

KATHRYN E. O'HARRA

ASSISTANT TEACHING PROFESSOR

CHEMICAL AND BIOLOGICAL ENGINEERING

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EDUCATION

Doctor of Philosophy in Chemical Engineering	July 2021
Master of Science in Chemical Engineering	June 2018
Bachelor of Science in Chemical and Biological Engineering	May 2017
Bachelor of Arts in Dance with a Minor in Mathematics	May 2017
<i>The University of Alabama</i>	<i>Tuscaloosa, AL</i>

WORK EXPERIENCE

Assistant Teaching Professor, Chemical & Biological Engineering University of Colorado Boulder <i>Boulder, Colorado</i>	August 2024 – Present
Assistant Professor (Honors College + College of Engineering) Adjunct Professor (Chemical & Biological Engineering) The University of Alabama	July 2021 – August 2024 August 2021 – August 2024
Adult Division Ballet Instructor – Druid City School of Ballet Adjunct Instructor (Honors College) Graduate Teaching Assistant (Chemical Engineering) Graduate Research Assistant (Chemical Engineering) Administrative Assistant, Instructor - Druid City School of Ballet Undergraduate Research Assistant Undergraduate Tutor	August 2022 – May 2024 January 2021 – July 2021 August 2018 – July 2021 May 2017 – July 2021 December 2018 – July 2021 May 2016 – May 2017 August 2014 – May 2016

PROFESSIONAL EXPERIENCE | ACADEMIC BACKGROUND

Teaching Experience:

- **Professor/Instructor of Record for Chemical and Biological Engineering courses:**
 - CHEN 1203 (General Chemistry for Engineers 2) [CUB]
 - CHEN 3010 (Applied Data Analysis) [CUB]
 - CHEN 3220, CHE 305 (Chemical Engineering Separations) [CUB]
 - CHE 412/413/512 (Polymer Materials Engineering) [UA]
 - CHE 354 (Chemical Reaction Engineering) [UA]
- **Professor/Instructor of Record for Honors (UH) and Engineering (EPIC) courses:**
 - The Chemistry of Baking (UH248), Visual Art Media & Materials Science (UH227) [UA]
 - UH200 (Life as a Scholar), UH401 (Honors Capstone), UH100 (Honors Connections) [UA]
 - Design and Development, all *Engineering Positive and Intentional Change* (EPIC) curriculum and seminars (EPIC 101, 102, 201, 202, 301, 302) [UA]
- **Director of Education Abroad Faculty-Led Program:** (July 2023 and 2024)
 - UA Honors in Holland, Centering Sustainability and Community
- **Co-Director for Education Abroad Faculty-Led Program:** (June 2023)
 - UA Chemical Engineering in Ireland
- GAANN Teaching Fellow

Peer-Reviewed Publications:

