

Blair Brettmann
Associate Professor
School of Chemical and Biomolecular Engineering
School of Materials Science and Engineering

I. Earned Degrees

Ph.D., Chemical Engineering, Massachusetts Institute of Technology, Advisor: Bernhardt Trout,
May 2012

M.S., Chemical Engineering Practice, Massachusetts Institute of Technology, May 2009

B.S., Chemical Engineering, University of Texas at Austin, May 2007

II. Employment History

Georgia Institute of Technology, Associate Professor, Chemical and Biomolecular Engineering and
Materials Science and Engineering, Aug 2023-Present

Georgia Institute of Technology, Assistant Professor, Chemical and Biomolecular Engineering,
Jan 2019-Aug 2023

Georgia Institute of Technology, Assistant Professor, Materials Science and Engineering,
Jan 2017-Aug 2023

The University of Chicago, Postdoctoral Researcher, Institute for Molecular Engineering,
Advisor: Matthew Tirrell, July 2014-Dec 2016

Saint-Gobain, Senior Research Engineer, Polymer Competency R&D Labs, July 2012-June 2014

III. Honors and Awards

A. International or National Awards

1. Faculty Honors Junior Faculty Outstanding Undergraduate Research Mentor Award (2023)
2. MRS Communications Lecture at the Spring MRS Meeting (2023)
3. Selected for China-America Frontiers of Engineering Symposium hosted by the National Academy of Engineering (2022)
4. Early Career Materials Researcher for MRS Communications (2022)
5. NSF Faculty Early Career Development Award (CAREER) (2021)
6. ACS Polymers Au Rising Star (2021)
7. AIChE Journal Futures Issue Honoree (2021)
8. American Chemical Society Polymeric Materials Science and Engineering Young Investigator (2020)

9. Air Force Research Lab Summer Faculty Fellow (2019)
10. International Union of Pure and Applied Chemistry Young Observer (2019)
11. Ralph E. Powe Junior Faculty Enhancement Award (2018)
12. Emerging Investigator, Journal of Materials Chemistry B (2018)
13. Poster Presentation Award, Soft Matter Summer School, Seoul, South Korea (2015)
14. NSF Graduate Research Fellowship Honorable Mention (2007, 2008)
15. Member of Tau Beta Pi and Omega Chi Epsilon Engineering Honors Societies
16. National Merit Scholar

IV. Research, Scholarship, and Creative Activities

B. Refereed Publications and Submitted Articles

Bold indicates student co-authors, *indicates work done at Georgia Tech, underline indicates corresponding author/s

B1. Published and Accepted Journal Articles

35. ***Marnot, A., L. Konzelman**, J.M. Jones, C. Hill, B. Brettmann, "*Applicability of UV-Curable Binders in High Solid Suspensions for Direct Ink Write 3D Printing in Extremely Cold Temperatures*", ACS Applied Materials and Interfaces, Accepted Oct 2023.
34. ***Ewaldz, E., J. Reinhart, M. Miller**, B. Brettmann, "*Processability of thermoelectric ultrafine fibers via electrospinning for wearable electronics*," ACS Omega, 2023 DOI: 10.1021/acsomega.3c03019.
33. ***Amrihesari, M., A. Murry**, B. Brettmann, "*Towards standardized polymer solubility measurements using a parallel crystallizer*," Polymer, 2023, DOI: 10.1016/j.polymer.2023.125983.
32. ***Venkatram, S.**, J. McCollum, N. Stingelin, B. Brettmann, "*A close look at polymer degree of crystallinity vs. polymer crystalline quality*," Polymer International, 2023, <https://doi.org/10.1002/pi.6508>.
31. ***Kern, J, S Venkatram, M Banerjee**; B Brettmann, R Ramprasad, "Solvent Selection for Polymers by Generalized Chemical Fingerprinting and Machine Learning", Physical Chemistry Chemical Physics, 2022, DOI: 10.1039/D2CP03735A.
30. ***Khan, N, AR Renfroe, P von Grey, HA Witherow**, B Brettmann, "The influence of electrostatic interactions of polycations in polyelectrolyte complexes on water retention values of cellulose nanofibers," Cellulose, 2022, <https://doi.org/10.1007/s10570-022-04827-9>
29. ***Alexandra Marnot, Alexandra Dobbs**, B Brettmann, "Material extrusion additive manufacturing of dense pastes consisting of macroscopic particles," MRS Communications,

<https://doi.org/10.1557/s43579-022-00209-1>. Early Career Materials Investigators 2022 Invited Prospective

28. ***Ewaldz, E., Randrup, J., Brettmann, B.**, "Solvent effects on the elasticity of electrospinnable polymer solutions," ACS Polymers Au, 2021 DOI: 10.1021/acspolymersau.1c00041. Rising Stars 2021 Invited Issue.

27. ***D Haase, B Brettmann, M Peeters**, "Leveraging Diversity and Inclusion in the Polymer Sciences: The Key to Meeting the Rapidly Changing Needs of our World.", Pure and Applied Chemistry, 2021. DOI: 10.1515/pac-2021-0601

26. ***S Jang, A Boddorff, DJ Jang, J Lloyd, K Wagner, N Thadhani, B Brettmann**, "Effect of Material Extrusion Process Parameters on Filament Geometry and Inter-Filament Voids in As-fabricated High Solids Loaded Polymer Composites." Additive Manufacturing, 2021, 47, 102313 DOI: 10.1016/j.addma.2021.102313.

25. ***I Campbell, A Marnot, M Ketcham, C Travis, B Brettmann**, "Direct Ink Write 3D Printing of High Solids Loading Bimodal Distributions of Particles." AIChE Journal, DOI: 10.1002/aic.17412. AIChE Futures 2021 Invited Issue.

24. ***M Banerjee, B Brettmann**, "Stabilization of metastable indomethacin α in cellulose nanocrystal aerogel scaffolds," Pharmaceutics, 2021, 13, 441, DOI:10.3390/pharmaceutics13040441.

23. ***M Banerjee, B Brettmann**, "Combining surface templating and confinement for controlling pharmaceutical crystallization," Pharmaceutics, 2021, 12 (10), 995. DOI:10.3390/pharmaceutics12100995

22. ***X Wang, J Yaeger, C Stanek, S Pennell, S Steward, JA Munoz, S Gregory, B Brettmann**, "Effects of solvent molecular structure on diffusion through plasticized poly(vinyl chloride) films," ACS Applied Polymer Materials, 2020, 2 (11), 4697-4708. DOI: 10.1021/acsapm.0c00731

21. ***GV Biesold-McGee, S Liang, B Brettmann, N Thadhani, Z Kang, Z Lin**, "Tailoring optical properties of luminescent semiconducting nanocrystals via hydrostatic, anisotropic static and dynamic pressures," Angewante Chemie International Edition, 2021, DOI: 10.1002/anie.202008395.

20. ***N Khan, N Zaragoza, C Travis, M Goswami, B Brettmann**, "Polyelectrolyte coacervate assembly with cellulose nanofibers", ACS Omega, 2020, 5 (28), pp 17129-17140. DOI: 10.1021/acsomega.0c00977.

