

Christopher Johnson
Chemical Engineering and Materials Analysis
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EDUCATION

University of Pennsylvania Philadelphia, PA
Ph.D. in Chemical and Biomolecular Engineering May 2025
Advised by Prof. Chinedum Osuji
GPA: 4.00, Additional course focus in Polymer Physics, Interfacial Phenomena, and Experimental Analysis Methods

University of Delaware Newark, DE
Honors Bachelor of Chemical Engineering, English Minor May 2020
GPA: 3.98, Additional course focus in Computational Modelling and Statistics

RELEVANT EXPERIENCE

University of Maryland College Park, MD
Postdoctoral Research Associate – Kofinas Lab Aug. 2025-Present

- Fabricated novel batteries for extreme temperature charging applications.
- Collaborated with the Army Research Laboratory and Johns Hopkins Applied Physics Laboratory to develop electrochemical experiments at extreme conditions.
- Prepared communications on data and research outcomes for national laboratory, industrial and academic stakeholders.
- Secured funding and provided mentorship for multiple undergraduate projects.
- Represented postdoctoral associates, fellows, and junior lecturers on the University Senate.

University of Pennsylvania Philadelphia, PA
Graduate Student/Research Fellow – Osuji Lab Aug. 2020-Aug. 2025

- Incorporated practical and theoretical design principles in the successful development of surfactant-derived membrane materials for ion transport and nanocontaminant filtration.
- Designed theoretical and experimental studies with end goals of water purification and controlled fluid transport, including filtration studies, SAXS, and conductivity analysis for large datasets.
- Promoted a culture of health and safety in the laboratory environment as safety officer, in addition to adhering to regulatory requirements.
- Led industrial and academic collaborations, translating knowledge for a variety of skill levels, and managed multiple teams to finish successful publications.
- Experienced with dielectric spectroscopy, scattering methods, coating deposition, and materials development.

University of Pennsylvania/University of Delaware Newark, DE and Philadelphia, PA
Teaching Assistant May 2018-Dec. 2022

- Mentored graduate and undergraduate students.
- Prepared and presented lecture materials for undergraduate and graduate students in experimental methods, chemical synthesis and polymer dynamics.
- Received positive feedback regarding quality of teaching, mentorship, and communication.

- Performed molecular dynamics experiments through LAMMPS to study the thermodynamics of polymeric micelles.
- Improved visualization techniques for presentation of data and developed code to analyze large amounts of position vector data.

PEER-REVIEWED PUBLICATIONS

1. F. A. Burni, **C. W. Johnson**, S. Bhattacharyya, S. Cho, E. K. Sam, Atticus Nemeroff, M. K. Monib, C. W. Glass, A. V. Cresce, P. Kofinas, P. Albertus, Minimal Component Electrolyte Design for -60°C Lithium-Ion Batteries with Nickel-Rich Cathode and Silicon-Containing Anode. *Adv. Sci.* (Under Review).
2. E. K. Sam, B. J. Tabor, **C.W. Johnson**, F. A. Burni, M. Scher, A. V. Cresce, P. Kofinas, P. Albertus. Methyl Propionate-Based Electrolytes with Tris(trimethylsilyl)borate for Low-temperature Lithium-Ion Performance. *J. Electrochem. Soc.* (Under Review).
3. **C. Johnson***, R. Ball*, L. Zhang*, S. Oh, R. Hopkins, K. Culley, A. Ali, J. Granite, K. Winey, A. Patel, C. Osuji, J. Anna, Anion transport and selectivity in ordered nanoporous polymers with 1 nm scale charged pores. *ACS Nano* (Accepted, in press).
4. R. Ball*, **C. Johnson***, L. Zhang*, R. Hopkins, J. Hwang, K. Winey, A. Patel, C. Osuji, J. Anna, Correlating Solvation Shell Dynamics and Ion Transport in Highly Ordered Nanoporous Polymers. *Nature Communications* (2026).
5. K. E. Culley, **C. W. Johnson**, A. W. Fehr, R. D. Noble, D. L. Gin. Nanoporous, Lyotropic Bicontinuous Cubic Polymer Network for Highly Selective Heterogeneous Catalytic Oxidation of Alcohols. *Polymer* (2025).
6. R. Dong*, **C. W. Johnson***, C. O. Osuji. Fast potassium ion transport in sub-1 nm pores of self-assembled polymer membranes derived from linoleic acid. *ACS Materials Letters* (2025).
7. **C. Johnson**, L. Zhang, K. Culley, S. Oh, D. Gin, G. Geise, A. Patel, K. Winey, C. Osuji. The Effects of Morphology and Hydration on Anion Transport in Self-Assembled Nanoporous Membranes. *ACS Nano* (2025).
8. Lyotropic Gyroid Mesophase Compositions, Polymer Compositions Comprising the Same, Methods of Preparation Thereof, and Methods of Using the Same, D. L. Gin, P. Li, C. Osuji, O. Imran, **C. Johnson**, S. S. Dyer - US Patent App. 17/949,072, 2023.
9. L. Bodkin, **C. Johnson**, K. Culley, Z. Krajnak, J. Hage, N. K. Kim, C. O. Osuji, D. L. Gin. Effect of localized control of cross-link density on mechanical properties of bicontinuous cubic lyotropic networks via copolymerization with different singly-polymerizable monomers. *Polymer* (2023).
10. K. Culley, **C. Johnson**, D. L. Gin. Sulfonic-acid-based lyotropic bicontinuous cubic polymer network for molecular-size-selective heterogeneous catalysis. *Chemical Communications* (2023).
11. P. Li*, **C. Johnson***, S. S. Dyer, C. O. Osuji, D. L. Gin. A pH- and Light-responsive Nanoporous Lyotropic Gyroid Polymer Network. *Adv. Mater. Interfaces* (2022).

