



Prof. Francisco Molina-Lopez  
Department of Materials Engineering – KU Leuven  
Kasteelpark Arenberg 44, 3001 Leuven, Belgium  
[francisco.molinalopez@kuleuven.be](mailto:francisco.molinalopez@kuleuven.be) • Tel: +32 (0) 16 19 38 64  
<https://www.molina-lopezresearchlab.com>

**Department of Materials Engineering, KU Leuven, Belgium** (Mar. 2024 – Present)

- Associate Professor
- Active research: **Printed and flexible hybrid inorganic/organic energy harvesting and energy storage devices.**

**Department of Materials Engineering, KU Leuven, Belgium** (Mar. 2019 – Mar. 2024)

- Assistant Professor (tenure track)
- Active research: **Printed and flexible hybrid inorganic/organic energy harvesting and energy storage devices.**
- H2020 ERC Starting Grant 2021 awardee.

**PROFESSIONAL EXPERIENCE**

**Hardware Engineering, Apple Inc., USA** (Jan. 2018 – Feb. 2019)

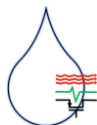
- **Senior Touch Module Process Engineer:** Designing process steps, driving vendors in Asia, collaborating with cross-functional teams.

**Department of Chemical Engineering, Stanford University, USA** (Apr. 2016 – Jan. 2018)

- **Postdoctoral Researcher** at Bao Research Group.
- Project: **Inkjet-Printed Stretchable Organic and CNTs-Based Transistors for Biomedical Applications and Skin Electronics.**
- Supervisor: **Prof. Zhenan Bao.**

**Department of Chemical Engineering, Stanford University, USA** (Oct. 2014 – Apr. 2016)

- **Swiss National Science Foundation Early PostDoc** research fellow at Bao Research Group.
- Project: **Tuning the Morphology of Solution-Based Organic Semiconductors for Fully-Printed Electronics with Improved Performance.**
- Supervisor: **Prof. Zhenan Bao.**
- **Collaboration** in synchrotron X-ray characterization: Michael Toney's group at the **Stanford Synchrotron Radiation Lightsource (SSRL), SLAC (USA).**



## EDUCATION AND TRAINING

### Institute of Microengineering (IMT), EPFL, Switzerland (Mar. 2010 – Jun. 2014)

- **PhD** in Microsystems Engineering.
- Dissertation title: **Inkjet-Printed Multisensor Platform on Flexible Substrates for Environmental Monitoring.**
- Supervisors: **Dr. Danick Briand** and **Prof. Nico de Rooij** at the Sensors, Actuators and Microsystems Laboratory.
- Funding & Project: FP7-**Marie Curie** Initial Training Network (ITN) **fellow** within the project **FlexSmell** - Gas Sensors on Flexible Substrates for Wireless Applications.
- **Research visit VTT Technical Research Centre of Finland** under the supervision of **Dr. Maria Smolander** (Oct. 2011 – Jan. 2012 & Dec. 2012 – Feb. 2013).

### University of Granada, Spain (Sep. 2002 – Sep. 2009)

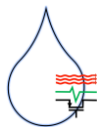
- **Double Major** in **Electrical Engineering (GPA: 8.091 / 10)** and **Physics (GPA: 8.265 / 10).**
- *Education abroad exchange program* at the **University of California San Diego, USA** (Sept. 2008 – Aug. 2009).
- *Erasmus exchange program* at **EPFL, Switzerland** (Oct. 2006 – Aug. 2007).
- **Awarded the highest GPA** in Electrical Engineering, class of 2008.

## TEACHING AND MENTORING EXPERIENCE

- *Materials Physics and Technology for Nanoelectronics* course, **Master of Materials Engineering/Master of Nanoscience, Nanotechnology and Nanoengineering**, KU Leuven (Belgium), fall 2020-present.
- *Nanomaterials for Nanoelectronics* course, **Master of Materials Engineering/Master of Nanoscience, Nanotechnology and Nanoengineering**, KU Leuven (Belgium), Spring 2020-present.
- *Surface Science and Engineering* course, **Master of Materials Engineering**, KU Leuven (Belgium), spring 2020-present.
- *Industrial Internship/Experience* courses, **Master of Materials Engineering**, KU Leuven (Belgium), fall 2022-present.
- Supervised/supervising 3+ bachelor students, 10+ master students, 10 PhD students and 3 postdoctoral researcher.