19. ***M Banerjee, S Saraswatula, A Williams, B Brettmann**, "Effect of purification methods on commercially available cellulose nanocrystal properties and TEMPO Oxidation," Processes, 2020, 8 (6), 698. DOI: 10.3390/pr8060698

18. ***Woods, H., A Boddorff, E Ewaldz, Z Adams, M Ketcham, DJ Jang, E Sinner, N Thadhani, B Brettmann**, *"Rheological considerations for binder development in direct ink writing of energetic materials"*, *Propellants, Explosives, Pyrotechnics*, 2019, 25 (1), pp 26-35. DOI:10.1002/prop.201900159.
17. ***Faubel, J, R Patel, W Wei, J Curtis, B Brettmann**, *"Giant Hyaluronan Brushes Display Polyelectrolyte Brush Polymer Physics Behavior"*, *ACS Macro Letters*, 2019, 8, 1323-1327. DOI:10.1021/acsmacrolett.9b00530.
16. ***Ewaldz, E., B Brettmann**, *"Molecular Interactions in Electrospinning: From Polymer Mixtures to Supramolecular Assemblies"*, *ACS Applied Polymer Materials*, 2019, 1 (3), 298-308. DOI: 10.1021/acsapm.8b00073.
15. ***Khan, N, B Brettmann**, *"Intermolecular Interactions in Polyelectrolyte and Surfactant Complexes in Solution"*, *Polymers*, 2019, 11 (1), 51. DOI: 10.3390/polym11010051.
14. ***Banerjee, M, LG Willows, S Saraswatula, H Woods, B Brettmann**, *"Pharmaceutical Crystallization in Surface-Modified Nanocellulose Organogels"*, *Journal of Materials Chemistry B*, 2018, 6 (44), 7317-7328. DOI: 10.1039/C8TB01554F Emerging Investigator Invited Issue.
13. ***Ewaldz, E, R Patel, M Banerjee, B Brettmann**, *"Material Selection in Electrospinning Microparticles,"* *Polymer*, 2018, 153, pp 529-537. DOI: 10.1016/j.polymer.2018.08.015
12. J Yu, NE Jackson, X Xu, **B Brettmann**, M Ruths, JJ de Pablo, M Tirrell, *"Multivalent Ions Induce Lateral Structural Inhomogeneities in Polyelectrolyte Brushes,"* *Science Advances*, 2017, 3 (12), eaao1497. DOI: 10.1016/j.polymer.2018.08.015.
11. N Jackson, B Brettmann, V Vishwanath, **M Tirrell, JJ de Pablo**, *"Comparing Solvophobic and Multivalent Induced Collapse in Polyelectrolyte Brushes,"* *ACS Macro Letters*, 2017, 6, 155-160. DOI: 10.1021/acsmacrolett.6b00837.
10. Brettmann, B, P Pincus, **M Tirrell**, *"Lateral Structure Formation in Polyelectrolyte Brushes Induced by Multivalent Ions,"* *Macromolecules*, 2017, 50 (3), 1225-1235. DOI:10.1021/acs.macromol.6b02563.
9. Marciel, AB, E J Chung, B Brettmann, **L Leon**, *"Bulk and Nanoscale Polypeptide Based Polyelectrolyte Complexes,"* *Advances in Colloid and Interface Science*, 2016, 239, pp 187-198. DOI: 10.1016/j.cis.2016.06.012.
8. Brettmann, B, N Laugel, N Hoffmann, P Pincus, **M Tirrell**, *"Bridging Contributions to Polyelectrolyte Brush Collapse in Multivalent Salt Solutions,"* *Journal of Polymer Science Part A: Polymer Chemistry*, 2015, 54 (2), 284-291. DOI: 10.1002/pola.27959.

7. Quon, JL, K Chadwick, GPF Wood, I Sheu, B Brettmann, AS Myerson, BL Trout, “*Templated nucleation of acetaminophen on spherical agglomerates*,” *Langmuir*, 2013, 29 (10), pp 3292-3300. DOI: 10.1021/la3041083.
6. Brettmann, B, K Cheng, AS Myerson, BL Trout, “*Electrospun formulations containing crystalline active pharmaceutical ingredients*,” *Pharmaceutical Research*, 2012, pp 1-9. DOI: 10.1007/s11095-012-0868-4.
5. Brettmann, B, S Tsang, KM Forward, GC Rutledge, AS Myerson, BL Trout, “*Free surface electrospinning of fibers containing microparticles*,” *Langmuir*, 2012, 28 (25), pp 9714-9721. DOI:10.1021/la301422x.
4. Brettmann, B, AS Myerson, BL Trout, “*Solid-state nuclear magnetic resonance study of the physical stability of electrospun drug and polymer solid solutions*,” *Journal of Pharmaceutical Sciences*, 2012, 101 (6), pp 2185-2193. DOI: 10.1002/jps.23107.
3. Brettmann, B, E Bell, AS Myerson, BL Trout, “*Design and characterization of high-loading solid solutions of API and excipients formed by electrospinning*,” *Journal of Pharmaceutical Sciences*, 2012, 101 (4), pp 1538-1545. DOI: 10.1002/jps.23032.
2. He, X., B Brettmann, H Jung, “*Effects of Test Methods on Crevice Corrosion Repassivation Potential Measurements of Alloy 22*,” *Corrosion*, 2009, 65 (7), pp 449-460. DOI: 10.5006/1.3319149.
1. Matteucci, M., B Brettmann, T Rogers, E Elder, RO Williams, KP Johnston, “*Design of Potent Amorphous Drug Nanoparticles for Rapid Generation of Highly Supersaturated Media*,” *Molecular Pharmaceutics*, 2007, 4 (5), pp 782-793. DOI: doi.org/10.1021/mp0700211

B2. Conference Presentations with Proceedings (Refereed)

1. **Marnot, A., J. Cho, B. Brettmann**, “*Print speed optimization for UV-assisted 3D printing of lunar regolith simulants composite inks*.” *Proceedings of the ASME-International Manufacturing Science and Engineering*, 2023.

B3. Other Refereed Material

No data

B4. Submitted Journal Articles (with Date of Submission)

1. ***Marnot, A., K. Koube**, S. Jang, N. Thadhani, J. Kacher, B. Brettmann, “*Material Extrusion Additive Manufacturing of High Particle Loaded Suspensions: A Review of Materials, Processes, and Challenges*,” *Virtual and Physical Prototyping*, Submitted June 2023

C. Other Publications and Creative Products

C1. Patents

C1.a. Patents Awarded

3. Composite Bearings having a Polyimide Matrix, US Patent 10,266,722, **2019**
2. Composite Bearings having a Polyimide Matrix, US Patent 9,890,298, **2018**
1. Layer Processing for Pharmaceuticals, US Patent 9,205,089, **2015**

C1.b. Provisional Patents, Applications, and Invention Disclosures

2. Coating Materials and Low Haze Heat Rejection Composites, US App., 14/572,432, **2013**
1. Electroprocessing of Active Pharmaceutical Ingredients, US App., 13/832,812, **2012**

C2. Editorials

1. Brettmann, B., M.A. Fraga, M. Gosecka, N. Stingelin, "Introduction to Polymer Upcycling", Journal of Materials Chemistry A, 2023, DOI: 10.1039/d3ta90040a

C3. Non-peer reviewed technical reports

1. **Marnot, A. J.** McElderry, E. Hayward, T. Schneider, J. Vaughn, J.M. Jones, C. Hill, B. Brettmann, Design optimization of commercially available robocasting 3D printer for operation in a simulated Lunar environment. NASA New Technology Reporting System report. 2023.

D. Presentations

Bold indicates student co-authors, underline indicates presenting author, *indicates work done at Georgia Tech

D1. Invited Conference and Workshop Presentations

30. *B. Brettmann, "Informatics-Driven Design of Solvent Systems and Depolymerizable Polymer Materials for Improved Plastics Recycling," Plastics Recycling and Upcycling Gordon Research Conference, July 2023, Oral Presentation.

29. ***A Marnot, A Dobbs**, B Brettmann, "Rheology and Formulation in Material Extrusion Additive Manufacturing of Dense Pastes", Materials Research Society spring meeting, April 2023. MRS Communications Award Lecture.

28. ***N Khan**, D C Reeves, B Brettmann, "Consumer gatekeeping in sustainable materials streams: An application in cellulose nanomaterials," Visions for Sustainable Polymers, Georgia Tech, April 2023. Invited Oral Presentation.

