

Muhammad Jahidul Hoque

Postdoctoral Associate
Department of Mechanical Science and Engineering
University of Illinois at Urbana-Champaign

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EDUCATION

University of Illinois at Urbana-Champaign (UIUC) Champaign, IL
Ph.D., Mechanical Engineering May 2022
Thesis: Scalable and durable macro-micro-nanomanufacturing of functional interfaces and devices
Adviser: Nenad Miljkovic; Thesis Committee: Tony Jacobi, Placid Ferreira, Marianne Alleyne

Bangladesh University of Engineering and Technology (BUET) Dhaka, Bangladesh
M.S., Mechanical Engineering Feb. 2016

Bangladesh University of Engineering and Technology (BUET) Dhaka, Bangladesh
B.S., Mechanical Engineering Feb. 2013

PROFESSIONAL EXPERIENCE

University of Illinois at Urbana-Champaign (UIUC) May 2022- Present
Postdoctoral Associate

University of Illinois at Urbana-Champaign (UIUC) May 2017- May 2022
Research Assistant

University of Illinois at Urbana-Champaign (UIUC) Aug. 2016- May 2017
Teaching Assistant, Dept. of Mechanical Science and Engineering

Bangladesh University of Engineering and Technology (BUET) July 2016-Aug. 2016
Assistant Professor; Dept. of Mechanical Engineering

Bangladesh University of Engineering and Technology (BUET) March 2013-July 2016
Lecturer; Dept. of Mechanical Engineering

Bureau of Research, Testing, and Consultation (BRTC) Feb. 2016- July 2016
Engineering Consultant, Dept. of Mechanical Engineering, BUET

Barishal, University, Bangladesh Aug. 2014- June 2015
Part-time Lecturer; Dept. of Computer Science

Institution of Engineers, Bangladesh Aug. 2015- May 2016
Part-time Lecturer

Daffodil International University, Bangladesh Spring 2014- Summer 2016
Part-time Lecturer, Dept. of Electrical Engineering, Dept. of Textile Engineering

Uttara University, Bangladesh Spring 2015- Fall 2015
Part-time Lecturer, Dept. of Electrical Engineering

Sonargaon University, Bangladesh Spring 2014- Spring 2015
Part-time Lecturer, Dept. of Mechanical Engineering

HONORS AND AWARDS

2023 R&D 100 Awards Winner

A 250 kW All Silicon Carbide Motor Drive for Hybrid Electric Aircraft

University of Arkansas

University of Illinois, Urbana-Champaign

Wolfspeed, Inc. Ampaire ARPA-E, U.S. Dept. of Energy

Best Poster Award

Semifinalist in Image of Research Competition

Awarded as one of the top poster presenters

List of Teachers Ranked as Excellent by Their Students

Dean's Award for Excellent Academic Results

MicroFIP 2023

UIUC, 2020

InterPACK 2019

UIUC, Fall 2016

BUET, Spring 2009-Fall2012

RESEARCH INTERESTS

- Thermo-fluid science
- Interfacial Phenomena
- Advanced Manufacturing of materials and devices
- Thermal Management of Electronics
- Energy Conversion Systems
- Advanced Analytics for Energy

PAPERS IN REFEREED JOURNALS (* equal contribution)

