Martina Marinelli

PostDoc Researcher

- *Group of Polymers - Dpt. of Industrial Chemistry "Toso Montanari", Viale Risorgimento 4, 40136, Bologna, Italy*
- *Mail martina.marinelli5@unibo.it*
- *Date of birth 15/01/1991*
- *Nationality Italian*

Work experience

April 2023 - Present — ***PostDoc***

University of Bologna (Italy), Dpt. of Industrial Chemistry "Toso Montanari".

Project: ***Optimization of low-impact processes for the production of photovoltaic cells,*** funded by the European Union - NextGenerationEU under the National Recovery and Resilience Plan (PNRR) - Mission 4 Education and research - Component 2 From research to business – Investment 1.5, from title: Ecosystem for Sustainable Transition in Emilia-Romagna, proposal code ECS00000033 - CUP J33C22001240001.

- Development of water-soluble heteroalkyltiophene based materials, for application in halogen-free OPVs.

November 2022 – March 2023 — ***PostDoc***

University of Bologna (Italy), Dpt. of Industrial Chemistry "Toso Montanari".

Project: ***Water-soluble polythiophenes based materials for organic solar cells.***

- Synthesis and characterization of polythiophenes containing porphyrin/ionic moieties, for alcohol-soluble ternary OPVs.

November 2021 – October 2022 — ***PostDoc***

University of Bologna (Italy), Dpt. of Industrial Chemistry "Toso Montanari".

Project: ***Preparation and characterization of new oligomeric and/or polymeric thiophene-based materials highly soluble in polar solvents for the production of organic solar cells with reduced environmental impact***.

- Design and study of alcohol-soluble thiophene and/or fluorene-based oligomers and polymers for halogen-free OPV application as interlayers.

November 2020 – October 2021 — ***PostDoc***

University of Bologna (Italy), Dpt. of Industrial Chemistry "Toso Montanari".

Project: ***Development and study of water-soluble single-active polythiophene based materials for photovoltaic applications***.

- Synthesis and characterization of ionic water/alcohol-soluble push-pull thiophene-based monomers and polymers for OPV applications.

November 2019 – October 2020 — ***PostDoc***

IPPT-PAN (Poland), Dpt. of Biosystems and Soft Matter.

Project: ***Electrospun conducting hydrogel nanomaterials for neural tissue engineering,*** funded by FIRST TEAM programme (Foundation for Polish Science).

- Design and study of water-soluble semiconducting polythiophene based materials for biomedical applications.

November 2016 – October 2019 — ***PhD in Chemistry***

University of Bologna (Italy), Dpt. of Industrial Chemistry "Toso Montanari".

Thesis: ***New functional polythiophene based materials: fine-tuning of photovoltaic or chiroptical properties.***

- Synthesis, characterization and study of the optical and photoactivity properties of

new organic polythiophene-based semiconductor materials. In detail, preparation - by using different synthetic approaches - of various low energy gap polymers and copolymers, with extensive study of their structural, chemical and photophysical properties. All the prepared derivatives were tested as photoactive materials in OPVs of the BHJ and SMOSC type. The research activity was also dedicated to the synthesis and study of chiral optically active polythiophenes, both in solution and in thin film.

February 2019 – May 2019 ***Research Abroad***

KU Leuven (Belgium), Dpt. of Chemistry – Polymer Chemistry and Materials.

- Synthesis and characterization of chiral main chain conjugated polymers/copolymers obtained by Suzuki-Miyaura and Kumada Catalyst Transfer Polymerization.

March 2015 – February 2016 ***Master Internship***

Polymer Group, Dpt. of Industrial Chemistry "Toso Montanari" & ISOF-CNR (Bologna).

- Synthesis and characterization of sulfur over-rich polythiophene materials for OPV application.

March 2013 – July 2013 ***Bachelor Internship***

I.T.I.S. E. Fermi (Modena) & Environmental Group, Dpt. of Industrial Chemistry "Toso Montanari".

- Atmospheric sampling of total suspended dust and characterization by GFAAS and IC of the ionic and metallic fractions.

Education and training

November 2016 – October 2019 ***PhD in Chemistry (XXXII Cycle)***

University of Bologna.

Final grade: excellent cum laude (defense on the 1st of April 2020).

Thesis: ***New functional polythiophene based materials: fine-tuning of photovoltaic or chiroptical properties***, Supervisor Prof. Elisabetta Salatelli.

