

Daniel J. Preston

Assistant Professor
Rice University

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EDUCATION

- Massachusetts Institute of Technology, PhD in Mechanical Engineering, GPA 5.00/5.00** 6/2017
Thesis: Enhanced Condensation Heat Transfer for Water and Low Surface Tension Fluids, advised by Prof. Evelyn N. Wang; committee: Prof. Bora Mikic, Prof. Gareth McKinley
- Massachusetts Institute of Technology, SM in Mechanical Engineering, GPA 5.00/5.00** 6/2014
Thesis: Electrostatic Charging of Jumping Droplets on Superhydrophobic Nanostructured Surfaces: Fundamental Study and Applications, advised by Prof. Evelyn N. Wang
- University of Alabama, BS in Mechanical Engineering, GPA 4.00/4.00, summa cum laude** 5/2012
Minor in Computer-Based Honors Program, six semesters of undergraduate research

PROFESSIONAL EXPERIENCE

- Assistant Professor, Rice University Department of Mechanical Engineering** 7/2019–present
Interdisciplinary research at the intersection of energy, materials, and fluids.
- Postdoctoral Fellow, Whitesides Group, Harvard University Dept. of Chemistry** 9/2017–6/2019
Surface engineering and coatings, fluid-surface interactions, soft robotics.
- Founder and Director, Lab Energy Assessment Center (LEAC) at MIT** 1/2017–6/2019
Energy audited labs using wireless network, raised over \$365,000 in funding.
- Research Assistant, Device Research Laboratory, MIT Mechanical Engineering** 6/2012–9/2017
Heat transfer, fluid mechanics, energy efficiency, and sustainability.
- Energy Consultant and Team Lead, Alabama Industrial Assessment Center** 12/2010–5/2012
Authored paper on lighting retrofit, led 3-member assessment teams.
- Research Assistant, University of Pennsylvania SUNFEST REU** 5/2011–8/2011
Developed self-contained in-shoe sensor with CHoP, won “Best in SUNFEST.”

AWARDS AND HONORS

- National Science Foundation CAREER Award (CMMI-2144809) 2022
“Textile-Based Wearable Robots with Integrated Fluidic Logic”
- Energy Polymer Group Certificate of Excellence 2022
- ASME Old Guard Early Career Award 2018
- National Science Foundation Graduate Research Fellowship 2012–2017
- MIT Wunsch Foundation Silent Hoist and Crane Award - Outstanding Research 2017
- Best Poster at International Conference on Nanochannels, Microchannels, and Minichannels 2017
- MIT Keck Travel Award in Thermal Sciences 2016
- MIT Green Labs Seed Funding and Innovation Award 2016
- Tau Beta Pi Engineering Honor Society Fellowship (of 40 awarded nationally) 2012
- Catherine J. Randall Premier Award, most outstanding student scholar (across all majors) 2012

PUBLICATIONS IN PEER-REVIEWED JOURNALS (PI's trainees underlined)

63. M.D. Bell, K. Ye, T.F. Yap, A. Rajappan, Z. Liu, Y.J. Tao, **D.J. Preston**, "Rapid In Situ Thermal Decontamination of Wearable Composite Textile Materials," *ACS Applied Materials and Interfaces*, accepted and in press, 2023.
62. B. Jumet, Z.A. Zook, A. Yousaf, A. Rajappan, D. Xu, T.F. Yap, N. Fino, Z. Liu, M.K. O'Malley, **D.J. Preston**, "Fluidically Programmed Wearable Haptic Textiles," *Device*, 1(3), 2023. Featured on *Front Cover* (forthcoming).
61. Z. Liu, T.F. Yap, A. Rajappan, R.A. Shveda, R.M. Rasheed, **D.J. Preston**, "Mitigating Contamination with Nanostructure-Enabled Ultra-Clean Storage," *Nano Letters*, 23(14), 2023.
60. N. Fino, B. Jumet, Z.A. Zook, **D.J. Preston**, M.K. O'Malley, "Mechanofluidic Instability-Driven Wearable Textile Vibrotactor," *IEEE Transactions on Haptics*, early access online, 2023.
59. M. Schara, M. Zeng, B. Jumet, **D.J. Preston**, "A Low-Cost Wearable Device for Portable Sequential Compression Therapy," *Frontiers in Robotics and AI*, 9, 1012862, 2022.
58. J. Zhang, Q. Li, C. Dai, M. Cheng, X. Hu, H.S. Kim, H. Yang, **D.J. Preston**, Z. Li, X. Zhang, W.K. Lee, "Hydrogel-Based, Dynamically Tunable Plasmonic Metasurfaces with Nanoscale Resolution," *Small*, 2205057, 2022.
57. C.J. Decker, H.J. Jiang, M.P. Nemitz, S.E. Root, A. Rajappan, J.T. Alvarez, J.A. Tracz, L. Wille, **D.J. Preston***, G.M. Whitesides*, "Programmable Soft Valves for Digital and Analog Control," *Proceedings of the National Academy of Sciences (PNAS)*, 119(40), 2022. *co-corresponding authors
56. A. Rajappan, B. Jumet, R.A. Shveda, C.J. Decker, Z. Liu, T.F. Yap, V. Sanchez, **D.J. Preston**, "Logic-Enabled Textiles," *Proceedings of the National Academy of Sciences (PNAS)*, 119(35), 2022. Featured in *PNAS "In This Issue,"* 119(35), 2022.
55. R.A. Shveda, A. Rajappan, T.F. Yap, Z. Liu, M.D. Bell, B. Jumet, V. Sanchez, **D.J. Preston**, "A Wearable Textile-Based Pneumatic Energy Harvesting System for Assistive Robotics," *Science Advances*, 8(34), 2022.
54. T.F. Yap, Z. Liu, A. Rajappan, T.J. Shimokusu, **D.J. Preston**, "Necrobotics: Biotic Materials as Ready-to-Use Actuators," *Advanced Science*, 9(29), 2201174, 2022. Featured on *Back Cover*.
53. D. Rhuy, Y. Lee, J.Y. Kim, C. Kim, Y. Kwon, **D.J. Preston**, I.S. Kim, T.W. Odom, K. Kang, D. Lee, W.K. Lee, "Ultraefficient Electrocatalytic Hydrogen Evolution from Strain Engineered, Multilayer MoS₂," *Nano Letters*, 22(14), 5742–5750, 2022.
52. B. Jumet, M.D. Bell, V. Sanchez, **D.J. Preston**, "A Data-Driven Review of Soft Robotics," *Advanced Intelligent Systems*, 4(4), 2100163, 2022.
51. W.K. Lee,* **D.J. Preston,*** M.P. Nemitz, A. Nagarkar, A.K. MacKeith, B. Gorissen, N. Vasios, V. Sanchez, K. Bertoldi, L. Mahadevan, G.M. Whitesides, "A Buckling-Sheet Ring Oscillator for Electronics-Free, Multimodal Locomotion," *Science Robotics*, 7(63), 2022. *equal contribution
50. R.M. Rasheed, L.J. Torres, A. Rajappan, M.M. Weislogel, **D.J. Preston**, "Additively Manufactured Multiplexed Inertial Coalescence Filters," *Separation and Purification Technology*, 292, 120966, 2022.
49. S.E. Root, V. Sanchez, J.A. Tracz, **D.J. Preston**, Y.S. Zvi, K. Wang, C.J. Walsh, S. Homer-Vanniasinkam, G.M. Whitesides, "An Expanding Foam-Fabric Orthopedic Cast," *Advanced Materials Technologies*, 2101563, 2022.
48. T.F. Yap, J.C. Hsu, Z. Liu, K. Rayavara, V. Tat, C.T.K. Tseng, **D.J. Preston**, "Efficacy and Self-Similarity of SARS-CoV-2 Thermal Decontamination," *Journal of Hazardous Materials*, 127709, 2022.
47. Z. Liu, Y. Song, A. Rajappan, E.N. Wang, **D.J. Preston**, "Temporal Evolution of Surface Contamination under Ultra-high Vacuum," *Langmuir*, 32(1258), 2022.