1. **M.J.Hoque**, J. Lee, S. Shamim, D. Ghaddar, D. Libes, Y. Zhou, P. Kabirzadeh, M. T. Hossain, M. J. Dipto, M. Pitschman, P. Fourspring, and N. Miljkovic, "Contactless Rejuvenation of Slippery Liquid Infused Surfaces", *ACS Applied Materials & Interfaces*, 2024, submitted.
2. **M.J. Hoque**, A. Lad, N. Upot, and N. Miljkovic. "Additively Manufactured Hybrid Cold for Thermal Management of High-Power Density Electronics," *International Journal of Heat and Mass Transfer*, 2024, submitted.
3. **L. Li***, **H. Cha***, **M.J. Hoque***, and N. Miljkovic, "Long Term Durability of Hydrophobic Promoters during Dropwise Condensation of Steam", *International Journal of Heat and Mass Transfer*, 2024, submitted.
4. **M.J.Hoque**, T. Thukral, W. Yang, N. Miljkovic, Non-Fluorinated Green Hydrophobic Chemistry for Anti-Fouling and Heat Transfer Applications, *Applied Thermal Engineering*, 2024, submitted.
5. **M.J.Hoque**, A. Solecki, and N. Miljkovic, How Ready Are the Next-Generation Anti-Icing Coatings for Extreme Weather Applications?, 2024, in preparation.
6. **M.J. Hoque**, H. Qiu, J. Stremmer, X. Yan, and N. Miljkovic. "Tuning of Droplet Jumping on Flexible Superhydrophobic Surfaces," 2024, in preparation.
7. **M.J. Hoque**, X. Yan, R. Zhao, N. Miljkovic, "Scalable and durable ceramic coating for heat transfer applications," 2024, in preparation.
8. **M.J. Hoque**, Soumyadip Sett, Kazi Fazle Rabbi, Ji nyao Ho, and Nenad Miljkovic, "Condensation Heat Transfer and Durability of Lubricant Infused Surfaces in Xylene Vapor Environment," 2024, in preparation.
9. **M.J.Hoque**, A. Solecki, and N. Miljkovic, "The Future of Electric Aviation: Tackling the Icing Problem", 2024, in preparation.
10. **M.J.Hoque**, R. Cheng, W. Yang, S. Shen, N. Miljkovic, Composite Hybrid-Wettability Surfaces for Enhanced Condensation Performance, 2024, in preparation.
11. **M.J.Hoque**, A. Jahagirdar, N. Miljkovic, Automated Scalable Manufacturing of Mixed-Wettability Surfaces for Phase Change Heat Transfer Applications, 2024, in preparation.
12. **M.J. Hoque**, **L. Li**, **J. Ma**, H. Cha, S. Sett, X. Yan, J. Suwala, and N. Miljkovic, "Ultra-resilient multi-layer fluorinated diamond like carbon hydrophobic surfaces," *Nature Communications* 14, 4902 (2023). <https://doi.org/10.1038/s41467-023-40229-6>
13. **M.J. Hoque**, X. Yan, Y. Feng, A. Qiu, J. Li, and N. Miljkovic, "Durability and Degradation Mechanisms of Anti-Frosting Surfaces," *ACS Applied Materials & Interfaces* 2023, 15, 10, 13711–13723. <https://doi.org/10.1021/acsami.2c21928>
14. **M.J. Hoque**, X. Yan, H. Qiu, and N. Miljkovic. "Defect-Density-Controlled Phase Change Phenomena," *ACS Applied Materials & Interfaces* 2023, 15, 11, 14925–14936. <https://doi.org/10.1021/acsami.2c20938>
15. **M. J. Hoque**, J. Ma, K. Rabbi, X. Yan, B. Singh, N. V. Upot, W. Fu, J. Kohler, T. Thukral, S. Dewanjee, and N. Miljkovic, "Perspectives on Superhydrophobic Surface Durability", *Applied Physics Letters* 123, 110501 (2023). <https://doi.org/10.1063/5.0164927>

