M€, 2021-2025
First ERC project addressing electrochemical nitrogen fixation as a decentralized alternative to Haber-Bosch. Established my laboratory expertise in operando electrochemistry, systematic experimental design, and high-risk hypothesis-driven research.
- **GREEN2MOVE** – Green potassium batteries manufacturing processes: towards sustainable gigafactories
FISA project (2022-00983), 1.9 M€, 2024-2028
Conceived and led the creation of the first Italian pilot line for K-ion battery manufacturing, bridging academic research and realistic production environments. Demonstrates my ability to coordinate large-scale, interdisciplinary teams, and infrastructures beyond laboratory scale.
- **GINNY** – Glycerol and nitrogen conversion through electrochemistry
ERC-PoC project (101213773), 150 k€, 2025-2026
Designed to translate fundamental insights from electrochemical N₂ conversion into application-oriented concepts. Demonstrates my ability to identify exploitable directions emerging from curiosity-driven research and to manage the transition from discovery to validation.
- **LOTUS** – Lithium protection for robust and safe batteries
FARE project (R20RKNBS7E), 300 k€, 2022-2027
Expanded my cross-chemistry expertise across energy storage systems and reinforced my capability to generalize concepts across distinct electrochemical platforms.
- **HYDREAM** – Tailoring the hydrophilic-hydrophobic reaction zone for the electrochemical nitrogen reduction reaction to ammonia
PRIN project (2022YXHXH5), 288 k€, 2023-2026
Addressing electrochemical N₂ reduction through deliberate control of interfacial environments. Strengthened my expertise in interface-sensitive electrochemical systems, coordination of multi-partner consortia, and hypothesis-driven exploration of complex reaction spaces.

Selected personal awards

- “ACS Sustainable Chemistry & Engineering Lectureship” award (2023): for multiple contributions that drive the application of sustainable chemistry in the field of energy
- Royal Society of Chemistry “Environment, Sustainability & Energy Division Early Career” Award (2019): for the inventive development of photoinduced polymerization
- “Energy Storage Materials Young Scientist” award (2023): from Elsevier, for the significant innovation in the field
- “ChemComm Emerging Investigator Lectureship” award (2024): for the substantial contribution to chemical sciences
- USERN Prize (2021): selected among 10000 eligible candidates, with a jury including Nobel awardees
- Chemistry Europe Fellow (2024): for the dedicated support in terms of outstanding authorship and refereeing activities
- Tajima Prize (2023): from the International Society of Electrochemistry, for contributions in the field of advanced photoelectrochemical and post-Li cells
- Environment, Sustainability & Energy Division Horizon Prize (2021): from RSC, for the development of an artificial leaf
- “Innovazione Leonardo” award (2016): 1st classified over 700 candidates, for the valorization of talent and ideas in view of the contact with the business world
- ENI Award – Debut in Research (2016): best PhD Thesis on renewable energy, awarded by the President of the Italian Republic

These awards from major international chemical societies, leading scientific publishers, and national institutions consistently recognize a research trajectory that has introduced non-conventional chemical approaches to energy-related materials. Spanning from early-career distinctions to recent international fellowships and prizes, they reflect sustained acknowledgment of work that goes beyond incremental optimization, opening new conceptual directions at the interface of chemistry and energy fields.

Publications-related awards

- Top-cited publication in “ACS Applied Polymer Materials” (2024): [article](#)
- Mentioned by Nature (2017) for having proposed one of the “Five Priorities” in the field of perovskite photovoltaics: [link](#)
- Best 2015-2016 paper in Energy Storage Materials (2016): [article](#)
- ChemSusChem Top Downloaded Article (2024): [article](#)
- WOS Highly Cited Paper in “Angewandte Chemie” (2025): [article](#)
- The most popular 2022 articles in “Journal of Materials Chemistry A” (2023): [article](#)
- Top 1% across Royal Society of Chemistry journals in terms of citations in 2020 (2021): [article](#)
- The top-10 most cited 2016 articles in “ACS Energy Letters”: [article](#)