46. S.V. Kendre, L. Whiteside, T. Fan, J.A. Tracz, G. Teran, T. Underwood, M. Sayed, H.J. Jiang, A. Stokes, **D.J. Preston**, G.M. Whitesides, M.P. Nemitz, "The Soft Compiler: A Web-Based Tool for the Design of Modular Pneumatic Circuits for Soft Robots," *IEEE Robotics and Automation Letters*, 7(3), 2022.
45. J.A. Tracz, L. Wille, D. Pathiraja, S.V. Kendre, R. Pfisterer, E. Turett, G. Teran, C.K. Abrahamsson, S.E. Root, W.K. Lee, **D.J. Preston**, H.J. Jiang, G.M. Whitesides, M.P. Nemitz, "Tube-Balloon Logic for the Exploration of Fluidic Control Elements," *IEEE Robotics and Automation Letters*, 7(2), 2022.
44. Y. Song, C. Wang, **D.J. Preston**, G. Su, M.M. Rahman, H. Cha, J.H. Seong, B. Philips, M. Bucci, E.N. Wang, "Enhancement of Boiling with Scalable Sandblasted Surfaces," *ACS Applied Materials and Interfaces*, 14(7), 2022.
43. Y. Song, H. Cha, Z. Liu, J.H. Seong, L. Zhang, **D.J. Preston**, E.N. Wang, "Alteration of Pool Boiling Heat Transfer on Metallic Surfaces by In Situ Oxidation," *International Journal of Heat and Mass Transfer*, 185(122320), 2022.
42. J. Kongoletos, E. Munden, J. Ballew, **D.J. Preston**, "Motion and Sash Height (MASH) Alarms for Efficient Fume Hood Use," *Scientific Reports*, 11(21412), 2021.
41. T.F. Yap, C.J. Decker, **D.J. Preston**, "Effect of Daily Temperature Fluctuations on Virus Lifetime," *Science of the Total Environment*, 148004, 2021.
40. A. Rajappan, B. Jumet, **D.J. Preston**, "Pneumatic Soft Robots Take a Step Toward Autonomy," *Science Robotics*, 6(51), 2021.
39. A. Nagarkar, W.K. Lee, **D.J. Preston**, M.P. Nemitz, N.N. Deng, G.M. Whitesides, L. Mahadevan, "Elastic-Instability-Enabled Locomotion," *Proceedings of the National Academy of Sciences (PNAS)*, 118(8), 2021.
38. S.E. Root, **D.J. Preston**, G.O. Feifke, H. Wallace, R.M. Alcoran, M.P. Nemitz, J.A. Tracz, G.M. Whitesides, "Bio-inspired Design of Soft Mechanisms Using a Toroidal Hydrostat," *Cell Reports Physical Science* 2(9), 2021.
37. K.L. Wilke, D.S. Antao, S. Cruz, R. Iwata, Y. Zhao, A. Leroy, **D.J. Preston**, E.N. Wang, "Polymer Infused Porous Surfaces for Robust, Thermally Conductive, Self-Healing Coatings for Dropwise Condensation," *ACS Nano*, 14(11), 2020.
36. T.F. Yap, Z. Liu, R. Shveda, **D.J. Preston**, "A Predictive Model of the Temperature-Dependent Inactivation of Coronaviruses," *Applied Physics Letters*, 117(060601), 2020.
35. D.S. Antao, K.L. Wilke, J.H. Sack, Z. Xu, **D.J. Preston**, E.N. Wang, "Jumping Droplet Condensation in Internal Convective Vapor Flow," *International Journal of Heat and Mass Transfer*, 163(120398), 2020.
34. V. Sanchez, C.J. Payne, **D.J. Preston**, J.T. Alvarez, J.C. Weaver, A.T. Atalay, M. Boyvat, D.M. Vogt, R.J. Wood, G.M. Whitesides, C.J. Walsh, "Smart Thermally Actuating Textiles," *Advanced Materials Technologies*, 2000383, 2020. Featured as *Frontispiece*.
33. Y. Song, L. Zhang, Z. Liu, **D.J. Preston**, E.N. Wang, "Effects of Airborne Hydrocarbon Adsorption on Pool Boiling Heat Transfer," *Applied Physics Letters*, 116(253702), 2020.
32. M. Wei, Y. Song, Y. Zhu, **D.J. Preston**, C.S. Tan, E.N. Wang, "Heat Transfer Suppression by Suspended Droplets on Microstructured Surfaces," *Applied Physics Letters*, 116(233703), 2020.
31. C. Abrahamsson, A. Nagarkar, M. Fink, **D.J. Preston**, S. Ge, J. Bozenko, G.M. Whitesides, "Analysis of Powders Containing Illicit Drugs Using Magnetic Levitation," *Angewandte Chemie*, 59(2), 2020. Featured on *Back Cover*.
30. Z. Liu, **D.J. Preston**, "Enhanced Condensation for Improved Energy Efficiency," *Joule*, 3(5), 2019.
29. **D.J. Preston**, H.J. Jiang, V. Sanchez, P. Rothmund, J. Rawson, M.P. Nemitz, W.-K. Lee, Z. Suo, C.J. Walsh, G.M. Whitesides, "A Soft Ring Oscillator," *Science Robotics*, 4(31), 2019.
28. **D.J. Preston**, P. Rothmund, H.J. Jiang, M.P. Nemitz, J. Rawson, Z. Suo, G.M. Whitesides, "Digital Logic for Soft Devices," *Proceedings of the National Academy of Sciences (PNAS)*, 116(16), 2019.

