

# Alex M. Jordan, Ph.D.

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## Current Appointments

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### Assistant Professor, University of Wisconsin – Stout

- Plastics Engineering, Department of Engineering & Technology, January 2018 – Present

## Previous Appointments

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### 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

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### 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

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### 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  
Interfacial rheology

## Awards

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- NSF Center for Layered Polymeric Systems Student Award 2014
- 3<sup>rd</sup> Place Poster; Polymer Initiative of Northeast Ohio Conference (2 times) 2013, 2015
- 15<sup>th</sup> 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

## Publications – 16 Total (331 citations via [Google Scholar](#))

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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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1073/pnas.1620985114).
11. Kim, S.-E.; **Jordan, A. M.**; Korley, L. T. J.; Pokorski, J. K., Drawing in poly( $\epsilon$ -caprolactone) fibers: tuning mechanics, fiber dimensions and surface-modification density, *J. Mater. Chem. B*, **2017**, 5 (23), 4499-4506, [DOI: 10.1039/C7TB00096K](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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( $\epsilon$ -caprolactone) Fibers, *Macromolecules*, **2015**, 48 (8), 2614-2627, [DOI: 10.1021/acs.macromol.5b00370](https://doi.org/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( $\epsilon$ -caprolactone) Nanofibers, *ACS Macro Lett.*, **2014**, 3 (6), 585-589, [DOI: 10.1021/mz500112d](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1021/am301072s).

\*Denotes corresponding author designation

## Granted Patents

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- **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

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- **Jordan, A. M.**; Kim, K.; Bates, F. S.; Macosko, C. W.; Jaffer, S.; Lhost, O., POLYETHYLENE AND POLYPROPYLENE MULTILAYERED STRUCTURES AND USES THEREOF, United states Provisional Patent Application Publication, Pub. No.: US 62/685,342

## Conference Proceedings

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- 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 (*3<sup>rd</sup> 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 (*3<sup>rd</sup> Place Poster*)
- American Chemical Society 245<sup>th</sup> National Meeting; New Orleans, LA, April 9, 2013 (Poster)

## Courses Taught

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### University of Wisconsin – Stout

- ENGR 391 – Fluid Mechanics
- ETECH 251 – Fundamentals of Plastics & Processing
- ETECH 343 – Extrusion Technology
- PLE 305 – Extrusion Theory and Application
- PLE 405 – Senior Capstone Design I
- PLE 410 – Senior Capstone Design II

	<i>Term</i>	<i>ENGR 391</i>	<i>ETECH 251</i>	<i>ETECH 343</i>	<i>PLE 305</i>	<i>PLE 405</i>	<i>PLE 410</i>
2018	Spring		x2				
	Fall		x2				
2019	Spring		x2				
	Fall						
2020	Spring		x2				
	Fall						

## Professional Service

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### Membership in Professional Societies

- Society of Rheology
- Society of Plastics Engineers (SPE) - Extrusion Division, Applied Rheology Division

### Conference Planning

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

### Reviewer for Journals and Organizations

- MDPI Journals (Polymers, Nanomaterials) 2018 – Present
- Taylor & Francis Journals (Rheologica Acta) 2019 – Present
- National Science Foundation (Emerging Frontiers in Research and Innovation)
- Department of Energy (Energy Efficiency & Renewable Energy)

### Service at UW-Stout

#### University

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

#### College

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

#### Department

- Plastics Program Coordinator May 2018 – Present
- 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

### Other External Service

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

## Technical Skills

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### 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
- <sup>1</sup>H NMR spectroscopy
- Size exclusion chromatography

### **Additional Techniques**

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

### **Software**

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

### **Externally Funded Research Grants/Projects (Total Funding = \$20,966)**

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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