June 2016 ***National Licensing Examination for Chemist***

University of Bologna.

October 2013 – March 2016 ***Master's Degree in Industrial Chemistry***

University of Bologna.

Final grade: 110/110 cum laude.

Thesis: ***Synthesis and characterization of new polythioalkylthiophene materials for Bulk-Heterojunction solar cells,*** Tutor Prof. Elisabetta Salatelli.

October 2010 – October 2013 ***Bachelor's Degree in Industrial Chemistry***

University of Bologna.

Final grade: 110/110 cum laude.

Thesis: ***Atmospheric sampling of total suspended dust: characterization of ionic and metallic fractions,*** Tutor Prof. Fabrizio Passarini.

September 2005 - July 2010 ***Chemical Technician High School Diploma***

I.T.I.S. E. Fermi (Modena).

Final grade: 100/100.

Skills

Mother language Italian

English

Understanding		***Speaking***		***Writing***
Listening	*Reading*	*Interaction*	*Production*	*Production*
C1	**C1**	**C1**	**C1**	**C1**

English courses and certifications

- Certificate in Advanced English (CAE): 183/210 level CEFR C1 (June 2018).
- Advanced English Course (90 h), British School (Bologna): aimed to the preparation of the CAE (November – May 2018).
- Scientific Writing Course (24 h), CLA (Bologna): aimed to the study of how to write a scientific paper (April - May 2017).
- Intensive Course, St. Giles School (Brighton, UK): level B2 (May 2016).

Soft skills Good communication/relational skills developed through the work in team projects during the scholastic/university experiences. Ability to plan the research activity and manage a chemical lab. Good mentoring skills gained through the tutoring activity of daily laboratory work of undergraduate students during their Master/Bachelor apprenticeship (950 h).

Technical skills Good theoretical knowledge and practical experience about **NMR** (^{1}H, ^{13}C, ^{31}P), **UV-Vis**, **PL** and **FT-IR** Spectroscopy, Circular dichroism (**CD**), Thermal analysis (**TGA** and **DSC**), Cyclic Voltammetry (**CV**) and Gel Permeation Chromatography (**GPC**). Preparation of organic solar cells of **BHJ** and **SMOSCs** type, with standard geometry, by **doctor-blade**, **spin-coating** and **air-spray coating** deposition. Good theoretical knowledge and data processing of **EQE** and morphology analyses (**AFM** and **X-Rays**).

Digital competence Excellent command of **Office** suite (Word, Excel, Power Point) and good command of the scientific software **ChemOffice**, **OriginPro**, **MestReNova** and **TA Universal Analysis**, in addition to search engine as **Reaxys, Scopus** (Elsevier) and **SciFinder-CAS** (American Chemical Society).

Academic activity

Lab tutor activity

- *"Polymer Science with Laboratory"* course of the BSc degree in Industrial Chemistry and Technology for the Environment and Materials, University of Bologna (Faenza) (a.a. 2016/2017, 2021/2022 and 2022/2023).
- *"Fundamental of Polymer Science with Laboratory"* course of the BSc degree in Industrial Chemistry, University of Bologna (a.a. 2018/2019 and 2020/2021).

Co-Mentor activity

BSc in Industrial Chemistry, University of Bologna

- Thesis *"Sintesi e studio di polimeri ionici alcohol-soluble a base tiofenica e derivati porfirinici per celle solari organiche"* which will be defended by Laura Zanarini (a.a. 2022/2023, Session I).
- Thesis *"Sintesi e studio di materiali regioregolari polieteroalchiltiofenici: effetto dell'ossigeno sulle proprietà ottiche e fotovoltaiche"* which will be defended by Erica Beletti (a.a. 2022/2023, Session I).
- Thesis *"Sintesi di nuovi materiali politiofenici per applicazioni fotovoltaiche"* defended by Nicola Iannacci (a.a. 2021/2022, Session II).
- Thesis *"Studio e applicazione di politiofeni e polifluoreni push-pull water-soluble per celle solari di tipo BHJ"* defended by Giulia Gallini (a.a. 2021/2022, Session II).

