

JINGCHENG MA

Assistant Professor
Department of Aerospace and Mechanical Engineering
University of Notre Dame

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EDUCATION

University of Illinois at Urbana-Champaign
Ph.D., Mechanical Engineering
Advisors: Nenad Miljkovic; David G. Cahill
Thesis Committee: Paul V. Braun; Anthony M. Jacobi

Urbana-Champaign, IL
Aug. 2017 – May 2022

Shanghai Jiao Tong University
B.S., Mechanical Engineering

Shanghai, China
Sep. 2013 – July 2017

EMPLOYMENT

University of Notre Dame
Assistant Professor (100%)
Department of Aerospace and Mechanical Engineering
Bioengineering graduate program

Notre Dame, IN
Aug. 2024 – Present

University of Chicago
Postdoctoral Research Associate, The James Franck Institute
Advisor: Bozhi Tian

Chicago, IL
June 2022 – June 2024

University of Illinois at Urbana-Champaign
Graduate Research Assistant
Department of Mechanical Science and Engineering
Advisors: Nenad Miljkovic; David G. Cahill

Urbana, IL
Aug. 2017 – May 2022

AWARDS

2022 Stanley I. Weiss Outstanding Dissertation Award
2020 PPG-MRL Travel Award
2020 PPG-MRL Graduate Research Fellowship
2019 AVS Dorothy M. and Earl S. Hoffman Travel Award
2018 UIUC MechSE Art of Science Award
2017 Excellent Undergraduate Student in Shanghai
2015 Undergraduate Research Awards & Grants (\$7,600 in total)

PAPERS IN REFEREED JOURNALS

Under review
(*Equal contribution. †Corresponding author.)

1. Airborne biomarker localization engine (ABLE) for open air point-of-care detection
J. Ma[†], M. Laune, P. Li, J. Lu, J. Yue, Y. Yu, J. Little, K. Oliphant, Z. Kessler, E. C. Claud[†], B. Tian[†]. Under peer review.

Publications

2. A bioinspired permeable junction approach for sustainable device microfabrication
C. Yang[†], P. Li, C. Wei, A. Prominski, J. Yue, J. Ma, J. Zhang, C. Sun, B. Ashwood, W. Li, J. Shi, F. Shi, P. Griffin, L. Jin[†], B. Tian[†]
Nature Sustainability. 2024. DOI: [10.1038/s41893-024-01389-5](https://doi.org/10.1038/s41893-024-01389-5)
3. A composition-nanoarchitecture-performance analysis of high energy density electrodeposited silicon for lithium-ion battery anodes
N. J. Fritz, H. Jeong, B. Zahiri, P. Sun, G. Singhal, M. A. Caple, Z. Yang, J. Ma, M. Choi, J. B. Cook, N. Miljkovic, D. G. Cahill, P. V. Braun[†]
ACE Applied Energy Materials. 2024, 7, 14, 5957-5966. DOI: [10.1021/acsaem.4c00941](https://doi.org/10.1021/acsaem.4c00941)
4. Monolithic-to-focal morphing biointerfaces in tissue regeneration and bioelectronics
J. Shi*, Y. Lin*, P. Li, P. Mickel, C. Sun, K. Parekh, J. Ma, S. Kim, B. Ashwood, L. Meng, Y. Luo, S. Chen, H. Tsai, C. M. Cham, J. Zhang, Z. Cheng, E. B. Chang, P. Král[†], J. Yue[†], B. Tian[†]
Nature Chemical Engineering. 2024, 1, 73-86. DOI: [10.1038/s44286-023-00008-y](https://doi.org/10.1038/s44286-023-00008-y)
5. Bridging the gap - Thermofluidic designs for precision bioelectronics
J. Ma*[†], A. Majmudar*, B. Tian[†]
Advanced Healthcare Materials. 2023, 2302431. DOI: [10.1002/adhm.202302431](https://doi.org/10.1002/adhm.202302431)
6. Characterization of nanoscale pinhole defects in hydrophobic coatings using copper electrodeposition
I. Zarin, G. Arissi, E. Barias, J. Ma, K. F. Rabbi, N. Miljkovic[†]
Applied Physics Letters. 2023, 123, 231602. DOI: [10.1063/5.0172805](https://doi.org/10.1063/5.0172805)
7. Resilient multi-layer fluorinated diamond like carbon hydrophobic surfaces
M. J. Hoque*, L. Li*, J. Ma*, H. Cha, S. Sett, X. Yan, K. Suwala, N. Miljkovic[†]
Nature Communications. 2023, 14, 4902. DOI: [10.1038/s41467-023-40229-6](https://doi.org/10.1038/s41467-023-40229-6)
8. Perspectives on superhydrophobic surface durability
M. J. Hoque, J. Ma, K. F. Rabbi, X. Yan, B. P. Singh, N. V. Upot, W. Fu, J. Kohler, T. S. Thukral, S. Dewanjee, N. Miljkovic[†]
Applied Physics Letters. 2023, 123, 110501. DOI: [10.1063/5.0164927](https://doi.org/10.1063/5.0164927)
9. Defect-density-controlled phase-change phenomena
M. J. Hoque, X. Yan, H. Qiu, Y. Feng, J. Ma, J. Li, X. Du, M. Linjawi, S. Agarwala, N. Miljkovic[†]
ACS Applied Materials & Interfaces. 2023, 15(11). DOI: [10.1021/acsaami.2c20938](https://doi.org/10.1021/acsaami.2c20938)
10. Direct measurement of solid-liquid interfacial energy using a meniscus
J. Ma[†], I. Zarin, N. Miljkovic[†].
Physical Review Letters. 2022, 129 (24), 246802. DOI: [10.1103/PhysRevLett.129.246802](https://doi.org/10.1103/PhysRevLett.129.246802).