16. **M.J. Hoque**, S. Chavan, R. Lundy, L. Li, J. Ma, X. Yan, S. Lei, N. Miljkovic, and R. Enright, “Biphilic Jumping-Droplet Condensation,” *Cell Reports Physical Science*, 3 (4), 100823, 2022. <https://doi.org/10.1016/j.xcrp.2022.100823>
17. **M.J. Hoque**, S. Sett, D. Liu, K. F. Rabbi, L. Li, X. Yan, M. Qureshi, And N. Miljkovic, “Lifespan of Slippery Liquid Infused Surfaces During the Condensation of Steam and Ethanol Vapor,” *ACS Applied Materials & Interfaces*,14(3)2022. <https://doi.org/10.1021/acsami.1c17010>
18. **M.J. Hoque**, A.A. Günay, A. Stillwell, Y. Gurumukhi, R.C.N. Pilawa-Podgurski, N. Miljkovic, “Modular Heat Sinks for Enhanced Thermal Management of Electronics,” *ASME Journal of Electronic Packaging* June 2021; 143(2): 020903. <https://doi.org/10.1115/1.4049294>
19. **M.J. Hoque**, X. Yan, H. Keum, L. Li, H. Cha, J. Park, S. Kim, and N. Miljkovic, “High-Throughput Stamping of Hybrid Functional Surfaces,” *Langmuir*, 36(21), 2020. <https://doi.org/10.1021/acs.langmuir.0c00416>
20. **M.J. Hoque**, H. Keum, S. Kim, N. Miljkovic, “Visualization of Droplet Nucleation on Patterned Hybrid Surfaces,” *Journal of Heat Transfer*, 141(10), 2019. <https://doi.org/10.1115/1.4044588>
21. S. Khodakarami, V. Agarwal, P. Kabirzadeh, A. Solecki, **M.J.Hoque**, W. Yang, N. Stokowski, J. Jacobs, A. Chatterji, E. Lovelace, A. Stillwell, N. Miljkovic, “Aircraft Electro-Thermal Pulse Deicing”, *J. Heat Mass Transfer*, 2024, 1-24, accepted. <https://doi.org/10.1115/1.4066396>
22. Y. Suh, S.Chang, P. Simadiris, T. Inouye, **M.J. Hoque**, S. Khodakarami, C. Kharangate, N. Miljkovic, Y. Won, VISION-iT: Deep Nuclei Tracking Framework for Digitalizing Bubbles and Droplets , *Energy and AI*, 2024, 15, 100309. <https://doi.org/10.1016/j.egyai.2023.100309>.
23. M. Kim, S. Sett, **M. J. Hoque**, E. Kim, J. Ahn, N. Miljkovic “Fundamental Limits of the Spatial Control of Heterogeneous Nucleation on Biphilic Surfaces”, *Langmuir* 2024, 40, 17767–17778. <https://pubs.acs.org/doi/10.1021/acs.langmuir.4c02247?goto=supporting-info>
24. X. Du, A. Solecki, **M. J. Hoque**, V. Garimella et. al. Advancing Agrivoltaics through a Systematic Design Framework: Guidelines for Integration and Informed Decision-Making, *Nature Sustainability*, under review.
25. K. F. Rabbi, S. Khodakarami, J. Y. Ho, **M. J. Hoque**, N. Miljkovic, Dynamic Omniphobic Surfaces enable the Stable Dropwise Condensation of Completely Wetting Refrigerants, *Nature Communications*, under review.
26. T. Gebrael, A. Gamboa, **M. J. Hoque**, S. Aflatounian, D. Huitink, R. Pilawa, N. Miljkovic, Thermally Conductive Electrically Insulating Electronics Packaging for Water Immersion Cooling, *Applied Thermal Engineering*, Under Review.
27. I. Zarin, A. Bakhshi, **M.J. Hoque**, V. Ganesan, T.S. Thukral, M.J. Inanlu, N. Miljkovic, Mass transfer as a proxy for hydrophobic coating durability, *Langmuir*, Submitted.
