

Kiarash Farajzadehahary

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✓ SUMMARY

Polymer scientist and machine learning researcher combining experimental and computational expertise to develop chemistry-informed models that bring polymer knowledge to AI and deploying it for reactor control, with proven track record in collaborative R&D and high-impact publications.

🎓 EDUCATION

Doctor of Philosophy in Applied Chemistry and Polymeric Materials

Dept. of Polymer Sci. & Tech., Faculty of Chemistry, University of the Basque Country

May 2022 – Present

San Sebastian, Spain

Thesis Evaluation: [To be determined]

Thesis: Utilizing machine learning in emulsion polymerization

Supervisors: Prof. Nicholas Ballard, Prof. José M. Asua

Master of Science in Polymer Engineering, Polymer Processing

Dept. of Polymer Engineering, School of Chemical Engineering, University of Tehran

Sep. 2017 – Oct. 2020

Tehran, Iran

Cum. GPA: 18.44/20 (4.0/4)

Thesis: Compatibilization of PHB/PCL blend: Morphological, rheological, mechanical, and thermal study

Supervisors: Prof. Mohammad Najafi, Prof. Babak Kaffashi; Advisor: Prof. Shervin Ahmadi

Bachelor of Science in Polymer Engineering, Polymer Industries

Dept. of Polymer Engineering, School of Chemical Engineering, University of Tehran

Sep. 2012 – Feb. 2017

Tehran, Iran

Cum. GPA: 15.39/20 (3.0/4)

Research: Investigation on restorative dental resin composites

Supervisor: Prof. Mohammad Najafi

🏢 WORK EXPERIENCE

Visiting Researcher

LCPO, University of Bordeaux

Feb. 2026 – Apr. 2026

Bordeaux, France

- Develop polymer chemistry informed neural networks (PCINNs) for RAFT polymerization
- Implement optimization to guide automated flow reactor experiments toward optimal conditions

Research Assistant (RA)

POLYMAT, Institute for Polymer Materials

May 2022 – Present

San Sebastian, Spain

- Conduct research on machine learning applications in emulsion polymerization
- Develop neural network models and reinforcement learning algorithms for reactor control
- Design and execute experiments using reaction calorimetry and characterization techniques
- Prepare manuscripts for peer-reviewed journals, and present findings at international conferences
- Mentor undergraduate and master's students in laboratory techniques and computational methods

Software Instructor/Tutor (Remote)

Maktabkhooneh Online Platform

Mar. 2019 – Present

Tehran, Iran

- Autodesk Moldflow: Prepare course materials, assist students, and assess final projects

Teaching Assistant (TA)

University of Tehran

Sep. 2016 – Dec. 2020

Tehran, Iran

- Prepared and presented lectures, held discussion sessions, designed and graded assignments and exams
 - Application of Computers in Polymer Engineering (Ph.D.), Spring 2019
 - Advanced Polymerization Process Engineering (Master's), Fall 2018–20
 - Principles of Polymerization Engineering (Bachelor's), Fall 2017–19
 - Industrial Resins Engineering (Bachelor's), Fall 2016–17
- Supervised laboratory sessions and assisted in preparation and execution of experiments
 - General Chemistry Laboratory, spring 2018–19

Quality Control Laboratory Technician

Khosh Paint & Resin Company

May 2016 – Aug. 2016

Tehran, Iran

- B.Sc. internship: Conducted physical and chemical analyses on paint and resin products

SKILLS

Language

- Persian: **Native**
- Arabic: **Elementary**
- Spanish: **Intermediate**
- English: **Fluent**

Soft Skills

- Interdisciplinary Teamwork
- Self-directed Research
- Scientific Communication
- Mentoring & Teaching
- Adaptability & Flexibility
- Time Management

Computer

- **Software Applications**
 - Office: Word, Excel, PowerPoint, Visio
 - Design: Moldflow, Inventor, AutoCAD
 - Graphic: Blender, Photoshop, Illustrator
 - Others: Origin, ChemDraw, Mendeley, Aspen
- **Programming & Computing**
 - Languages: Python, MATLAB, LaTeX, Bash
 - HPC: Slurm, Linux clusters, parallel computing
- **Machine Learning**
 - Frameworks: TensorFlow, PyTorch, Scikit-learn
 - Deep Learning: Neural Networks, CNN, RNN, GAN
 - Other: Ensemble, Boosting, Reinforcement Learning

Technical

- Reaction Engineering
- Reaction Calorimetry
- Injection molding
- Extrusion process
- Mechanical testing (Tensile, Shear, Creep)
- Chromatography (GC, GPC, AF4)
- Thermal analysis (DSC, DMTA, TGA)
- Electron microscopy (SEM, TEM)
- Spectroscopy (NMR, FTIR)

HONORS & AWARDS

Master of Science Top Student, University of Tehran

Ranked 1st among all Polymer Engineering graduate students.

May 2019

Scholarship, Ministry of Science, Research and Technology

Ranked within the top 1% nationwide in the Graduate Entrance Exam in Polymer Engineering.

Aug. 2017

Bachelor of Science Top Student, University of Tehran

Ranked among the top 5 undergraduate students in Polymer Engineering.

Feb. 2017

Full tuition waiver, Ministry of Science, Research and Technology

Ranked within the top 1% of ~230,000 participants in the Iranian University Entrance Exam.