1. Ravula, ... **O'Harra**, Bara, *et al.* (8th author) "Impact of Ionic Modifications on Polyimide Properties for Gas Separation Applications", *Macromolecules*, **2024**.
2. Nabeel, Shinde, **O'Harra**, Biswas, Bara, Anderson. "Neat and Rapid Preparation of Hydrophobic Magnetic Ionic Liquids Composed of Transition Metal Chelates Featuring In-situ Formation Capabilities in Aqueous Matrices", *New Journal of Chemistry*, **2024**.
3. Bepari, Sullivan, **O'Harra**, Barbosa, Turner, Bara. "Depolymerizing PET via "Imidazolysis"- A New Strategy to Obtain a Diverse Array of Intermediates from Plastic Waste", *ACS Applied Polymer Materials*, **2024**.
4. Dennis, **O'Harra**, *et al.* "Experimental and Computational Studies on the Effects of C(2) Methylation on the Properties and Gas Separation Performance of Polyimide-Ionene Membranes", *RSC Applied Polymers*, **2023**.
5. Walter, ..., **O'Harra**, *et al.* (7th author), "Enhancing Transport of CO₂ Across the Interface Between a PEEK-Ionene Membrane and a Water-Lean Solvent", *ChemSusChem*, **2023**.
6. **O'Harra**, *et al.*, "PEEK-Ionenes: Ultra High-Performance Polymers Meet Ionic Liquids", *ACS Applied Poly. Mat.*, **2022**. doi.org/10.1021/acsapm.2c01312
7. **O'Harra**. "Design, develop, launch: the making of an innovative Honors Minor program focused on Engineering Positive and Intentional Change", *American Society for Engineering Education*, **2022**. peer.asee.org/41802
8. Gao, ... Bara, **O'Harra**, *et al.* (5th author), "The interfacial compatibility between a potential CO₂ separation membrane and capture solvents", *Carbon Capture & Technology*, **2022**. doi.org/10.1016/j.ccst.2022.100037
9. Kammakakam, **O'Harra**, *et al.*, "Spirobisindane-Containing Imidazolium Polyimide-Ionene: Structural Design and Gas Separation Performance of "Ionic PIMs", *Macromolecules*, **2022**. doi.org/10.1021/acs.macromol.1c02317
10. Barbosa, Liu, **O'Harra**, *et al.*, "Charge scaling parameter evaluation for multivalent ionic liquids with fixed point charge force fields", *J. Ionic Liquids*, **2021**. doi.org/10.1016/j.jil.2022.100020
11. Sappidi, Maurya, **O'Harra**, *et al.*, "Molecular simulations and experimental studies of the structural properties of imidazolium ionenes with butyl and decyl spacers solvated in 1-ethyl-3-methylimidazolium bistriflimide", *J. Ionic Liquids*, **2021**. doi.org/10.1016/j.jil.2021.100013
12. **O'Harra**, *et al.*, "Design and Gas Separation Performance of Imidazolium Poly(ILs) Containing Multivalent, Imidazolium Fillers and Crosslinking Agents", *Polymers MDPI (Polymer and Metal Organic Framework Membranes - Special Issue)*, **2021**. doi.org/10.3390/polym13091388
13. **O'Harra**, *et al.*, "Poly(Ionic Liquid)-Ionene Semi-Interpenetrating Networks: A New Approach to the Design of Ionic Liquid - Derived Polymer ssComposites", *ACS Applied Poly. Mat.*, **2021**. doi.org/10.1021/acsapm.1c00080
14. Liu, **O'Harra**, *et al.*, "Screening Ionic Liquids Based on Ionic Volume and Electrostatic Potential Analyses", *J. Phys. Chem. B.*, **2021**. doi.org/10.1021/acs.jpcc.0c10259
15. Liu, **O'Harra**, *et al.*, "Solubility Behavior of CO₂ in Ionic Liquids Based on Ionic Volume and Electrostatic Potential Analysis", *J. Phys. Chem. B.*, **2021**. doi.org/10.1021/acs.jpcc.1c01508
16. Sappidi, Liu, **O'Harra**, *et al.*, "How Do Ionic Liquids "Fold" Ionenes? Computational and Experimental Analysis of Imidazolium Polymers Based on Ether and Alkyl Chain Variations Dissolved in an Ionic Liquid", *Macromolecules*, **2021**. doi.org/10.1021/acs.macromol.0c02604
17. Alshaikh & **O'Harra**, *et al.*, "Scalable, Safer and Greener Synthesis of 1-Vinylimidazoles via Reactive Distillation of Hydroxyethylimidazole Intermediates", *Polymer International*, **2020**. doi.org/10.1002/pi.6161
18. Kammakakam, **O'Harra**, *et al.*, "Synthesis of Imidazolium-Mediated Poly(benzoxazole) Ionene and Composites with Ionic Liquids as Advanced Gas Separation Membranes", doi.org/10.1016/j.polymer.2020.123239
19. **O'Harra**, *et al.* "Nearly Perfect 3D Structures Obtained by Assembly of Printed Parts of Polyamide Ionene Self-Healing Elastomer", *ACS Applied Poly. Mat.*, **2020**. doi.org/10.1021/acsapm.0c00799
20. Liu, **O'Harra**, *et al.* "Molecular Insight into the Anion Effect and Free Volume Effect of CO₂ Solubility in Multivalent ILs", *Phys. Chem. Chem. Phys.*, **2020**. doi.org/10.1039/D0CP03424J