28. X. Yan **M.J. Hoque**, , H. Qiu, and N. Miljkovic, Robustness of Hydrophobic Finned Surfaces, in preparation.
29. Y. Gurumukhi, **M. J. Hoque**, H. Qiao, K. Goodson, M. Asheghi, N. Miljkovic, Single-Phase Cooled Charging Cables for Extreme Fast Charging Systems in EV Applications, in preparation.
30. J. Kasitz, A. Lad, **M.J. Hoque**, N. Miljkovic, D. Huitink ,”Transient Nature of Flight and Its Impact on Thermal Management for All Electric Aircraft”, *J. Electron. Packag.* Mar 2023, 145(1): 011101. <https://doi.org/10.1115/1.4055464>.
31. L. Zhao, X. Du, Z. Yang, C. Xia, J. Xue, **M.J. Hoque**, W. Fu, X. Yan and N. Miljkovic, Online State of Health Estimation with Deep Learning Frameworks Based on Short and Random Battery Charging Data Segments, *J. Electrochem. Soc.* 2023, 170 090537. <https://iopscience.iop.org/article/10.1149/1945-7111/acf8ff/meta>
32. A. Lad; **M.J. Hoque**; S. Christian; Y. Zhao; J. C. Balda; W. P. King, N. Miljkovic, “High Power Density Thermal Management of Discrete Semiconductor Packages enabled by Additively Manufactured Hybrid Polymer-Metal Coolers”, *Applied Thermal Engineering*, 2023,220, 1197. <https://doi.org/10.1016/j.applthermaleng.2022.119726>.
33. A. Lad; A. Tayade; **M.J. Hoque**; Y. Zhao; J. C. Balda; W.P. King, N. Miljkovic, “Conventional and Topologically Optimized Polymer Manifolds for Direct Cooling of Power Electronics”, *International Journal of Heat and Mass Transfer*,2023,201(1), 123611. <https://doi.org/10.1016/j.ijheatmasstransfer.2022.123611>
34. D. Ghaddar, K. Boyina, K. Chettiar, **M.J. Hoque**, M. Baker, P. Bhalerao, S. Reagen, and N. Miljkovic, “Performance comparison of refrigerators integrated with superhydrophobic and superhydrophilic freezer evaporators”, *Appl. Phys. Lett.* 123, 051602 (2023). <https://doi.org/10.1063/5.0157647>
35. N. Gomez, P. Mwebaze, M. Khanna, B. Branham, A. Time, EH. DeLucia , C. Bernacchi, A. Knapp, **M.J. Hoque**, X. Du, E. Blanc-Betes, G.A. Barron-Gafford, B. Peng, K. Guan, J. Macknick, R. Miao, N. Miljkovic “Agrivoltaics to sustainably intensify energy and food production – knowns, uncertainties and challenges”, *Cell Reports Physical Science* 4, 101518, August 16, 2023. <https://doi.org/10.1016/j.xcrp.2023.101518>.
36. I. Zarin, G. Arissi, E. Barias, **M.J. Hoque**, J. Ma, K. F. Rabbi, and N. Miljkovic, “Characterization of nanoscale pinhole defects 2 in hydrophobic coatings using copper 3 electrodeposition”, *Appl. Phys. Lett.* 123, 2023. <https://doi.org/10.1063/5.0172805>
37. P. Jin, X. Yan, **M.J. Hoque**, K. F. Rabbi, S. Sett, J. Ma, J. Li, X. Fang, J. Carpenter, S. Cai, W. Tao, N. Miljkovic, “Ultra-low ice-substrate adhesion and self-deicing during droplet impact freezing”, *Cell Reports Physical*