## GRANTS

- Belgium Excellence of Science (**EOS**): *Caloritronics in magNETic Weyl semimetal* (**CONENCT**) (ref. 40007563), consortium budget 4 M€ (personal budget 667.7 k€), success rate ~ 20% (based on previous call), **Dec. 2021.**



- **KU Leuven** Internal Funding Interdisciplinary Network (**ID-N**): *Understanding and boosting the performance of organic thermoelectrics by a tailored molecular design guided by experiments and simulations (ref. IDN/21/012)*, budget 700 k€ shared with Prof. G. Koeckelberghs & Prof. D. Escudero (Dept. Chemistry, KU Leuven), success rate 47 %, **Oct. 2021**.
- **KU Leuven** Internal Funding **C1**: *Towards additive manufacturing of flexible thermoelectric energy harvesters: boosting the performance by laser sintering-induced nanostructuring (ref. C14/21/078)*, budget 390 k€, success rate 45%, **Sept. 2021**.
- Research Foundation-Flanders (**FWO**) **Junior Research Project**: *Printed organic photovoltaics for energy harvesting in smart contact lenses (ref. G065021N)*, budget 409.8 k€, success rate 21.4 %, **Dec. 2020**.
- **European Union H2020 ERC-2020-STG 3DALIGN**: *Enhancing the performance of 3D-printed organic thermoelectrics by electric field-assisted molecular alignment (ref. 948922)*, budget 1.711 M€, success rate 13 %, **Sept. 2020**.

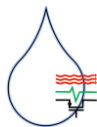
## MEMBERSHIPS

- Materials Research Society (MRS).
- Leuven Brain Institute (LBI); KU Leuven Institute for Micro- and Nanoscale Integration (LIMNI); KU Leuven Additive Manufacturing Institute.

## ACADEMIC/TEACHING HONORS AND AWARDS

- Selected by the journal *Advanced Materials* in the special issue *Rising Stars* in Dec. 2023.
- Received the *Gouden Krijtje (Golden Chalk)* award for the **best teacher** in the Master of Nanoscience, Nanotechnology and Nanoengineering, KU Leuven (Belgium) by the VTK students association. **1<sup>st</sup> semester academic year 2022/2023**.
- Awarded the *Swiss National Science Foundation Early PostDoc Mobility Fellowship*, *Fully-printed organic electronics and sensors on flexible substrates for wearable point-of-care applications*. Budget to cover living and travel expenses as a postdoctoral researcher at Stanford University from **Oct. 2014 to Mar. 2016**.
- Awarded for obtaining the **highest GPA** (8.091 out of 10) in the major of **Electrical Engineering** at the **University of Granada** (Spain) in 2008.
- Elected by the University of California to participate in its undergrad *Education Abroad Program* in 2007.
- Honors in Final Degree Project (Semester Project at EPFL) in 2007.

## EDITORIAL ACTIVITY



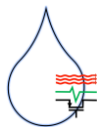
- **Reviewer** of the international journals: *Sensors and Actuators A: Physical*, and *Sensors and Actuators B: Chemical* (Elsevier); *Flexible and Printed Electronics* (IOPscience); *ACS Energy Letters* (ACS); *Communications Materials*, *Nature Communications*, *NPJ Flexible Electronics*, and *Nature* (Nature Research); *Advanced Materials*, *Small* and *Advanced Science* (Wiley); *Device* (Cell Press).

## PROJECT REVIEW EXPERIENCE

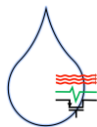
- Reviewer European Innovation Council (EIC) **Pathfinder** projects, European Union, 2023.
- Member of the **panel W&T6**: Chemical Engineering, Material Sciences, Research Foundation-Flanders (FWO), Belgium, 2022-2024.
- Reviewer **ANR** (Agence Nationale de la Recherche), France, 2021.