27. ***E Ewaldz, H Carroll, B Brettmann**, *“Design for manufacturability: Linking formulation to processability in electrospinning,”* AIChE Annual Meeting, Area 08A Polymers, November 2022. Invited Plenary Presentation.
26. ***M Banerjee, B Brettmann**, *“Surface modified cellulose nanocrystal gels for pharmaceutical crystallization”*, Association for Crystallization Technology Larson Workshop, Halifax, Nova Scotia, October 2022. Invited Plenary Presentation.
25. ***A Marnot, I Campbell, B Brettmann**, *“Rheology and formulation in material extrusion additive manufacturing of high solids suspensions”*, American Chemical Society National Meeting, August 2022 Invited Oral Presentation.
24. ***J Faubel, J Curtis, B Brettmann**, *“Stimuli-responsive behavior from giant hyaluronan polyelectrolyte brushes”*, International Materials Research Congress, August 2022. Invited Oral Presentation.
23. ***A Marnot, A Dobbs, I Campbell, B Brettmann**, *“Rheology and formulation in material extrusion additive manufacturing of dense pastes for energetic materials applications”*, International Materials Research Congress, August 2022. Invited Oral Presentation.
22. ***B Brettmann**, *“Quality-by-design for Additive Manufacturing of Energetic Materials.”*, Energetic Materials Gordon Research Conference, July 2022. Invited Oral Presentation.
21. ***B Brettmann**, *“Coupling Formulation and Processability for the Design and Manufacture of Biobased Polymeric Materials”*, ACS Green Chemistry and Engineering Conference, June 2022, Invited Oral Presentation.
20. ***E Ewaldz, B Brettmann**, *“Tying formulation and extensional rheology to processability in the manufacturing of ultrafine fibers,”* Fundamental Polymer Rheology Enabling Next Generation Technologies Workshop, April 2022, Invited Oral Presentation.
19. ***I Campbell, A Marnot, B Brettmann**, *“Interplay of formulation and processing in 3D printing high solids suspensions,”* American Chemical Society Meeting, March 2022, Invited Oral Presentation.
18. ***I Campbell, A Marnot, M Ketcham, C Travis, B Brettmann**, *“Direct Ink Write 3D Printing of High Solids Loading Bimodal Distributions of Particles.”* AIChE Annual Meeting, Nov 2021, Invited Oral Presentation
17. ***E Ewaldz, J Randrup, B Brettmann**, *“Tying formulation and extensional rheology to processability in the manufacturing of ultrafine fibers via electrospinning”*, AIChE Annual Meeting, Nov 2021, Invited Oral Presentation
16. ***I Campbell, A Marnot, B Brettmann**, *“Rheology and formulation in 3D printing high solids suspensions,”* Dense Paste Direct Ink Write Workshop, Aug 2021, Invited Keynote Oral Presentation.

15. ***N Khan, M Banerjee, B Brettmann**, *“Challenges in Formulating and Processing Charged Fiber-Based Materials”*, Bioenvironmental Polymer Society Meeting, June 2021. Invited Oral Presentation.
14. ***A Marnot, I Campbell, H Woods, Z Adams, M Ketcham, K Wagner, B Brettmann**, *“Rheology and Formulation in 3D Printing High Solids Suspensions,”* Interfaces and Effects in Composite Energetic Materials Conference, April 2021. Invited Oral Presentation.
13. ***J Faubel, R Patel, J Curtis, B Brettmann**, *“Stimuli-responsive behavior from giant hyaluronan polyelectrolyte brushes.”*, Institute of Biological Engineering Annual Meeting, Virtual, March 2021. Invited Oral Presentation.
12. ***B Brettmann** *“Direct Ink Write Additive Manufacturing of High Particle Content Suspensions.”* Energetic Materials Gordon Research Conference, June 2020. Invited Oral Presentation. Canceled due to COVID-19
11. ***N Khan, M Banerjee, B Brettmann**, *“Assembly of polymers with nanocellulose: Polyelectrolyte complexes to CNC surface modification.”* American Chemical Society National Meeting, Philadelphia, PA, March 2020. Invited Oral Presentation. Canceled due to COVID-19
10. ***H Woods, I Campbell, Z Adams, M Ketcham, B Brettmann**, *“Direct ink write additive manufacturing of high particle content suspensions.”*, 3D Printing IPRIME Midyear Workshop, Minneapolis, MN, Jan 2020. Invited Oral Presentation.
9. ***B. Brettmann**, *“Surface modified cellulose nanocrystals for drug polymorph screening,”* 13th IEEE International Conference on Nano/Molecular Medicine & Engineering, Gwangju, Korea, November 2019. Invited Oral Presentation.
8. ***E Ewaldz I Campbell, R Patel, J Randrup, B Brettmann**. *“Increasing the functionality of electrospun polymer fibers through large particle inclusion,”* Southeastern Regional Meeting of the American Chemical Society, Savannah, GA, October 2019. Invited Oral Presentation.
7. ***M Banerjee, N Khan, M Goswami, B Brettmann**. *“Molecular Interactions with Cellulose: Polyelectrolyte Complexes to CNC Surface Modification,”* International Symposium on Materials from Renewables, Athens, GA, October 2019. Invited Oral Presentation.
6. ***E Ewaldz, I Campbell, R Patel, J Randrup, B Brettmann**. *“Electrospinning of Hard to Spin Materials,”*, Telluride Science Research Conference on the Role of Assembly in Dictating the Functionality and Applications of Organic Semiconductors, Telluride, CO, July 2019. Invited Oral Presentation.
5. ***B Brettmann**., *“Molecular Interactions with Cellulose: Polyelectrolyte Complexes to CNC Surface Modification,”* Bio-Environmental Polymer Society, Greenville, SC, June 2019. Invited Oral Presentation.
4. ***B Brettmann**., *“Latest Research on Applications of Continuous Processing in Drug Products,”* Commercializing Continuous Processing, Cambridge, MA, Jan 2019. Invited Oral Presentation.

3. ***B Brettmann**, *“Molecular Engineering of Multicomponent Complex Mixtures,”* Kimoto Tech, 2018 Kimoto Technical Conference, Rome, GA, October 2018. Invited Oral Presentation.

2. ***E Ewaldz, R Patel, B Brettmann**, *“Encapsulation of High Loadings of Microparticles During Electrospinning,”* 4th Functional Polymeric Materials Conference, Nassau, Bahamas, June 2018. Invited Oral Presentation.

1. **B Brettmann**, *“Multivalent Ion-driven Structure Formation in Polyelectrolyte Brushes,”* Fyl Fest: New forms of organization in soft matter physics, Les Houches, France, May 2017. Invited Oral Presentation.

D3. Conference and Workshop Presentations

63. **A Dobbs**, B Brettmann, *“Polymer Property Impacts on Processing Propellant Composites,”* American Chemical Society National Meeting, August 2023, Oral presentation.*

62. **M Amrihesari**, B Brettmann, American Chemical Society National Meeting, August 2023, Poster presentation.*

61. **A Marnot, J Cho, B Brettmann**, *“Print speed optimization for UV-Assisted 3D printing of lunar regolith simulants composite inks”* ASME Manufacturing Science and Engineering conference, June 2023, oral presentation.*

60. **L Konzelman, A Marnot** B Brettmann, *“Dual Cure for Highly Loaded Systems Printed via DIW at Low Temperatures.”* ASME Manufacturing Science and Engineering conference, June 2023, poster presentation.*

59. **HK Verma**, J Hester, B Brettmann, N Arora. *“Biodegradable flexible microphone with a sustainability rating,”* 27th Annual Green Chemistry & Engineering Conference. June 2023, poster presentation.

58. **Shiqi Wei, Yvonne Walker**, Blair Brettmann, *“Electrospinning fibers from low molecular weight or low-concentration polymer solutions: Compensating for the loss of entanglement with secondary interaction”*, 97th ACS Colloid and Surface Science Symposium, June 2023, poster presentation.

57. **Haley Carroll**, Blair Brettmann, *“Uncovering the interplay between conductivity and viscosity through electrospinning a bio-based polyelectrolyte”*, 97th ACS Colloid and Surface Science Symposium, June 2023, oral presentation.