- Thesis *"Studio di politiofeni water-soluble per la realizzazione di celle solari polimeriche"* defended by Riccardo Zuppiroli (a.a. 2020/2021, Session II).
- Thesis *"Studio di politiofeni "push-pull" water-soluble per applicazione in celle solari di tipo SMOSC"* defended by Ginevra Calzolai (a.a. 2020/2021, Session II).
- Thesis *"Sintesi e caratterizzazione di un nuovo politiofene solubile in acqua"* defended by Cecilia Iuliitti (a.a. 2018/2019, Session III).

MSc in Industrial Chemistry, University of Bologna

- Thesis *"Studio e sintesi di politiofeni water-soluble contenenti gruppi elettron donatori e accettori in catena principale"* defended by Maria Luisa Basile (a.a. 2019/2020, Session III).
- Thesis *"Sintesi e caratterizzazione di materiali polimerici water-soluble per applicazioni nel campo del fotovoltaico organico"* defended by Antonia Grieco (a.a. 2019/2020, Session II).
- Thesis *"Sintesi e proprietà fotovoltaiche di politiofeni water-soluble"* defended by Laura Graciotti (a.a. 2019/2020, Session II).
- Thesis *"Sintesi e caratterizzazione di nuovi politiofeni water-soluble per applicazioni fotovoltaiche"* defended by Roberto Guidara (a.a. 2017/2018, Session III).
- Thesis *"Effetto dell'eteroatomo sulle proprietà chirali e fotovoltaiche in materiali polieteroalchiltiofenici*" defended by Letterio Giannino (a.a. 2017/2018, Session II).
- Thesis "*Nuovi polimeri tiofenici per celle fotovoltaiche con architettura BHJ*" defended by Debora Quadretti (a.a. 2017/2018, Session II).
- Thesis "*Sintesi e proprietà fotovoltaiche di polimeri contenenti gruppi elettron donatori e accettori in catena principale*" defended by Andrea Crocetta (a.a. 2016/2017, Session II).

MSc in Low Carbon Technologies and Sustainable Chemistry, University of Bologna

- Thesis *"Alcohol-soluble heteroalkylthiophene derivatives: inside the role of cathode interlayers for green energy production"* defended by Cecilia Iuliitti (a.a. 2021/2022, Session III).

Publications

Published:

1) D. Quadretti, M. Marinelli, E. Salatelli, F. Pierini, A. Zanelli, M. Lanzi, "Effects of water/alcohol soluble cationic polythiophenes as cathode interlayers for eco-friendly solar cells", *Macromol. Chem. Phys.* **224** (2023) 2200422.
2) M. Marinelli*, M. Lanzi, F. Pierini*, Y. Ziai, A. Zanelli, D. Quadretti, F. Di Maria, E. Salatelli, "Ionic push-pull polythiophenes: a further step towards eco-friendly BHJ organic solar cells", *Polymers* **14** (2022) 3965.
3) M. Marinelli, A. Candini, F. Monti, A. Boschi, M. Zangoli, E. Salatelli, F. Pierini, M. Lanzi, A. Zanelli, M. Gazzano, F. Di Maria, "Push-pull thiophene-based small molecules with donor and acceptor units of varying strength for photovoltaic application: beyond P3HT and PCBM", *J. Mater. Chem. C* **9** (2021) 11216-11228.
4) M. Lanzi, D. Quadretti, M. Marinelli, Y. Ziai, E. Salatelli, F. Pierini, "Influence of the active layer structure on the photovoltaic performance of water-soluble polythiophene-based solar cells", *Polymers* **13** (2021) 1640.