## SELECTED PUBLICATIONS (*h* index = 26, complete list in <https://scholar.google.com/citations?user=YaAZ2PIAAAAJ&hl=en>)

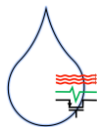
1. H. E. Baysal, T.-Y. Yu, V. Naenen, S. De Smedt, D. Hiz, B. Zhang, H. Xia, I. Florenciano, M. Rosenthal, R. Cardinaels, **F. Molina-Lopez**, *Omnidirectional 3D Printing of PEDOT: PSS Aerogels with Tunable Electromechanical Performance: A Playground for Unconventional Stretchable Interconnects and Thermoelectrics*, **Advanced Science** (2025), DOI: 10.1002/advs.202412491.
2. V. Toral, S. Gómez-Gijón, F. J. Romero, D. P. Morales, E. Castillo, N. Rodríguez, S. Rojas, **F. Molina-Lopez\***, A. Rivadeneyra\*, *Future Trends in Alternative Sustainable Materials for Low-Temperature Thermoelectric Applications*, **ACS Applied Electronic Materials** (2024), vol. 6, 8640-8654. DOI: 10.1021/acsaelm.4c00770.
3. Y. Tian, I. Florenciano, H. Xia, Q. Li, H. E. Baysal, D. Zhu, E. Ramunni, S. Meyers, T.-Y. Yu, K. Baert, T. Hauffman, S. Nider, B. Göksel, **F. Molina-Lopez**, *Facile fabrication of flexible and high-performing thermoelectrics by direct laser printing on plastic foil*, **Advanced Materials** (2024), vol. 36, 2307945. DOI: 10.1002/adma.202307945.
4. N. Goossens, K. Lambrinou, B. Tunca, V. Kotasthane, M. C. Rodríguez González, A. Basylevska, P. O. Å. Persson, S. De Feyter, M. Radovic, **F. Molina-Lopez**, J. Vleugels, *Upscaled Synthesis Protocol for Phase-Pure, Colloidally Stable MXenes with Long Shelf Lives*, **Small Methods** (2024), vol. 8, 2300776, DOI: 10.1002/smt.202300776.
5. W. Monnens, B. Zhang, Z. Zhou, L. Snels, K. Binnemans, **Francisco Molina-Lopez\***, Jan Fransaer\*, *Scalable electrodeposition of liquid metal from an acetonitrile-based electrolyte for highly-integrated stretchable electronics*, **Advanced Materials** (2023), vol. 35, 2305967. DOI: 10.1002/adma.202305967.
6. Y. Tian and **F. Molina-Lopez\***, *Boosting the performance of printed thermoelectric materials by inducing morphological anisotropy*, **Nanoscale** (2021), vol. 13, 5202. DOI: 10.1039/D0NR08144B.
7. J. Liu, J. Wang, Z. Zhang, **F. Molina-Lopez**, G.-J. N. Wang, B.C. Schroeder, X. Yan, Y. Zeng, O. Zhao, H. Tran, T. Lei, Y. Lu, Y.-X. Wang, J. B.-H. Tok, R. Dauskardt, J. W. Chung, Y. Yun and Z. Bao, *Fully Stretchable Active-Matrix*



