Alex M. Jordan, Ph.D.

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Current Appointments

Associate Professor, University of Wisconsin – Stout
- Plastics Engineering, Department of Engineering & Technology, August 2024 – Present

Program Director, B.S. Plastics Engineering, University of Wisconsin – Stout
- College of Science, Technology, Engineering, Math and Management, May 2023 – Present

Previous Appointments

Assistant Professor, University of Wisconsin – Stout
- Plastics Engineering, Department of Engineering & Technology, January 2018 – August 2024

Post-doctoral Fellow, University of Minnesota
- Department of Chemical Engineering and Materials Science, July 2016 – August 2018
  Advisors: Prof. Christopher W. Macosko & Prof. Frank S. Bates

Education

Doctor of Philosophy, Case Western Reserve University
- Macromolecular Science and Engineering, June 2016
  Thesis Title: "Fiber-Composite *in situ* Fabrication: Multilayer Coextrusion as an Enabling Technology"
  Advisor: Prof. LaShanda T. J. Korley

Bachelor of Science Engineering, Case Western Reserve University
- Chemical Engineering, May 2011
  - Biomedical Engineering Concentration; Economics Minor

Current Research Areas

Polymer Physics and Interfaces for a Sustainable Global Community

Non-woven fiber mat manufacturing for air, water, and fuel filtration
Polymer blends from post-consumer recycled plastics
Advanced processing techniques for bio-based polymers
Polymer rheology and processing

Publications – 18 Total (739 citations via Google Scholar)

18. **Jordan, A.M.***; Meyer, L.; Kim, K.; Lee, B.; Bates, F. S.; Macosko, C. M., Improved Polypropylene Thermoformability through Polyethylene Layering, *ACS Appl. Mater. Interfaces*, **2022**, *14* (*29*), 34134-34142, DOI: 10.1021/acsami.2c08586.

17. Behzadfar, E.; Kim, K.; Lee, B.**; Jordan, A. M.;** Lhost, O.; Jaffer, S. A.; Bates, F. S.; Macosko, C. W.**,** Effects of a layered Morphology on Drip Suppression in Burning Polymers, *ACS Appl. Polym. Mater.*, **2021**, *3* (*3*), 1664-1574, DOI: 10.1021/acsapm.1c00081.

16. **Jordan, A. M.***; Lee, B.; Kim. K.; Ludtke, E.; Lhost, O.; Jaffer, S.; Bates, F. S.; Macosko, C. W., Rheology of Polymer Multilayers: Slip in Shear, Hardening in Extension, *J. Rheol.*, **2019**, *63* (*5*), 751-761, DOI: 10.1122/1.5109788.

15. **Jordan, A. M.**; Lee, P. C.; Thurber, C.; Macosko, C. W., Adapting a Capillary Rheometer for Research on Polymer Melt Interfaces, *Ind. Eng. Chem. Res.*, **2018**, *57* (*42*), 14106-14113, DOI: 10.1021/acs.iecr.8b03674.

14. **Jordan, A. M.**; Kim, K.; Soetrisno, D.; Hannah, J.; Bates, F. S.; Jaffer, S. A.; Lhost, O.; Macosko, C. W., Role of Crystallization on Polyolefin Interfaces: An Improved Outlook for Polyolefin Blends, *Macromolecules*, **2018**, *51* (7), 2506-2516, DOI: 10.1021/acs.macromol.8b00206.

13. **Jordan, A. M.**; Kim, S.-E.; Van de Voorde, K.; Pokorski, J. K.; Korley, L. T. J., In Situ Fabrication of Fiber Reinforced Three-Dimensional Hydrogel Tissue Engineering Scaffolds, *ACS Biomater. Sci. Eng.*, **2017**, *3* (*8*), 1869-1879, DOI: 10.1021/acsbiomaterials.7b00229.

12. Gu, Y.; Kawamoto, K.; Zhong, M.; Chen, M.; Hore, M. J. A.; **Jordan, A. M.**; Korley, L. T. J.; Olsen, B. D.; Johnson, J. A., Semibatch monomer addition as a general method to tune and enhance the mechanics of polymer networks via loop-defect control, *PNAS*, **2017**, *114* (*19*), 4875-4880, DOI: 10.1073/pnas.1620985114.

11. Kim, S.-E.; **Jordan, A. M.**; Korley, L. T. J.; Pokorski, J. K., Drawing in poly(ε-caprolactone) fibers: tuning mechanics, fiber dimensions and surface-modification density, *J. Mater. Chem. B*, **2017**, *5 (23)*, 4499-4506, DOI: 10.1039/C7TB00096K.