- Science*, 100894, 2022. <https://doi.org/10.1016/j.xcrp.2022.100894>
38. J. Ma, Z. Zheng, **M.J. Hoque**, L. Li, K. F. Rabbi, J. Ho, P. Braun, P. Wang, N. Miljkovic, “A Lipid-Inspired Highly Adhesive Interface for Durable Superhydrophobicity in Wet Environments and Stable Jumping Droplet Condensation”, *ACS nano* 16 (3), 4251-4262, 2022. <https://doi.org/10.1021/acsnano.1c10250>
 39. X. Yan, B. Ji, L. Feng, X. Wang, D. Yang, K. F. Rabbi, Q. Peng, **M.J. Hoque**, P. Jin, E. Bello, S. Sett, M. Alleyne, D. M. Cropek, N. Miljkovic, “Particulate-Droplet Coalescence and Self-Transport on Superhydrophobic Surfaces”, *ACS Nano*, 16, 8, 12910–12921 2022. <https://doi.org/10.1021/acsnano.2c05267>
 40. H. Woo, H. Woo, K. Zhou, S. Kim, A. Manjarrez, **M.J. Hoque**, T. Seong, and L. Cai, “Visibly Transparent and Infrared Reflective Coatings for Personal Thermal Management and Thermal Camouflage” *Advanced Functional Materials*, , 32, 2201432, 2022. <https://doi.org/10.1002/adfm.202201432>
 41. X. Yan, F. Chen, C. Zhao, X. Wang, L. Li, S. Khodakarami, K. F. Rabbi, J. Li, **M.J. Hoque**, F. Chen, J. Feng, N. Miljkovic, “Micro-Scale Confinement and Wetting Contrast Enable Enhanced and Tunable Condensation” *ACS Nano* 2022, 16, 6, 9510–9522. <https://doi.org/10.1021/acsnano.2c02669>
 42. K. F. Rabbi, J. Ho, X. Yan, J. Ma, **M.J. Hoque**, S. Sett, N. Miljkovic, “Polydimethylsiloxane-Silane Synergy enables Dropwise Condensation of Low Surface Tension Liquids”, *Advanced Functional Materials*, 32 (19), 2112837, 2022. <https://doi.org/10.1002/adfm.202112837>
 43. Y. Wu, **M.J. Hoque**, M.H. Mahmud, E. Allee, A. Lad, Y. Zhao, A. Mantooth, N. Miljkovic, “Electrothermal-Control Co-Design of an All Silicon Carbide 2× 250 kW Dual Inverter for Heavy-Duty Traction Applications”, *IEEE Transactions on Industry Applications* 58 (1), 505-516, 2022. <https://doi.org/10.1109/TIA.2021.3127144>
 44. J. Ma, J. Kim, **M.J. Hoque**, S. Nam, D. G. Cahill, N. Miljkovic, “Role of thin film adhesion on capillary peeling,” *Nano Letters*, 21(23), 2021. <https://doi.org/10.1021/acs.nanolett.1c03494>
 45. X. Yan, Y. Qin, F. Chen, R. Zhao, S. Sett, H. Wang, **M.J. Hoque**, K.F. Rabbi, X. Zhang, Z. Wang, L. Li, Q. Peng, Z. Huang, F. Chen, J. Feng, N. Miljkovic, “Laplace Pressure Driven Single Droplet Jumping on Structured Surfaces,” *ACS Nano*, Oct, 2020. <https://doi.org/10.1021/acsnano.0c03487>
 46. H. Zhao, C. Deshpande, L. Li, X. Yan, **M.J. Hoque**, G. Kuntumalla, M. C Rajagopal, H. Chang, Y. Meng, S. Sundar, P. Ferreira, C. Shao, S. Srinivasa, S. Sinha, N. Miljkovic, “Extreme Anti-Scaling Performance of Slippery Omniphobic Covalently Attached Liquids,” *ACS Applied Materials & Interfaces*, 12(10), 2020. <https://doi.org/10.1021/acsnano.0c03487>
 47. X. Yan, F. Chen, X. Zhang, Y. Qin, C. Zhao, S. Sett, H. Cha, **M.J. Hoque**, F. Zhao, Z. Huang, N. Miljkovic, “Atmosphere-Mediated Scalable and Durable Biphilicity on Rationally Designed Structured Surfaces,” *Advanced Materials Interfaces*, (2000475), 2020. <https://doi.org/10.1002/admi.202000475>
 48. H. Chang, M.C Rajagopal, **M.J. Hoque**, J. Oh, L. Li, J. Li, H. Zhao, G. Kuntumalla, S. Sundar, Y. Meng, C. Shao, P. Ferreira, S. Salapaka, S. Sinha, N. Miljkovic, “Composite Structured Surfaces for Durable Dropwise Condensation,” *International Journal of Heat and Mass Transfer*, 156(2020) 119890.
 49. S.M. Razavi, J. Oh, S. Sett, L.Feng, X. Yan, **M.J. Hoque**, A. Liu, R. Haasch, M. Masoomi, R. Bagheri, and N. Miljkovic, “Superhydrophobic Surfaces Made from Naturally Derived Hydrophobic Materials,” *ACS Sustainable Chem. Eng.*, 2017, 5(12), 11362-11370. <https://doi.org/10.1021/acssuschemeng.7b02424>

