



OLIVIER BARDAGOT

GROUP LEADER AT ICPEES - CNRS STRASBOURG

EXPERIENCE

CONTACTS

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PROFILE

Passionate early-stage group leader with 8+ years of experience in organic electronics. Physico-chemist expert in semiconductor doping. Large (inter)national network of collaborators. Dedicated mentor. Fluent in French and English with excellent writing and oral skills.

LANGUAGES

French Mother tongue

English C2 - Fluent

German B1

Spanish B1

COMPUTING

LabVIEW, Python, Density

Functional Theory, C++

OriginLab, Igor, Zotero,

ChemOffice, MestReNova,

WSxM, Topspin

INTERESTS

Volunteering

Bouldering & trail

Drum & guitar

Chess

Chargé de Recherche CNRS | 01/02/2023 – current position

French National Centre for Scientific Research (CNRS), Strasbourg, France

- **Tenured associate professor**, at ICPEES (UMR 7515): research activities focused on the optimization of OECTs thanks to porous and anisotropic elaborations of polymer films. Biosensors for neuropathology and bacterial detections under developments.

Post-doctoral Research Associate | 01/01/2020 – 31/01/2023

University of Bern, Bern, Switzerland – Prof. Natalie Banerji

- Device optimization and characterization of organic electrochemical transistors (OECT) for bioelectronics applications: time-resolved spectroscopy, electrochemical doping

PhD – Jury's congratulations | Defended on 15/10/2019

Université Grenoble Alpes (UGA), Alternative Energies and Atomic Energy Commission (CEA) Grenoble, France | 15/10/2016 – 14/10/2019

- **N-type organic semiconductors for energy conversion**: Organic photovoltaics (OPVs) and thermoelectricity (OTEGs), polymer doping, doping mechanistic, organic field-effect transistors (OFETs), morphological studies, organic chemistry, DFT modeling

Mentoring and teaching | 2016 – 2024

- 4 x PhD candidates
- 5 x MSc 2 students and 1 x BSc 3 student
- Teaching: Organic Semiconductors (M2, ECPM), Quantum chemistry (BSc 2 tutorial and lectures, University of Bern), Physical chemistry of aqueous solutions (BSc 2 practical, UGA), Organic chemistry (BSc 1 tutorial, Grenoble INP), Polymer-based solar cells (PhD/postdoc practical, CEA Grenoble)

Research internship | 01/12/2015 – 01/06/2016

Imperial College London, Centre for Plastic Electronics, London, UK

- Zone-casting of organic semiconductors for OFETs and OPVs

Research internship | 01/06/2015 – 01/09/2015

Central Research Institute of Electric Power Industry, Tokyo, Japan

- Development of light-emitting electrochemical cells (LECs)

EDUCATION

Imperial College International Diploma – first class honors

Imperial College London, Department of Physics, UK | 2015 – 2016

MSc in Physics and Nanoscience engineering – first class honors

Grenoble Institute of Technology Phelma (INP), France | 2013 – 2016

RESEARCH OBJECTIVE

The research objective of my team is to **control the macroscale and nanoscale morphologies** of organic **semiconducting polymer thin films** to develop **functional, cost-efficient, portable, and environmentally friendly** organic electronic devices. The group aims to optimize **organic electrochemical transistors (OECTs)** in views of providing a new generation of biosensors for neuropathology detection (UN goal 3) and bacterial detection for identifying water drinkability (UN goal 6). To achieve these goals, the group elaborates **new highly-structured polymer films** and understanding the **fundamental mechanisms** driving their chemical and electrochemical **doping**. We are combining a wide range of **microscopy** techniques, with *in-operando* **advanced spectroscopic and electrical characterization techniques** to rationally guide **molecular and device engineering**. To carry out this highly **interdisciplinary research**, the group is collaborating with internationally-renowned (i) **chemists**, to provide start-of-the-art performing polymers tailored to answer our research questions, (ii) **physico-chemists**, to access top-notch characterization instruments to clarify specific questions with pinpoint accuracy, and (iii) **biologists**, to valorize our findings and move up the Technology Readiness Level scale by developing functional biosensors.

