

Jonathan Brown

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Professional Experience

Asst. Professor of Practice OSU Dept. of Materials Science and Eng. 2020-present
Lecturer (*partial appointment*) OSU 2015–2020

- Dept. of Materials Science and Engineering (2020)
- Dept. of Engineering Education (2017–2020)
- Marion campus (2014–2016)

Research Scientist OSU Dept. of Chemical Engineering 2015–2019
(*0% appointment for 2018-2019*)

Projects:

- Fluids density functional theory of salt doped microphase separating copolymers and block ionomers
- Self-consistent field theory of microphase separating polymers
- Advising undergraduate researchers

Research Scientist Nationwide Children's Hospital 2018–2019

Project:

- Agent-based modeling of bacterial biofilms

Education

Post-Doctoral Researcher The Ohio State University 2012–2015

Ph.D. Materials Engineering *Minor in Physics* New Mexico Tech 2012
“Linear and Nonlinear Dynamic Heat Capacity of a Simple Simulated Polymer”

M.S. Mathematics *Industrial Math Specialization* New Mexico Tech 2009
“Dynamic Heat Capacity of the East Ising Model”

B.S. Mathematics *Minor in Physics* New Mexico Tech 2007
GPA: 3.94 / 4.00 Graduated with Highest Honors

Selected Honors and Awards

Article on classroom use of VR featured on OSU's front webpage August 2018
<https://www.osu.edu/features/2018/the-classes-of-the-future-are-now.html>

Center for Integrated Nanotechnologies (CINT) user project Jan. 2018- June 2019
Grant of time to work with Amalie Frischknecht at Sandia National Laboratory

STEAM Powered Projects funding through the STEAM Factory at OSU

Buckeye Virtual Reality (*as collaborator*), April 2016

Enhanced Interactivity for BuckeyeVR (*as collaborator*), May 2018

Junior Investigator Award 2013 MRS Fall Meeting

From the organizers of Symposium A: Modeling and Theory-Driven Design of Soft Materials

Graduate Research Fellowship through Sandia National Laboratory, 2008-2011
with Douglas Adolf (2008-10) and Amalie Frischknecht (2010-11)

Ashman Award *Materials Engineering Departmental Award*, 2010

Tech Scholar *New Mexico Tech Undergraduate Award*, 2006

Teaching Experience

Asst. Professor of Practice OSU Department of Materials Science and Engineering

Fall 2020–present

- Coordinator and Co-instructor for Introduction to Engineering Materials (Fall 2020, Spring 2021, Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 2023, Spring 2024)
- Instructor for Modeling and Simulation I (Spring 2023 Spring 2024)
- Instructor for Modeling and Simulation II (Spring 2021, Spring 2022, Spring 2023 Spring 2024)
- Instructor for Structure and Properties of Amorphous Materials (Fall 2021, Fall 2022)
- Instructor for Structure-Property Relationships of Polymers (Fall 2023)

Lecturer Ohio State University Department of Materials Science and Engineering

Spring 2020

- Co-instructor for Modeling and Simulation II (Spring 2020)
- Coordinator for Introduction to Engineering Materials (Spring 2020)

Lecturer Ohio State University Department of Engineering Education

Fall 2017–Spring 2020

- Instructor for Fundamentals of Engineering for Transfers - CAD (Fall 2019, Spring 2020)
- Co-instructor for Fundamentals of Engineering for Honors II - Integrated Business & Engineering (Spring 2020)
- Instructor for Fundamentals of Engineering I (Fall 2017, Fall 2018, Fall 2019)
- Instructor for Fundamentals of Engineering II (Spring 2019)

Lecturer Ohio State University Marion Campus

Fall 2014–Spring 2016

- Instructor for Statics (Fall 2014, Fall 2015)
- Instructor for Fundamentals of Engineering I (Spring 2016)

Teaching Assistant New Mexico Tech Chemical Engineering Department

Fall 2011–Spring 2012

- Lab instructor for Computer Programming for Engineers

Teaching Assistant Purdue University Mathematics Department

Fall 2007–Spring 2008

- Recitation instructor for Multivariate Calculus (Spring 2008)
- Recitation instructor for Analytic Geometry and Calculus I (Fall 2007)

Teaching Assistant New Mexico Tech Physics Department

Spring 2007

- Recitation instructor for General Physics I

Grader New Mexico Tech Mathematics Department

2006

- Grader for Vector Analysis and Ordinary Differential Equations (Fall 2006)
- Grader for Basic Concepts of Mathematics (Spring 2006)

Publications

(Undergraduate students co-mentored by me are underlined.)