10. Chen, M.; Gu, Y.; Singh, A.; Zhong, M.; **Jordan, A. M.**; Biswas, S.; Korley, L. T. J.; Balazs, A. C.; Johnson, J. A., Living Additive Manufacturing: Transformation of Parent Gels into Diversely Functionalized Daughter Gels Made Possible by Visible Light Photoredox Catalysis, *ACS Cent. Sci.*, **2017**, *3 (2)*, 124-134, DOI: 10.1021/acscentsci.6b00335.

9. Lenart, W. R.; Jang, K.-S.; **Jordan, A. M.**; Baer, E.; Korley, L. T. J., Mechanically tunable dual-component polyolefin fiber mats via two-dimensional multilayer coextrusion, *Polymer*, **2016**, *103*, 328-336, DOI: 10.1016/j.polymer.2016.09.060.

8. **Jordan, A. M.**; Viswanath, V.; Kim, S-E.; Pokorski, J. K.; Korley, L. T. J., Processing and surface modification of polymer nanofibers for biological scaffolds: a review, *J. Mater. Chem. B*, **2016**, *4 (36)*, 5958-5974, DOI: 10.1039/C6TB01303A.

7. **Jordan, A. M.**; Marotta, T.; Korley, L. T. J., Reducing Environmental Impact: Solvent and PEO Reclamation During Production of Melt-extruded PCL Nanofibers, *ACS Sustainable Chem. & Eng.*, **2015**, *3* (*11*), 2994-3003, DOI: 10.1021/acssuschemeng.5b01019.

6. **Jordan, A. M.**; Korley, L. T. J., Toward a Tunable Fibrous Scaffold: Structural Development During Uniaxial Drawing of Coextruded Poly(ε-caprolactone) Fibers, *Macromolecules,* **2015**, *48* (*8*), 2614-2627, DOI: 10.1021/acs.macromol.5b00370.

5. Kim, S-E.; Wang, J.; **Jordan, A. M.**; Korley, L. T. J.; Baer, E.; Pokorski, J. K., Surface Modification of Melt Extruded Poly(ε-caprolactone) Nanofibers, *ACS Macro Lett.*, **2014**, *3* (*6*), 585-589, DOI: 10.1021/mz500112d.

4. **Jordan, A. M.**; Lenart, W. R.; Carr, J. M.; Baer, E.; Korley, L. T. J., Structural Evolution during Mechanical Deformation in High-Barrier PVDF-TFE/PET Multilayer Films Using in Situ X-ray Techniques, *ACS Appl. Mater. Interfaces*, **2014**, *6* (*6*), 3987-3994, DOI: 10.1021/am4053893.

3. Burt, T. M.; Monemian, S.; **Jordan, A. M.**; Korley, L. T. J., Thin Film Confinement of Spherical Block Copolymers via Forced Assembly Co-extrusion, *Soft Matter*, **2013**, *9* (*17*), 4381-4385, DOI: 10.1039/C3SM27797F.

2. Burt, T. M.; **Jordan, A. M.**; Korley, L. T. J., Investigating Interfacial Contributions on the Layer-thickness Dependent Mechanical Response of Confined Self-assembly via Forced Assembly, *Macromol. Chem. Phys*, **2013**, *214* (*8*), 873-881, DOI: 10.1002/macp.201200588.

1. Burt, T. M.; **Jordan, A. M.**; Korley, L. T. J., Towards Anisotropic Materials via Forced Assembly coextrusion, *ACS Appl. Mater. Interfaces*, **2012**, *4* (*10*), 5155-5161, DOI: 10.1021/am301072s.

*Denotes corresponding author designation

Book Chapters

1. **Jordan, A.M.**; Kramschuster, A.; Zheng, W., "Polymer Processing: An Introduction", *ASM Handbook: Characterization and Failure Analysis of Plastics*, **2022**, Volume 11B, 1-30, DOI: 10.31399/asm.hb.v11B.9781627083959.

Granted Patents

- **Jordan, A. M.**; Korley, L. T. J.; Wnek, G. E., FIBER REINFORCED HYDROGELS AND METHODS OF MAKING SAME, United States Patent Application Publication, Pub. No.: US 15239808.