- Organic Light-Emitting Electrochemical Cell Array*, **Nature Communications** (2020), vol. 11, 3362. DOI: 10.1038/s41467-020-17084-w.
8. U. Kraft, **F. Molina-Lopez**, D. Son, Z. Bao and B. Murmann, *Ink Development and Printing of Conducting Polymers for Intrinsically Stretchable Interconnects and Circuits*, **Advanced Electronic Materials** (2019), vol. 6, pp. 1900681. DOI: 10.1002/aelm.201900681.
  9. **F. Molina-Lopez**, T. Z. Gao, U. Kraft, C. Zhu, T. Öhlund, R. Pfattner, V. R. Feig, Y. Kim, S. Wang, Y. Yun and Z. Bao, *Inkjet-Printed Stretchable and Low Voltage Synaptic Transistor Array*, **Nature Communications** (2019), vol. 10, 2676. DOI: 10.1038/s41467-019-10569-3.
  10. G. Chen, R. Rastak, Y. Wang, H. Yan, V. Feig, Y. Liu, Y. Jiang, S. Chen, F. Lian, **F. Molina-Lopez**, L. Jin, K. Cui, J.W. Chung, E. Pop, C. Linder and Zhenan Bao, *Strain- and Strain-Rate-Invariant Conductance in a Stretchable and Compressible 3D Conducting Polymer Foam*, **Matter** (2019), vol. 1, pp. 1-14. DOI: 10.1016/j.matt.2019.03.011.
  11. J. Xu, H.-C. Wu, C. Zhu, A. Ehrlich, L. Shaw, M. Nikolka, S. Wang, **F. Molina-Lopez**, X. Gu, S. Luo, D. Zhou, Y.-H. Kim, G.-J.N. Wang, K. Gu, V.R. Feig, S. Chen, Y. Kim, T. Katsumata, Y.-Q. Zheng, H. Yan, J.W. Chung, J. Lopez, B. Murmann and Z. Bao, *Multi-Scale Ordering in Highly Stretchable Polymer Semiconducting Films*, **Nature Materials** (2019), vol. 18, pp. 594-601. DOI: 10.1038/s41563-019-0340-5.
  12. A. Gasperini, G.-J.N. Wang, **F. Molina-Lopez**, H.-C. Wu, J. Lopez, J. Xu, S. Luo, D. Zhou, G. Xue, J.B.-H. Tok and Z. Bao, *Characterization of Hydrogen Bonding Formation and Breaking in Semiconducting Polymers under Mechanical Strain*, **Macromolecules** (2019), vol. 52 (6), pp. 2476-2486. DOI: 10.1021/acs.macromol.9b00145.
  13. D. Son, J. Kang, O. Vardoulis, Y. Kim, N. Matsuhisa, J.Y. Oh, J.W.F. To, J. Mun, T. Katsumata, Y. Liu, A.F. McGuire, M. Krason, **F. Molina-Lopez**, J. Ham, U. Kraft, Y. Lee, Y. Yun, J.B.-H. Tok and Z. Bao, *An integrated self-healable electronic skin system fabricated via dynamic reconstruction of a nanostructured conducting network*, **Nature Nanotechnology** (2018), vol. 13 (11), pp. 1057-1065.
  14. T.Z. Gao, T. Lei, **F. Molina-Lopez** and Z. Bao, *Enhanced Process Integration and Device Performance of Carbon Nanotubes via Flocculation*, **Small Methods** (2018), vol. 2 (10), pp. 1800189.
  15. G.-J.N. Wang, **F. Molina-Lopez**, H. Zhang, J. Xu, H.-C. Wu, J. Lopez, L. Shaw, J. Mun, Q. Zhang, S. Wang, A. Ehrlich and Z. Bao, *Nonhalogenated Solvent Processable and Printable High-Performance Polymer Semiconductor Enabled by Isomeric Nonconjugated Flexible Linkers*, **Macromolecules** (2018), vol. 51 (13), pp. 4976-4985.
  16. **F. Molina-Lopez**, H.-C. Wu, G.-J. N. Wang, H. Yan, L. Shaw, J. Xu, M.F. Toney and Z. Bao, *Enhancing Molecular Alignment and Charge Transport of Solution-Sheared Semiconducting Polymer Films by the Electrical - Blade Effect*, **Advanced Electronic Materials** (2018), vol. 4, pp. 1800110.
  17. S. Wang, J. Xu, W. Wang, G.-J.N. Wang, R. Rastak, **F. Molina-Lopez**, J.W. Chung, S. Niu, V.R. Feig, J. Lopez, T. Lei, S.-K. Kwon, Y. Kim, A.M. Foudeh, A. Ehrlich, A. Gasperini, Y. Yun, B. Murmann, J.B.-H. Tok and Z. Bao, *Skin*