PAPERS AND PRESENTATIONS IN REFEREED CONFERENCE PROCEEDINGS

1. **M. J. Hoque**, N. Miljkovic, Tailoring Surface Chemistry and Surface Roughness to Enable the Long-Term Stable Dropwise Condensation, 10th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics 26-30 August 2024, Rhodes Island, Greece.
2. V. Garimella, D. Yoo, T. Gebrael, H. Qiu, S. A. Haider, **M. J. Hoque**, Nenad Miljkovic, **Electrostatic** Oil-Refrigerant Separation, 10th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics 26-30 August 2024, Rhodes Island, Greece.
3. **M.J. Hoque**, L. Li, J. Ma, H. Cha, S. Sett, X. Yan, K. F. Rabbi, J. Y. Ho, S. Khodakarami, J. Suwala, and N. Miljkovic, “Resilient multi-layer fluorinated diamond like carbon films promote the stable dropwise condensation of steam for high-performance energy generation”, Gordon Research Conference, Tuscany, Italy, 2023.
4. **M.J. Hoque**, L. Li, J. Ma, H. Cha, S. Sett, X. Yan, K. F. Rabbi, J. Y. Ho, S. Khodakarami, J. Suwala, and N. Miljkovic, “Ultra-Resilient Multi-Layer Fluorinated Diamond Like Carbon Hydrophobic Films Promote the Stable Dropwise Condensation of Steam”, 3rd Conference on Micro Flow and Interfacial Phenomena (μFIP) June 18-21, 2023, Evanston, Illinois 2023. **(Received Best Poster Award)**
5. **M.J. Hoque**, X. Yan, Y. Feng, A. Qiu, J. Li, and N. Miljkovic, “How Many Frosting and Defrosting Cycles Can a Structured Anti-Frosting Surface Take: A Durability Study”, Summer Heat Transfer Conference, Washington DC, 2023.
6. **M. J. Hoque**, S. Khodakarami, A. Solecki, Wentao Yang, P. Kabirzadeh, N. Stokowski, A. Stillwell, A. Chatterji, E. Lovelace, N. Miljkovic, “Efficient and Rapid Electro-Thermal Pulse Deicing, Defrosting, and Desnowing for Electrified Aircraft Systems” Proceedings of the 2023 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, InterPACK2023, San Diego, CA, October 24-26, 2019.

7. **M.J. Hoque**, N. Miljkovic, “Additive Manufactured Hybrid Cold Plates for Efficient Thermal Management of High Power Density Electronics”, Proceedings of the 2019 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, InterPACK2019, Anaheim, CA, October 7-9, 2019.
8. **M.J. Hoque**, A.A. Günay, A. Stillwell, Y. Gurumukhi, R.C.N. Pilawa-Podgurski, N. Miljkovic, “Modular Heat Sinks for Enhanced Thermal Management of Electronics”, Proceedings of the 2019 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, InterPACK2019, Anaheim, CA, October 7-9, 2019.
9. Y. Gurumukhi, **M.J. Hoque**, H. Qiao, M.K. Sung, X. Lu, T. Fillipi, A. Alleyne, K. Goodson, M. Asheghi, N. Miljkovic, “Thermal Management of Fast Charging Systems for Electrified Vehicles”, Proceedings of the 2019 ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, InterPACK2019, Anaheim, CA, October 7-9, 2019.
10. **M.J. Hoque**, N. Upot, N. Miljkovic, “Additive Manufacturing of Hybrid Cold Plates to Enable Ultra-High Gravimetric Power Density Electronics”, Proceedings of the 17th International Conference on Nanochannels, Microchannels and Minichannels, ICNMM2019, St. Johns Convention Centre, St. John's, Newfoundland, Canada, June 23-26, 2019.
11. **M. J. Hoque**, N. Miljkovic, “Stamping process to characterize hybrid surfaces for dropwise condensation”, Proceedings of the 2018 ASME International Mechanical Engineering Congress & Exposition, IMECE2018, Pittsburgh, PA, November 9-15, 2018.
12. **M. J. Hoque**, L. Li, N. Miljkovic, “Durability of Polymer Coating for Dropwise Condensation”, Proceedings of the 2018 ASME International Mechanical Engineering Congress & Exposition, IMECE2018, Pittsburgh, PA, November 9-15, 2018.
13. **M.J. Hoque**, N. Miljkovic, “Light-Weight Hybrid Cold Plates for Isothermalization of Electronics”, Proceedings of the 2019 ASME Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, InterPACK2019, Anaheim, CA, October 7-9, 2019.
14. **M. J. Hoque**, S. Kim, N. Miljkovic, “Visualization of droplet nucleation on patterned superhydrophobic-hydrophilic hybrid surfaces”, Proceedings of the 2018 ASME International Mechanical Engineering Congress & Exposition, IMECE2018, Pittsburgh, PA, November 9-15, 2018.