JOURNAL PUBLICATIONS

1. *Balancing Electroactive Backbone and Oligo(Ethylene Oxy) Side-Chain Content Improves Stability and Performance of Soluble PEDOT Copolymers in Organic Electrochemical Transistors*, **O. Bardagot***, B. T. DiTullio, A. L. Jones, J. Speregen, J. R. Reynolds, N. Banerji, [Advanced Functional Materials](#) **2024**, 2412554
2. *Controlling conjugated polymer morphology by precise oxygen position in single-ether side chains*, P. Durand, H. Zeng, B. Jismy, O. Boyron, B. Heinrich, L. Herrmann, **O. Bardagot**, I. Moutsios, A. V. Mariasevskaia, A. P. Melnikov, D. A. Ivanov, M. Brinkmann, N. Leclerc, [Materials Horizons](#) **2024**, 11, 4737–4746
3. *Ultra-High μC^* beyond 10 000 F Cm⁻¹ V⁻¹ s⁻¹ in Organic Electrochemical Transistors*, **O. Bardagot***, P. Durand, S. Guchait, G. Rebetz, P. Cavassin, J. Réhault, M. Brinkmann, N. Leclerc, N. Banerji*, <https://www.researchsquare.com/article/rs-3221543/v1> (Preprint - Under Review for publication in Nature Materials)
4. *Interplay between Side Chain Density and Polymer Alignment: Two Competing Strategies for Enhancing the Thermoelectric Performance of P3HT Analogues*, P. Gilhooly-Finn, I. Jacobs, **O. Bardagot**, Y. Aziz-Zaffar, A. Lemaire, S. Guchait, L. Zhang, M. Freeley, W. Neal, F. Richard, M. Palma, N. Banerji, H. Sirringhaus, M. Brinkmann, C. Nielsen, [Chemistry of Materials](#) **2023**, 35, 9029–9039

5. *Effect of a benzothiadiazole spacer on transport properties and N-doping of naphthalene-diimide-based copolymers*, **O. Bardagot***, Y. Kervella, A. A. Medjahed, S. Pouget, T. N. Domschke, A. Carella, C. Aumaître, P. Lévêque, R. Demadrille*, [Journal of Material Chemistry C 2023, 11, 14108–14118](#)
6. *Electrochemical Doping in Ordered and Disordered Domains of Organic Mixed Ionic–Electronic Conductors*, P. Cavassin, I. Holzer, D. Tsokkou, **O. Bardagot**, J. Réhault, N. Banerji, [Advanced Materials 2023, 35, 2300308](#) – cover
7. *Effects of Side-Chain Length and Functionality on Polar Poly(dioxythiophene)s for Saline-Based Organic Electrochemical Transistors*, B. T. DiTullio, L. R. Savagian, **O. Bardagot**, M. De Keersmaecker, A. M. Österholm, N. Banerji, J. R. Reynolds. [Journal of the American Chemical Society 2023, 145, 122-134](#)
8. *The effect of residual palladium on the performance of organic electrochemical transistors*, S. Griggs, A. Marks, D. Meli, G. Rebetez, **O. Bardagot**, B. D. Paulsen, H. Chen, K. Weaver, M. I. Nugraha, E. A. Schafer, J. Tropp, C. M. Aitchison, T. D. Anthopoulos, N. Banerji, J. Rivnay, I. McCulloch, [Nature Communications 2022, 13, 7964](#)
9. *Spectroscopic tools to investigate the electrochemical doping kinetics and efficiency in organic semiconductors*, **O. Bardagot**, N. Banerji, [CHIMIA 2022, 76, 546–546](#)
10. *Deep Transfer Learning: A Fast and Accurate Tool to Predict the Energy Levels of Donor Molecules for Organic Photovoltaics*, G. J. Moore, **O. Bardagot**, N. Banerji. [Advanced Theory and Simulations 2022, 2100511](#)
11. *Hidden surface photovoltages revealed by pump probe KPFM*, V. Aubriet, K. Courouble, **O. Bardagot**, R. Demadrille, L. Borowik, B. Grévin, [Nanotechnology 2022, 33, 225401](#)
12. *Revisiting doping mechanisms of n-type organic materials with N-DMBI for thermoelectric applications: Photo-activation, thermal activation, and air stability*, **O. Bardagot***, C. Aumaître, A. Monmagnon, J. Pécaut, P.-A. Bayle, R. Demadrille*, [Applied Physics Letters 2021, 118, 203904](#)
13. *What Drives the Kinetics and Doping Level in the Electrochemical Reactions of PEDOT:PSS?* G. Rebetez, **O. Bardagot**, J. Affolter, J. Réhault, N. Banerji, [Advanced Functional Materials 2021, 2105821](#)
14. *Non-Fullerene Acceptors with an Extended π -Conjugated Core: Third Components in Ternary Blends for High-Efficiency, Post-Treatment-Free Organic Solar Cells*, Y. A. Avalos-Quiroz, **O. Bardagot**, Y. Kervella, C. Aumaître, L. Cabau, A. Rivaton, O. Margeat, C. Videlot-Ackermann, U. Vongsaysy, J. Ackermann, R. Demadrille, [ChemSusChem 2021, 14, 3502–3510](#) – cover

