Matteo Sensi (Updated on 01/09/2025)

RTDa CHEM/03 (Inorganic Chemistry)
Department of Life Sciences, University of Modena and Reggio Emilia

Date of birth: 28/04/1988.

Contacts
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Academic experience:

01/09/2025 – 31/08/2028

- **Researcher (RTDa)** in Inorganic Chemistry, funded by PNR (Programma Nazionale per la Ricerca) at the Department of Life Sciences, University of Modena and Reggio Emilia, Organic Electronics Laboratory.

16/01/2025 – 31/08/2025

- **Senior Post-doc** at the University of Modena and Reggio-Emilia, Italy. Tutor Prof. Carlo Augusto Bortolotti.

01/01/2022 – 31/12/2024

- **Researcher (RTDa)** in Inorganic Chemistry.
  The research activity is carried out in the Laboratory of organic electronics, directed by Prof. Fabio Biscarini and Prof. Carlo Augusto Bortolotti. The research aims to develop bio and chemosensors for food freshness based on electrolyte gated organic transistors.
  Teaching activity: laboratory of inorganic chemistry for the bachelor's students of Biotechnology and Biological sciences, laboratory of biomaterials for medical industry for the master's students in Industrial Biotechnologies (total teaching hours = 72).

01/04/2021 – 31/12/2021

- **Post-Doctoral fellowship** grant from Fondazione Veronesi for the project "An Organic Electronic Biosensor for patients stratification through alternative splicing signature".
  Hosted by UNIMORE, in the Laboratory of organic electronics, directed by Prof. Fabio Biscarini and Prof. Carlo Augusto Bortolotti.

16/11/2019 – 15/04/2021

- **Senior Post-doc** at the University of Modena and Reggio-Emilia, Italy.
  Laboratory of organic electronics, directed by Prof. Fabio Biscarini
  and Prof. Carlo Augusto Bortolotti. Funding: Euronanomed III – AMI "Antidrug-Antibody and Drug Molecular Detection In Inflammatory Diseases With Organic Electronics Platform".

29/07–31/08/2019

- **Collaborator** at the University of Modena and Reggio-Emilia, Italy.
  Laboratory of organic electronics, directed by Prof. Fabio Biscarini
  and Prof. Carlo Augusto Bortolotti. Funding project PRODE.

01/06/2018 – 31/05/2019

- **Junior Post-doc** at the University of Modena and Reggio-Emilia, Italy.
  Laboratory of organic electronics, directed by Prof. Fabio Biscarini

and Prof. Carlo Augusto Bortolotti. Funding: FAR 2017, "Deciphering immune response to checkpoints inhibitors and finding novel biomarkers in melanoma".

Education:

2014 – 2017

- **Ph.D. in Chemical Sciences, double degree in joint supervision between University of Aix-Marseille, France and University of Milano-Bicocca, Italy.**
  Defended on 08/11/2017
  Thesis title: *Direct electrochemistry and photochemistry of FeFe hydrogenases.*
  Supervisors: Dr. Christophe Léger (Directeur de recherche CNRS) e Prof. Luca De Gioia (Full Professor at Unimib).
  A*Midex funding: Académie d'Excellence, Aix-Marseille Université (FR)

2011 – 2014

- **M.Sc. Industrial biotechnologies, University of Milano-Bicocca, Italy.**
  Thesis title: *Computational study of the stereoeletronic and catalytic properties of the enzyme CODH*.
  Internship: 12 months in the Molecular Modelling lab

2007 – 2011

- **B.Sc. Biotechnology, University of Milano-Bicocca, Italy**
  Thesis title: *Molecular dynamics studies of enzymes involved in the SUMO pathway: allosteric regulation mechanism mediated by the E3 ligase enzyme RANBP2*.
  Internship: 3 months in the Molecular Modelling lab

Teaching activity

Academic Year 2022-2023

1. General Chemistry with laboratory for the Bachelor's degree course in Biotechnology (L2): 2 CFU. Laboratory activities within the General Chemistry course, 16 hours of laboratory per shift, 2 shifts, total 32 hours.
2. General Chemistry for the Bachelor's Degree in Biological Sciences (L13): 2 CFU. Laboratory activities within the General Chemistry course, 16 hours of laboratory per shift, 1.5 shifts, total 24 hours.
3. Biomaterials for the Biomedical Industry for the Master's Degree Course in Industrial Biotechnology (LM8): 2 CFU. Laboratory activities within the course of Biomaterials for the Biomedical Industry, 16 hours of laboratory on a single shift.