27. B.J. Cafferty, A.S. Ten, M.J. Fink, S. Morey, **D.J. Preston**, M. Mrksich, G.M. Whitesides, "Storage of Information Using Small Organic Molecules," *ACS Central Science*, 5(5), 2019.
26. B.J. Cafferty, V.E. Campbell, P. Rothemund, **D.J. Preston**, A. Ainla, N. Fulleringer, A.C. Diaz, A.E. Fuentes, D. Sameoto, J.A. Lewis, G.M. Whitesides, "Fabricating 3D Structures by Combining 2D Printing and Relaxation of Strain," *Advanced Materials Technologies*, 4(1), 2019.
25. K.L. Wilke, **D.J. Preston**, Z. Lu, E.N. Wang, "Toward Condensation-Resistant Omniphobic Surfaces," *ACS Nano*, 12(11), 2018.
24. L. Becerra, J. Ferrua, M. Drake, D. Kumar, A. Anders, E.N. Wang, **D.J. Preston**, "Active Fume Hood Sash Height Monitoring with Audible Feedback," *Energy Reports*, 4, 2018.
23. **D.J. Preston**, K.L. Wilke, Z. Lu, S.S. Cruz, Y. Zhao, L.L. Becerra, E.N. Wang, "Gravitationally Driven Wicking for Enhanced Condensation Heat Transfer," *Langmuir*, 34(15), 2018.
22. S. Ge, Y. Wang, N.J. Deshler, **D.J. Preston**, G.M. Whitesides, "High-Throughput Density Measurement Using Magnetic Levitation," *JACS*, 140(24), 2018.
21. P. Rothemund, A. Ainla, L. Belding, **D.J. Preston**, S. Kurihara, Z. Suo, G.M. Whitesides, "A Soft, Bistable Valve for Autonomous Control of Soft Actuators," *Science Robotics*, 3(16), 2018.
20. **D.J. Preston**, E.N. Wang "Jumping Droplets Push the Boundaries of Condensation Heat Transfer," *Joule*, 2(2), 2018.
19. **D.J. Preston**, Z. Lu, Y. Song, Y. Zhao, K.L. Wilke, D.S. Antao, M. Louis, E.N. Wang "Heat Transfer Enhancement during Water and Hydrocarbon Condensation on Lubricant Infused Surfaces," *Scientific Reports*, 8(540), 2018.
18. Y. Zhao,* **D.J. Preston**,* Z. Lu, L. Zhang, J. Queeney, E.N. Wang, "Effects of Millimetric Geometric Features on Dropwise Condensation under Different Vapor Conditions," *International Journal of Heat and Mass Transfer*, 119, 2018. *equal contribution
17. **D.J. Preston**, Y. Song, Z. Lu, D.S. Antao, E.N. Wang, "Design of Lubricant Infused Surfaces," *ACS Applied Materials and Interfaces*, 9(48), 2017.
16. Z. Lu,* **D.J. Preston**,* D.S. Antao, Y. Zhu, E.N. Wang, "Coexistence of Pinning and Moving on a Contact Line," *Langmuir*, 33(36), 2017. *equal contribution
15. Z. Lu, K.L. Wilke, **D.J. Preston**, I. Kinefuchi, E. Chang-Davidson, E.N. Wang, "An Ultrathin Nanoporous Membrane Evaporator," *Nano Letters*, 17(10), 2017.
14. **D.J. Preston**, A. Anders, B. Barabadi, E. Tio, Y. Zhu, D.A. Dai, E.N. Wang, "Electrowetting-on-Dielectric Actuation of a Vertical Translation and Angular Manipulation Stage," *Applied Physics Letters*, 109(24), 2016.
13. H.J. Cho, **D.J. Preston**, Y. Zhu, E.N. Wang, "Nanoengineered Materials for Liquid-Vapour Phase-Change Heat Transfer," *Nature Reviews Materials*, 2, 2016.
12. A. Cavalli, **D.J. Preston**, E. Tio, D. Martin, N. Miljkovic, E.N. Wang, F. Blanchette, J.W.M. Bush, "Electrically Induced Drop Detachment and Ejection," *Physics of Fluids*, 28(2), 2016.
11. S.M. Jung, **D.J. Preston**, H.Y. Jung, Z. Deng, E.N. Wang, J. Kong, "Porous Cu Nanowire Aerosponges from One-Step Assembly and their Applications in Heat Dissipation," *Advanced Materials*, 28(7), 2015.
10. **D.J. Preston**, D.L. Mafra, N. Miljkovic, J. Kong, E.N. Wang, "Scalable Graphene Coatings for Enhanced Condensation Heat Transfer," *Nano Letters*, 10(1021), 2015.
9. **D.J. Preston**, N. Miljkovic, J. Sack, J. Queeney, E.N. Wang, "Effect of Hydrocarbon Adsorption on the Wettability of Rare Earth Oxide Ceramics," *Applied Physics Letters*, 105(1), 2014.
8. **D.J. Preston**, N. Miljkovic, R. Enright, E.N. Wang, "Jumping Droplet Electrostatic Charging and Effect on Vapor Drag," *Journal of Heat Transfer*, 136(8), 2014.
7. N. Miljkovic, **D.J. Preston**, R. Enright, E.N. Wang, "Jumping-Droplet Electrostatic Energy Harvesting," *Applied Physics Letters*, 105(1), 2014.

6. N. Miljkovic, **D.J. Preston**, R. Enright, E.N. Wang, "Ostwald Ripening During Freezing on Scalable Superhydrophobic Surfaces," *Journal of Heat Transfer*, 136(8), 2014.
5. N. Miljkovic, **D.J. Preston**, R. Enright, E.N. Wang, "Electric-Field-Enhanced Condensation on Superhydrophobic Nanostructured Surfaces," *ACS Nano*, 7(12), 2013.
4. N. Miljkovic, **D.J. Preston**, R. Enright, E.N. Wang, "Electrostatic Charging of Jumping Droplets," *Nature Communications*, 4, 2013.
3. N. Miljkovic, **D.J. Preston**, R. Enright, S. Adera, Y. Nam, E.N. Wang, "Jumping Droplet Dynamics on Scalable Nanostructured Superhydrophobic Surfaces," *Journal of Heat Transfer*, 135(8), 2013.
2. N. Miljkovic, R. Xiao, **D.J. Preston**, R. Enright, I.S. McKay, E.N. Wang, "Condensation on Hydrophilic, Hydrophobic, Nanostructured Superhydrophobic and Oil-Infused Surfaces," *Journal of Heat Transfer*, 135(8), 2013.
1. **D.J. Preston**, K.A. Woodbury, "Cost-Benefit Analysis of Retrofit of HID Factory Lighting with More Energy-Efficient Alternatives," *Energy Efficiency*, 6(2), 2013.

PATENTS

5. J.A. Fazzini, **D.J. Preston**, S.E. Root, V. Sanchez, G.M. Whitesides, "Expanding Foam-Fabric Orthopedic Limb Stabilization Device," International Patent Application PCT/US20/56624, filed Oct. 21, 2020. Patent Pending.
4. C.K. Abrahamsson, M.J. Fink, S. Ge, A.A. Nagarkar, M. Nemitz, **D.J. Preston**, G.M. Whitesides, "Magnetic Levitation System," International Patent Application PCT/US20/22924, filed Mar. 16, 2020. Patent Pending.
3. **D.J. Preston**, E.N. Wang, "Lubricant Infused Surfaces," US Patent Application 62/587,447, filed Nov. 16, 2017. Patent Pending.
2. **D.J. Preston**, A. Anders, E.N. Wang, "Electrowetting-Actuated Spatial and Angular Manipulation Device," US Patent Application 62/403,767, filed Oct. 4, 2016. Patent Pending.
1. N. Miljkovic, **D.J. Preston**, R. Enright, E.N. Wang, "Condensation on Surfaces," US Patent Application 14/220,094, filed Mar. 19, 2014, issued December 25, 2018.

BOOK CHAPTERS

1. N. Miljkovic, **D.J. Preston**, and E.N. Wang, "Recent Developments in Altered Wettability for Enhancing Condensation," *Encyclopedia of Two-Phase Heat Transfer and Flow II*, Volume 3, 2015.

SELECT CONFERENCE PRESENTATIONS (PI's trainees underlined)

37. Z. Liu, T.F. Yap, A. Rajappan, R.A. Shveda, R.M. Rasheed, **D.J. Preston**, "Nanostructure-Enabled Clean Storage for Consistent Phase-Change Heat Transfer Experiments," 11th International Conference on Boiling and Condensation Heat Transfer, Edinburgh, Scotland, UK, May 15-17, 2023.
36. T.J. Shimokusu, A. Nathani, Z. Liu, T.F. Yap, **D.J. Preston**, G. Wehmeyer, "Aluminum Jumping Droplet Thermal Diodes," 11th International Conference on Boiling and Condensation Heat Transfer, Edinburgh, Scotland, UK, May 15-17, 2023. *Awarded Best Poster Presentation.*
35. M.D. Bell, T.F. Yap, K. Ye, A. Rajappan, C.J. Decker, Y.J. Tao, **D.J. Preston**, "A Heat-Based Self-Decontaminating Textile Material for Wearables," MRS Fall Meeting, Boston, MA, Nov. 27-Dec. 2, 2022. *Awarded Best Presentation by Institute of Physics.*
34. T.F. Yap, Z. Liu, A. Rajappan, T.J. Shimokusu, **D.J. Preston**, "Necrobotics: Reimagining Robotic Materials," Third International Workshop on Insect Bio-Inspired Technologies, Edinburgh, Scotland, UK, Nov. 17-18, 2022. *Awarded Best Poster Presentation.*