Teaching activity	• <i>Chemistry</i>: titular teacher for BSc courses in Engineering (Politecnico di Torino), since 2019. Enrolment: 250 students • <i>Facing the scientific publishing world</i>: titular teacher for PhD courses in Engineering (Politecnico di Torino), since 2022.	• <i>Photochemistry-related materials for the present and future energy scenario</i>: cycle of lessons as ERASMUS⁺ teacher, @BSc in Chemical Engineering (Universitat Politècnica de València, 2017)
Organization of events	• <i>Chair of international conferences</i>: Merck Young Chemists Symposium (editions: 2014, 2015, 2016, 2017, 2018) • <i>Member of the programme committee</i>: 13th International Conference on Environmental Catalysis (2025)	• <i>Symposium organizer</i>: 69th Annual Meeting of the International Society of Electrochemistry (2018) • <i>Member of the organizing committee</i>: International Symposium on Beyond Li-Ion Batteries (2024)
Institutional responsibilities	• <i>Italian Chemical Society</i>: Vice-President • <i>Expert roles</i>: European Research Executive Agency, European Innovation Council and SMEs Executive Agency, European Climate, Infrastructure and Environment Executive Agency, European Commission's Health and Digital Executive Agency	• <i>European Chemical Society (EuChemS)</i>: Italian Delegate at annual meeting (2015-2018) and Chair of the 2018 Delegate Assembly • <i>Commissions of trust</i>: referee for Agence National de la Recherche, Latvian Council of Science, Czech Science Foundation, Science Fund of the Republic of Serbia
Editorial roles	• <i>Board member</i>: Energy Storage Materials (IF 20.2), Chemical Engineering Journal (IF 13.2), Energy Materials (IF 11.2), ACS Sustainable Chemistry & Engineering (IF 7.3), ChemSusChem (IF 6.6)	• <i>Editor-in-Chief</i>: Sustainable Energy (RSC book series), Materials Open (World Scientific Publishing), GreenMat Energy (OAE Publishing)
Invited contributions in scientific events	• <u>15</u> talks, <u>9</u> awardee lectures, <u>9</u> lectures in PhD schools, <u>6</u> keynotes, <u>2</u> plenary talks, <u>2</u> lectio magistralis. - Top-5 is given below: - 248th ECS Meeting (Chicago, 2025), <i>A chemometric approach aimed at tuning electrolyte composition for lithium-mediated ammonia electrosynthesis</i> - 75th ISE Meeting (Montreal, 2024), <i>Engineering integrated electrochemical energy devices through non-critical materials</i>	- 17th International Conference on Materials Chemistry (Edinburgh, 2025), <i>Nitrogen species electroreduction for sustainable ammonia production: a materials perspective</i> - 18th FEMS EUROMAT (Granada, 2025), <i>Self-healable polymer electrolyte for lithium batteries, targeting light-mediated and 3D-printable processes</i> - 47th IUPAC World Chemistry Congress (Paris, 2019), <i>Publishing in top journals: tips and common mistakes</i>
Other contributions to the research community	Beyond research achievements, I have made sustained contributions to the research community through scientific dissemination, training, and leadership activities. I am personally committed to <u>communicating chemical science</u> in non-specialist environments, including schools, media, and international audiences. I launched and chaired <i>ChiMiCapisce</i> (2018), the first Italian national contest for 3-minute presentations in applied and technological chemistry, and received the <i>MiPiace Award</i> (2015) for scientific communication to high-school students. I have contributed to community building through an editorial on <u>scientific writing for early-career researchers</u> (<i>J. Mater. Chem. A</i>, 10.1039/D1TA90183D) and by organizing training lectures for chemistry students in developing countries (Malaysia ACS Student Chapter, 2021). These activities reflect a broader commitment to strengthening the interface between fundamental research, education, and society, and to <u>fostering a new generation of chemists</u> capable of communicating complex scientific challenges with clarity and responsibility (further sustained by my roles in <i>European Chemical Society</i> and <i>Italian Chemical Society</i>). My research has <u>attracted international media attention</u> (e.g. Le Figaro, The Times, Radio24, TG1), reflecting its broader societal relevance and reinforcing the role of chemistry as a driver of sustainable technological transformation.	

The above provides a focused selection of my most significant achievements. A comprehensive academic and professional record – including all of the institutional leadership roles, editorial responsibilities, national and international research projects, industrial collaborations, awards and distinctions, grant evaluation activities, invited lectures, advanced training schools, full lists of publications, patents and books, as well as organized scientific events and professional affiliations – is available at this [link](#).