H. Jeremy Cho, PhD

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Las Vegas, NV 89154-4027
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EDUCATION

Massachusetts Institute of Technology *2011–2017*
PhD in Mechanical Engineering with a Minor in Chinese
Thesis: Physicochemical Mechanics of Surfactant-Enhanced Boiling Heat Transfer
Core areas of interest: nanotechnology, heat and mass transfer, thermodynamics, interfacial science, physical chemistry, molecular mechanics

Massachusetts Institute of Technology *2009–2011*
SM in Mechanical Engineering
Thesis: Surface tension and electroporation of lipid bilayers

University of Michigan *2005–2009*
BSE in Mechanical Engineering with a Minor in Music
Experiences: Strain analysis of polymers, shape memory alloys

EXPERIENCE

Associate Professor at the University of Nevada, Las Vegas, Las Vegas, NV *2025–Present*
Mechanical Engineering

Assistant Professor at the University of Nevada, Las Vegas, Las Vegas, NV *2019–2025*
Mechanical Engineering

- Built an experimental research group in heat/mass transfer and soft matter physics
- Secured over **$3 million of funding as PI**
- Led a team of researchers in cutting-edge research on surfactant-mediated wetting phenomena, boiling heat transfer, atmospheric water harvesting, and electrochemical iron production

Co-Founder and Chief Science Officer of WAVR Technologies, Inc., Las Vegas, NV 2024–Present

- Co-founded a startup company based on own-invented atmospheric water harvesting technology
- Technology enables atmospheric water harvesting at lower humidities and faster rates compared to competitors
- Currently seeking seed-round funding to develop prototypes for B2B applications

Postdoctoral Research Associate at Princeton University, Princeton, NJ *2017-2019*
Chemical and Biological Engineering
Advisor: Professor Sujit S. Datta
Cracking and Healing Behavior of Shrinkable Granular Systems

- Built a universal understanding of how cracks occur in shrinkable granular materials by bridging the fields of soft matter physics, solid mechanics, and mass transfer using a combination of experiments and simulations
- Discovered a new mode of crack healing controlled by drying rate
- Developed a new particle-based simulation method for shrinkable granular systems

Surfactant Effects on Multiphase Porous Media Flow

- Identifying a new mode of oil scavenging in porous media flow using surfactants
- Utilizing a novel method of 3D flow visualization using confocal microscopy and refractive index-matched transparent porous media systems

Research Assistant and Postdoctoral Associate at MIT, Cambridge, MA *2009–2017*
Mechanical Engineering
Advisor: Professor Evelyn N. Wang

Physicochemical Mechanics of Surfactant-Enhanced Boiling Heat Transfer

- Identified molecular mechanism of how surfactants (detergents) can improve boiling performance, which is an energy intensive process used in domestic and industrial settings around the world
- Designed and built numerous experimental setups as well as refined existing experimental techniques and methodologies
- Developed theory to predict performance enhancement based on underlying surfactant chemistry
- Invented a novel way to actively control (turn on and off) boiling spatially and temporally using electric fields and charged surfactants

Surface Tension and Electroporation of Lipid Bilayers

- Investigated the use of artificial cell membranes to engineer new biomaterials for filtration technologies and lab-on-a-chip devices
- Formed lipid layers with Langmuir-Blodgett deposition and studied surface characteristics with atomic force microscope and goniometry

Research Intern at Samsung Electronics, Suwon, South Korea *Summer 2012*

- Researched heat transfer within human tissue for development of noninvasive cancer treatment devices
- Optimized heat-transfer simulation methods to increase performance by one hundredfold

Undergraduate Researcher at The University of Michigan, Ann Arbor, MI *2008–2009*
Mechanical Engineering
Advisor: Professor Samantha Daly

- Designed and built a mini tensile-testing experimental rig
- Tested mechanical stress of polymers used for medical implants in order to understand how they fail *in vivo*

PEER-REVIEWED JOURNAL PUBLICATIONS

B. Ortiz, I. Berk, S. Ricoy, **H. J. Cho**, "Separating the effects of diffusion and dilation during surfactant adsorption," *in preparation*.