INVITED TALKS

1. **Florida International University**, Functional Surfaces and Devices for Sustainable Decarbonization, March 14, 2024.
2. **Tennessee Tech University**, Functional Surfaces and Devices for Sustainable Decarbonization, March 1, 2024.
3. **Villanova University**, Functional Surfaces and Devices for Sustainable Decarbonization, February 19, 2024.
4. **Bangladesh University of Engineering and Technology**, Functional Surfaces and Devices: Paving the Way for Sustainable Industrial Decarbonization, January 16, 2024.
5. **NSF-FAPESP Center-to-Center meeting in São Paulo Brazil**, Data-driven Reliability of Carbon-based Energy Conversion, Capture and Storage Systems, November 29, 2023.
6. **South Dakota School of Mines & Technology**, Functional Surfaces for Sustainable Energy Generation and Carbon Footprint Reduction, February 27, 2023.

TEACHING AND MENTORING EXPERIENCE

Classroom Experience

1. **ME 320-Heat Transfer**, Lecture on condensation heat transfer section to undergraduate class, Fall 2019, Fall 2021, Spring 2023, Fall 2024 **UIUC**.
2. **TAM335-Introductory Fluid Mechanics**, instructed undergraduate students on fluid mechanics laboratory classes, Fall 2016 and Spring 2017, **UIUC**.
3. Instructor of **ME 165: Basic Mechanical Engineering**, Fall 2015, **BUET**.
4. Instructor of **ME 267: Mechanical Engineering Fundamentals**, Spring 2016, **BUET**.
5. Lab Instructor of **ME 160: Mechanical Engineering Drawing-I**, **ME 172: Computer Programming Language Sessional**, **ME 262: Numerical Analysis Sessional**, **ME 422: Fluid Machinery Sessional**, **ME 304: Heat and Mass Transfer Sessional**, **ME 306: Heat Transfer Sessional**, **ME 404: Steam Laboratories Sessional**. March 2013-July 2016, **BUET**.

6. Instructor for Fundamental of Heat Transfer, Mechanical of Machineries, Fall 2015-Spring 2016, Institution of Engineers, Bangladesh.
7. Instructor for Mechanical Engineering Drawing, Mechanical Engineering Fundamentals, August 2014- June 2015, Barishal University, Bangladesh.

Mentoring Experience (Graduate and Undergraduate Students)

1. Aniket Lad- Mentored during his first two years of doctoral research on modeling, manufacturing and characterizing of advanced cooling solutions for high density power electronics. He recently finished his Ph.D.
2. Saif Al Afsan-Mentoring his doctoral research on different functional surface fabrication and characterization.
3. Haoyun Qui-Supervised and guided him during his junior and senior year research and he is currently pursuing his PhD at UIUC.
4. Derrick Liu- Supervised and advised during his undergraduate research and currently he is pursuing MS at University of Michigan.
5. Sakshi Agarwala- Supervised and advised during her senior year research at UIUC on biphilic surface fabrication. Currently she is pursuing MS at UIUC.
6. Jackson Stemmer- currently supervising his work on the durability of functional surfaces under extreme environments.
7. Brisa McGrath- Supervising her on the study on scale formation behavior on different functional surfaces.
8. Ashrith Keshireddy- Supervising him on the study of in plane droplet movement on patterned slippery liquid infused surfaces.
9. Shiven Grag- Supervising him on the study of frost growth dynamics on engineered surfaces.
10. Ahmad Al-Juboory- Supervising him on the microstructure fabrication and functionalization of shape memory alloys.
11. Archit Jahagirdar- Working on the Development of an Automated Scalable Biphilic Surface Fabrication Facility.
12. Ankit Shivkumar- Working on Exploring Novel Ideas for Long-Term Thermal Energy Storage.
13. S.G. Siddanth- Working on Data Center Cooling Architectures.
14. David Libes- Worked on a contactless respraying system for slippery liquid-infused surfaces. He is currently pursuing his master's degree at Columbia University.
15. Yintao Zhou – Currently a master's student at the University of California, Berkeley. Previously worked on the durability studies of functional surfaces in extreme environments.
16. Joyce Shim Kim – Currently an undergraduate at UIUC, working on laser-engraved surfaces for phase change heat transfer.
17. Milena Savic – Currently an undergraduate at UIUC, working on the fabrication of porous surfaces for heat transfer applications.
18. Yichen Yang – Worked on defrosting with different functional surfaces. He is currently a PhD student at Georgia Tech.
19. Sam Rutledge – Currently an undergraduate at UIUC. He is working on the characterization of green hydrophobic chemistry.
20. Sidney Cardoso – An undergraduate researcher from Brazil, working on the development of novel etching chemistry for common engineering metals.