1. Joseph R. Smith, Bart Snapp, Savva Madar, **Jonathan R. Brown**, Jim Fowler, Maeve Andersen, Christopher D. Porter, and Chris Orban. "A Smartphone-Based Virtual Reality Plotting System for STEM Education." *PRIMUS* (2022). DOI: 10.1080/10511970.2021.2006378
2. Chris D. Porter, Joseph R. H. Smith, Eric M. Stagar, Amber Simmons, Megan Nieberding, Chris M. Orban, **Jonathan R. Brown**, and Abigail Ayers. "Using Virtual Reality in Electrostatics Instruction: The Impact of Training." *Physical Review Physics Education Research*, **16**, 020119 (2020).
3. Youngmi Seo, Kuan-Hsuan Shen, **Jonathan R. Brown**, and Lisa M. Hall. "Role of Solvation on Diffusion of Ions in Diblock Copolymers: Understanding the Molecular Weight Effect through Modeling." *Journal of the American Chemical Society*, **141**, 18455-18466 (2019).
4. **Jonathan R. Brown**, Joseph Jurscisek, Vinal Lakhani, Ali Snedden, William C. Ray, Elaine M. Mokrzan⁴, Lauren O. Bakaletz, and Jayajit Das. "In Silico Modeling of Biofilm Formation by Nontypeable *Haemophilus Influenzae* In Vivo." *mSphere*, **4**, e00254-19 (2019).
5. Kuan-Hsuan Shen, **Jonathan R. Brown**, and Lisa M. Hall. "Diffusion in Lamellae, Cylinders, and Double Gyroid Block Copolymer Nanostructures." *ACS Macro Letters*, **7**, 1092 (2018).
6. **Jonathan R. Brown**, Youngmi Seo, and Lisa M. Hall. "Ion Correlation Effects in Salt-Doped Block Copolymers." *Physical Review Letters*, **120**, 127801 (2018).
7. **Jonathan R. Brown**, Youngmi Seo, and Lisa M. Hall. "Unique Phase Behavior of Inverse Tapered Block Copolymers: Self-Consistent Field Theory and Molecular Dynamics Simulations." *Macromolecules*, **50**, 5619 (2017).
8. Youngmi Seo, **Jonathan R. Brown**, and Lisa M. Hall. "Diffusion of Selective Penetrants in Interfacially Modified Block Copolymers from Molecular Dynamics Simulations." *ACS Macro Letters*, **6**, 375 (2017).
9. William G Levine, Youngmi Seo, **Jonathan R. Brown**, and Lisa M. Hall. "Effect of sequence dispersity on morphology of tapered diblock copolymers from molecular dynamics simulations." *The Journal of Chemical Physics*, **145**, 234907 (2016).
10. Kyaw Hpone Myint, **Jonathan R. Brown**, Anne R. Shim, Barbara E. Wyslouzil, and Lisa M. Hall. "Encapsulation of Nanoparticles During Polymer Micelle Formation: A Dissipative Particle Dynamics Study." *Journal of Physical Chemistry B*, **120**, 11582 (2016).
11. Ming Luo, **Jonathan R. Brown**, Roddel A. Remy, Douglas M. Scott, Michael E. Mackay, Lisa M. Hall, and Thomas H. Epps, III. "Determination of Interfacial Mixing in Tapered Block Polymer Thin Films: Experimental and Theoretical Investigations." *Macromolecules*, **49**, 5213 (2016).
12. **Jonathan R. Brown**, Youngmi Seo, Tiara Ann D. Maula, and Lisa M. Hall. "Fluids Density Functional Theory and Initializing Molecular Dynamics Simulations of Block Copolymers." *The Journal of Chemical Physics*, **144**, 124904 (2016).

13. Prasant Vijayaraghavan, **Jonathan R. Brown**, and Lisa M. Hall. "Modeling the Effect of Polymer Composition on Ionic Aggregation in Poly(Propylene Glycol)-Based Ionenenes." *Macromolecular Chemistry and Physics*, **217**, 930 (2016).
14. Youngmi Seo, **Jonathan R. Brown**, and Lisa M. Hall. "Effect of Tapering on Morphology and Interfacial Behavior of Diblock Copolymers from Molecular Dynamics Simulations." *Macromolecules*, **48**, 4974 (2015).
15. Sara M. Waters, John D. McCoy, Amalie L. Frischknecht, and **Jonathan R. Brown**. "Simulation of a Small Molecule Analogue of a Lithium Ionomer in an External Electric Field." *The Journal of Chemical Physics*, **140**, 014902 (2014).
16. **Jonathan R. Brown**, Scott W. Sides, and Lisa M. Hall. "Phase Behavior of Tapered Diblock Copolymers from Self-Consistent Field Theory." *ACS Macro Letters*, **2**, 1105 (2013).
17. **Jonathan R. Brown** and John D. McCoy. "Nonlinear Dynamic Heat Capacity of a Bead-Spring Polymeric Glass Former." *The Journal of Chemical Physics*, **137**, 244504 (2012).
18. **Jonathan R. Brown** and John D. McCoy. "The Potential Energy Landscape Contribution to the Dynamic Heat Capacity." *The Journal of Chemical Physics*, **134**, 194503 (2011).
19. **Jonathan R. Brown**, John D. McCoy, and Brian Borchers. "Theory and Simulation of the Dynamic Heat Capacity of the East Ising Model." *The Journal of Chemical Physics*, **133**, 064508 (2010).
20. **Jonathan R. Brown**, John D. McCoy, and Douglas B. Adolf. "Driven Simulations of the Dynamic Heat Capacity." *The Journal of Chemical Physics*, **131**, 104507 (2009).