56. **A Marnot, L Konzelman**, B Brettmann, *“Additive Manufacturing of Regolith Composites through UV-Assisted Direct-Ink-Write in Simulated Space Environments.”* Materials Research Society spring meeting, April 2023, oral presentation.*

55. **M Amrihesari, J Kern, A Murry**, R Ramprasad, **B Brettmann**, *“Experimental Design for High Fidelity Polymer Solubility Data to Improve Machine Learning Capabilities,”* Materials Research Society spring meeting, April 2023, oral presentation.*

54. **N Khan**, D C Reeves, **B Brettmann**, "*Consumer gatekeeping in sustainable materials streams: An application in cellulose nanomaterials*," Materials Research Society spring meeting, April 2023, oral presentation.*
53. **J Cho**, B Brettmann, "Polymer-particle interfacial effect on bond exchange rate of vitrimers composites," American Physical Society March meeting, March 2023, poster presentation.*
52. **M Amrihesari**, **J Kern**, **A Murry**, R Ramprasad, B Brettmann, "Towards standardized polymer solubility measurements using a parallel crystallizer", Materials Research Society fall meeting 2022, poster presentation.*
51. **A Marnot**, B Brettmann, "Evaluation of UV-Curable Polymeric Binders for Additive Manufacturing Construction in Space Environments," AIChE Annual Meeting, November 2022, oral presentation in Excellence in Graduate Polymer Research Symposium.*
50. **A Marnot**, B Brettmann, "*Enabling Off-Earth Construction and ISRU Through 3D Printing of Dense Regolith Suspensions*," AIChE Annual Meeting, November 2022, oral presentation.*
49. **A. Marnot**, **B Brettmann**, Rheology and Processing of UV-Curable Polymeric Binders for Additive Manufacturing in Space Environments, Society of Rheology, October 2022, oral presentation.*
48. **H. Carroll** B. Brettmann, Understanding surface tension and elasticity effects on spinnability unlocks future technologies for electrospun ultrafine fibers, Carbice "Engineers of the Future - Dare to Achieve More", August 2022, poster presentation.*
47. **J. Cho**, B. Maiti, **D. Collins**, M.G. Finn, B. Brettmann, Thermally reversible thermoset nanocomposite based on dissociative covalent adaptable network, American Chemical Society National Meeting, August 2022, poster presentation.*
46. **A. Marnot**, **L. Konzelman**, B. Brettmann, ISRU 3D Printing of high solid suspensions for off-Earth construction, Gordon Research Conference on Additive Manufacturing of Soft Materials, August 2022, Poster Presentation.*
45. **H. Carroll**, B. Brettmann, Understanding the roles of surface tension and elasticity in electrospinning ultrafine fibers, ACS Colloids and Surface Science Symposium, July 2022, poster presentation.*
44. **A. Dobbs**, **A. Marnot**, B. Brettmann, Thixotropy of High Solids Suspensions with Variable Surface Tension and Viscosity, 96th ACS Colloid and Surface Science Symposium, July 2022, poster presentation. 1st place poster prize*
43. **A. Dobbs**, **A. Marnot**, B. Brettmann, Thixotropy of High Solids Suspensions of Mock Energetic Materials with Variable Surface Tension and Viscosity, Energetic Materials Gordon Research Conference, June 2022, poster presentation.*

42. **N. Khan, A. Renfro, P. Von Grey, H. Witherow, B. Brettmann**, "*The influence of polyelectrolyte complex phase behavior on water retention values of cellulose nanofibers*," TAPPI Nano, Helsinki Finland, June 2022, Poster presentation.*
41. **N. Khan**, B. Brettmann, D.C. Reeves, "*Consumer gatekeeping in sustainable materials streams: an application in cellulose nanomaterials*." TAPPI Nano, Helsinki Finland, June 2022, Oral Presentation.*
40. **A. Marnot**, B. Brettmann, "*ISRU 3D Printing of High Solid Suspensions for Off-Earth Construction*", Lunar Surface Innovation Consortium, May 2022, Poster Presentation and Lightning Talk.*
39. **A. Marnot**, B. Brettmann, "*In-Situ Resource Utilization and 3D Printing of High Solid Suspensions for Construction on Mars*", 1st International Conference on Advanced Manufacturing for Air, Space, and Land Transportation, March 2022, Virtual Oral Presentation.*
38. **E. Ewaldz**, B Brettmann, "*Defining the electrospinning window through solvent effects on extensional rheology*" APS March Meeting, March 2022, Oral Presentation*
37. **E. Ewaldz**, B Brettmann, "*Understanding the mechanical properties of ultrafine fibers with large ceramic particles for informed product design*" AATCC 2021 Textile Discovery Summit, November 2021, Oral Presentation.*
36. **A. Marnot**, B Brettmann., "*Direct ink write of high solids suspensions: Considerations in particle time and binder properties*" AIChE Annual Meeting, November 2021. Oral presentation.*
35. **Marnot, A, B Brettmann**, "*Rheology and formulation in material extrusion additive manufacturing of high solids suspensions*" Society of Rheology Annual Meeting, October 2021. Oral Presentation.*
34. **J. Cho**, B. Maiti, M.G. Finn, B. Brettmann, "*Solid-State Degradation of Simple Polyester Composites*", ACS National Meeting, August, 2021, Virtual Poster Presentation.*
33. **E. Ewaldz, J. Randrup, M. McLeroy**, B Brettmann, "*Thermoelectric ultrafine fibers for temperature regulation and power generation*" MRS Virtual Spring/Fall Meeting, December 2020, Virtual Oral Presentation*
32. **E. Ewaldz, J. Randrup**, B. Brettmann, "*Extensional rheology of particle suspensions in polymer solution*" Southeast Soft Matter Symposium, August 2020, Virtual Poster Presentation.*
31. **A. Marnot**, B. Brettmann, "*Rheological Investigations of Highly Loaded Suspensions for DIW Ink Formulation*", Southeast Soft Matter Symposium, August, 2020, Virtual Poster Presentation.*

30. **E. Ewaldz, J. Randrup, M. McLeroy**, B. Brettmann, *“Expanding the limits of electrospinning through large particles and molecular interactions for functional textiles”* AATCC International Conference 2020, March 2020, Poster Presentation.*
29. **Faubel, J, R Patel**, J Curtis, **B Brettmann**, *“Giant hyaluronan polymer brushes display polyelectrolyte brush polymer physics behavior,”* AIChE Annual Meeting, November 2019. Oral Presentation.*
28. **Ewaldz, E, Woods, H, Campbell, I, Adams, Z, B Brettmann**, *“Drug form considerations in continuous solution processing of oral solid dosage products”*, AIChE Annual Meeting, November 2019. Oral Presentation.*
27. **M Banerjee, B Brettmann**, *“Surface modifications of nanocellulose for assembly of a stable organogel support for drug crystallization”*, International Union of Pure and Applied Chemistry General Assembly, Paris, France, July 2019. Oral Presentation.*
26. **N. Khan, C. Travis, N. Zaragoza**, B. Brettmann, *Association of cellulose nanomaterials with polyelectrolyte complex coacervates*. Forest Products Society Conference, June 2019, Atlanta, GA, Poster Presentation
25. **Faubel, J, R Patel**, J Curtis, **B Brettmann**, *“Giant hyaluronan polymer brushes display polyelectrolyte brush polymer physics behavior,”* ACS Colloids and Surface Science Symposium, June 2019. Oral Presentation.*
24. **B Brettmann**, *“Processing High Solids Suspensions via Additive Manufacturing,”* ACS Colloids and Surface Science Symposium, June 2019. Oral Presentation.*
23. **Khan, N**, B Brettmann, *“Association of nano-cellulosic material with polyelectrolyte complex coacervates,”* ACS Colloids and Surface Science Symposium, June 2019. Oral Presentation.*
22. **Ewaldz, E**, B Brettmann, *“Increased functionality of ultrafine fibers through large particle inclusion,”* ACS Colloids and Surface Science Symposium, June 2019. Oral Presentation.*
21. **Banerjee, M**, B Brettmann, *“Impact of cellulose nanocrystal source, purification, and surface modification on organogel formation and strength”*, ACS Colloids and Surface Science Symposium, June 2019. Oral Presentation.*
20. **Banerjee, M, E Ewaldz, H Woods, B Brettmann**, *“Pharmaceutical oral dosage forms: New approaches for a classic drug delivery method,”* Preclinical Form and Formulation for Drug Discovery Gordon Research Conference, June 2019, Poster Presentation.*
19. **Banerjee, M**, B Brettmann, *“Factors Affecting CNC Organogel Formation and Their Effects on Pharmaceutical Crystallization,”* TAPPI International Conference on Nanotechnology for Renewable Materials, June 2019, Oral Presentation.*
18. **Banerjee, M**, B Brettmann, *“Organogels of surface modified nanocellulose for applications in crystallizing pharmaceuticals,”* ACS Spring National Meeting, April 2019, Oral Presentation.*