11. Slippery omniphobic covalently attached liquid coatings mitigate carbon deposition by autooxidation of jet fuel
S. Khodakarami, H. Zhao, K. F. Rabbi, Q. Wu, J. Ma, N. Miljkovic[†]
Cell Reports Physical Science. 2022, 100859. [DOI: 10.1016/j.xcrp.2022.100859](https://doi.org/10.1016/j.xcrp.2022.100859)
12. Ultra-low ice-substrate adhesion and self-deicing during droplet impact freezing
P. Jin, X. Yan, M. J. Hoque K. F. Rabbi, S. Sett, J. Ma, J. Carpenter, S. Cai, W. Tao[†], N. Miljkovic[†]
Cell Reports Physical Science. 2022, 100859. [DOI: 10.1016/j.xcrp.2022.100894](https://doi.org/10.1016/j.xcrp.2022.100894)
13. A lipid-inspired highly adhesive interface for durable superhydrophobicity in wet environments and stable jumping droplet condensation
J. Ma^{*†}, Z. Zheng^{*}, M. J. Hoque, L. Li, P. V. Braun, P. Wang, N. Miljkovic[†]
ACS Nano. 2022, 16(3), 4251–4262. [DOI: doi.org/10.1021/acsnano.1c10250](https://doi.org/10.1021/acsnano.1c10250)
14. High-efficiency cooling via the monolithic integration of copper on electronic devices
T. Gebrael, J. Li, A. Gamboa, J. Ma, J. Schaadt, L. Horowitz, R. Pilawa-Podgurski[†], N. Miljkovic[†]
Nature Electronics. 2022, 5, 394 - 402. [DOI: 10.1038/s41928-022-00748-4](https://doi.org/10.1038/s41928-022-00748-4)
15. Biphilic jumping-droplet condensation
M. J. Hoque, S. Chavan, R. Lundy, L. Li, J. Ma, S. Lei, N. Miljkovic[†], R. Enright[†]
Cell Reports Physical Science. 2022, 3(4), 100823. [DOI: 10.1016/j.xcrp.2022.100823](https://doi.org/10.1016/j.xcrp.2022.100823)
16. Scalable siloxane-silane surfaces enable dropwise condensation of low surface tension liquids
K. F. Rabbi, J. Y. Ho, X. Yan, J. Ma, S. Sett, M. J. Hoque, N. Miljkovic[†]
Advanced Functional Materials. 2022, 202112837. [DOI: 10.1002/adfm.202112837](https://doi.org/10.1002/adfm.202112837)
17. Opportunities in nanoengineered surface designs for enhanced condensation heat and mass transfer (invited review)
J. Y. Ho, S. Khodakarami, K. F. Rabbi, J. Ma, K. Boyina, N. Miljkovic[†]
Journal of Heat Transfer. 2022, 144(5): 050801. [DOI: 10.1115/1.4053454](https://doi.org/10.1115/1.4053454)
18. Role of thin film adhesion on capillary peeling
J. Ma[†], J. M. Kim, M. J. Hoque, K. Thompson, S. Nam, D. G. Cahill, N. Miljkovic[†]
Nano Letters. 2021, 21(23), 9983–9989. [DOI: 10.1021/acs.nanolett.1c03494](https://doi.org/10.1021/acs.nanolett.1c03494)
19. Superior anti-degeneration hierarchical nanoengineered wicking surfaces for boiling enhancement
J. Li, Y. Zhao, J. Ma, W. Fu, X. Yan, K. F. Rabbi, N. Miljkovic[†]
Advanced Functional Materials. 2021, 202108836. [DOI: 10.1002/adfm.202108836](https://doi.org/10.1002/adfm.202108836)
20. Ultra-thin self-healing vitrimer coatings for durable hydrophobicity
J. Ma^{*}, L. E. Porath^{*}, M. F. Haque, S. Sett, K. F. Rabbi, S. Nam, N. Miljkovic[†], C. M. Evans[†]
Nature Communications. 2021, 12, 5210. [DOI: 10.1038/s41467-021-25508-4](https://doi.org/10.1038/s41467-021-25508-4)
Top 25 Chemistry and Materials Sciences Articles in 2021
21. Fabrication optimization of ultra-scalable nanostructured aluminum-alloy surfaces
L. Li, Y. Lin, K. F. Rabbi, J. Ma, Z. Chen, A. Patel, W. Su, X. Ma, K. Boyina, S. Sett, D. Mondal, N. Tomohiro, F. Hirokazu, N. Miljkovic[†]
ACS Applied Materials & Interfaces. 2021, 13(36). [DOI: 10.1021/acsmi.1c08051](https://doi.org/10.1021/acsmi.1c08051)