M. Mata, **H. J. Cho**, "How boiling performance of is modified by charged surfactants with different chain lengths," *in preparation*.

I. Berk, E. Luong, **H. J. Cho**, "Beyond goniometry: 3D digital twinning of droplets from a single image," *Droplet*, p. e70065, 2026. doi: https://doi.org/10.1002/dro2.70065.

Y. Gao, A. Eason, S. Ricoy, A. Cobb, R. Phung, A. Kashani, M.R. Mata, A. Sahm, N. Ortiz, S. Rao, **H.J. Cho**, "High-yield atmospheric water capture via bioinspired material segregation," *Proceedings of the National Academy of Sciences*, vol. 121, no. 44, p. e2321429121, 2024. doi: https://10.1073/pnas.2321429121

M.R. Mata, M. Može, A. Hadžić, G. Lee, B. Naccarato, I. Berk, I. Golobič, **H.J. Cho**, "Changes in boiling controlled by molar concentration-dependent diffusion of surfactants", *International Journal of Heat and Mass Transfer*, vol. 233, p. 126008, 2024. doi: https://doi.org/10.1016/j.ijheatmasstransfer.2024.126008

A. Kashani, **H.J. Cho**, "The role of poroelastic diffusion in the transient wetting behavior of hydrogels", *Soft Matter*, vol. 20, p. 421, 2024. doi: https://10.0.4.15/D3SM01472J

M. Mata, B. Ortiz, D. Luhar, V. Evereux, **H.J. Cho**, "How dynamic adsorption controls surfactant-enhanced boiling," *Scientific Reports*, vol. 12, no. 1, p. 18170, 2022. doi: https://doi.org/10.1038/s41598-022-21313-1

Y. Gao, **H. J. Cho**, "Quantifying the trade-off between stiffness and permeability in hydrogels," *Soft Matter*, vol. 18, no. 40, pp. 7735–7740, 2022. doi: https://doi.org/10.1039/D2SM01215D

Y. Gao, N. K. K. Chai, N. Garakani, S. S. Datta, **H. J. Cho**, "Scaling laws to predict humidity-induced swelling and stiffness in hydrogels," *Soft Matter*, vol. 17, no. 43, pp. 9893–9900, 2021. doi: http://dx.doi.org/10.1039/D1SM01186C **Work featured on inside front cover.**

J-F Louf, N. B. Lu, M. G. O'Connell, **H. J. Cho**, S. S. Datta, "Under pressure: Hydrogel swelling in a granular medium," *Science Advances*, vol. 7, no. 7, pp. 3840–3847, 2021. doi: https://doi.org/10.1126/sciadv.abd2711

H. J. Cho, S. S. Datta, "Scaling law of cracking in shrinkable, granular packings," *Physical Review Letters*, vol. 123, no. 15, pp. 158004, 2019. doi: https://doi.org/10.1103/PhysRevLett.123.158004

H. J. Cho, E. N. Wang, "Bubble nucleation, growth, and departure: A new, dynamic understanding," *International Journal of Heat and Mass Transfer*, vol. 145, pp. 118803, 2019. doi: https://doi.org/10.1016/j.ijheatmasstransfer.2019.118803

H. J. Cho, N. B. Lu, M. P. Howard, R. A. Adams, S. S. Datta, "Crack formation and self-closing in shrinkable, granular packings," *Soft Matter*, vol. 15, no. 23, pp. 4689–4702, 2019. doi: https://doi.org/10.1039/C9SM00731H

C. Tian, J. Feng, **H. J. Cho**, S. S. Datta, R. K. Prud'homme, "Adsorption and denaturation of structured polymeric nanoparticles at an interface," *Nano Letters*, vol. 18, no. 8, pp. 4854–4860, 2018. doi: https://doi.org/10.1021/acs.nanolett.8b01434

H. K. Mutha, **H. J. Cho**, M. Hashempour, B. L. Wardle, C. V. Thompson, E. N. Wang, "Salt rejection in flow-between capacitive deionization devices," *Desalination*, vol. 437, pp. 154–163, 2018. doi: https://doi.org/10.1016/j.desal.2018.03.008