33. M.D. Bell, T.F. Yap, A. Rajappan, C.J. Decker, **D.J. Preston**, "A Self-Heating Wearable Material for In Situ Thermal Decontamination," Society of Engineering Science Annual Technical Meeting (SES2022), College Station, TX, Oct. 16-19, 2022.
32. **D.J. Preston**, "Wearable Robots with Integrated Fluidic Control and Energy Harvesting," Society of Engineering Science Annual Technical Meeting (SES2022), College Station, TX, Oct. 16-19, 2022.
31. A. Rajappan, **D.J. Preston**, "A Compact Microporous Foam Resistor for Soft Pneumatic Logic Circuits," Micro Flow and Interfacial Phenomena (μ FIP) Conference, Irvine, CA, June 20-23, 2022.
30. T.F. Yap, A. Rajappan, **D.J. Preston**, "Understanding and Leveraging Temperature-Dependent Physical Phenomena," Micro Flow and Interfacial Phenomena (μ FIP) Conference, Irvine, CA, June 20-23, 2022.
29. T.F. Yap, **D.J. Preston**, "Effect of Thermal Mass on Virus Inactivation Timescale," Micro Flow and Interfacial Phenomena (μ FIP) Conference, Irvine, CA, June 20-23, 2022.
28. R.M. Rasheed, L.J. Torres, A. Rajappan, M.M. Weislogel, **D.J. Preston**, "Additively Manufactured Inertial Coalescence Filters," Micro Flow and Interfacial Phenomena (μ FIP) Conference, Irvine, CA, June 20-23, 2022.
27. Z. Liu, Y. Song, A. Rajappan, E.N. Wang, **D.J. Preston**, "Surface Contamination under Ultra-High Vacuum," Micro Flow and Interfacial Phenomena (μ FIP) Conference, Irvine, CA, June 20-23, 2022.
26. B. Jumet, Z.A. Zook, D. Xu, N. Fino, A. Rajappan, M. Schara, J. Berning, N. Escobar, M.K. O'Malley, **D.J. Preston**, "A Textile-Based Approach to Wearable Haptic Devices," 5th IEEE International Conference on Soft Robotics (RoboSoft), Edinburgh, Scotland, UK, Apr. 4-8, 2022.
25. T.F. Yap, C.J. Decker, **D.J. Preston**, "Effects of Diurnal Temperature Range on the Inactivation Rate of SARS-CoV-2," APS March Meeting, Chicago, IL, Mar. 14-28, 2022.
24. R.M. Rasheed, L.J. Torres, A. Rajappan, M.M. Weislogel, **D.J. Preston**, "Ultralow-Pressure-Drop Multiplexed Coalescence Inertial Filters," APS March Meeting, Chicago, IL, Mar. 14-28, 2022.
23. Z. Liu, Y. Song, A. Rajappan, E.N. Wang, **D.J. Preston**, "The Effects of Ultra-High Vacuum on Surface Contamination," APS March Meeting, Chicago, IL, Mar. 14-28, 2022.
22. M.D. Bell, T.F. Yap, A. Rajappan, J.C. Hsu, C.J. Decker, V. Tat, C.T.K. Tseng, **D.J. Preston**, "Composite Wearable Textile Materials with Spatial Control of Joule Heating," APS March Meeting, Chicago, IL, Mar. 14-28, 2022.
21. B. Jumet, J. Berning, N. Escobar, M. Schara, Z.A. Zook, M.K. O'Malley, **D.J. Preston**, "Textile-Based Wearable Haptic Devices," MRS Fall Meeting, Boston, MA, Nov. 29-Dec. 2, 2021.
20. T.F. Yap, Z. Liu, R. Shveda, C.J. Decker, M.D. Bell, R.M. Rasheed, **D.J. Preston**, "Reaction Kinetics Governing the Thermal Inactivation of Viruses," ACS Fall Natl. Mtg., Atlanta, GA, Aug. 22-26, 2021.
19. T.F. Yap, Z. Liu, R. Shveda, **D.J. Preston**, "Data-driven Model of the Thermal Inactivation of SARS-CoV-2," ACS Fall 2021 National Meeting, Atlanta, GA, Aug. 22-26, 2021. *Selected for Sci-Mix session (top 10% of submissions)*.
18. T.F. Yap, Z. Liu, R. Shveda, **D.J. Preston**, "Data-driven Model of the Thermal Inactivation of SARS-CoV-2," NSF Workshop: New Frontiers of Thermal Transport, Dec. 14-16, 2020, Jan. 4-6, 2021.
17. T.F. Yap, Z. Liu, R. Shveda, **D.J. Preston**, "A Data-driven Model of the Thermal Inactivation of SARS-CoV-2," 6th Annual Small Curly Institute Summer Research Colloquium. Aug. 5, 2020. *Best Poster*.
16. **D.J. Preston** "Fluidic Control through Surface Engineering," Additive Manufacturing, Performance & Tribology (AMPT) Symposium, Houston, TX, Aug. 15-16, 2019.
15. **D.J. Preston**, K. Wilke, Z. Lu, Y. Zhao, L. Becerra, E.N. Wang, "Gravitationally-Driven Wicking Condensation," International Heat Transfer Conference 16, Beijing, China, Aug. 10-15, 2018.
14. **D.J. Preston**, Y. Song, Z. Lu, D.S. Antao, E.N. Wang, "Design of Lubricant Infused Surfaces," MRS Fall Meeting, Boston, MA, Nov. 26-Dec. 1, 2017.

13. P. Greenley, **D.J. Preston**, "MIT Green Labs Contest: A Certified Success," International Institute for Sustainable Laboratories Conference, Boston, MA, Oct. 16-18, 2017.
12. **D.J. Preston**, Z. Lu, Y. Song, K.L. Wilke, Y. Zhu, D.S. Antao, E.N. Wang, "Gravitationally-Driven Wicking for Enhanced Condensation Heat Transfer," International Conference on Nanochannels, Microchannels, and Minichannels, Cambridge, MA, August 27-30, 2017. **Best Poster**.
11. **D.J. Preston**, D.S. Antao, Y. Zhao, K.L. Wilke, E.N. Wang "Heat Transfer Enhancement during Condensation of Hydrocarbons with Slippery Liquid-Infused Porous Surfaces for Improved Natural Gas Processing Efficiency," 4th Int. Workshop on Heat Transfer, Las Vegas, NV, April 2-5, 2017.
10. **D.J. Preston**, Z. Lu, Y. Zhao, D.S. Antao, K.L. Wilke, E.N. Wang, "Optimal Design of Slippery Liquid-Infused Porous Surfaces for Enhanced Condensation of Low Surface Tension Fluids," APS March Meeting, New Orleans, LA, March 13-17, 2017.
9. **D.J. Preston**, A. Anders, B. Barabadi, E. Tio, Y. Zhu, D.A. Dai, E.N. Wang, "Electrowetting-on-Dielectric Actuation of a Spatial and Angular Manipulation MEMS Stage," MEMS 2017, Las Vegas, NV, Jan. 22-26, 2017.
8. **D.J. Preston**, D.S. Antao, Y. Zhao, K.L. Wilke, E.N. Wang, "Heat Transfer Enhancement during Condensation of Hydrocarbons with Liquid Infused Surfaces," Gordon Research Conference on Micro- and Nanoscale Phase Change Heat Transfer, Galveston, TX, Jan. 8-13, 2017.
7. **D.J. Preston**, D.S. Antao, K.L. Wilke, Z. Lu, M. Louis, E.N. Wang "Micro- and Nanoscale Surface Design for Enhanced Condensation Heat Transfer," International Workshop on New Understanding in Nanoscale/Microscale Phase Change, Trondheim, Norway, June 12-16, 2016.
6. **D.J. Preston**, D.L. Mafra, N. Miljkovic, J. Kong, E.N. Wang, "Enhanced Condensation Heat Transfer with Scalable Graphene Coatings," Proceedings of the 9th International Conference on Boiling and Condensation Heat Transfer, Boulder, CO, April 26-30, 2015.
5. **D.J. Preston**, N. Miljkovic, J. Sack, J. Queeney, A. Krishnamachar, E.N. Wang, "Role of Nanostructure Size and Coating Quality in Delay of Surface Flooding during Jumping Droplet Condensation," Gordon Research Conference on Micro/Nanoscale Phase Change Heat Transfer, Galveston, TX, Jan. 11-16, 2015.
4. **D.J. Preston**, N. Miljkovic, J. Sack, R. Enright, J. Queeney, E.N. Wang, "Effect of Hydrocarbon Adsorption on the Wetting of Rare Earth Oxides," Proceedings of the 15th International Heat Transfer Conference (IHTC-15), Kyoto, Japan, August 10-15, 2014.
3. **D.J. Preston**, N. Miljkovic, S. Yang, J. Sack, E.N. Wang, "Scalable Growth of Superhydrophobic Zinc Oxide Nanowires on Common Industrial Substrates for Enhanced Condensation," 4th Micro-Nanoscale Heat and Mass Transfer International Conference, Hong Kong, China, December 11-14, 2013.
2. **D.J. Preston**, N. Miljkovic, R. Enright, E.N. Wang, "Vapor Flow Entrainment of Jumping Water Droplets," 66th Annual Meeting of the APS Division of Fluid Dynamics - Gallery of Fluid Motion Poster, Pittsburgh, PA, November 24-26, 2013.
1. **D.J. Preston**, N. Miljkovic, R. Enright, A. Limia, E.N. Wang, "Effect of Vapor Flow on Jumping Droplets during Condensation on Superhydrophobic Surfaces," 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA, November 24-26, 2013.