17. **Ewaldz, E**, B Brettmann, "*Large particle electrospinning for increased functionality*," ACS Spring National Meeting, April 2019, Oral Presentation.*
16. **B Brettmann**, "*Encapsulation of High Loadings of Microparticles During Electrospinning*," AIChE Annual Meeting, October 2018. Oral Presentation.*
15. **Banerjee, M**, **B Brettmann**, "*Nanocellulose Gels as a Flexible, High Surface Area Material for Crystallizing Pharmaceuticals*," AIChE Annual Meeting, October 2018. Oral Presentation.*
14. **Banerjee, M**, B Brettmann, "*Surface Modifications of Nanocellulose for Assembly of a Stable Organogel Support for Drug Crystallization*," TAPPI International Conference on Nanotechnology for Renewable Materials, June 2018. Oral Presentation*
13. **B Brettmann**, "*Multivalent Ion and Solvophobic Contributions to Polyelectrolyte Collapse*," Materials Research Society Fall Meeting, November 2017. Oral Presentation.
12. **Banerjee, M**, **B Brettmann**, "*Molecular Interactions between Nanocellulose and Crystallizing Pharmaceuticals*," AIChE Annual Meeting, October 2017. Oral Presentation.*
11. **B Brettmann**, "*Nanostructure Formation on Collapse of Polyelectrolyte Brushes*," AIChE Annual Meeting, October 2017. Oral Presentation.
10. **B Brettmann**, "*Solvophobic and Multivalent Ion Induced Collapse in Polyelectrolyte Brushes*," ACS Colloids and Surface Science Symposium, July 2017. Oral Presentation.
9. **B Brettmann**, "*Polyelectrolyte Brush Interactions with Multivalent Ions Lead to a Nanostructured Collapsed State*," Southeast Polymer Forum, June 2017. Oral Presentation.
8. **B Brettmann**, P Pincus, M Tirrell, "*Polyelectrolyte Brush Conformations in Multivalent Ion-driven Brush Collapse*," AIChE Annual Meeting, November 2016. Oral Presentation.
7. **B Brettmann**, P Pincus, M Tirrell, "*Chain Bridging Contributions to Polyelectrolyte Brush Conformations and Interactions in the Presence of Multivalent Ions*," ACS Colloids and Surface Science Symposium, June 2016. Oral Presentation
6. **B Brettmann**, N. Laugel, P. Pincus, M. Tirrell, "*Chain Bridging Contributions to Polyelectrolyte Brush Collapse in the Presence of Multivalent Ions*," AIChE National Meeting, Nov 2015. Oral Presentation.
5. **B Brettmann**, N. Laugel, P. Pincus, M. Tirrell, "*Multivalent counterion-induced bridging of polyelectrolyte chains*," ACS National Meeting, Aug 2015. Oral Presentation.
4. **B Brettmann**, N. Laugel, P. Pincus, M. Tirrell, "*Polyelectrolyte Brushes in Multivalent Salt Solutions: Bridging Effects*," Soft Matter Summer School: Polymers in Biology, Seoul, South Korea, June 2015. Oral and poster presentation.
3. **B Brettmann**, N. Laugel, P. Pincus, M. Tirrell, "*Bridging contributions to polyelectrolyte brush collapse in the presence of multivalent ions*," ACS Colloids and Surface Science Symp., June

2015. Oral Presentation.

2. B Brettmann, *"Heat Rejection Coating Formulations,"* Saint-Gobain Wet Coatings Symposium, Paris, France, March 2014. Oral Presentation.

1. B Brettmann, E Bell, AS Myerson, BL Trout, *"Solid State NMR Relaxation Measurements to Evaluate Methods of Forming Amorphous Solid Solutions,"* AAPS Annual Meeting, Oct. 2011. Poster.

D4. Invited Seminar Presentations

41. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* Lawrence Livermore National Lab July 2023, Invited Seminar.*

40. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Electrospun Ultrafine Fibers"* Stanford University, June 2023, Invited Seminar.*

39. B Brettmann, *"Balancing rheology and solidification in 3D printing high solids suspensions,"* Arkema, May 2023, Invited Seminar.*

38. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* The University of Colorado, Colorado Springs, March 2023, Invited Seminar.*

37. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Electrospun Ultrafine Fibers"* The University of Nebraska Lincoln, March 2023, Invited Seminar.*

36. B Brettmann, *"Informatics-driven design of resilient and depolymerizable polymer composites,"* Air Force Research Lab Composites Performance Research Group, October 2022, Invited seminar.*

35. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* Argonne National Lab, August 2022, Invited Seminar.*

34. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* University of Texas at Austin, May 2022, Invited Seminar.*

33. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* Princeton University, April 2022, Invited Seminar.*

32. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* University of California Santa Barbara, April 2022, Invited Seminar.*

31. B Brettmann, *"Rheology and formulation in 3D printing high solids suspensions,"* Texas Tech University, February 2022, Invited Seminar.*

30. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* Case Western Reserve University, December 2021, Invited Seminar.*

29. B Brettmann, *"Coupling Formulation and Processability for the Design and Manufacture of Polymeric Materials,"* University of Illinois Urbana-Champaign, November 2021, Invited Seminar.*
28. B Brettmann, *"Understanding Molecular Interactions and Processability for the Design and Manufacture of Polymeric Materials,"* Army DEVCOM, November 2021, Invited Seminar.*
27. B Brettmann, *"Rheology and formulation in 3D printing high solids suspensions,"* St. Norbert University, September 2021, Invited Seminar.*
26. B Brettmann, *"Solution Processing of High Particle Loading Polymer/Particle Mixtures",* Lehigh University, February 2021, Invited Seminar.*
25. B Brettmann *"Direct ink write additive manufacturing of high particle content suspensions.",* 3M Corporation, Minneapolis, MN, Jan 2020. Invited Seminar.*
24. B Brettmann, *"Expansion of electrospinnable materials beyond high molecular weight polymers,"* Nano@Tech Seminar Series, Sept 2019, Invited Seminar.*
23. B Brettmann, *"Processing of High Particle Loading Polymer/Particle Mixtures,"* AFRL-Munitions, Eglin AFB, June 2019, Invited Seminar.*
22. B Brettmann, *"Solution Processing of High Particle Loading Polymer/Particle Mixtures,"* PPG Industries, May 2019, Invited Seminar.*
21. B Brettmann, *"Pharmaceutical Oral Dosage Forms: New Approaches for a Classic Drug Delivery Method,"* University of Puerto Rico, Molecular Science, March 2019, Invited Seminar.*
20. B Brettmann, *"Processing High Particle Loading Polymer Composites via Additive Manufacturing and Electrospinning,"* University of Tennessee Knoxville, March 2019, Invited Seminar.*
19. B Brettmann, *"Pharmaceutical Oral Dosage Forms: New Approaches for a Classic Drug Delivery Method,"* University of Georgia, February 2019, Invited Seminar.*
18. B Brettmann, *"Processing High Particle Loading Polymer Composites via Additive Manufacturing,"* Saint-Gobain Research North America, Northboro, MA, February 2019, Invited Seminar.*
17. B Brettmann, *"Processing High Particle Loading Polymer Composites via Additive Manufacturing and Electrospinning,"* University of Alabama, November 2018, Invited Seminar.*
16. B Brettmann, *"Rheology and Formulation Considerations for Direct Ink Writing of High Solids Slurries for Energetic Materials,"* Naval Surface Warfare Center, Indian Head, MD, September 2018. Invited Seminar.*

15. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Rensselaer Polytechnic Institute, March 2016. Invited Seminar.
14. B Brettmann, "*Molecular Engineering for Integrated Product Development*," University of Rhode Island, March 2016. Invited Seminar.
13. B Brettmann, "*Molecular Engineering for Integrated Product Development*," The University of Massachusetts, Amherst, March 2016. Invited Seminar.
12. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Arizona State University, Polytechnic School, February 2016. Invited Seminar.
11. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Northwestern University, February 2016. Invited Seminar.
10. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Colorado School of Mines, February 2016. Invited Seminar.
9. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Auburn University, February 2016. Invited Seminar.
8. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Georgia Institute of Technology, February 2016. Invited Seminar.
7. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Princeton University, February 2016. Invited Seminar.
6. B Brettmann, "*Molecular Engineering for Integrated Product Development*," North Carolina State University, February 2016. Invited Seminar.
5. B Brettmann, "*Molecular Engineering for Integrated Product Development*," The University of Houston, January 2016. Invited Seminar.
4. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Kansas State University, January 2016. Invited Seminar.
3. B Brettmann, "*Molecular Engineering for Integrated Product Development*," Imperial College, London, January 2016. Invited Seminar.
2. B Brettmann, "*Molecular Engineering for Integrated Product Development*," The University of California, Davis, January 2016. Invited Seminar.
1. B Brettmann, "*Molecular Engineering for Integrated Product Development*," The University of Nebraska, Lincoln, December 2015. Invited Seminar.

E. Grants and Contracts

E1. As Principal Investigator

8. Title of Project: 3D Printing of Dense Regolith Suspensions for Construction and Weatherability at Ultra-low Temperatures
Agency/Company: National Aeronautics and Space Administration Graduate Research Opportunities
Total Dollar Amount: \$80,000
Role: PI
Collaborators: NSTGRO student Alexandra Marnot
Period of Contract: 08/23-07/24, renewable up to 4 years
Candidate's share: 100% (\$80,000)

7. Title of Project: 3D Printing of Dense Regolith Suspensions for Construction and Weatherability at Ultra-low Temperatures
Agency/Company: National Aeronautics and Space Administration Graduate Research Opportunities
Total Dollar Amount: \$80,000
Role: PI
Collaborators: NSTGRO student Alexandra Marnot
Period of Contract: 08/22-07/23, renewable up to 4 years
Candidate's share: 100% (\$80,000)

6. Title of Project: Formulation of highly loaded suspensions for homogeneous particle spatial distributions
Agency/Company: Office of Naval Research, Department of Defense
Total Dollar Amount: \$419,695
Role: PI
Collaborators: N/A
Period of Contract: 01/2022-12/2024
Candidate's Share: 100% (\$419,695)

5. Title of Project: 3D Printing of Dense Regolith Suspensions for Construction and Weatherability at Ultra-low Temperatures
Agency/Company: National Aeronautics and Space Administration Graduate Research Opportunities
Total Dollar Amount: \$80,000
Role: PI
Collaborators: NSTGRO student Alexandra Marnot
Period of Contract: 08/21-07/22, renewable up to 4 years
Candidate's share: 100% (\$80,000)

4. Title of Project: CAREER: Understanding Molecular Interactions and Processability for the Design and Manufacture of Ultrafine Electrospun Polymer Fibers
Agency/Company: National Science Foundation
Total Dollar Amount: \$567,705
Role: PI

Collaborators; N/A
Period of Contract: 03/21-02/26
Candidate's share: 100% (\$567,705)

3. Title of Project: Electrospun thermoelectric textiles for body temperature regulation and electricity generation
Agency/Company: Georgia Tech Research Institute
Total Dollar Amount: \$40,000
Role: PI
Collaborators: N/A
Period of Contract: 07/15/20-07/15/21
Candidate's share: 100% (\$40,000)

2. Title of Project: Electrospun thermoelectric textiles for body temperature regulation and electricity generation
Agency/Company: Georgia Tech Research Institute
Total Dollar Amount: \$25,000
Role: PI
Collaborators: N/A
Period of Contract: 07/15/19-07/15/20
Candidate's share: 100% (\$25,000)

1. Title of Project: Polyelectrolyte Complex Coacervate Interactions with Particles
Agency/Company: Oak Ridge Associated Universities, Ralph E. Powe Junior Faculty Enhancement Award
Total Dollar Amount: \$10,000
Role: PI
Collaborators: N/A
Period of Contract: 06/01/18-05/31/19
Candidate's Share: 100% (\$10,000)

E2. As Co-Principal Investigator

5. MAHEM

4. Title of Project: Water Removal Prior to Evaporation in Paper Machines
Agency/Company: Department of Energy
Total Dollar Amount: \$2,957,909
Role: Co-PI
Collaborators: Christopher Leuttgen (PI), Victor Breedveld (Co-PI), Scott Siquefield (Co-PI), Valerie Thomas (Co-PI)
Period of Contract: 7/1/23-6/30/26
Candidate's share: ~18% (\$370,000)

3. Title of Project: Informatics-Driven Design of Resilient and Depolymerizable Polymers
Agency/Company: Office of Naval Research, MURI
Total Dollar Amount: \$7,500,000
Role: co-PI

Collaborators: Rampi Ramprasad (PI), Blair Brettmann (co-PI), M. G. Finn (co-PI), Will Gutekunst (co-PI), Jerry Qi (co-PI), Le Song (co-PI)
Period of Contract: 7/1/2020 – 6/31/2025
Candidate's Share: ~15% (\$1.1M)

2. Title of Project: Implications of Inherent Heterogeneities and Tailored Structural Configurations on High Strain Rate Mechanical Response and Chemical Reactivity of Additively Manufactured Energetic/Reactive Materials
Agency/Company: Defense Threat Reduction Agency
Total Dollar Amount: \$3,000,000
Role: co-PI

Collaborators: Naresh Thadhani (PI), Min Zhou (PI), Blair Brettmann (Co-PI), Zhiquan Lin (Co-PI), Zhitao Kang (Co-PI) (GT); Mike Lindsay (Co-PI) and Didier Moutaigne (Co-PI) (AFRL-RWME); Cole Yarrington (Co-PI) and Ryan Wixom (Co-PI) (Sandia National Labs)
Period of Contract: 01/01/2018-12/05/2021
Candidate's Share: ~10% (\$300,000)

1. Title of Project: Macromolecule Templating for Precision Crystallization
Agency/Company: Georgia Tech Center for Research on Active Surfaces and Interfaces
Total Dollar Amount: \$10,000
Role: co-PI
Collaborators: Rampi Ramprasad (co-PI)
Period of Contract: 11/14/18-6/31/19
Candidate's Share: 100% (\$10,000)

G. Societal and Policy Impacts

5. Electrospinning: A Promising Approach to Continuous Manufacturing for Pharmaceuticals (Aug 2018), https://www.ondrugdelivery.com/publications/89/Georgia_Tech.pdf, *ONdrugDelivery* Early Insight Article.*

4. Researchers Target Rapid Changes to Downstream Continuous Manufacturing (May 29, 2018), <https://www.biopharma-reporter.com/Article/2018/05/29/Researchers-target-rapid-changes-to-downstream-continuous-manufacturing>, *BioPharma-reporter*, William Reed Media Ltd.*

3. Electrospinning and the Future of Continuous Pharmaceutical Manufacturing (March 26, 2018)
<https://www.pharmaceuticalonline.com/doc/electrospinning-the-future-of-continuous-pharmaceutical-manufacturing-0001> Guest Column for *Pharmaceutical Online*, featured in *Biosimilar Development, Outsourced Pharma**

2. The Next Frontier in Molecular Engineering (March 13, 2018)
<https://coe.gatech.edu/news/next-frontier-molecular-engineering>
Featured in *Pharmaceutical Processing**

1. Perking Up and Crimping the ‘Bristles’ of Polyelectrolyte Brushes (December 12, 2017)
<http://www.rh.gatech.edu/news/599811/perking-and-crimping-bristles-polyelectrolyte-brushes>
 Featured in *EurekaAlert! Science News, Phys Org, AZO Materials, Technology Breaking News, Science Daily*