* - considered equal contribution.

CONTRIBUTED AND INVITED PRESENTATIONS

1. **C. Johnson**. The Impact of Structure and Solvation on the Transport Properties of Nanoporous Polymers Derived from Lyotropic Mesophases, *Invited Speaker*, Polymer Physics GRS (2026).
2. **C. Johnson**, F.A. Burni, P. Kofinas, Minimal Component Electrolytes for -60°C Pouch Cells, Poster, ISR@40 Celebration, (2026).
3. **C. Johnson**, F.A. Burni, P. Kofinas, Minimal Component Electrolytes for -60°C Pouch Cells, Poster, *University of Maryland Department Showcase* (2026).
4. **C. Johnson**. Nanoporous Polymers Derived from Lyotropic Mesophases for Ion Transport, Oral Presentation, *Mid-Atlantic Soft Matter Workshop* (2024).
5. P. Shapturenka, **C. Johnson**, C. Osuji. Soft-AE: Accelerating conductive polymer development through accessible autonomous experimentation. Poster, *APS March Meeting* (2025).
6. **C. Johnson**, C. Osuji, Impact of Direct Hexagonal Mesophase Geometry and Hydration on Ion Motion, Poster, *Vagelos Institute Showcase* (2025).
7. **C. Johnson**, R. Ball, L. Zhang, C. Osuji. Impact of Direct Hexagonal Mesophase Geometry and Hydration on Ion Motion, Oral Presentation, *Mid-Atlantic Soft Matter Workshop* (2024).
8. **C. Johnson**, R. Ball, L. Zhang, C. Osuji. Impact of Direct Hexagonal Mesophase Geometry and Hydration on Ion Motion, Oral Presentation, *University of Pennsylvania Graduate Student Symposium* (2024).
9. **C. Johnson**, R. Ball, L. Zhang, C. Osuji. Impact of Direct Hexagonal Mesophase Geometry and Hydration on Ion Motion, Oral Presentation, *ACS Fall* (2024).
10. **C. Johnson**. Transport in Resilient Anion Exchange Membranes Derived from Crosslinked Lyotropic Mesophases, Oral Presentation, *ACS Fall* (2023).
11. **C. Johnson**, H. Nguyen, K. Culley, D. Gin, C. Osuji. Resilient Self-Assembled Surfactant Membranes for Anionic Species Conductivity, Poster, *University of Pennsylvania Graduate Student Symposium* (2022).
12. **C. Johnson**, Studies on the Film Applications of Self-Assembled Lyotropic Mesophase Materials, Poster, *University of Pennsylvania Graduate Student Symposium* (2021).

SELECTED HONORS AND AWARDS

- Diamond State Scholarship (2016-2019)
- Lillian Sincoskie Scholarship (2017)
- Chemical Engineering Industrial Sponsors Scholarship (2017)
- University of Delaware Munson Fellow (2018-2019)
- John A. Thoroughgood Legacy Scholarship (2019)
- James Kearns Scholarship (2019)
- Elda Wollaeger Gregory Poetry Award (2020)
- Work featured in *A Guide to Professional Writing* (2020)
- Finalist – NNCI Scientific Imaging Competition (2021)
- Vagelos Institute of Energy Science and Technology Graduate Student Fellowship (2022-2023)
- Finalist – Penn Energy Week Lightning Talks (2024)
- Finalist – Penn 3 Minute Thesis Competition (2024)
- University of Maryland Department Showcase – Poster Competition Runner-Up (2026)
- Poetry featured in *Caesura* and *Paper Dragon* journals (2020, 2026).

RELEVANT SKILLS

Leadership: Communication, project management, team organization, scientific writing, public engagement.

General Software: Rhino, Adobe Photoshop, Affinity Publisher, Origin, LabView, Vegas Pro, GIMP, Microsoft Office, COMSOL.

Coding Languages: MATLAB, Bash, Python (numpy, scipy, matplotlib, pandas, pyVISA).

Experimental Machinery/Methods/Theory: Small angle x-ray scattering (transmission, grazing incidence, temperature/humidity-controlled), dynamic light scattering (DLS), scanning electron microscopy (SEM), transmission electron microscopy (TEM), vapor sorption analysis, rheometry, optical microscopy, electrochemical impedance spectroscopy (EIS), dynamic mechanical analysis (DMA), FTIR spectroscopy, UV-Vis spectroscopy, differential scanning calorimetry (DSC), thermogravimetric analysis, battery analysis, (TGA), spin-coating, dip-coating, blade-coating, NMR relaxometry.