22. Scalable slippery omniphobic covalently attached liquid coatings for flow fouling reduction
H. Zhao, S. Khodakarami, C. Anand, J. Ma, Q. Wu, S. Sett, N. Miljkovic[†]
ACS Applied Materials & Interfaces. 2021, 13(32). [DOI: 10.1021/acsami.1c08845](https://doi.org/10.1021/acsami.1c08845)
23. Recent developments, challenges, and pathways to stable dropwise condensation: a perspective (invited perspective paper)
J. Ma, S. Sett, H. Cha, X. Yan, N. Miljkovic[†]
Applied Physics Letters. 2020, 116, 260501. [DOI: 10.1063/5.0011642](https://doi.org/10.1063/5.0011642)
Top 20 APL Articles in 2020
24. Condensation induced blistering as a measurement technique for the adhesion energy of nanoscale polymer films
J. Ma[†], D. G. Cahill, N. Miljkovic[†]
Nano Letters. 2020, 20(5), 3918-3924. [DOI: 10.1021/acs.nanolett.0c01086](https://doi.org/10.1021/acs.nanolett.0c01086)
25. Condensation induced delamination of nanoscale hydrophobic films
J. Ma[†], H. Cha, M. Kim, D. G. Cahill, N. Miljkovic[†]
Advanced Functional Materials. 2019, 29(43), 1905222. [DOI: 10.1002/adfm.201905222](https://doi.org/10.1002/adfm.201905222)
26. In-situ droplet microgoniometry using optical microscopy
H. Cha, J. Ma, YS. Kim, L. Li, L. Sun, J. Tong, N. Miljkovic[†]
ACS Nano. 2019, 13 (11), 13343-13353. [DOI: 10.1021/acsnano.9b06687](https://doi.org/10.1021/acsnano.9b06687)
27. Controlling the contact times of bouncing droplets: droplet impact on vibrating surfaces
P. B. Weisensee, J. Ma, N. Miljkovic[†], W. P. King[†]
Journal of Heat Transfer. 2018, 140(3): 030901. [DOI: 10.1115/1.4039166](https://doi.org/10.1115/1.4039166)
28. Droplet impact on vibrating superhydrophobic surfaces
P. B. Weisensee*, J. Ma*, Y. H. Shin, Y. Chang, J. Tian, W. P. King[†], N. Miljkovic[†]
Physical Review Fluids. 2017, 2(10), 103601. [DOI: 10.1103/PhysRevFluids.2.103601](https://doi.org/10.1103/PhysRevFluids.2.103601)
29. Entropy generation of supercritical water in a vertical tube with concentrated incident solar heat flux on one side
G. Zhang, Y. Li, J. Ma, R. Wang[†]
Int. J. Heat Mass Transfer. 2017, 108, 172-180. [DOI: 10.1016/j.ijhmt.2016.12.010](https://doi.org/10.1016/j.ijhmt.2016.12.010)