H. Other Professional Activities

H1. Temporary Employment

H1.a. Faculty Fellowships and Sabbaticals

1. Air Force Research Lab Summer Faculty Fellowship, AFRL-Eglin, Valparaiso, FL, May 2019-Aug 2019

2. Lawrence Livermore National Laboratory Faculty Mini-Sabbatical, Livermore, CA, May 2023-Aug 2023.

H1.b. Internships

Mawana Sugar Works, Intern, Mawana, India, Oct 2008-Dec 2008

GlaxoSmithKline, Intern, Upper Merion, PA, Aug 2008-Oct 2008

Southwest Research Institute, Intern, San Antonio, TX, June 2007-Aug 2007

Massachusetts Institute of Technology, Biotechnology Process Engineering Center, Undergraduate Researcher, Cambridge, MA, Advisor: Linda Griffith, June 2006-Aug 2006

Cornell University, Cornell Nanofabrication Facility, Undergraduate Researcher, Ithaca, NY, Advisor: Abraham Stroock, June 2005-Aug 2005

V. Education

A. Courses Taught

Semester, Year	Course Number	Course Title	Number of Students
Spring, 2023	CHBE 2100	Chemical Process Principles	29
Fall, 2022	MSE 6775	Polymer Communications	12
Fall, 2022	MSE4775/CHBE4775/ ME4775/CHEM4775	Polymer Science and Engineering I	36
Fall, 2022	CHBE 3225	Separation Processes	51
Spring, 2022	CHBE 3225	Separation Processes	86
Spring, 2022	CHBE4765/BMED4765/ CHEM4765/CHBE6765	Drug Design, Development and Delivery	61
Fall, 2021	MSE4775/CHBE4775/ ME4775/CHEM4775	Polymer Science and Engineering I	42

Spring, 2021	CHBE4765/BMED4765/ CHEM4765/CHBE6765	Drug Design, Development and Delivery	72
Fall, 2020	CHBE 2100	Chemical Process Principles	25
Fall, 2020	MSE 6775	Polymer Communications	16
Spring, 2020	CHBE 2100	Chemical Process Principles	20
Fall, 2019	MSE4775/CHBE4775/ ME4775/CHEM4775	Polymer Science and Engineering I	61
Spring, 2019	MSE 4420	Capstone Engineering Design II	34
Fall, 2018	MSE4775/CHBE4775/ ME4775/CHEM4775	Polymer Science and Engineering I	65
Spring, 2018	MSE 4420	Capstone Engineering Design II	30
Spring, 2017	MSE 4420	Capstone Engineering Design II	33

B. Individual Student Guidance

B1. Ph.D. Students

B1.a. Graduated Ph.D. Students

1. Manali Banerjee (MSE PhD 2021) Internship at Tesla Motors (Fall 2019), Thesis title: "Surface-modified cellulose nanocrystal gels for applications in pharmaceutical crystallization." Passed PhD thesis defense in May 2021 and joined Sealed Air as a Product Development Engineer
2. Nasreen Khan (MSE PhD 2022) Internship at SAPPI (Summer 2020), Thesis title, "Increasing sustainability of the papermaking process via formulation of cellulose nanofibers and polyelectrolyte complexes" and joined the Robert C. Williams Museum of Papermaking
3. Elena Ewaldz (MSE PhD 2022) Internship at AbbVie (Summer 2018), Best poster awards at 2020 Southeast Soft Matter Symposium and 2021 Georgia Tech MRS Poster Session, Thesis title: "Advancing product development of ultrafine fibers: From formulation considerations to thermoelectric textiles." Joined Donaldson Corporation as a Senior Scientist.

B1.b. In Process Ph.D. Students

8. Preksha Vichare (MSE), Advisement began Summer 2023, co-advised with Victor Breedveld
7. Matteo Palesati (MSE), Advisement began Spring 2023, co-advised with Natalie Stingelin
6. Shiqi Wei (MSE), Advisement began Summer 2022, passed qualifying exams (June 2022)
5. Alexandra Dobbs (CHBE), Advisement began Fall 2021, passed qualifying exams (Jan 2022) and thesis proposal (May 2023), Internship at Lawrence Livermore National Lab (May 2023), 1st place ACS Colloids and Surface Science Symposium Poster Session 2022
4. Haley Carroll-Bassham (MSE), Advisement began Fall 2021, passed qualifying exams (June 2022), awarded AATCC Foundation Student Research Support Grant
3. Mona Amrihesari (ChBE), Advisement began Spring 2021, passed qualifying exams (May 2021) and thesis proposal (May 2023)
2. Jaehyun Cho (ChBE), Advisement began Spring 2021, passed qualifying exams (May 2021) and thesis proposal (Aug 2022)
1. Alexandra Marnot (ChBE), Advisement began Fall 2019, passed qualifying exams (Aug 2020) and thesis proposal (June 2021), Awarded NASA Graduate Research Opportunities fellowship

B2. M.S. Students (Indicate Thesis Option for Each Student)

B2.a. Graduated M.S. Students

1. Hannah Woods (MSE MS 2019) Thesis title: "Rheology and characterization of high-solids suspensions for direct ink writing of energetic materials." Joined NexTex Innovations.

B2.b. In Process M.S. Students

1. Harsh Kumar Verma (MSE), Advisement began Spring 2023, co-advised by Josiah Hester.

B3. Undergraduate Students

B3.a. Undergraduate Research Thesis Students

1. Zachary Adams (MSE), Jan 2018-May 2021, Undergrad Research Thesis title "Extent of UV Curing in Highly Loaded Systems for Direct Ink Writing," Joined MIT MSE PhD program

B3.b. Undergraduate researchers supervised

46 total undergraduate researchers supervised since Jan 2017, 2 NSF GRFP awardees, 13 research articles with undergraduate co-authors, 6 PURA awards, 3 Georgia Tech undergraduate poster session winners.

B4. Service on Thesis or Dissertation Committees

B4.a. Internal

44 total thesis committees across MSE, CHBE, CHEM, Physics, BME, ME and Bio-E.

B5. Mentorship of Postdoctoral Fellows or Visiting Scholars

1. Naomi Deneke, Postdoctoral Scholar, Presidential Postdoctoral Fellowship Awardee, Sept 2022-Present
Co-mentored with Natalie Stingelin

C. Educational Innovations and Other Contributions

Project Management Training for Students

Graduate students

- 3 hr professional development workshop in project management for PhD research including defining a project, creating a project charter, Gantt charts and critical path analysis that enable them to use planning tools to bring different parties and stakeholders onto the same page and efficiently work in concert towards the common research goal.
 - CHBE students July 2020, Aug 2020, July 2021, Aug 2022 approximately 20 students each

Undergraduate students

- 6 x 1 hr sessions on project management for undergraduate researchers covering defining a project/project charter, stakeholder analysis, managing resources, Gantt charts, critical path analysis and risk and mitigation strategies with application to a virtual research project
 - Fall 2020, 10 student participants
- 2 x 1 hr sessions on project management for the MSE Research Scholars program enabling them to define their project, make a project charter and use Gantt charts to manage their full time summer research projects
 - 2021, 2022, approximately 10 student participants each year

VI. Service

A. Professional Contributions

A1. Society Offices, Activities, and Membership

Leadership and service roles

- International Union of Pure and Applied Chemistry – Member of Subcommittee on Polymer Terminology 2020-present
- American Institute of Chemical Engineers, Area Chair 3D Printing Next Gen Manufacturing 2022

Membership

- Materials Research Society
- Royal Society of Chemistry
- American Chemical Society
- American Institute of Chemical Engineers
- American Physical Society
- American Association for the Advancement of Science
- Bioenvironmental Polymer Society

A2. Organization and Chairmanship of Technical Sessions, Workshops, and Conferences

American Institute of Chemical Engineers

- *2022 Annual Meeting*: Chair of “3D Printing Novel Methods and Applications” in Next-Gen Manufacturing Forum
- *2021 Annual Meeting*: Track chair for “Applied Formulations Design” track in Pharmaceutical Discovery, Development and Manufacturing Forum, Chair of “Polymers in Additive Manufacturing” in the Next-Gen Manufacturing Forum
- *2020 Annual Meeting*: Track Chair for “Advancements in Particle Engineering and Material Sciences in Pharmaceutical Process Development” track in Pharmaceutical Discovery, Development and Manufacturing Forum, Chair of “Polymer Viscoelasticity: Mechanics, Processing and Rheology II” in Area 08A, Chair of “3D Printing Fundamentals” in the Next-Gen Manufacturing Forum