5) T. Moreira, F. Di Maria, M. Zangoli, E. Fabiano, I. Manet, R. Mazzaro, V. Morandi, M. Marinelli, G. Gigli, A. J. Parola, C. A. T. Laia, G. Barbarella, "Processable thiophene-based polymers with tailored electronic properties and their application in solid-state electrochromic devices using nanoparticle films", *Adv. Electron. Mater.* **7** (2021) 2100166.
6) M. Marinelli, L. Angiolini, M. Lanzi, F. Di Maria, E. Salatelli, "Effect of regioregularity and role of heteroatom on the chiral behavior of oligo(heteroalkyl)thiophenes", *Chirality* **32** (2020) 1361-1376.
7) M. Marinelli, M. Lanzi, A. Liscio, A. Zanelli, M. Zangoli, F. Di Maria, E. Salatelli, "Single-material organic solar cells with conjugated electron-donor alkoxy substituted bithiophene units and electron-acceptor benzothiadiazole moieties in the main chain", *J. Mater. Chem. C* **8** (2020) 4124-4132.
8) M. Lanzi, E. Salatelli, M. Marinelli, Filippo Pierini, "Effect of photocrosslinking of D-A thiophene copolymers on the performance of single-material solar cells", *Macromol. Chem. Phys.* **221** (2020) 1900433.
9) L. Verheyen, K. Janssens, M. Marinelli, E. Salatelli, G. Koeckelberghs, "Rational design of poly(fluorene)-b-poly(thiophene) block copolymers to obtain a unique aggregation behavior", *Macromolecules* **52** (2019) 6578-6584.
10) M. Lanzi, E. Salatelli, L. Giorgini, M. Marinelli, F. Pierini, "Effect of the incorporation of an Ag nanoparticle interlayer on the photovoltaic performance of green bulk heterojunction water-soluble polythiophenes solar cells", *Polymers* **149** (2018) 273-285.
11) E. Salatelli, M. Marinelli, M. Lanzi, A. Zanelli, S. Dell'Elce, A. Liscio, M. Gazzano, F. Di Maria, "Bulk heterojunction solar cells: the role of alkyl side chain on nanoscale morphology of sulphur over-rich regioregular polythiophene/fullerene blends", *J. Phys. Chem. C* **122** (2018) 4156-4164.

Communications

Conferences

As a speaker:

1) M. Marinelli, D. Quadretti, E. Salatelli, M. Lanzi, *"Alcohol-soluble cationic polythiophenes: inside the role of cathode interlayers for halogen-free OSCs"*, 3rd Global Conference on Polymers, Plastics and Composites - PPC 2023 (11-12/09/**2023** Barcelona, Spain). *(Accepted Oral)*
2) M. Marinelli, M. Lanzi, F. Pierini, Y. Ziai, A. Zanelli, D. Quadretti, F. Di Maria, E. Salatelli, *"Eco-friendly ionic push-pull polythiophenes: synthesis, study and fabrication of halogen-free BHJ organic solar cells"*, Chemistry Summit 2023 (15-16/03/**2023** Webinar). *(Oral)*
3) M. Marinelli, M. Zangoli, E. Salatelli, F. Pierini, M. Lanzi, F. Di Maria, *"Bifunctional push–pull thiophene-based molecules for photovoltaic application"*, 2nd Global Conference on Polymers, Plastics and Composites - PPC 2022 (21-22/03/**2022** Budapest, Hungary). *(E-Poster)*
4) M. Marinelli, E. Salatelli, M. Lanzi, L. Angiolini, "*Regioregular optically active polythiophenes bearing 3-alkylsulphanyl- and 3-alkoxy- side chains*", Chemical Research in Flanders – CRF 2 (14-16/10/**2019** Blankenberge, Belgium). *(Poster)*
5) M. Marinelli, E. Salatelli, M. Lanzi, L. Angiolini, *"Chiral behavior of regioregular polyheteroalkylthiophenes"*, Europen Polymer Congress - EPF 2019 (9-14/06/**2019** Heraklion, Crete). *(Poster)*
6) M. Marinelli, E. Salatelli, M. Lanzi, *"Regioregular and regiorandom double-cable copolymers for organic solar cells"*, XVIII Giornata della Chimica dell'Emilia Romagna (17/12/**2018** Parma, Italy). *(Poster)*

7) M. Marinelli, E. Salatelli, M. Lanzi, *"Double-cable copolymers for polymeric solar cells"*, Merck & Elsevier Young Chemists Symposium – MEYCS 2018 (19-21/11/**2018** Rimini, Italy). *(Flash e Poster)*
8) M. Marinelli, *"A regioregular double-cable copolymer for organic solar cells"*, Macrogiovani 2018 (14-15/06/**2018** Salerno, Italy). *(Oral)*
9) M. Marinelli, E. Salatelli, M. Lanzi, *"Synthesis and characterization of new thiophene-based materials containing both electron-donor and -acceptor units in the main chain"*, XVII Giornata della Chimica dell'Emilia Romagna (01/12/**2017** Bologna, Italy). *(Poster)*
10) M. Marinelli, E. Salatelli, M. Lanzi, *"Synthesis and photovoltaic properties of polymers containing both electron- donor and –acceptor units"*, Merck Young Chemists Symposium – MYCS 2017 (13-15/11/**2017** Milano Marittima, Italy). *(Flash e Poster)*
11) M. Marinelli, E. Salatelli, M. Lanzi, *"New thiophene-based low band gap polymeric materials for Bulk-Heterojunction solar cells"*, Macrogiovani 2017 (22-23/06/**2017** Trento, Italy). *(Oral)*
12) M. Marinelli, E. Salatelli, M. Lanzi, *"Photovoltaic behavior of regioregular thioalkyl substituted polythiophenes"*, XVI Giornata della Chimica dell'Emilia Romagna (19/12/**2016** Ferrara, Italy). *(Poster)*