PATENTS

1. Hydrophobic, self-Healing coating and coated substrate, and fabrication method
N. Miljkovic, C. M. Evans, J. Ma, L. E. Porath.
Application #: US 63/263,551
2. Nanostructured surfaces for collecting exhaled breath condensate for biosensing, and fabrication method
B. Tian, J. Ma, P. Li, Z Kessler.
U.S. Provisional application Ser. No. 63/483,806.
3. Scalable and robust double-layer coating having lipid-like and non-polar interface for stable dropwise condensation, and fabrication method

N. Miljkovic, J. Ma.

In process at the UIUC Office of Technology Management

4. Self-powered anti-scaling system for solar thermal collectors
J. Ma, Z. Zhang, Z. Zhao, R. Wang. CN104913533B (2017)

CONFERENCES & PRESENTATIONS

1. 2023 MRS Fall Meeting & Exhibit – Meet the New Faculty Candidate Poster Session. Massachusetts, USA, Nov 29, 2023.
[Poster] J. Ma: Precise Bioelectronics by Synergetic Thermofluidic Designs
2. 2023 MRS Fall Meeting & Exhibit – CH01: Advanced Characterization Methods of Energy Material Applications. Massachusetts, USA, Nov 28, 2023.
[Talk] I. Zarin, J. Ma, N. Miljkovic: Direct Measurement of Solid-Liquid Interfacial Energy Using a Meniscus
3. Micro Flow and Interfacial Phenomena (μ FIP) Conference, Illinois, USA, June 20, 2023.
[Poster] J. Ma, I. Zarin, N. Miljkovic: Direct Measurement of Solid-Liquid Interfacial Energy Using a Meniscus
4. 2021 MRS Fall Meeting & Exhibit - EN03: Thermal Materials, Modeling and Technoeconomic Impacts for Thermal Management and Energy Application. Massachusetts, USA, Dec 6, 2021
[Talk] J. Ma, Z. Zheng, P. V. Braun, P. Wang, N. Miljkovic: Achieving long-term dropwise condensation with cell-inspired interfaces
5. 2021 MRS Spring Meeting & Exhibit - SM05: Progress in Multimaterials and Multiphase-Based Multifunctional Materials, Online, Apr 17-23, 2021
[Talk] J. Ma, L. Porath, C. Evans, N. Miljkovic: Self-healing vitrimer coating for robust hydrophobicity
6. 2021 MRS Spring Meeting & Exhibit - ST02: In Situ Mechanical Testing of Materials at Small Length Scales, Modeling and Data Analysis, Online, Apr 17-23, 2021
[Talk] J. Ma, D. Cahill, N. Miljkovic: Condensation induced blistering as a measurement technique for adhesion energy of nanoscale polymer films
7. NSF Workshop: New Frontiers of Thermal Transport - Thermal Management, Dec 15, 2020
[Poster] S. Sett, J. Ma, K. F. Rabbi, J. Y. Ho, X. Yan, N. V. Upot, N. Miljkovic: Surface engineering for next-generation phase-change heat transfer
8. AVS International Symposium and Exhibition, Thin Film Division. Colorado, USA, Oct 25, 2020
[Talk. Cancelled due to COVID-19 pandemic] J. Ma, N. Miljkovic: High spatial and temporal resolution characterization of polymer thin film adhesion using condensation induced blistering
9. AVS International Symposium and Exhibition, Thin Film Division. Ohio, USA, Oct 20-25, 2019
[Talk] J. Ma, N. Miljkovic: The origins of condensation-driven degradation of hydrophobic thin films