- electronics from scalable fabrication of an intrinsically stretchable transistor array*, **Nature** (2018), vol. 555 (7694), pp. 83-88.
18. X. Gu, Y. Zhou, K. Gu, T. Kurosawa, Y. Guo, Y. Li, H. Lin, B.C. Schroeder, H. Yan, **F. Molina-Lopez**, C.J. Tassone, C. Wang, S.C.B. Mannsfeld, H. Yan, D. Zhao, M.F. Toney and Z. Bao, *Roll-to-Roll Printed Large Area All-Polymer Solar Cells with 5% Efficiency Based on a Low Crystallinity Conjugated Polymer Blend*, **Advanced Energy Materials** (2017), vol. 7 (14), pp. 1602742.
19. Y. Wang, C. Zhu, R. Pfattner, H. Yan, L. Jin, S. Chen, **F. Molina-Lopez**, F. Lissel, J. Liu, N.I. Rabiah, Z. Chen, J.W. Chung, C. Linder, M.F. Toney, B. Murmann and Z. Bao, *A Highly Stretchable, Transparent and Conductive Polymer*, **Science Advances** (2017), vol. 3 (3), pp. e1602076.
20. **F. Molina-Lopez**, H. Yan, X. Gu, Y. Kim, M.F. Toney, Z. Bao, *Electric Field Tuning Molecular Packing and Electrical Properties of Solution-Shearing Coated Organic Semiconducting Thin Films*, **Advanced Functional Materials** (2017), vol. 27 (8), pp. 1605503.
21. X. Gu, H. Yan, T. Kurosawa, B.C. Schroeder, K.L. Gu, Y. Zhou, J.W.F. To, S.D. Oosterhout, V. Savikhin, **F. Molina-Lopez**, C.J. Tassone, S.C.B. Mannsfeld, C. Wang, M.F. Toney, Z. Bao, *Comparison of the Morphology Development of Polymer-Fullerene and Polymer-Polymer Solar Cells during Solution - Shearing Blade Coating*, **Advanced Energy Materials** (2016), vol. 6 (22), pp. 1601225.
22. A. Vásquez Quintero, **F. Molina-Lopez**, E.C.P. Smits, E. Danesh, J. van den Brand, K. Persaud, A. Oprea, N. Barsan, U. Weimar, N.F. de Rooij, D. Briand, *RFID Label with Printed Multisensor Platform for the Monitoring of Perishable Goods*, **Flexible and Printed Electronics** (2016), vol. 1 (2), pp. 025003.
23. **F. Molina-Lopez**, D. Briand, N.F. de Rooij, *Inkjet and Microcontact Printing of Functional Materials on Foil for the Fabrication of Pixel-Like Capacitive Vapor Microsensors*, **Organic Electronics** (2015), vol. 16, pp. 136-147.
24. **F. Molina-Lopez**, R.E. De Araujo, M. Jarrier, J. Courbat, D. Briand and N.F. de Rooij, *Study of Bending Reliability and Electrical Properties of Platinum Lines on Flexible Polyimide Substrates*, **Microelectronics Reliability**, vol. 54 (11), pp. 2542-2549.
25. E. Danesh, **F. Molina-Lopez**, M. Camara, A. Bontempi, A. Vásquez Quintero, D. Teyssieux, L. Thiery, D. Briand, N.F. de Rooij, K.C. Persaud, *Development of a New Generation of Ammonia Sensors on Printed Polymeric Hotplates*, **Analytical Chemistry** (2014), vol. 86 (18), pp. 8951-8958.
26. J.F. Salmerón, **F. Molina-Lopez**, D. Briand, J.J. Ruan, A. Rivadeneyra, M.A. Carvajal, L.F. Capitan-Vallvey, N.F. de Rooij and A.J. Palma, *Properties and Printability of Inkjet and Screen-Printed Silver Patterns for RFID Antennas*, **Journal of Electronic Materials** (2014), vol. 43 (6), pp. 604-617.
27. **F. Molina-Lopez**, D. Briand and N.F. De Rooij, *Decreasing the Size of Printed Comb Electrodes by the Introduction of a Dielectric Interlayer for Capacitive Gas Sensors on Polymeric Foil: Modeling and Fabrication*, **Sensors and Actuators B: Chemical** (2013), vol. 189, pp. 89-96.



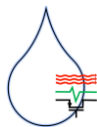
28. **F. Molina-Lopez**, T. Kinkeldei, G. Tröster, D. Briand, N.F. de Rooij, *Theoretical and Experimental Study of the Bending Influence on the Capacitance of Interdigitated Micro-Electrodes Patterned on Flexible Substrates*, **Journal of Applied Physics** (2013), vol. 114, pp. 174907.
29. **F. Molina-Lopez**, A. Vásquez Quintero, G. Mattana, D. Briand, N.F. de Rooij, *Large-Area Compatible Fabrication and Encapsulation of Inkjet-Printed Humidity Sensors on Flexible Foils with Integrated Thermal Compensation*, **Journal of Micromechanics and Microengineering** (2013), vol. 23, pp. 025012.
30. **F. Molina-Lopez**, D. Briand and N.F. de Rooij, *All Additive Inkjet Printed Humidity Sensors on Flexible Substrate*, **Sensors and Actuators B: Chemical** (2012), vol. 166-167, pp. 212-222.