ACADEMIC AND PROFESSIONAL ACTIVITIES

Grant Writing Experience (Role: Co-PI, Technical writing, and organizing)

- **Air Conditioning and Refrigeration Center (ACRC)**
Topic: Coating, Durability, Heat Exchanger; Timeline: 2020-2024; Awarded: \$300K (multiple projects)
- **Center for Power Optimization of Electro-Thermal Systems (POETS)**
Topic: Thermal Management of Power Electronics; Timeline: 2019-2024 Awarded: \$300K (multiple projects)
- **Advanced Research Projects Agency–Energy (ARPA-E)**
Topic: Data Center Cooling; Timeline: 2022
- **Department of Energy (DOE)**
Topic: Agrivoltaics, Agriculture-Energy Impact; Timeline: 2022
- **Navy Nuclear Laboratory**
Topic: Engineered and Functional Surfaces, Durability; Timeline: 2022-2024; Awarded: \$468K
- **NSF EAGER**
Topic: Green chemistry for functional surfaces; Timeline: 2024-2025; wrote as Co-PI
- **BP-ICAM**
Topic: Thermal Management Fluids for Electronics; Timeline: 2024-2026; Awarded: \$500k
- **NSF Engineering Fellowship**
Topic: Eco-friendly Cooling Architecture for Data Centers; Timeline: 2024-2025; submitted as Co-PI

Book Chapters

- **M. J. Hoque**, Aniket Lad, Nenad Miljkovic, “Additively Manufactured Hybrid Thermal Solution for High Density Power Electronics”, Wide Bandgap Power Electronics: Emerging Converter Technologies and Applications, under a contract with Springer Nature.

Patents

- S. Khodakarami, N. Miljkovic, L. Li, **M. J. Hoque**, A. Solecki, P. Kabirzadeh, W. Yang, A. Stillwell, N. Stokowski, electro-thermal multilayer, system, and method for defrosting, desnowing and deicing, Application # Pending.

Professional Society Membership

- American Society of Mechanical Engineering
- Materials Research Society

Referee For

- Nature Communications (2024)
- Cell Reports Physical Science (2022, 2024)
- ACS Nano (2022)
- ACS Applied Materials & Interfaces (2022-2024)
- Advanced Materials Interfaces (2022-2024)
- Droplet (2022-2023)
- Chemical Society Reviews (2022)
- Itherm (2020-2022)

Conferences

- Co-chair of Gordon Research Seminar (GRS), 2023
- Co-chair of Heat and Mass Transport Track k16, IMECE 2018

PROJECT MANAGEMENT EXPERIENCE

Advanced Research Projects Agency-Energy (ARPA-E), Office of Naval Research (ONR), Navy Nuclear Laboratory (NNL), Caterpillar, Ford, PPG, United States Department of Agriculture (USDA)

LEADERSHIP EXPERIENCE

Worldwide Youth in Science and Engineering Program (WYSE Camp)

Camp Coordinator

July 2019 and 2021

Summer Research Opportunities Program

Research Team Leader

June-July 2019

Bangladeshi Student Association

President

RSO, UIUC

Aug. 2017-July 2018

WORK AUTHORIZATION

Authorized to work permanently in the United States as a Green Card holder.