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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 — **May 2022 – Present**
Dept. of Polymer Sci. & Tech., Faculty of Chemistry, University of the Basque Country — *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 — **Sep. 2017 – Oct. 2020**
Dept. of Polymer Engineering, School of Chemical Engineering, University of Tehran — *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 — **Sep. 2012 – Feb. 2017**
Dept. of Polymer Engineering, School of Chemical Engineering, University of Tehran — *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 — **Feb. 2026 – Apr. 2026**
LCPO, University of Bordeaux — *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) — **May 2022 – Present**
POLYMAT, Institute for Polymer Materials — *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) — **Mar. 2019 – Present**
Maktabkhooneh Online Platform — *Tehran, Iran*

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

Teaching Assistant (TA) — **Sep. 2016 – Dec. 2020**
University of Tehran — *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 — **May 2016 – Aug. 2016**
Khosh Paint & Resin Company — *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)

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.

RECENT CONFERENCES & REVIEWS

Conference Presentations

[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.

Peer Review Activities

[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.

REFERENCES

References available upon request.