15. *Impact of Morphology on Charge Carrier Transport and Thermoelectric Properties of N-Type FBDOPV-Based Polymers*, **O. Bardagot**, P. Kubik, T. Marszalek, P. Veyre, A. A. Medjahed, M. Sandroni, B. Grévin, S. Pouget, T. N. Domschke, A. Carella, S. Gambarelli, W. Pisula, R. Demadrille, [Advanced Functional Materials](#) **2020**, *30*, 2000449
16. *Implementation of Data-Cube Pump–Probe KPFM on Organic Solar Cells*, B. Grévin, **O. Bardagot**, R. Demadrille, [Beilstein Journal of Nanotechnology](#) **2020**, *11*, 323–337
17. *Unraveling the Mechanism behind Air Instability in Thin Semiconducting Polymer Layers P-Doped with Molybdenum Dithiolene Complexes*, T. Nunes Domschke, **O. Bardagot**, A. Benayad, R. Demadrille, A. Carella, R. Clerc, A. Pereira, [Synthetic Metals](#) **2020**, *260*, 116251
18. *Visible and Near-Infrared Organic Photosensitizers Comprising Isoindigo Derivatives as Chromophores: Synthesis, Optoelectronic Properties and Factors Limiting Their Efficiency in Dye Solar Cells*, C. Aumaitre, C. Rodriguez-Seco, J. Jover, **O. Bardagot**, F. Caffy, Y. Kervella, N. López, E. Palomares, R. Demadrille, [Journal of Materials Chemistry A](#) **2018**, *6*, 10074–10084

GRANTS

2024	ANR JCJC, CAROT – 240'412 €
2024	PEPS Energie, PoroTOP – 14'000 €
2023	Attractivité IdEx Unistra, MAESTRO – 55'000 €

AWARDS

May 2024	Prize of the Materials Horizons journal (RSC) at the international conference SPIE 2024 for " his exceptional contribution to the Women in Renewable Energy workshop "
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PANELS AND BOARDS

Since 2024	Member of the steering committee of the international conference Neuromorphic Organic Devices , and co-organizer of the NOD2024 edition in Paris
Nov 2024	Co-organizer of the international conference MATSUS Fall Meeting – Organic Mixed Ionic-Electronic Conductors symposium , in Lausanne, Switzerland
Since 2023	Gender equality referent at ICPEES (UN goal 5) – volunteer mission supported by the CNRS to promote equality and fight against all forms of discrimination.

- 2022** Coordinator of [Organic Mixed Ionic-Electronic Conductors](#) research topic
- Since 2021** Review editor for Thermoelectric Materials of [Frontiers in Electronic Materials](#)
- Since 2021** Reviewer for Nature Chemistry, Science Advances, Advanced Materials, Advanced Energy Materials, Journal of Materials Chemistry C, etc.