Patents Pending

- **Jordan, A. M**.; Kim, K.; Bates, F. S.; Macosko, C. W.; Jaffer, S.; Lhost, O., POLYETHYELENE AND POLYPROPYLENE MULTILAYERED STRUCTURES AND USES THEREOF, United States Provisional Patent Application Publication, Pub. No.: US 62/685,342.
- **Jordan, A. M**.; Kim, K.; Bates, F. S.; Macosko, C. W.; Jaffer, S.; Lhost, O., POLYETHYELENE AND POLYPROPYLENE MULTILAYERED STRUCTURES AND USES THEREOF, World Intellectual Property Organization, Pub. No.: WO 2019/238967 A1.
- Liu, K.; **Jordan. A. M.**; Ellison, C. J.; Macosko, C. W.; Thurber, C. M.; Huang, W.; Peterson, T. H., RESIN HAVING A CATALYST FOR REACTIVE ADHESION TO A POLYESTER, United States Provisional Patent Application Publication, Pub. No.: US 62/674,953.
- Behzadfar, E.; Macosko, C. W.; Bates, F. S.; **Jordan, A. M.**; Kim, K., ADDITIVE FREE FABRICATION OF POLYMERIC COMPOSITES WITH DELAYED AND REDUCED DRIPPING, United States Provision Patent Application Publication, Pub. No.: US 2022/0274386 A1.

Conference Proceedings

- Society of Plastics Engineers Annual Technical Conference, Denver, CO, May 7, 2021 (Talk)
- Society of Plastics Engineers Annual Technical Conference; San Antonio, TX, April 1, 2020 (Accepted, Not delivered due to COVID-19)
- Society of Rheology Annual Meeting; Raleigh, NC, October 22, 2019 (Talk)
- Society of Plastics Engineers Annual Technical Conference; Detroit, MI, March 19, 2019 (Talk)
- Society of Rheology Annual Meeting; Houston, TX, October 16, 2018 (Talk)
- Society of Plastics Engineers Annual Technical Conference; Orlando, FL, May 9, 2018 (Talk)
- American Institute of Chemical Engineers Annual Meeting; Minneapolis, MN, November 2, 2017 (Talk)
- Society of Rheology Annual Meeting; Denver, CO, October, 10, 2017 (Talk)
- Industrial Partnership for Research in Interfacial & Materials Engineering Annual Meeting; Minneapolis, MN, June 1, 2017 (Invited lecture)
- Society of Plastics Engineers Annual Technical Conference; Anaheim, CA, May 8, 2017 (Talk)
- American Institute of Chemical Engineers Annual Meeting; San Francisco, CA, November 16, 2016 (Talk)
- Advanced Photon Source User Sciences Seminar; Lemont, IL, March 25, 2016 (Invited lecture)
- Polymer Initiative of Northeast Ohio Conference; Cleveland, OH, June 12, 2015 (*3rd Place Poster*)
- American Institute of Chemical Engineers Annual Meeting; Atlanta, GA, November 19, 2014 (Talk)
- Polymer Initiative of Northeast Ohio Conference; Cleveland, OH, June 14, 2013 (*3rd Place Poster*)
- American Chemical Society 245th National Meeting; New Orleans, LA, April 9, 2013 (Poster)

Courses Taught

University of Wisconsin – Stout

- ENGR 391 – Fluid Mechanics
- ETECH 251 – Fundamentals of Plastics & Processing
- ETECH 343 – Extrusion Technology

- PLE 380 – Extrusion Theory and Design
- PLE 405/410 – Senior Capstone Design I/II
- ENGR 275 – Thermodynamics & Heat Transfer
- ETECH 204 – Polymer & Wood Processes
- ETECH 342 – Thermoforming & Blow Molding Processes

Term		*ENGR 391*	*ETECH 251*	*ETECH 343*	*PLE 380*	*PLE 405/410*	*ENGR 275*	*ETECH 204*	*ETECH 342*
2018	Spring		×2						
	Fall		×2						
2019	Spring		×2						
	Fall								
2020	Spring		×2						
	Fall								
2021	Spring								
	Fall								
2022	Spring		×2						
	Fall								
2023	Spring		×2						
	Fall								
2024	Spring								
	Fall								

Professional Service

Membership in Professional Societies

- Society of Rheology
- Society of Plastics Engineers (SPE) - Extrusion Division, Young Professional on Board of Directors

Conference Planning

- Session Aide, American Institute of Chemical Engineers Annual Meeting 2017
- Technical Reviewer, SPE Annual Technical Conference 2020 – Present