Aug. 2012

SELECTED COURSES

Graduate

- Biocompatible Polymers: 19/20
- Advanced Polymer Processing: 19.5/20
- Polymer Blends: 18.25/20
- Advanced Engineering Mathematics: 17.65/20

Undergraduate

- Mass Transfer: 17.5/20
- Fluid Mechanics: 16.5/20
- Process Control: 16.5/20
- Physical Chemistry: 17.25/20
- Fibers Engineering: 17/20
- Elastomers Engineering: 17.5/20
- Polymers Characterization: 19.5/20
- Polymer Reaction Engineering: 19/20

ACADEMIC PROJECTS & ACTIVITIES

Plastic Injection Molding Simulation

Simulated and optimized the plastic injection molding process using Autodesk Moldflow.

Spring 2018

9th Conference on CFD in the Chemical and Petroleum Industry (CFD2018)

Served as an organizing committee member; supported technical operations in the control room.

Nov. 2018

3rd International Conference on Masterbatch and Polymer Compounds (MPC2018)

Contributed as a student committee member; assisted with scientific coordination and sessions.

Feb. 2018

Modeling of PVC Suspension Polymerization

Developed a MATLAB model using the Method of Moments as a group project.

Fall 2017

70th Anniversary of Chemical Engineering in Iran

Served as a member of the main organizing team; coordinated events and presentations.

Nov. 2016

12th International Conference on Membrane Science and Technology (MST2015)

Served as an organizing committee member; supported technical operations in the control room.

Dec. 2015




INTERESTS & HOBBIES

Attending cinema screenings, writing film critiques and reviews, photography and video editing, playing guitar, culinary exploration, hiking, traveling, and volunteering with Be My Eyes.

REFERENCES



Prof. Nicholas Ballard

Associate Professor
University of the Basque Country

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 nicholas.ballard@polymat.eu
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Prof. José M. Asua

Full Professor and Coordinator
University of the Basque Country

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 jm.asua@ehu.es
 (+34) 943 018 181

Prof. Mohammad Najafi

Associate Professor
University of Tehran

 Research Profile
 najafi.m@ut.ac.ir
 (+98) 21 61112195

PUBLICATIONS

- [1] **Farajzadehahary, Kiarash**, Hamzehlou, Shaghayegh, Ballard, Nicholas. “Adding Machine Learning to the Polymer Reaction Engineering Toolbox”. In: *Progress in Polymer Science* (2025), p. 102029.
- [2] Naderi, Mehdi, **Farajzadehahary, Kiarash**, Melchin, Timo, Weitzel, Hans-Peter, Leiza, Jose R, Asua, José M. “Alkali-Soluble Resins as pH-Responsive Protective Colloids”. In: *ACS Applied Materials & Interfaces* 17.30 (2025), pp. 43750–43760.
- [3] Ballard, Nicholas, **Farajzadehahary, Kiarash**, Hamzehlou, Shaghayegh, Mori, Usue, Asua, José M. “Reinforcement learning for the optimization and online control of emulsion polymerization reactors: Particle morphology”. In: *Computers & Chemical Engineering* 187 (2024), p. 108739.
- [4] Ballard, Nicholas, Larrañaga, Jon, **Farajzadehahary, Kiarash**, Asua, José M. “Polymer chemistry informed neural networks (PCINNs) for data-driven modelling of polymerization processes”. In: *Polymer Chemistry* 15.44 (2024), pp. 4580–4590.
- [5] **Farajzadehahary, Kiarash**, Hamzehlou, Shaghayegh, Ballard, Nicholas, Asua, José M. “The hidden secrets of the average number of radicals per particle (\bar{n}) and their implications in control of emulsion polymerization reactors”. In: *Chemical Engineering Journal* 487 (2024), p. 150681.
- [6] **Farajzadehahary, Kiarash**, Telleria-Allika, Xabier, Asua, José M, Ballard, Nicholas. “An artificial neural network to predict reactivity ratios in radical copolymerization”. In: *Polymer Chemistry* 14.23 (2023), pp. 2779–2787.

CONFERENCES

- [1] **Farajzadehahary, Kiarash**. “Machine Learning Approaches for the Modeling and Control of Complex Polymerization Processes”. In: Oral presentation. Groningen, Netherlands, June 2025.
- [2] **Farajzadehahary, Kiarash**. “Polymer Chemistry Informed Neural Networks for Modeling of Polymerization Reactions”. In: Oral presentation. Prague, Czech Republic, May 2025.
- [3] **Farajzadehahary, Kiarash**. “Machine learning models for predicting key properties in free radical emulsion polymerization”. In: Conference Poster. San Sebastián - Donostia, Spain, Apr. 2025.
- [4] **Farajzadehahary, Kiarash**. “Navigating Polymerization Complexity with Artificial Intelligence: A New Era of MWD Control and Optimization”. In: Oral presentation. Lyon, France, Oct. 2024.
- [5] **Farajzadehahary, Kiarash**. “Using reinforcement learning to control and optimize emulsion polymerization reactors”. In: Oral presentation. San Sebastián, Spain, Sept. 2024.
- [6] **Farajzadehahary, Kiarash**. “Using machine learning to predict reactivity ratios in radical polymerization”. In: Oral presentation. San Sebastián, Spain, Oct. 2023.

PEER REVIEWS

- [1] *Chemical engineering journal*. In: (Feb. 2026). Elsevier B.V., ISSN: 1385-8947.
- [2] *Digital Discovery*. In: (Oct. 2025). Royal Society of Chemistry, ISSN: 2635-098X.
- [3] *Nanoscale*. In: (May 2024). Royal Society of Chemistry, ISSN: 2040-3372.