TEACHING AND MENTORING EXPERIENCE

Teaching Experience

- **Rice University MECH 587 Capillarity and Wetting – Professor (S2021, S2022, S2023)**
Students learn to analyze, model, and design systems based on interfacial phenomena, with applications including wetting, enhanced oil recovery, cosmetics, pharmaceuticals, microfluidic devices, and even

everyday food and drink. After completing this course, students will exhibit a strong understanding of surface tension and energy, adsorption and adhesion, surface-tension-driven flows, capillarity, contact angle, fluid spreading, wetting of textured surfaces, and self-cleaning surfaces. *Overall effectiveness of instructor as a teacher and overall quality of the course* both better than Rice University average.

- **Rice University MECH 472 Thermofluidic Systems – Professor (F2019, F2020, F2021, F2022, F2023)**
Students learn to analyze and design thermal and fluidic systems. After completing this course, students will be able to synthesize knowledge from their courses in fluid mechanics, heat transfer, thermodynamics, and other related topics covered in engineering and physics to generate solutions to system design problems and support their analyses and conclusions with detailed calculations and explanations, including justification for ethical, legal, and financial aspects of a project. *Overall effectiveness of instructor as a teacher and overall quality of the course* both better than Rice University average.
- **Rice University ENGI 120 Intro to Eng. Design – Faculty Mentor (F2019, F2021, S2022, F2022)**
Students learn the engineering design process and use it to solve meaningful problems. Faculty mentors meet with teams of students once per week to guide the engineering aspects of their course projects.
- **Olin College ENGR 2340 Dynamics – Guest Lecturer (F2017)**
Discussed analogs between the mass-spring-damper system and systems in electronics, fluid mechanics, and heat transfer. Students learned why there is no "inductor" in heat transfer. Finally, thermal effects, such as heating from friction, were considered based on energy conservation.
- **University of Alabama CBH 101 Computer-Based Honors – Teaching Assistant (F2010, F2011)**
Course description: Taken by first-year students in the University of Alabama Computer-Based Honors Program, this course provides an accelerated introduction to computer hardware and software. Students learn to use Unix commands and program in Fortran; final project is a DMV/RMV database.
- **University of Alabama CBH 102 Computer-Based Honors – Teaching Assistant (S2011, S2012)**
Course description: Taken by first-year students in the University of Alabama Computer-Based Honors Program, this course provides an accelerated introduction to computer hardware and software. Students learn object-oriented programming in C++; final project is a database with custom UI.
- **University of Alabama Center for Athletic Student Services - Tutor (Nov. 2009 to Dec. 2010)**
Reviewed physics, chemistry, and math with groups of 1-4 students, 15 hours/week.

Postdoctoral Fellows Currently Advised

- **Anoop Rajappan, Rice University (9/2020-present)**
Research focus: Fluid dynamics, material intelligence
Awards: Rice Academy of Fellows (\$60k/year stipend for two years, \$5k discretionary funding), "Best Presenter" in the Workshop on New Directions for Simplified Control of Soft Robots at RoboSoft 2022

Graduate Students Currently Advised

- **Te Faye Yap, Rice University (8/2019-present, Ph.D. student)**
Research focus: Actuators, microfluidics, reaction kinetics, thermodynamics, soft materials
Awards: 2020 AMPT Center Resiliency Award (\$1.5k, internal), 2020 Audience Choice Award for poster presentation at the Smalley-Curl Institute Summer Research Colloquium, Selected for Sci-Mix Session (top 10%) at ACS Fall Meeting 2021, 2022 Rice IBB Travel Award (\$1k, internal), 2022 Roberts Award for Outstanding Research (\$4k, internal), 2022 μ FIP Conference Travel Award, Best Poster Award at IWIBIT 2023, Rising Stars in Mechanical Engineering Workshop at Stanford, SES2023 Conference Future Faculty Symposium with Travel Award

- **Zhen Liu, Rice University** (8/2019-present, Ph.D. student)
Research focus: Surface coatings, fluid dynamics, phase change heat transfer
Awards: 2022 μ FIP Conference Travel Award, 2023 μ FIP Conference Travel Award
- **Barclay Jumet, Rice University** (5/2020-present, Ph.D. student)
Research focus: Soft robots and devices, low-level fluidic control
Awards: NSF Graduate Research Fellowship, 2020 AMPT Center Resiliency Award (\$1.5k, internal), AATCC Foundation Student Research Support Grant (\$1.1k), MRS Fall Meeting Travel Award
- **Marquise D. Bell, Rice University** (7/2020-present, Ph.D. student)
Research focus: Materials science, thermodynamics, heat transfer, phase-change processes
Awards: NASA NSTGRO Fellowship, GEM Associate Fellowship, SES2022 Conference Travel Award, MRS Fall Meeting IOP Best Presentation Award, NextProf Nexus Workshop at Georgia Tech
- **Richard J. Fontenot, Rice University** (7/2021-present, Ph.D. student)
Research focus: Heat transfer, thermal management, interfacial phenomena
Awards: DOD SMART Scholarship
- **Irfan Zobayed, Rice University** (7/2022-present, Ph.D. student)
Research focus: Soft robots and devices, energy harvesting for assistive wearables
- **Adam Broshkevitch, Rice University** (8/2022-present, M.S. student)
Research focus: Thermal processing of soft materials
- **Evan Noce, Rice University** (8/2022-present, M.S. student)
Research focus: Fluidic control via additive manufacturing
- **Neethu Pottackal, Rice University** (5/2023-present, Ph.D. student, co-advised with P.M. Ajayan)
Research focus: Additive manufacturing of novel materials
Awards: NSF Graduate Research Fellowship, Rice Innovation Fellow (\$7.5k, internal), Second Place in Napier Rice Launch Challenge Startup Pitch Contest (\$25k equity-free)
- **Sofia Urbina, Rice University** (7/2023-present, Ph.D. student)
Research focus: Wearable assistive devices, human-robot interaction
- **Xin Xu, Rice University** (8/2023-present, M.S. student)
Research focus: Additive manufacturing of soft and fluidic systems

Graduate Students Advised (Alumni)

- **Rawand M. Rasheed, Rice University** (8/2020-9/2023, Ph.D. in Mechanical Engineering)
Research focus: Additive manufacturing, phase separations, interfacial phenomena, heat transfer
Awards: DOE IBUILD Fellowship, 2022 Hershel M. Rich Invention Award (\$7.5k, internal), Inaugural Rice Innovation Fellow (\$7.5k, internal), SCI-STAR Grant (\$7k; awarded as PI), First Place in Napier Rice Launch Challenge Startup Pitch Contest (\$35k equity-free), First Place in TEX-E Startup Pitch Contest (\$25k equity-free), 2022 μ FIP Conference Travel Award, Chain Reaction Innovations Fellowship
- **Rachel A. Shveda, Rice University** (8/2019-5/2021, M.S. in Mechanical Engineering)
Research focus: Soft pneumatic systems
Awards: Full funding for graduate study from the U.S. Coast Guard
Currently: Officer, U.S. Coast Guard

Thesis Committees at Rice University

- **Trevor Shimokusu**, Ph.D. in Mechanical Engineering advised by Geoff Wehmeyer (in progress)