Total of 72 hours, carried out in the first semester.

Academic Year 2023-2024

1. General Chemistry with laboratory for the Bachelor's degree course in Biotechnology (L2): 2 CFU. Laboratory activities within the General Chemistry course, 16 hours of laboratory per shift, 2 shifts, total 32 hours.
2. General Chemistry for the Bachelor's Degree in Biological Sciences (L13): 2 CFU. Laboratory activities within the General Chemistry course, 16 hours of laboratory per shift, 1.5 shifts, total 24 hours.
3. Biomaterials for the Biomedical Industry for the Master's Degree Course in Industrial Biotechnology (LM8): 2 CFU. Laboratory activities within the course of Biomaterials for the Biomedical Industry, 16 hours of laboratory on a single shift.

Total of 72 hours, carried out in the first semester.

Academic year 2024-2025 (planned)

1. General Chemistry with laboratory for the Bachelor's degree course in Biotechnology (L2): 2 CFU. Laboratory activities within the General Chemistry course, 16 hours of laboratory per shift, 2 shifts, total 32 hours.
2. General Chemistry for the Bachelor's Degree in Biological Sciences (L13): 2 CFU. Laboratory activities within the General Chemistry course, 16 hours of laboratory per shift, 1.5 shifts, total 24 hours.
3. Biomaterials for the Biomedical Industry for the Master's Degree Course in Industrial Biotechnology (LM8): 2 CFU. Laboratory activities within the course of Biomaterials for the Biomedical Industry, 16 hours of laboratory on a single shift.

Total of 72 carried out in the first semester.

National Scientific Habilitation

- ASN 03/B1 – CHEM-03/A from 06/02/2023 to 06/02/2034
- ASN 03/B1 – CHEM-02/A from 28/02/2025 to 28/02/2037

Projects

1. 09/06/2020 – 11/03/2021 PI of the IscraC "NeuroPeP" project at the Cineca HPC center, for the DFT study of the interaction between neurotransmitters and PEDOT:PSS.
2. 16/11/2019 – 31/03/2021 Research Fellow in the project "Antidrug-Antibody and Drug Molecular Detection In Inflammatory Diseases With Organic Electronics Platform" (AMI), funded by the Euronanomed III platform (ERA-Net Cofund Action on Nanomedicine, Horizon 2020). I was in charge of the research activity and the coordination of the activity with the other partners.
3. 01/04/2021 – 31/12/2021 Umberto Veronesi Foundation Post-doctoral fellowship 2021
   - 01/01/2022 – present. I collaborated in the scientific activity of the European projects ICHTHYS (H2020-MSCA-RISE-2019, 872217) and FRUALGAE (PRIMA programme) and in the training of junior research fellows involved in the projects (M. Bosi, L. Fiesoli, M. Genitoni, I. Sergi).

Scientific Production

- H-index (Scopus): 16
- Citations (Scopus): 731
- Papers (Scopus): 27
- Total Impact Factor totale = 296

Publications

1. Genitoni, M., Greco, P., Paradisi, A., **Sensi, M.**, Berto, M., Murgia, M., Di Lauro, M., Bortolotti, C. A., Fadiga, L., Biscarini, F. " Discrimination of Tryptophan Enantiomers at Sub-pm Level by Multiparametric Analysis of a Label-Free Organic Immunosensor." *Small Methods* 2025: 2500545. DOI: 10.1002/smtd.202500545
2. Zanotti, R., Berto, M., **Sensi, M.**, Paradisi, A., Veronese, E., Pasquato, L., Bortolotti, C. A., Metrangolo, P., Biscarini, F. Fluorophobic Effect Enables Selective Detection of PFAS in Water with Electrolyte-Gated Organic Transistors. *Advanced Functional Materials* 2025, e08425. DOI: 10.1002/adfm.202508425
3. Basdeki, E., Vasilaki, S. E., **Sensi, M.**, Flemetakis, E., Biscarini, F., Power, D., Tsironi, T., Reviewing the Correlation of Fish Quality Alteration and In-Package Headspace Composition: Evidence From a pH Freshness Indicator Case Study, *International Journal of Food Science*, 2025, 3576183, 21 pages, 2025. DOI: 10.1155/ijfo/3576183