## INVITED PRESENTATIONS

1. **F. Molina-Lopez**, *2D- and 3D-printed organic thermoelectric materials leading to performing devices*, **Conference on Functional Materials Engineering** organized by IMO-IMOMECE in Hasselt (Belgium), 30 September – 3 October 2024.
2. **F. Molina-Lopez**, *Reconciling Material Morphology Control and Device Integration for High-Performance Flexible and Printed Organic Thermoelectrics*, The International Conference on Flexible and Printed Electronics (**ICFPE 2024**) in Taipei (Taiwan), 28-30 August 2024.
3. H. Baysal, **F. Molina-Lopez**, *Direct Ink Writing of Stretchable Organic Thermoelectrics*, The 5th IEEE International Flexible Electronics Technology Conference (**IEEE IFETC 2023**) in San Jose (California, USA), 13-16 August 2023.
4. **F. Molina-Lopez**, *Uniaxial Molecular Anisotropy as a Strategy to Boost the Performance of Organic Electronics: a Case Study for OFETs and Thermoelectrics*, The 16th edition of the International Conference on Organic Electronics (**ICOE 2023**) in Madrid (Spain), 3-7 July 2023.
5. **F. Molina-Lopez**, *Emerging Thermoelectric Generators Based on Printed and Flexible Electronics Technology*, In Proceedings of the 19th IEEE Sensors Conference, **IEEE SENSORS 2020**, Virtual Conference, 25-28 October 2020.

## PARTICIPATION IN INTERNATIONAL DOCTORAL COMMITTEES

1. Joao Silvano (PhD candidate), *Fabrication of Monolithic Perovskite-on-Chalcogenide Photovoltaic Tandem Devices by Ultrasonic Spray Coating*, **Hasselt University** (Belgium), supervisor Prof. Wim Deferme, **Sept. 2024**.
2. Nathan Pataki (PhD candidate), *Printed Organic Micro Thermoelectric Generators*, **Italian Institute of Technology (IIT) & The Polytechnic University of Milan** (Italy), supervisor Dr. Mario Caironi, **Sept. 2024**.
3. (Opponent of) Karem Lozano Montero (PhD candidate), *Development of Printed Devices for Self-Powered Wearable Electronics*, **Tampere University** (Finland), supervisor Prof. Matti Mäntysalo, **Apr. 2024**.



4. Raheel Riaz (PhD candidate), *Triboelectric Nanogenerators: From Energy Harvesters To Wearable Sensors*, **Free University of Bolzano** (UNIBIZ, Italy), supervisors Prof. P. Lugli, Dr. M. A. Costa Angeli, and Prof. L. Petti, **Aug. 2023**.
5. Francisco J. Romero (PhD candidate), *Design, Modeling and Fabrication of Flexible Sensors for IoE Applications using Emerging Technologies*, **University of Granada** (Spain), supervisors Prof. D. P. Morales Santos and Prof. N. Rodriguez, **Jul. 2021**.
6. Fernando Moreno Cruz (PhD candidate), *Wireless power for IoT*, **University of Granada** (Spain), supervisors Prof. D. P. Morales Santos and Dr. A. Rivadeneyra, **Dec. 2020**.
7. Cecilia Teixeira da Rocha (PhD candidate), *Improved Organic Semiconductor Thin-Film Formation through the Addition of Vibrations to the Solution Shearing Method*, **Dresden University of Technology** (Germany), supervisor Prof. S. Mannsfeld, **Jun. 2020**.

#### **OTHER PERSONAL SKILLS**

- Languages: **Spanish** (Native), **English** (Fluent), **French** (Fluent), **Dutch** (Intermediate, B2), **Mandarin** (Beginner).
- Extracurricular activities: certificate for intermediate level in piano from the Superior Conservatory of Music Victoria Eugenia of Granada (Spain).