Other:

1) D. Quadretti, M. Lanzi, M. Marinelli, E. Salatelli, *"Study of new water-soluble polythiophenes as photo-active layer in polymeric photovoltaic devices"*, Merck Young Chemists Symposium – MYCS 2021 (22-14/11/**2021** Rimini, Italy). *(Flash e Poster)*
2) D. Quadretti, M. Lanzi, M. Marinelli, E. Salatelli, *"Next generation of green OPV cells based on water-soluble photo-active material"*, Green Chemistry Summer School 2021 (4-10/07/**2021** Venice, Italy). *(Poster)*
3) D. Quadretti, M. Lanzi, E. Salatelli, M. Marinelli, *"Water-soluble photo-active materials: next generation of eco-friendly BHJ polymeric solar cell"*, EPF Summer School 2021 "Polymers and Circular Economy" (17-19/05/**2021** Digital event). *(E-Poster)*
4) D. Quadretti, M. Marinelli, M. Lanzi, E. Salatelli, L. Angiolini, F. Pierini, *"Water-soluble polythiophenes: a further step towards green energy production",* ENERCHEM 2 (12-14/02/**2020** Padua, Italy). *(Poster)*
5) E. Salatelli, F. Di Maria, M. Lanzi, M. Marinelli, L. Zuppiroli, *"Sulfur-overrich polythiophenes for BHJ solar cells"*, 20th European Symposium on Polymer Spectroscopy- ESOPS 20 (11-14/09/**2016** Dresden, Germany). *(Poster)*

Lessons

- *"New functional semiconducting organic materials – Synthesis, study and application"*, 1h for "Polymers for environment and energy applications" course, MSc in Low Carbon Technologies and Sustainable Chemistry, University of Bologna (Resp. Prof. L. Mazzocchetti, 28/11/**2022**).
- *"Design and tailoring of new functional semiconducting thiophene based materials"*, 1h for "Polymers for environment and energy applications" course, MSc in Low Carbon Technologies and Sustainable Chemistry, University of Bologna (Resp. Prof. L. Mazzocchetti, 09/12/**2021**).
- *"Tailoring of photovoltaic or chiroptical properties of new functional polythiophene based materials"*, 1h for "Polymers for environment and energy applications" course, MSc in Low Carbon Technologies and Sustainable Chemistry, University of Bologna (Resp. Prof. L. Mazzocchetti, 11/12/**2019**).

Courses and workshops

- Workshop “Composite materials: not only curing - Focus on DSC and DEA methods”, Faenza (14/09/2018).
- AIM School 2018 - Processing Polymers Materials, Bertinoro (13-18/05/2018).
- Workshop “ROADSHOW 2017 - Materials Characterization”, Modena (07/11/2017).
- “From IP Management to Technology Transfer for Business” course, University of Bologna (PhD programme, Resp. Prof. P. Reschiglian, June-July 2017).
- “Scientific Writing” course, CLA Bologna (PhD programme, April-May 2017).

Additional informations

Grant and awards

- Spada 2020 award for the best PhD thesis in Industrial Chemistry.
- Marco Polo Programme (2019).
- Award winner for the 10 best oral presentations (Macrogiovani 2018).
- Award winner for the 10 best posters (XVII and XVIII Giornata della Chimica dell’Emilia Romagna).
- PhD Scholarship at the University of Bologna (2016 - 2019).
- "Fondazione Centenario" merit-based scholarhip (2006 - 2010).

Driving licence Category **B**

Autorizzo il trattamento dei miei dati personali ai sensi del GDPR (Regolamento UE 2016/679) e del Decreto Legislativo 30 giugno 2003, n. 196 “Codice in materia di protezione dei dati personali”.

Date ***Signature***

Bologna, 14/04/2023