21. **O’Harra**, et al. (Mini-Review) “Toward controlled functional and structural sequencing in imidazolium ionenes”, *Poly. Int.*, **2020**. doi.org/10.1002/pi.6109
22. Dennis, **O’Harra**, et al. “6FDA-containing Polyimide-Ionene + Ionic Liquid Gas Separation Membranes”, *J. Poly. Sci.*, **2020**. doi.org/10.1002/pol.20200325
23. **O’Harra**, et al. “Designing imidazolium poly(amide-amide) and poly(amide-imide) ionenes and their interactions with mono- and tris(imidazolium) ionic liquids”, *Polymers MDPI (Innovative Polymer Electrolytes, Special Issue)*, **2020**. doi.org/10.3390/polym12061254
24. Demarteau, **O’Harra**, et al. “Valorization of plastic wastes for the synthesis of imidazolium based self-healing elastomeric ionenes”, *ChemSusChem*, **2020**. doi.org/10.1002/cssc.202000505
25. **O’Harra**, et al. “Synthesis and Performance of Aromatic Polyamide Ionenes as Gas Separation Membranes”, *Membranes*, **2020**. doi.org/10.3390/membranes10030051
26. Bara, ... **O’Harra**, et al. (5th author) “Properties of Imidazolium-based Ionic Liquids Bearing both Benzylic and n-Alkyl Substituents”, *Ind. Eng. Chem. Res.*, **2019**. doi.org/10.1021/acs.iecr.9b03159
27. **O’Harra**, et al. “Synthesis and Performance of 6FDA-based Polyimide-Ionenes and Composites with Ionic Liquids as Gas Separation Membranes”, *Membranes*, **2019**. doi.org/10.3390/membranes9070079
28. **O’Harra**, et al. “Understanding the effects of backbone chemistry and anion type on the structure and thermal behaviors of imidazolium polyimide-ionenes”, *Polymer International*, **2019**. doi.org/10.1002/pi.5825
29. Bara & **O’Harra** (Invited Review) “Recent Advances in the Design of Ionenes: Toward Convergence with High-Performance Polymers”, *Macromolecular Chem. & Physics*, **2019**. doi.org/10.1002/macp.201900078
30. Kammakakam, **O’Harra**, et al. “Self-Healing Imidazolium-based Ionene-Polyamide Membranes: An Experimental Study on Physical and Gas Transport Properties”, *Polymer International*, **2019**. doi.org/10.1002/pi.5802
31. Kammakakam, **O’Harra**, et al. “Design and Synthesis of Imidazolium-Mediated Tröger’s Base Containing Ionene Polymers for Advanced CO₂ Separation Membranes”, *ACS Omega*, **2019**. doi.org/10.1021/acsomega.8b03700
32. Whitley, ... **O’Harra**, et al. (9th author) “Systematic Investigation of the Photopolymerization of Imidazolium-Based Ionic Liquid Styrene and Vinyl Monomers”, *J. Polymer Chem. A*, **2018**. doi.org/10.1002/pola.29211
33. Bara, **O’Harra**, et al. “Synthesis and Characterization of Ionene-Polyamide Materials as Candidates for New Gas Separation Membranes”, *MRS Advances*, **2018**. doi.org/10.1557/adv.2018.376

Patents:

- Bara, J. E.; **O’Harra, K. E.** Ionic Polyamide and Polyamide-Imide Materials and Methods of Use. US Patent 2018, 0230272A1
- Bara, J. E.; **O’Harra, K. E.**, Dennis, G. Ionic Polyesters, Polyethers, and Poly(ether sulfones), and Related Compounds. US Patent 2020, 11034794B1
- Bara, J. E.; **O’Harra, K. E.** Methods for synthesizing vinylidenes and alkenes, US Patent 2023, 1572355.
- Bara, J. E.; **O’Harra, K. E.** Polymers derived from 2, 2'-bisimidazoles, US Patent 2024, 11912825.
- Other disclosures and patents applications pending.