- **Yingru Song**, Ph.D. in Mechanical Engineering advised by Geoff Wehmeyer (in progress)
- **Nataira Pagan-Pagan**, Ph.D. in Chemical Engineering advised by Amanda Marciel (in progress)
- **Zane A. Zook**, Ph.D. in Mechanical Engineering advised by Marcia K. O'Malley (3/2023)
- **Joshua Wagner**, Ph.D. in Mechanical Engineering advised by C. Fred Higgs (11/2022)
- **Nathan Dunkelberger**, Ph.D. in Mechanical Engineering advised by Marcia K. O'Malley (11/2022)
- **Ajay Garg**, M.S. in Mechanical Engineering advised by Geoff Wehmeyer (11/2022)
- **Jiran Li**, Ph.D. in Mechanical Engineering advised by Peter Lillehoj (3/2022)
- **Zhuqing Zhang**, Ph.D. in Chemical Engineering advised by Sibani Lisa Biswal (12/2021)
- **Stephen Alexander**, M.S. in Mechanical Engineering advised by Marcia K. O'Malley (4/2021)
- **John Britt**, M.S. in Mechanical Engineering advised by Marcia K. O'Malley (8/2020)
- **Brandon Cambio**, M.S. in Mechanical Engineering advised by Marcia K. O'Malley (4/2020)

Undergraduate Students Supervised at Rice University

- **Colter Decker, Rice University '23** (9/2019-5/2023)
Project title: Fabrication Strategies for Fluidic Control of Robotic Systems
- **Esha Ghai, Rice University '23** (9/2019-12/2021)
Project title: Micro- and Nanoscale Surface Design for Fluid Wicking
- **Bryan Zeng, Rice University '23** (10/2019-5/2023)
Project title: Soft, Interactive Wearables
- **Mark Schara, Rice University '23** (10/2019-5/2023)
Project title: Soft, Interactive Wearables
- **Aman Eujayl, Rice University '23** (1/2020-5/2023)
Project title: Thermal Aspects of Wearable Devices
- **Divya Wagh, Rice University '23** (8/2020-5/2022)
Project title: Spray Coatings for Fluid Management
- **Alia Nathani, Rice University '24** (10/2020-present)
Project title: Jumping Droplet Condensation Heat Transfer Enhancement
- **Wyeth McKinley, Rice University '22** (2/2021-12/2021)
Project title: Inertial Droplet and Particulate Filtration
- **Isaac Heil, Harrisburg University of Science and Technology '23** (6/2021-8/2021)
Project title: Additive Manufacturing of Complex Internal Geometries
- **Rodrigo Cisneros, University of Texas at Austin '24** (6/2021-8/2021)
Project title: Robust Superhydrophobic Surface Fabrication
- **Doris Xu, Rice University '23** (9/2021-5/2023)
Project title: Soft, Wearable Haptic Devices
- **Gerardo Vega, Rice University '23** (9/2021-present)
Project title: CNC Thermal Bonding
- **Vi Vo, Rice University '23** (9/2021-present)
Project title: Layer-Based Fabrication of Fluidic Components
- **Damian Gonzalez, Rice University '24** (2/2022-present)
Project title: Characterization of Inertial Filters (work performed with Helix Earth Technologies)
- **Abduallah Alsinan, Rice University '25** (2/2022-12/2022)
Project title: Superhydrophilic Coatings for Condensation Management
- **Leighton Less, Rice University '24** (6/2022-1/2023)
Project title: Characterization of Thermal Layer-Based Fabrication

- **Sofia Urbina, Louisiana Tech University '23** (6/2022-8/2022)
Project title: Layer-Based Fabrication of Assistive Devices
- **John Lentz, Lone Star University '22** (6/2022-8/2022)
Project title: Capture of Dry Particulate Matter with Inertial Filtration
- **Chris Avalos, San Jacinto College South '22** (6/2022-8/2022)
Project title: Experimental Characterization of Condensation Management
- **Summer Barrette, Rice University '24** (8/2022-12/2022)
Project title: Large-Scale Soft Pneumatic Displays
- **Cat-Linh Tran, Rice University '25** (8/2022-present)
Project title: Robust Magnetically Driven Biotic Material Actuators
- **Hannah Wixom, Rice University '26** (9/2022-present)
Project title: Textile-Based Haptic Actuators
- **Jennifer Turrubiantes, Lone Star College '25** (5/2023-present)
Project title: Mist-Based Chemical Reactors
- **Karina Manrique, Rice University '26** (5/2023-present)
Project title: Toolkit for Rapid Assembly of Fluidic Circuits
- **Juan Alejandro Garavito Leon, Universidad Javeriana '25** (6/2023-present)
Project title: Thermal Processing of Polymer Films
- **Emily Ellison, Rice University '24** (8/2023-present)
Project title: Design and Optimization of Inflatable Devices
- **Veronica Aguilar, Rice University '24** (8/2023-present)
Project title: Assistive Wearable Technology
- **Marvyn Raya, Rice University '25** (8/2023-present)
Project title: Wicking in 3D-Printed Materials
- **Megan Enriquez, Rice University '26** (8/2023-present)
Project title: Thermal Energy Harvesting
- **Jasmine Klinkao, Rice University '27** (8/2023-present)
Project title: Strength and Adhesion of Silicone Elastomers
- **Kory Sila, Rice University '27** (8/2023-present)
Project title: Actively Patterned Wettability for Fluid Manipulation

Undergraduate Students Supervised Prior to Joining Rice University

- **Alex Limia, University of Miami '14** (6/2013-8/2013)
Project title: Fabrication of Superhydrophobic Surfaces for Condensation and AC Electrowetting
- **Immanuel D. Madukauwa-David, MIT '14** (9/2013-6/2014)
Project title: Aluminum Oxide Nanostructures as Scalable Superhydrophobic Surfaces
- **Dhananjai Saranadhi, MIT '14** (9/2013-6/2014)
Thesis title: Design and Fabrication of an Internal Condensation Loop for Effectiveness and Robustness
Testing of Nanostructured Superhydrophobic Steam Condenser Tubes
- **Evelyn Tio, MIT '14** (9/2013-6/2014)
Thesis title: Electrowetting Study of Jumping Droplets on Hydrophobic Surfaces
- **Miles Burr, MIT '15** (6/2013-12/2013)
Project title: Parametric Study of Copper Oxide Nanostructure Wet Chemical Growth Methods
- **John Queeney, MIT '15** (6/2013-5/2015)
Thesis title: Evaporative Cooling via Jumping Droplet Condensation on Superhydrophobic Surfaces

- **Samalis Santini, University of Puerto Rico Mayaguez '15** (6/2014-8/2014)
Project title: Performance of Micro Heat Pipes with Copper Oxide Nanostructures
- **Matthew Clarke, Howard University '16** (6/2015-8/2015)
Project title: Modelling Evaporative Cooling *via* Superhydrophobic Jumping Droplet Condensation
- **Manuel C. Castro, MIT '17** (6/2014-1/2015)
Project title: Video Tracking Software for Jumping Droplet Trajectory Analysis
- **Anjali M. Krishnamachar, MIT '17** (6/2014-8/2014)
Project title: Characterization of Superhydrophobic Structured Surfaces with Environmental SEM
- **Marcel Louis, Howard University '17** (6/2016-8/2016)
Project title: Wicking Media Usage to Promote Heat Transfer Performance in Condensers
- **DingRan Annie Dai, MIT '18** (6/2015-11/2015)
Project title: Linear Droplet Motion Induced by Electrowetting on Surfaces with Potential Gradient
- **Manuel Garcia, Florida International University '18** (6/2017-8/2017)
Project title: Simplified Fabrication of Doubly-Reentrant Structures
- **Laura Becerra, University of San Diego '19** (6/2017-8/2017)
Project title: Active Monitoring of Chemical Fume Hood Sash Position for Energy Conservation
- **Georgia Phillips, MIT '20** (1/2017-5/2017)
Project title: Lab Energy Assessment Center
- **Max Drake, MIT '20** (1/2017-8/2017)
Project title: Lab Energy Assessment Center
- **Juan Ferrua, MIT '20** (6/2017-12/2017)
Project title: Lab Energy Assessment Center
- **Lisa Tang, MIT '20** (9/2017-1/2018)
Project title: Lab Energy Assessment Center
- **Dheekshita Kumar, MIT '20** (1/2017-5/2017 and 9/2017-6/2019)
Project title: Lab Energy Assessment Center
- **Ethan Munden, MIT '20** (9/2018-6/2019)
Project title: Lab Energy Assessment Center
- **Anupama Phatak, MIT '21** (9/2018-6/2019)
Project title: Lab Energy Assessment Center