Conference Papers

1. **Jonathan R. Brown**, Janet M Meier, Brandon Free, and Jenifer (Warner) Locke. "Virtual adaptation of introductory materials engineering: a partially asynchronous approach to engage a large class" Paper presented at *ASEE 2022 Annual Conference*, Minneapolis, MN, (2022).
2. Christopher D. Porter, **Jonathan R. Brown**, Joseph R. Smith, Erik M. Stagar, Amber Simmons, Megan Nieberding, Abigail Ayers, and Christopher Orban. "A Controlled Study of Virtual Reality in First-Year Magnetostatics." Paper presented at *Physics Education Research Conference 2019*. Provo, UT (2019).
3. **Jonathan R. Brown**, Irina Kuznetcova, Ethan K. Andersen, Nick H. Abbott, Deborah M. Grzybowski, and Christopher D. Porter. "Implementing Classroom-Scale Virtual Reality into a Freshman Engineering Visuospatial Skills Course." Paper presented at *ASEE First Year Engineering Experience (FYEE) Conference*, Penn State University, PA (2019).

Conference Presentations

Materials Science & Technology (MS&T) technical meeting and exhibition 2021

Contributed Talk: Online Instruction of a Large Introductory Materials Course: A Partially Asynchronous Approach

American Physical Society's March 2020 Meeting (cancelled due to COVID-19)

Contributed Talk: Controlled Studies of Stereoscopic Virtual Reality in Freshman STEM Classes

8th American Society for Microbiology Conference on Biofilms (October 2018)

*Contributed Poster: Modeling the Structure of Biofilms Formed by nontypeable *Haemophilus influenzae* (NTHI) in vivo*

American Physical Society's March 2018 Meeting

Contributed Talk: Correlation and Association Effects of Ions in Block Copolymers from Fluids Density Functional Theory

American Physical Society's March 2017 Meeting

Contributed Talk: Fluids Density Functional Theory of Salt-Doped Block Copolymers

Polymer Physics Gordon Research Conference and Seminar 2016

Contributed Poster: PRISM Informed Fluids Density Functional Theory of Ion-Containing Block Copolymers

2016 Ohio Project Kaleidoscope Annual Conference

Contributed Poster: Improving Introductory STEM courses via Smartphone-based Virtual Reality

American Physical Society's March 2016 Meeting

Contributed Talk: Fluids Density Functional Theory of Diblock Copolymers for Electrolyte Applications

American Physical Society's March 2015 Meeting

Contributed Talk: Morphology of Tapered and Ion-containing Diblock Copolymers from Fluids Density Functional Theory

Polymer Physics Gordon Research Conference and Seminar 2014

Contributed Poster: Structure and Phase Behavior of Model Tapered Block Copolymers

American Physical Society's March 2014 Meeting

Contributed Talk: Structure and Phase Behavior of Tapered Diblock Copolymers from Self-Consistent Field Theory

Materials Research Society's Fall 2013 Meeting

Contributed Talk: Phase Behavior of Model Tapered Block Copolymers

American Physical Society's March 2013 Meeting

Contributed Talk: Self-consistent Field Theory Simulations of the Phase Behavior of Tapered Diblock Copolymers

American Physical Society's March 2012 Meeting

Contributed Poster: Nonlinear Dynamic Heat Capacity of a Simple Chain Polymer

American Physical Society's March 2011 Meeting

Contributed Poster: The Dynamic Heat Capacity of the Potential Energy Landscape of a Simple Chain Model

American Physical Society's March 2010 Meeting

Contributed Poster: Dynamic Heat Capacity of the East Ising Model

American Physical Society's March 2009 Meeting

Contributed Poster: Driven Simulations of the Dynamic Heat Capacity

Service and Outreach

Reviewer

- Macromolecules
- ASEE Computers in Education (CoED) Journal
- ASEE First Year Engineering Experience (FYEE) Conference
- Journal of Chemical Physics
- Journal of Physical Chemistry
- Journal of Polymer Science Part B: Polymer Physics
- Polymer

New Mexico Supercomputing Challenge 2008–present

- Judge
- Mentor
- Provide feedback for student proposals and interim reports
- Kickoff Presenter – co-taught a class on optimization

COSI 2017–2018

- Presented research and outreach demonstrations at COSI's "Interview with an Engineer" program

Outreach at Ohio State University Summer 2013–Spring 2018

- Advised an undergraduate researcher in creating a demonstration using interactive molecular dynamics simulations of simple polymers and presented this demo to the public at multiple outreach events

Project GUTS 2009–2011

- Facilitator – taught basic programming in StarLogo TNG to a class of middle schoolers