Proposals:

1. Bara, J. (PI), **O’Harra, K.** (co-PI) [UA] & Vasenkov, S. [UF]. “Collaborative Research: Rational Design of Ionene + Ionic Liquid Membranes based on Understanding Gas Transport on Different Length Scales” Total Budget: \$348,309. 08/2023-05/2026.
2. Weinman, S. (PI), **O’Harra, K.** (Senior Person, 2023 Program Director), “NSF REM: UPWARD: Utilizing Plastic Waste in Applications for Removing Dissolved Debris”, *National Science Foundation*, \$109,989. 5/1/2023-5/31/2024.
3. **O’Harra, K.**, “Broadening Conversations and Community via R.A.D.I.A.T.E.S. Initiatives”. *National Collegiate Honors Council Portz Grants*, \$1200. 07/01/2022 – 07/01/2023.

4. Moon, J., O’Harra, K., et al., “Examining Preservice Teachers' Digital Literacy Development and Learning Engagement via Art Integrated Technology-Enhanced Learning” *Collaborative Arts Research Initiative*, \$15000. 01/01/2022 – 12/31/2024.

Presentations:

1. National Collegiate Honors Society (NCHC) Annual Meeting, Fall 2023: Individual Oral Presentation (EPIC) and Honors Core Faculty Panel (Organizer, Panelist)
2. UKC KSEA Conference, Annual Meeting, Summer 2023: Oral Presentation (JPAR CARI Grant, Project ADAPT)
3. National Collegiate Honors Society (NCHC) Annual Meeting, Fall 2022: Faculty Panel (Organizer, Panelist)
4. American Society for Engineering Education (ASEE), Annual Meeting, Summer 2022: Oral Presentations
5. Honors Education at Research Universities (HERU), Biannual Meeting, Summer 2022: Oral Presentations
6. AIChE, Fall 2021: Invited Oral Presentation, “Excellence in Graduate Student Research” Session
7. NAMS, Annual Meeting, Fall 2021 (Received NSF Travel Award): Oral Presentation
8. ACS Annual Conference, Fall 2021: Invited Oral Presentation in DSM Bright Award Symposium
9. ACS Annual Conference, Spring 2021: Oral Presentation, Virtual Sharing
10. International Congress on Membranes (ICOM) 2020: Poster Presentation + Live Session Moderator, Virtual Sharing
11. AIChE Annual Conference, Fall 2020: (Received WIC Travel Award) Oral Presentations, Virtual Sharing
12. ACS Annual Conference, Fall 2020: Oral Presentation, Virtual Sharing
13. North American Membrane Society, Annual Meeting, Spring 2020: Oral & Poster Presentations, Virtual Sharing
14. ACS Annual Conference, Spring 2020: Presentation Selected for Excellence in Graduate Polymer Research Symposium: Oral & Poster Presentations
15. Alabama Student Materials Research Symposium (Birmingham, AL): Oral Presentation
16. IL-MAT 5, Fall 2019 (Paris, France): (Received Springer Award): Poster & Oral Presentations
17. Polymers Gordon Research Conference & Seminar, Summer 2019 (South Hadley, MA)
18. AIChE Annual Professional Conference, Fall 2018: Poster Presentations
19. Polycondensation, Fall 2018: Poster Presentation
20. North American Membrane Society, Annual Meeting, Summer 2018: Poster & Oral Presentations
21. ACS Annual Conference, Spring 2018: Oral Presentation
22. JEC Composites Annual Conference, 2017: Poster Presentations and Booth Preparation
23. AIChE Annual Conference, Fall 2016: Student Poster Competition (Received Laura Spence Davis Travel Award)