ACADEMIC AND PROFESSIONAL ACTIVITIES

Internal Service Roles

- Advisory Board, Shared Equipment Authority, Rice University, Jan. 2020-present
- Committee for Graduate Studies, MECH Department, Rice University, July 2019-present
- Seminar Committee, MECH Department, Rice University, Aug. 2022-present
- Laboratory Committee, MECH Department, Rice University, July 2021-June 2023
- Gulf Coast Undergraduate Research Symposium (GCURS), Rice University – incl. review of applicants, judging talks, and moderation of sessions – Nov. 2, 2019; Oct. 31, 2020; Oct. 16, 2021; Oct. 8, 2022

External Service Roles

- NSF Panel Reviewer, GRFP, 2023
- MIT MSRP Application Review Committee, 2023
- NSF Panel Reviewer, GRFP, 2022

- MIT MSRP Application Review Committee, 2022
- NSF Panel Reviewer, GRFP, 2021
- NSF Ad Hoc Reviewer, CBET, 2020
- NSF Panel Reviewer, SBIR/STTR, 2020
- NSF Panel Reviewer, CMMI, 2020
- NSF Panel Reviewer, CBET, 2020

Leadership Roles

- Chair of the Board of Directors for the Catherine J. Randall Premier Award (this award recognizes the most outstanding student-scholar at The University of Alabama in each class), Sept. 2018-Sept. 2021
- Environmental Health and Safety representative for the MIT Device Research Lab, Sept. 2013-Jan. 2017
- Founded MIT Lab Energy Assessment Center with grant from MIT Green Labs program, Jan. 2017

Invited Talks

- École Polytechnique Fédérale de Lausanne (EPFL) Mechanical Engineering Seminar Series – Invited Speaker – Lausanne, Switzerland, Nov. 21, 2023 (upcoming)
- Morphing Matter Symposium, Society of Engineering Science Annual Technical Meeting – Invited Speaker – Minneapolis, MN, Oct. 9, 2023
- The First Indian Conference on Micro Nano Fluidics – Invited Speaker – Indian Institute of Technology Madras, Chennai, Tamil Nadu, India, Oct. 1, 2023 (upcoming)
- University of Waterloo Institute for Nanotechnology Seminar Series – Invited Speaker – Waterloo, Ontario, CA, Sept. 15, 2023 (upcoming)
- University of Pennsylvania Mechanical Engineering and Applied Mechanics Seminar Series – Invited Speaker – Philadelphia, PA, Apr. 4, 2023
- Alabama K-12 Robotics Contest – Keynote Speaker – Tuscaloosa, AL, Apr. 1, 2023
- The University of Alabama Premier Awards Ceremony, Randall Premier Award Banquet – Keynote Speaker – Tuscaloosa, AL, Mar. 31, 2023
- University of Illinois Urbana Champaign Mechanical Science & Engineering Seminar Series – Invited Speaker – Champaign, IL, Mar. 20, 2023
- Stanford University Department of Mechanical Engineering Seminar Series – Invited Speaker – Stanford, CA, Mar. 16, 2023
- Carnegie Mellon University Mechanical Engineering Seminar Series – Invited Speaker – Pittsburgh, PA, Mar. 13, 2023
- Georgia Tech Woodruff School of Mechanical Engineering Seminar Series – Invited Speaker – Atlanta, GA, Mar. 2, 2023
- Cornell University Sibley School of Mechanical and Aerospace Engineering Seminar Series – Invited Speaker – Ithaca, NY, Mar. 2, 2023 (upcoming)
- University of Michigan Robotics Department Seminar Series – Invited Speaker – Ann Arbor, MI, Feb. 20, 2023 (upcoming)
- University of California, Santa Barbara Department of Mechanical Engineering Seminar Series – Invited Speaker – Santa Barbara, CA, Feb. 2, 2023
- The Fourth International Conference on Flexible Electronics – Keynote Speaker – Hangzhou, China, Dec. 11, 2022

- The University of Maryland Department of Materials Science and Engineering Seminar Series – Invited Speaker – College Park, MD, Nov. 30, 2022
- The Third International Workshop on Insect Bio-Inspired Technologies – Plenary Speaker – Edinburgh, Scotland, UK, Nov. 17, 2022
- The University of Alabama Department of Mechanical Engineering Seminar Series – Invited Speaker – Tuscaloosa, AL, Oct. 25, 2022
- International Conference on Intelligent Wearable Systems – Invited Speaker – Hong Kong, June 28, 2022
- Micro Flow and Interfacial Phenomena (μ FIP) Conference – Keynote Speaker – Irvine, CA, June 20, 2022
- Workshop on Shaping the Future of Robotics through Materials Innovation hosted by the Max Planck Institute at Schloss Ringberg – Invited Presenter – Tegernsee, Germany, June 16, 2022
- Energy Polymer Group Winter Technical Meeting – Invited Speaker – Houston, TX, Jan. 13, 2022
- MIT InnoTherm Colloquium – Moderator – virtual, Apr. 28, 2021
- Rice Academy of Fellows Seminar Series – Invited Speaker – Jan. 14, 2021
- Toshiba Technical Society Meeting – Invited Speaker – Houston, TX, Feb. 19, 2020
- Additive Manufacturing, Performance & Tribology Symposium – Invited Speaker – Houston, TX, Aug. 15, 2019
- Cornell University MAE Colloquium – Invited Speaker – Ithaca, NY, Feb. 15, 2018
- Rice University Mechanical Engineering Seminar Series – Invited Speaker – Houston, TX, Jan. 31, 2018

Conference Organization

- Co-Organizer, materialsXrobotics Workshop, Houston, TX, Dec. 2023 (upcoming).
- Co-Organizer, Soft Robotics Symposium, Society of Engineering Science Annual Technical Meeting (SES2023), Minneapolis, MN, Oct. 8-11, 2023 (upcoming).
- Co-Organizer, Texas Regional Robotics Symposium (TEROS), Houston, TX, Apr. 2023.
- Co-Organizer, Workshop on *Mechanical and Fluidic Control of Soft Robots*, 6th IEEE International Conference on Soft Robotics (RoboSoft), Singapore, Apr. 3-7, 2023.
- Subcommittee Member, *Sensors, MEMS, and Bioelectronics*, 7th IEEE Electron Devices Technology and Manufacturing Conference, Seoul, Korea, Mar. 7-11, 2023.
- Organizer, Full-Day Workshop on *New Directions for Simplified Control of Soft Robots*, 5th IEEE International Conference on Soft Robotics (RoboSoft), Edinburgh, Scotland, UK, Apr. 4-8, 2022.
- Subcommittee Member, *Sensors, MEMS, and Bioelectronics*, 6th IEEE Electron Devices Technology and Manufacturing Conference, Oita, Japan, Mar. 6-9, 2022.
- Subcommittee Member, *Sensors, MEMS, and Bioelectronics*, 5th IEEE Electron Devices Technology and Manufacturing Conference, Chengdu, China, Mar. 9-12, 2021.
- Session Chair, *Surface Engineering for Advanced Phase Change Heat Transfer*, International Conference on Nanochannels, Microchannels, and Minichannels, Cambridge, MA, Aug. 27-30, 2017.
- Session Co-Chair, *Heat and Mass Transfer in Porous Media*, 4th International Workshop on Heat Transfer, Las Vegas, NV, Apr. 2-5, 2017.
- Organizer, MIT Micro-Nano Poster Session, \$4k budget, 35 presenters, Cambridge, MA, Feb. 20, 2014.