- *2019 Annual Meeting*: Track Chair for “Advancements in Particle Engineering and Material Sciences in Pharmaceutical Process Development” track in Pharmaceutical Discovery, Development and Manufacturing Forum, Chair of award session, “Rising Stars in the Polymer Industry” in Area 08A, Chair of “Polymer Processing and Rheology” in Area 08A
- *2018 Annual Meeting*: Track Chair for “Advancements in Particle Engineering and Material Sciences in Pharmaceutical Process Development” track in Pharmaceutical Discovery, Development and Manufacturing Forum, Initiator and Chair of new award session, “Rising Stars in the Polymer Industry” in Area 08A, Chair of “Polymer Processing and Rheology” and “Polymer Characterization” in Area 08A
- *2017 Annual Meeting*: Co-chair of “Nanoscale Phenomena in Macromolecular Systems” in Area 08A

American Chemical Society

- *2024 Spring ACS National Meeting*, Symposium Organizer: “Polymer Binders in Highly Filled Systems.”
- *2022 Fall ACS National Meeting*, Symposium Organizer: “ACS Award in Colloid Chemistry: Symposium in Honor of Matthew Tirrell”
- *2020 Spring ACS National Meeting*, Symposium Organizer: “Polymer Processing: Additive Manufacturing of Functional Materials”. Canceled due to COVID-19
- *2019 Southeast Regional Meeting*, Symposium Organizer: “Polymers at Interfaces”
- *2019 Colloids and Surface Science Symposium*: Track Chair for “Formulation, Processing and Manufacturing on the Colloidal Length Scale and Beyond”

Other

- 2023 Visions for Sustainable Polymers Symposium at Georgia Tech, lead organizer
- 2019 Workshop on Macromolecule-Mediated Crystallization at Georgia Tech, Co-Organizer
- 2018 Soft Matter Frontiers Symposium at Georgia Tech, Co-Organizer

A3. Technical Journal or Conference Referee Activities

Guest editor: Themed Collection on Polymer Upcycling across *Materials Horizons*, *Journal of Materials Chemistry A*, *Journal of Materials Chemistry B* and *Journal of Materials Chemistry C*.

Reviewer: ACS Applied Bio Materials, ACS Applied Materials and Interfaces, ACS Applied Nanomaterials, ACS Applied Polymer Materials, ACS Catalysis, ACS Engineering Au, ACS Macro Letters, ACS Nano, ACS Omega, Additive Manufacturing, Biomacromolecules, Carbohydrate Polymers, Cellulose, Crystal Growth and Design, Energy and Fuels, Food Hydrocolloids, Frontiers of Chemical Science and Engineering, Journal of the American Chemical Society, Journal of Chemical Physics, Journal of Colloid and Interfacial Science, Journal of Materials Chemistry A, Journal of Manufacturing Processes, Journal of Molecular Liquids, Langmuir, Macromolecular Research, Macromolecules, Materials Advances, Molecular Pharmaceutics, Nature Synthesis, Polymers, Progress in Polymer Science, Propellants, Explosives and Pyrotechnics, Science Advances, Scientific Reports, Soft Matter

A4. Proposal Panels and Reviews

Panels

NSF Advanced Manufacturing, NSF Interfacial Engineering, NSF SBIR, NSF IUCRC

Ad hoc reviews

Grant reviewer for the NSF, the US Defense Threat Reduction Agency, the American Association for the Advancement of Science Research Competitiveness Program, the Irish Research Council, the Petroleum Research Fund, Oak Ridge Associated Universities, CASIS (ISS National Lab)

B. Public and Community Service

B1. Career Panels and Presentations

Professional development presentation “Project Management Skills in Academia”

One hour introduction to fundamental concepts in project management including defining a project, project charters, project initiation and planning tools and resource management.

- MSE Teaching Practicum, Georgia Tech, November 2018
- University of Illinois at Chicago Mentored Professional Development Seminar Series, July 2018
- ASEE Inspire² Workshop at Georgia Tech, April 2018

Career Panels

Discuss career in industry and academia and answer questions from student participants

- Gordon Research Conference Connects Preclinical Form & Formulation for Drug Discovery, Virtual, June 2021
- NextProf NEXUS, Virtual, Sept 2020
- CRIDC Panel on Academic Career Paths, Georgia Tech, Feb 2018, Feb 2019
- STEM panel at GirlFest at Atlanta Girls School, May 2018

B2: Science Communications

- Speaker for Georgia Tech Alumni Association of Cincinnati, April 2019.
- Contributor to FunSize Physics, an NSF-DMR sponsored outreach website (blog post “Creating Nanoscale Octopus Structures from Polymer Brushes” and classroom activity “Using a Laser Pointer to Measure the Thickness of your Hair”).
- Guest on “Inside the Black Box” radio show, Georgia Tech, January 2017

B3: Other Public and Community Service

- Member of Floor360 and Association for Innovation in Sustainability, Industry-Academia-Government consortiums in Northwest Georgia, Summer 2017-August 2018.
- Developed and ran 10 hour course for Francis W. Parker high school students on Polymer Theory, The University of Chicago, Spring 2016

C. Institute Contributions

C1. School Committee Service

Chemical and Biomolecular Engineering

CHBE Faculty Search Committee, 2020-present

CHBE Staff Awards Committee 2023-present

CHBE Safety Committee, Aug 2019-2022

CHBE Chair Search Committee, 2021

CHBE Seminar Organizer, 2020-2021

CHBE Graduate Admissions Committee, 2019-2020

Materials Science and Engineering

MSE Seminars and Pritchett Lecture Committee, Jan 2017-Present

MSE Undergraduate Program Administration Committee, Jan 2017-Aug 2021

MSE Entrepreneurship and Industry Relations Committee, Jan 2017-Aug 2019

MSE Instructional and Invention Labs and Equipment Committee, Jan 2017-Aug 2019

MSE Faculty Search Committee, Oct 2018-May 2019

C2. Program Development: Research

Georgia Tech Polymer Network, Co-Director, 2020-Present

- Connect faculty and students working in polymers across Georgia Tech departments through workshops and networking activities
- Raise visibility of Georgia Tech polymer research through supporting faculty and students in seminars and conference attendance and hosting key external faculty for seminars

Renewable Bioproducts Institute, Strategic Initiative lead, 2023-Present

- Build teams across departments at the interface of biomass and polymers
- Advocate for and advise on polymers research in RBI activities

Georgia Tech National Lab Strategic Engagement Committee, 2023-Present

- Build connections and administrative infrastructure for GT-national lab connections
- Serve as point of contact for Lawrence Livermore National Lab

Institute for Materials, Initiative Lead, 2021- 2022

- Build teams across departments in the area of polymers
- Advocate for and advise on polymers research in IMAT activities

Institute for Materials, Blue Ribbon Panel, 2018-2019

- Identify research equipment that would strategically expand Georgia Tech's capabilities

Institute for Bioengineering and Biosciences Director Search Committee, Jan-May 2018

- Identify and interview candidates for the director of the IBB

C3. Program Development: Academic

Institute Graduate Curriculum Committee, Sept 2022-Present

Institute Study Abroad Committee, Sept 2022-Present

Professional Development Working Group, Nov 2017-June 2018

- Identify existing professional development opportunities for graduate students across Georgia Tech
- Identify gaps in training opportunities and potential avenues to close those gaps

C4. Other Institute Service Contributions

Faculty advisor for student organizations/groups

Student Polymer Network, Aug 2017-Present

Polymers Undergraduate Network of Students, Jan 2020-Present

MSE Georgia High School Outreach for Science and Technology, May 2018-Present

Advisor for CREATE-X Entrepreneurial Teams, Hera Health (now an independent start up) April 2017-Aug 2018, Totem ID Jan 2020-Dec 2020.