4. Sergi, I., **Sensi, M.***, Zanotti, R., Tsironi, T., Flemetakis, E., Power, D. M., Bortolotti, C. A., Biscarini, F. Dual-compartment-gate organic transistors for monitoring biogenic amines from food. *Biosensors and Bioelectronics*, 2025, 271. DOI: 10.1016/j.bios.2024.117098
5. Zanotti, R., **Sensi, M.**, Berto, M., Paradisi, A., Bianchi, M., Greco, P., Bortolotti, C. A., Di Lauro, M., Biscarini, F. Charge Carrier Density in Organic Semiconductors Modulates the Effective Capacitance: A Unified View of Electrolyte Gated Organic Transistors. *Advanced Materials* 2024, 2410940. DOI: 10.1002/adma.202410940
6. **Sensi, M**.*, Ricci, A., Rigillo, G., Paradisi, A., Berto, M., Gnesutta, N., Imbriano, C., Biscarini, F., Bortolotti, C. A. Investigation of Transcription Factor-DNA Binding with Electrolyte-Gated Organic Transistors. *Journal of Materials Chemistry C* 2024. DOI: 10.1039/D4TC00260A
7. Allison Manco Urbina, P., Paradisi, A., Hasler, R., **Sensi, M.**, Berto, M., Deniz Saygin, G., Dostalek, J., Pinti, M., Greco, P., Borsari, M., Knoll, W., Augusto Bortolotti, C., & Biscarini, F. Dynamic studies of antibody-antigen interactions with an electrolyte-gated organic transistor. *Cell Reports Physical Science* 2024. DOI: 10.1016/j.xcrp.2024.101919
8. **Sensi, M.**, de Oliveira, R. F., Berto, M., Paradisi, A., Greco, P., Bortolotti, C. A., Samorì, P., Biscarini, F. How Biorecognition Affects the Electronic Properties of Reduced Graphene Oxide in Electrolyte-Gated Transistor Immunosensors. *Advanced Functional Materials 2024*, 2313871.
9. **Sensi, M.**, de Oliveira, R. F., Berto, M., Palmieri, M., Ruini, E., Livio, P. A., Conti, A., Pinti, M., Salvarani, C., Cossarizza, A., Cabot, J. M., Ricart, J., Casalini, S., González-García, M. B., Fanjul-Bolado, P., Bortolotti, C. A., Samorì, P., Biscarini, F., Reduced Graphene Oxide Electrolyte-Gated Transistor Immunosensor with Highly Selective Multiparametric Detection of Anti-Drug Antibodies. *Advanced Materials* 2023, 2211352.
10. **Sensi, M.***; Migatti, G.; Beni, V.; D'Alvise, T. M.; Weil, T.; Berto, M.; Greco, P.; Imbriano, C.; Biscarini, F.; Bortolotti, C. A. Monitoring DNA Hybridization with Organic Electrochemical Transistors Functionalized with Polydopamine. *Macromolecular Materials and Engineerig* 2022, 307 (5), 2100880.
11. Manco Urbina, P.; Berto, M.; Greco, P.; **Sensi, M.**; Borghi, S.; Borsari, M.; Bortolotti, C. A.; Biscarini, F. Physical Insights from Frumkin Isotherm Applied to Electrolyte Gated Organic Transistor as Protein Biosensors. *Journal of Materials Chemistry C* 2021, 9, 10965-10974.
12. **Sensi, M.**; Baffert, C.; Fourmond, V.; De Gioa, L.; Bertini, L.; Léger, C. Photochemistry and photoinhibition of the H-cluster of FeFe-hydrogenases. *Sustainable Energy and Fuels* 2021, 5, 4248-4260.
13. Selvaraj, M.; Greco, P.; **Sensi, M.**; Saygin, G. D.; Bellassai, N.; D'Agata, R.; Spoto, G.; Biscarini, F. Label Free Detection of MiRNA-21 with Electrolyte Gated Organic Field Effect Transistors (EGOFETs). *Biosensors & Bioelectronics* 2021, 182, 113144.
14. Berto, M.; di Giosia, M.; Giordani, M.; **Sensi, M.**; Valle, F.; Alessandrini, A.; Menozzi, C.; Cantelli, A.; Gazzadi, G. C.; Zerbetto, F.; Calvaresi, M.; Biscarini, F.; Bortolotti, C. A. Green Fabrication of (6,5)Carbon Nanotube/Protein Transistor Endowed with Specific Recognition. *Advanced Electronic Materials* 2021, 7 (5), 200114.
15. **Sensi, M**.; Berto, M.; Gentile, S.; Pinti, M.; Conti, A.; Pellacani, G.; Salvarani, C.; Cossarizza, A.; Bortolotti, C. A.; Biscarini, F. Anti-Drug Antibody Detection with Label-Free Electrolyte-Gated Organic Field-Effect Transistors. *Chemical Communications* 2021, 57 (3), 367–370.
16. Breglia, R.; Arrigoni, F.; **Sensi, M.**; Greco, C.; Fantucci, P.; Gioia, L. de; Bruschi, M. First-Principles Calculations on Ni,Fe-Containing Carbon Monoxide Dehydrogenases Reveal Key Stereoelectronic Features for Binding and Release of CO 2 to/from the C-Cluster. *Inorganic Chemistry* 2021, 1 (60), 387–402.
17. Galliani, M.; Diacci, C.; Berto, M.; **Sensi, M.**; Beni, V.; Berggren, M.; Borsari, M.; Simon, D. T.; Biscarini, F.; Bortolotti, C. A. Flexible Printed Organic Electrochemical Transistors for the Detection of Uric Acid in Artificial Wound Exudate. *Advanced Materials Interfaces* 2020, 7, 2001218.
18. Parkula, V., Berto, M., Diacci, C., Patrahau, B., Di Lauro, M., Kovtun, A., Liscio, A., **Sensi, M.**, Samorì, P., Greco, P., Bortolotti, C.A., Biscarini, F. Harnessing selectivity and sensitivity in electronic biosensing: a novel lab-on-chip multigate organic transistor. *Analytical Chemistry* 2020, 92 (13), 9330-9337.
19. Giordani, M., **Sensi, M.**, Berto, M., Di Lauro, M., Bortolotti, C.A., Gomes, H.L., Zoli, M., Zerbetto, F., Fadiga, L., Biscarini, F. Neuromorphic Organic Devices that Specifically Discriminate Dopamine