10. Gordon Research Conference. Micro and Nanoscale Phase Change Heat Transfer - The Effects of Hydrodynamic, Interfacial and Intermolecular Forces on Phase Change, Italy, February 3-8, 2019 [Poster] J. Ma, H. Cha, M. Kim, D. G. Cahill, N. Miljkovic: The origins of condensation-driven degradation of hydrophobic thin films
11. Proceedings of the 3rd International Conference on Droplets, UCLA, USA, July 24 -26, 2017 [Talk] P. B. Weisensee, J. Ma, J. Tian, W. P. King, N. Miljkovic: Water droplet impact dynamics on active and passive vibrating surfaces
12. ASME Summer Heat Transfer Conference, SHTC 2017, Washington, USA, July 9-14, 2017 [Talk] P. B. Weisensee, J. Ma, Y. H. Shin, Y. Chang, J. Tian, W. P. King, N. Miljkovic: Controlling the contact times of bouncing droplets: droplet impact on vibrating surfaces

TEACHING EXPERIENCE

1. AME 70671 – Thermofluids Designs in Biomedicine, Fall 2024, University of Notre Dame.

TALKS & SEMINARS

1. “From Heat to Health: Surface engineering of complex phase transition”, Department of Physics, **Tulane University**, NO, March 14, 2024.
2. “From Heat to Health: Surface engineering of complex phase transition”, Department of Aerospace and Mechanical Engineering, **University of Notre Dame**, IN, February 1, 2024.
3. “Precise bioelectronics by synergetic thermofluidic designs”, Department of Mechanical Engineering, **University of Kansas**, KA, December 18, 2023.
4. “Precise bioelectronics by synergetic thermofluidic designs”, Department of Mechanical Engineering & Materials Science, **Washington University at St. Louis**, MO, November 2, 2023.
5. “KABOOM in a drying gel bead”, Department of Physics Baglunch, **University of Chicago**, IL, USA, Nov 17, 2022.
6. “Towards a clean energy future using thin and durable water-repellent coatings”, PPG-MRL joint conference, **University of Illinois Urbana Champaign**, IL, USA, April 6, 2022.

PROFESSIONAL ACTIVITIES

Session Chair for:

- EN03.14: Phonon Dynamics and Thermal Transport. **MRS Fall Meeting**, 2021, Boston, MA, USA.

Invited Reviews for:

- Interfacial Engineering program. Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET). **National Science Foundation**. March, 2024.
- Petroleum Research Fund. **American Chemical Society**. August, 2024.

Referee For:

- ACS Nano (2018, 2019)

- ACS Omega (2021, 2021)
- Physical Review Letters (2019, 2021)
- International Journal of Heat and Mass Transfer (2021, 2021, 2022)
- International Communications of Heat and Mass Transfer (2022, 2023, 2023, 2023)
- Applied Thermal Engineering (2019, 2024)
- Cell Reports Physical Science (2021)
- Proceedings of the National Academy of Sciences (2021)
- Chemical Society Reviews (2022)
- Langmuir (2022, 2023)
- Advanced Materials Interfaces (2023)
- Nature Communications (2023, 2023)
- Chemical Reviews (2023)
- Nature (2024)

MENTORING EXPERIENCE

At the University of Notre Dame:

1. Sai Prashanth Peri (Arizona State University M.S. Student) – Ph.D. student joining my lab in Spring 2025.
2. Yamin Mansur (Bangladesh University of Engineering and Technology B.S. Student) – Ph.D. student joining my lab in Spring 2025.
3. Amio Pronoy Das Ritwik (Bangladesh University of Engineering and Technology B.S. Student) – Ph.D. student joining my lab in Spring 2025.

At the University of Chicago:

4. Megan Laune (U. Chicago. Rotational Ph.D. student) - Supervising summer graduate research. Recruited as a Ph.D. student in my postdoc research group at the University of Chicago.
5. Aman Majmudar (U. Chicago. B.S. Student) - Supervising undergraduate research.

At the University of Illinois, Urbana-Champaign:

6. Ishrat Zarin (Univ. Illinois. Ph.D. Student) - Supervised graduate research. Recruited as a Ph.D. student in my Ph.D. research group at UIUC.
7. Kamila Thompson (Ohio State Univ. B.S. Student) - Supervised undergraduate research. Kamila was enrolled in the NSF REU program in 2021. Kamila is currently pursuing her Ph.D. in Electrical Engineering at Stanford University.
8. Yoshinori Furukawa (Kyushu Univ. B.S. Student) - Supervised undergraduate research.
9. Nicole Jeon (Univ. Illinois. B.S. Student) - Supervised and advised on undergraduate research.