Awards & Recognitions:

- Engineering Council of Birmingham (ECOB) Young Engineer of the Year, UA Capstone Engineering Society Nominee (2024)
- Recipient of National Alumni Association 18 under 31 Award from The University of Alabama (2024)
- National Academy of Inventors: The University of Alabama Inductee (2023)
- 2021-2022 Outstanding Doctoral Thesis Award, The University of Alabama (2022)
- College of Engineering Overall Graduate Student of the Year, The University of Alabama (2022)
- 2021 AIChE Annual “Excellence in Graduate Student Research” Speaker/Presenter (2021)

- MIT Chemical Engineering Rising Stars Workshop, Invited Participant/Presenter (2021)
- 2021 DSM Bright Science Award Finalist, ACS Award Symposium (2021)
- 2021 3M Raising Influence in Science & Engineering (RISE) Symposium (2021)
- Engineering Council of Birmingham (ECOB) Graduate Engineering Student of the Year (2021)
- Selected Speaker/Panelist, "Soft Matter for All" Symposium (2020)
- 2020 Women in Chemical Engineering (WIC) Travel Award (AIChE Annual Meeting, 2020)
- "Excellence in Graduate Polymer Research" Symposium (ACS National Meeting, 2020)
- 1st Place Springer Award for Oral Presentation (ILMAT 5, Nov. 2019)
- 1st Place in Gas Separations Category (NAMS Student Poster Competition, 2018)
- 3-Minute-Thesis (3MT) Semi-Finalist (The University of Alabama, 2018 and 2019)
- Elias Klein Travel Award (North American Membrane Society Annual Meeting, 2018)

SERVICE & VOLUNTEER ACTIVITIES

- Member, CU ChBE Undergraduate and Engagement Committees, Recruiting Sub-Committee
- CU ChBE Co-advisor for 2024-2025 Departmental Ambassadors (15 UG student representatives)
- Honors Action Faculty Mentor/Director (K12 Outreach, Community Service)
- UA Competitive Ballroom Team (Volunteer Coach '19-20, Prev. Faculty Advisor)
- UA Community Affairs 2021 STEM Showcase Mentor (2021) or Judge (2022)
- UA Honors College *Experiential Education* ('21-'23), *Faculty Development* ('21-'22) Committees
- Honors Faculty Representative on UA Undergraduate Council and Policy Subcommittee ('22-'25)
- Search Committee Member –Honors Capstone Director and Special Programs Director ('22-'23)
- Participant in Honors Teaching Triads, Peer Observer for Honors Colleagues ('22-'23)
- Working on Womanhood (WOW) Intervention Program (Dance Instructor Volunteer) ('19-'20)
- Dance Alabama Tour (AL K12 School Programs) ('19-'20)

PROFESSIONAL DEVELOPMENT | MENTORSHIP AND LEADERSHIP

- Mentor to Honors Engineering/Comp. Science students in the EPIC Scholars Program ('21-'23)
- NSF EFRI REM Mentoring Catalyst Training (Summer 2023)
- Member of American Institute of Chemical Engineers, North American Membrane Society, American Chemical Society, National Collegiate Honors Council, American Society for Engineering Education
- Graduate student mentor to 8 undergraduate [B.S. ChE] & 2 graduate [ChBE M.S. or starting PhD] research assistants

COMPUTER SKILLS

- Extensively utilize Microsoft Word, Excel, and PowerPoint for written reports, manuscript preparation, data processing and visualization, and oral presentations.
- Proficient in Origin, Minitab, Diffraction.Eva, ChemCad, Polymath, and Matlab Software.
- Trained in several analytical techniques including NMR, XRD, DSC, SEM, and MALDI-TOF MS.