from Its Metabolites by Nonspecific Interactions. *Advanced Functional Materials* 2020, 2002141, 1–13.

20. **Sensi, M.**; Berto, M.; Candini, A.; Liscio, A.; Cossarizza, A.; Beni, V.; Biscarini, F.; Bortolotti, C. A. Modulating the Faradic Operation of All-Printed Organic Electrochemical Transistors by Facile in Situ Modification of the Gate Electrode. *ACS Omega* 2019, 4, 5374–5381.
21. Berto, M.; Vecchi, E.; Baiamonte, L.; Condò, C.; **Sensi, M.**; Di Lauro, M.; Sola, M.; De Stradis, A.; Biscarini, F.; Minafra, A.; Bortolotti, C. A. Label Free Detection of Plant Viruses with Organic Transistor Biosensors. *Sensors and Actuators B Chemical* 2019, 281, 150–156.
22. del Barrio, M.; **Sensi, M.**; Fradale, L.; Bruschi, M.; Greco, C.; de Gioia, L.; Bertini, L.; Fourmond, V.; Léger, C. Interaction of the H-Cluster of FeFe Hydrogenase with Halides. *Journal of the American Chemical Society* 2018, 140 (16), 5485–5492.
23. del Barrio, M.; **Sensi, M.**; Orain, C.; Baffert, C.; Dementin, S.; Fourmond, V.; Léger, C. Electrochemical Investigations of Hydrogenases and Other Enzymes That Produce and Use Solar Fuels. *Accounts of Chemical Research* 2018, 51 (3), 769–777.
24. **Sensi, M.**; Baffert, C.; Fradale, L.; Gauquelin, C.; Soucaille, P.; Meynial-Salles, I.; Bottin, H.; De Gioia, L.; Bruschi, M.; Fourmond, V.; Léger, C. and Bertini, L. Photoinhibition of FeFe Hydrogenase. *ACS Catalysis* 2017, 7 (10), 7378–7387.
25. **Sensi, M.**; del Barrio, M.; Baffert, C.; Fourmond, V.; Léger, C. New Perspectives in Hydrogenase Direct Electrochemistry. *Current Opinion in Electrochemistry* 2017, 5 (1), 135–145.
26. Kubas, A.; Orain, C.; De Sancho, D.; Saujet, L.; **Sensi, M.**; Gauquelin, C.; Meynial-Salles, I.; Soucaille, P.; Bottin, H.; Baffert, C.; Fourmond, V.; Best, R.B.; Blumberger, J. and Léger, C. Mechanism of O2 Diffusion and Reduction in FeFe Hydrogenases. *Nature Chemistry* 2017, 9, 88–95.
27. **Sensi M.**; Baffert, C.; Greco, C.; Caserta, G.; Gauquelin, C.; Saujet, L.; Fontecave, M.; Roy, S.; Artero, V.; Soucaille, P.; Meynial-Salles, I.; Hervé, B.; de Gioia, L.; Fourmond,V.; Léger, C.; Bertini, L. Reactivity of the Excited States of the H-Cluster of FeFe Hydrogenases. *Journal of the American Chemical Society* 2016, 138 (41), 13612–13618.