Reviewer for Journals and Organizations

- Wiley Journals 2018 – Present
- Taylor & Francis Journals 2019 – Present
- National Science Foundation
- Department of Energy

Service at UW-Stout

University

- Curriculum & Instruction Committee May 2020 – May 2023
- Planning & Review Committee May 2020 – May 2023
- Positive Action, Ethics & Competition Review Committee May 2018 – August 2020

College

- 1st Floor Jarvis Hall Technology Wing Space Vision Team September 2018 – May 2019

Department

- Plastics Program Coordinator — May 2018 – May 2023
- E&T Department Bylaw Revision — September 2018 – January 2020
- E&T Summer Fellowship Application and Review — January 2019 – May 2020
- Mechanical Engineering Search & Screen Committee — August 2019 – February 2020
- Capital Budget Committee, Chairperson — August 2021 – Present

Other External Service

- Future Faculty Workshop, Invited Mentor — 2018 – 2019, 2022
- NSF CLiPS Polymer Envoy Mentor — 2011 – 2016

Technical Skills

Polymer Processing

- Extrusion
- Multilayer coextrusion
- Thermoforming
- Injection molding
- Electrospinning
- Blow Molding
- Heat seal lamination
- Uni/bi-axial orientation
- Rotational Molding

Structural Analysis and Microscopy

- Small/wide angle X-ray scattering
- Laser scanning confocal microscopy
- Scanning electron microscopy
- Transmission electron microscopy
- Atomic force microscopy
- Optical microscopy

Rheological Characterization

- Oscillatory shear
- Steady shear
- Capillary flow
- Capillary break-up
- Extensional rheology
- Melt flow index

Mechanical Analysis

- Uniaxial tensile testing
- Uniaxial compression
- Lap shear
- Nano-indentation
- T-peel adhesion
- Izod impact

Thermal Analysis

- Thermo-Gravimetric Analysis
- Differential Scanning Calorimetry
- Dynamic Mechanical Analysis

Chemical Analysis

- FT-IR spectroscopy
- ^{1}H NMR spectroscopy
- Size exclusion chromatography

Additional Techniques

- Contact angle
- BET surface area analysis
- (Cryo) ultra-microtome
- UV-Vis spectroscopy
- Gas barrier analysis
- Cell culture/MTT assay

Software

- Microsoft Word, Excel, PowerPoint
- Origin
- Adobe Illustrator, Photoshop
- MatLab
- ImageJ
- ANSYS simulation workbench

Awards

- NSF Center for Layered Polymeric Systems Student Award — 2014
- 3rd Place Poster; Polymer Initiative of Northeast Ohio Conference (*2 times*) — 2013, 2015
- 15th National School on X-ray and Neutron Spectroscopy, Selected Attendee — 2013
- NSF Center for Layered Polymeric Systems Graduate Research Fellowship — 2011 – 2016
- Certified Engineer Intern, Ohio Board of Engineering — 2011
- University honors list (*4 times*) — 2007 – 2011
- Case Western Reserve University Provost's Scholarship — 2007 – 2011

Externally Funded Research Grants/Projects (Total Funding = $162,295.85)

1. Oxygen Transport Rate Testing of Multilayer Polyolefin Films (TAP 201901-1729), February 2019 funded for $4,430

2. Sustana Poly Recycle Stream (TAP 201902-1742), March 2019 funded for $5,000
3. Thermoforming at UW-Stout (TAP 201909-1861), October 2019 funded for $5,566
4. Coextrusion at UW-Stout (GIK 2020-03-01), March 2020 equipment donation with estimated value $6,000
5. Recyclability Test of Metallized PE Film (TAP 202101-2088), January 2021 funded for $8,955
6. Design and Fabrication of a Shear Cell for in-situ X-ray Scattering Studies (QCPS 0002208541), February 2022 funded for $7,978.27
7. High Impact Polystyrene, Polypropylene, and Polyethylene terephthalate Extruded Sheet Donation (GIK 2022-04-04), March 2022 material donation with estimated value $9441.58
8. UW-Stout Sustainability Project submitted to EVCO Plastics, September 2022 funded for $100,000
9. High School Educator Outreach Program submitted to Society of Plastics Engineers – Milwaukee Section, November 2022 funded $4925
10. Differential Scanning Calorimeter Donation (GIK Q10 DSC), August 2023 equipment donation from Charter Next Generation with estimated value of $10,000