ORAL COMMUNICATIONS

- 13/10/2023** **Invited talk** – [NOD 2024](#), Paris
Balancing Electroactive Backbone and Oligo(Ethylene Oxy) Side-Chain Content Improves Stability and Performance of Soluble PEDOT Copolymers in Organic Electrochemical Transistors, B. DiTullio, A. Jones, J. Speregen, J. Reynolds, N. Banerji, **O. Bardagot**
- 29/05/2024** [E-MRS Spring Meeting 2024](#), Strasbourg
Novel polar single-ether side chains for high-performing doped materials, P. Durand, B. Jismy, S. Guchait, B. Heinrich, D. Ivanov, N. Banerji, M. Brinkmann, N. Leclerc, **O. Bardagot**
- 13/10/2023** **Invited talk** – [GDR OERA](#), Marseille
How morphology controls electrochemical doping and how to achieve record performance in organic electrochemical transistors (OECTs), **O. Bardagot**, P. Cavassin, P. Durand, S. Guchait, I. Holzer, D. Tsokkou, G. Rebetz, J. Réhault, M. Brinkmann, N. Leclerc, N. Banerji.
- 30/08/2023** **Invited talk** – STELORG mini-symposium, Strasbourg
How to design polymers for high performance organic electrochemical transistors (OECTs)? **O. Bardagot**
- 26/11/2022** [MRS Fall Meeting 2022](#), Boston, USA
Uniaxial Alignment of Polymer Chains: a Versatile Strategy to Achieve Faster Switching and Higher Performing Organic Electrochemical Transistors (SB06.08.03), **O. Bardagot**, P. Durand, S. Guchait, G. Rebetz, M. Brinkmann, N. Leclerc, N. Banerji.
- 13/09/2022** **Invited talk** – [USIAS Symposium](#), ICS, Strasbourg
Doping Mechanisms of Organic Mixed Ionic-Electronic Conductors: Spectral deconvolution, THz spectroscopy and Uniaxial Polymer Alignment, **O. Bardagot**, G. Rebetz, D. Tsokkou, P. Durand, S. Guchait, J. Réhault, M. Brinkmann, N. Leclerc, N. Banerji.
- 04/04/2022** [SPIE Photonics Europe](#), Strasbourg

Absorbance spectra deconvolution and THz spectroscopy: tools to access fundamental mechanisms limiting the development of bioelectronic and energy storage devices (PC12149), O. Bardagot, G. Rebetez, P. Cavassin, J. Réhault, N. Banerji.

02/12/2021 **Invited talk** - Department seminar, ICPEES, Strasbourg, France
Let's play Pictionary: molecules for energy harvesting and bioelectronics, O. Bardagot.

02/06/2021 [E-MRS Spring Meeting](#), Strasbourg (online)
Mixed polar/ionic side chain copolymers open the doors to faster electrochemical devices (C.3.2), O. Bardagot, S. Govaerts, G. Rebetez, P. Cavassin, F. Schneider, J. Réhault, W. Maes, N. Banerji.

20/04/2021 [MRS Spring Meeting 2021](#), Boston, USA (online)
Next-generation Organic Mixed Ionic-electronic Conductors: a Dynamic Study on Copolymers for Faster Electrochemical Devices (EL01.12.01), O. Bardagot, S. Govaerts, G. Rebetez, P. Cavassin, F. Schneider, J. Réhault, W. Maes, N. Banerji.

MAJOR COLLABORATIONS

Nicolas Leclerc	ICPEES, Strasbourg, France
Natalie Banerji	University of Bern, Bern, Switzerland
Martin Brinkmann	ICS, Strasbourg, France
Renaud Demadrille	CEA Grenoble, Grenoble, France
Patrick Lévêque	iCube, Strasbourg, France
Laure Biniek	ICS, Strasbourg, France
Benjamin Grévin	CNRS Grenoble, Grenoble, France
Jörg Ackermann	CINaM, Marseille, France
Wojciech Pisula	Max Planck Institute for Polymer Research, Mainz, Germany
Wouter Maes	University of Hasselt, Hasselt, Belgium
Christian Nielsen	Queen Mary University of London, London, UK
Iain McCulloch	University of Oxford, Oxford, UK
Simone Fabiano	Linköping University, Norrköping, Sweden
John Reynolds	Georgia Institute of Technology, Atlanta, USA
Natalie Stingelin	Georgia Institute of Technology, Atlanta, USA

REFERENCES

Postdoctoral supervisor: **Prof. Natalie Banerji** | 2020 – 2023

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PhD supervisor: **Dr. Renaud Demadrille** | 2016 – 2019

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