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Book chapters

- Bortolotti, C. A., Berto, M., Sensi, M., Di Lauro, M. & Biscarini, F. Biosensing with Electrolyte Gated Organic Field Effect Transistors. In Materials Research Foundations 56, 71–96 (Materials Research Forum LLC, 2019).

Awards

- Prix de thése 2018 at Aix-Marseille University, award for the best PhD thesis.

Posters and Talks

- 7 poster presentations at national and international congresses
- 19 oral presentations at national and international congresses
- Invited speaker at “3rd International Electronic Conference on Biosensors”, 8–21 May 2023
- Invited speaker at “4th International Electronic Conference on Biosensors”, 20–22 May 2024

Participation to workshops and schools:

- ECOSTBIO scientific workshop, 12-13/01/2015, St. Jérôme University and Amphitheatre Pharo, Aix-Marseille Université, France.
- Cyclic Voltammetry International School, 23-27/05/2016, Université Paris Diderot, Paris, France.
- Orbitaly 2019, 17-19/10/2018, Center for Nano Science and Technology, Milan, Italy.

Reviewing

- Reviewer for Elsevier: Life Sciences and Biotechnology Letters.
- Reviewer for ACS Applied Materials & Interfaces.

- Reviewer for MDPI journals (Biosensors, Sensors, Diagnostics, Symmetry, Materials, Chemosensors).

- Guest Editor di una Collection per la rivista Discover Sensors (Springer Nature): “Recent Advances in Electronic Sensor Materials and Applications”.
- Special Issue guest editor for MDPI Biosensors: “Current Advance in Transistor-Based Biosensors for Diagnostics”.
- Research Topic guest editor for Frontiers in Chemistry:” Innovations in Electrolyte-Gated Transistors for Bio- and Chemo-sensors”.
- Guest Editor of a Collection for the journal Discover Sensors (Springer Nature): “Recent Advances in Electronic Sensor Materials and Applications”.
- Member of the American Chemical Society.

Students supervision and co-supervision

- 5 bachelor’s degree students (Biotechnology degree)
- 3 master’s degree students (Industrial Biotechnology degree)
- From 23/03/2023 to 26/09/2024: Tutor for students of the Biotechnology course of study at UNIMORE

Scientific dissemination

1. 08/03/2024 - Research corner for the Biotechnology course at UNIMORE Orienta
2. Orientation activities for the Biotechnology course during the open days of the Department of Life Sciences for the academic years 2022-2023 and 2023-2024.
3. 26/04/2021 - Presentation, as part of the "Postdoctoral fellowship" of the Umberto Veronesi Foundation, at the Lussana Scientific High School (BG), concerning the work of the researcher (Researchers in the Classroom, Umberto Veronesi Foundation). 62 students participated.
4. 9-13/09/2024 School of Green and Sustainable Chemistry at UNIMORE. The school of green and sustainable chemistry is a school aimed at secondary school students who do not have a specialized specialization in chemistry.
5. 27/09/2024 – Notte della Ricerca 2024 (Modena), stand entitled: (Bio)smart materials and sustainable devices.