Peer-Review Referee for:

- ACS Applied Materials & Interfaces
- Advanced Materials Interfaces
- Applied Physics Letters
- Applied Surface Science
- Journal of Physical Chemistry
- Langmuir
- Nanoscale
- Nature Communications

- Applied Thermal Engineering
- Energies
- Environmental Science & Technology Letters
- International Journal of Heat and Mass Transfer
- Joule
- Journal of Heat Transfer
- Journal of Micromechanics and Microengineering
- Nature Materials
- Physical Review Letters
- PNAS
- Science
- Science Advances
- Science Robotics
- Small
- Soft Matter

Professional Society Memberships

- Tau Beta Pi engineering honor society, AL-Beta Chapter – Treasurer, 2011-2012
- Pi Tau Sigma mechanical engineering hon. society, AL-Pi Omicron Chapter – Corr. Secretary, 2011-2012
- Sigma Xi scientific research honor society
- American Society of Mechanical Engineers (ASME) – Honorary lifetime membership
- American Chemical Society (ACS)
- American Physical Society (APS)
- Materials Research Society (MRS)
- Institute of Electrical and Electronics Engineers (IEEE)

SELECT MEDIA COVERAGE

Necrobotics

- "‘Necrobotics’ Research Sees Scientists Turn Dead Spiders into Robots," S. Al Mustaqeem, London Evening Standard, Jul. 28, 2022. [Link](#). **Excerpt:** *Speaking to the Standard, Dr. Preston said that public surprise at the materials is often followed by an ‘a-ha moment’ when they understand the mechanism. [He] said: ‘We hope this research will spark new ideas for how we can respectfully and sustainably source and utilize biotic materials for robotics applications.’*
- "Watch Researchers Use Dead Spiders as Robotic Grippers," S. Crowe, The Robot Report, Jul. 25, 2022. [Link](#). **Excerpt:** *‘[We] use previously untapped types of actuation and materials,’ said Preston. ‘The spider falls into this line of inquiry. It’s something that hasn’t been used before but has a lot of potential.’*
- "Lab Manipulates Deceased Spiders’ Legs with a Puff of Air to Serve as Grabbers," B. Martin, Rice University, Jul. 25, 2022. [Link](#). **Excerpt:** *‘We can apply hydraulic pressure when we use the spider as the material for our gripper.’* Over 300k views; top-ten video of all time on Rice’s YouTube channel.
- "Meanwhile... The Rise of the Necrobots," S. Colbert, The Late Show with Stephen Colbert, Jul. 28, 2022. [Link](#). **Excerpt:** *It’s a Venn diagram where spiders, robots, and zombies overlap.* Over 3 million live viewers upon airing and > 900k subsequent views on YouTube.

Textile-Based Wearable Robotics

- "Forget Silicon. This Computer Is Made of Fabric," S. Chen, WIRED, Sept. 12, 2022. [Link](#). **Excerpt:** *‘...you can think of the air-filled pouches on the jacket as analogous to electronic transistors, says Preston. In an electronic circuit, transistors control the flow of electrons, or electric current, based on the voltage in the circuit. ‘We’re just replacing voltage with pressure, and we’re replacing current with the flow of a fluid, which is air in this case,’ he says.*

- "Walking Feeds Pressure To Pneumatic Robots That Could Help Those With Disabilities," A. Shawn, Verve Times, Aug. 26, 2022. [Link](#). **Excerpt:** *'Now that we're providing the power, we can tap into all the existing work on actuation,' Preston added. 'This would include things like gloves that help people close their hands, assistance at the elbow and shoulder joints, and other devices that still rely on rigid and bulky power supplies that are either uncomfortable or require being tethered to external infrastructure.'*

Soft Robotics

- "Fluidic Circuits Add Analog Options for Controlling Soft Robots," J. Boyd, Science Daily, Sept. 29, 2022. [Link](#). **Excerpt:** *'The undergraduates at Rice are truly top notch, and Colter, in his case, actually has risen to essentially what I would say is the level of a Ph.D. student in terms of some of his output as an undergraduate researcher,' Preston said.*
- "Squishy Robots Now Have Squishy Computers to Control Them," K. Eschner, Popular Science, Mar. 25, 2019. [Link](#). **Excerpt:** *'It allows devices that are completely soft to be able to interact with their environment, and with human users through things like completely soft sensors,' Preston says.*
- "A Soft Ring Oscillator Allows Soft Robots to Roll, Undulate, Sort, and Swallow," A. Malewar, Tech Explorist, Jul. 9, 2019. [Link](#). **Excerpt:** *'It's another tool in the toolkit to make these smart, soft robots without any electronics, and without hard valves,' according to Daniel Preston, lead author of the study.*
- "Making the Switch," Z. Budrikis, Nature Reviews Materials, Apr. 26, 2018. [Link](#). **Excerpt:** *'Combining the bistable valve with soft control elements, which were developed for microfluidic circuits, or combining multiple bistable valves will allow the execution of more complex functions. There are many different types of instabilities that occur in soft structures, which may be used in the future for the control of soft actuators,' concludes Preston.*

Interfacial Phenomena and Fluid Dynamics

- "Keeping VOCs away from delicate technology," E. Phiddian, Cosmos Magazine, Jul. 19, 2023. [Link](#). **Excerpt:** *'VOCs are in the air that surrounds us every day,' says Dr. Daniel Preston ... 'texturing allows the internal container wall to act as a 'sacrificial' material,' says lead author Zhen Liu ... 'VOCs are pulled onto the surface of the container wall, which allows other objects stored inside to remain clean.'*
- "Thin Coating on Condensers Could Make Power Plants More Efficient," D.L. Chandler, MIT News, May 29, 2015. [Link](#). **Excerpt:** *'We thought graphene could be useful,' Preston says, 'since we know it is hydrophobic by nature.' So he and his colleagues decided to test both graphene's ability to shed water and its durability under typical power plant conditions.*
- "Could Tiny Water Droplets Lower Your Electric Bill?" E. Barber, Christian Science Monitor, Oct. 3, 2013. [Link](#). **Excerpt:** *'We emphasize the scalability of jumping droplet surfaces so that they can be easily implemented at large scales for competitive costs,' says Daniel Preston.*
- "Jumping Droplets Repel Each Other," Nature Research Highlights, Nature, Oct. 2, 2013. [Link](#).
- "No-Contact Micromechanical Systems Last Longer," S. Nathan, The Engineer, Dec. 19, 2016. [Link](#). **Excerpt:** *'There are a lot of experiments ... that could really benefit from a way to make these small-scale movements,' [Preston] said. Known as electrowetting-on-dielectric, this technique is not unknown but has not been used to steer a non-contacting platform around a surface before, Preston added.*

Thermal Inactivation of Viruses

- "Rice Engineer Wins Grant to Study Temperature and Coronavirus," KTRH News, May 14, 2020. [Link](#).
Excerpt: *'Dry heat sterilization can be performed almost anywhere, even using home ovens,' Preston said. 'Viruses inside crevices or within fabrics can easily be inactivated. Our project will provide evidence-based guidelines for the time required to achieve sterilization at a given temperature.'*
- "To Decontaminate Your Mask, Pop It in the Oven," M. Williams, Futurity, Nov. 15, 2021. [Link](#).
Excerpt: *'Ultimately, what we hypothesized and have now found to be true is that the thermal inactivation of the virus can be easily explained by a combination of two fundamental relationships,' [Preston] says. 'One of them is the Arrhenius equation, which relates the reaction parameters to temperature. And the other is the rate law, which uses those reaction parameters to tell you how fast a reaction occurs. In this case, the reaction is inactivation of the virus itself.'*

Other Media Coverage

- "Students Build Assistive Technologies for Boston Residents in Need," M. Cichon, MIT Lincoln Laboratories, June 2016. **Excerpt:** *'We presented the app to the Massachusetts Visually Impaired and Blind User Group. We then deployed a beta version of the app on the phones of several visually impaired users,' says Preston. After successful beta testing, [the] app, called Boop, is now available in the iTunes Store, free of charge.*
- "MRS Features Image Gallery – Look Again: Pearl on Grass," MRS Bulletin, Aug. 7, 2015. [Link](#).

(C.V. last updated September 2, 2023)