H. J. Cho, V. Sresht, E. N. Wang, "Predicting surface tensions of surfactant solutions from statistical mechanics," *Langmuir*, vol. 34, no. 6, pp. 2386–2395, 2018. doi: https://doi.org/10.1021/acs.langmuir.7b03749

H. K. Mutha, Y. Lu, I. Y. Stein, **H. J. Cho**, M.E. Suss, T. Laoui, B. L. Wardle, C. V. Thompson, E. N. Wang, "Porosimetry and packing morphology of vertically-aligned carbon nanotube arrays via impedance spectroscopy," *Nanotechnology*, vol. 28, no. 5, pp. 1–6, 2016. doi: https://doi.org/10.1088/1361-6528/aa53aa

H. J. Cho, D. J. Preston, Y. Zhu, E. N. Wang "Nanoengineered materials for liquid-vapour phase-change heat transfer", *Nature Reviews Materials*, vol. 2, p. 16092, 2016. doi: https://doi.org/10.1038/natrevmats.2016.92

H. Kim, **H. J. Cho**, S. Narayanan, S. Yang, H. Furukawa, S. Schiffres, X. Li, Y. Zhang, J. Jiang, O.M. Yaghi, E.N. Wang, "Characterization of Adsorption Enthalpy of Novel Water-Stable Zeolites and Metal-Organic Frameworks," *Scientific Reports*, vol. 6, pp. 1–8, January 2016. doi: https://doi.org/10.1038/srep19097

H. J. Cho, J. P. Mizerak, E. N. Wang, "Turning bubbles on and off during boiling using charged surfactants," *Nature Communications*, vol. 6, pp. 1–7, October 2015. doi: https://doi.org/10.1038/ncomms9599

N. Miljkovic, R. Enright, S. C. Maroo, **H.J. Cho**, E.N. Wang, "Liquid Evaporation on Superhydrophobic and Superhydrophilic Nanostructured Surfaces," *Journal of Heat Transfer*, vol. 133, no. 8, p. 080903, 2011. doi: https://doi.org/10.1115/1.4003890

PEER-REVIEWED CONFERENCE PUBLICATIONS

R.C. Alvarez, M.R. Mata, **H.J. Cho**, M. Bucci, "Experimental Investigation of Tween-40 Surfactant Effects on Boiling Phenomena," 10th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics, Rhodes Island, Greece, August 22–26, 2024.

M. R. Mata, **H. J. Cho**, "Surfactant Mass Transfer to Control the Boiling Crisis," 3rd Conference on Micro Flow and Interfacial Phenomena (μFIP), Evanston, IL, June 18–21, 2023.

Y. Gao, S. Ricoy, A. Cobb, R. Phung, A. Lewis, A. Sahm, N. Ortiz, S. Rao, **H. J. Cho**, "Convection-Limited Water Transport Leads to High-Yield Atmospheric Water Capture," 3rd Conference on Micro Flow and Interfacial Phenomena (μFIP), Evanston, IL, June 18–21, 2023.

M. R. Mata, B. Ortiz, D. Luhar, V. Evereux, **H. J. Cho**, "Balancing Surfactant Mass Transfer to Optimize Boiling Heat Transfer," 2nd Conference on Micro Flow and Interfacial Phenomena (μFIP), Irvine, CA, June 20–23, 2022.

Y. Gao, M. R. Mata, B. Navarro, S. Wachs, **H. J. Cho**, "Liquid Transport Properties through Hydrogels," 2nd Conference on Micro Flow and Interfacial Phenomena (μFIP), Irvine, CA, June 20–23, 2022.

H. J. Cho, E. N. Wang, "A New Analytical Model of Bubble Growth during Boiling," *Pacific Rim Thermal Engineering Conference,* Maui, HI, December 13–17, 2019.

H. J. Cho, V. Sresht, D. Blankschtein, E. N. Wang, "Understanding Enhanced Boiling with Triton X Surfactants," *Proceedings of the ASME 2013 Summer Heat Transfer Conference*, Minneapolis, MN, July 14–19, 2013.

H. J. Cho, S. C. Maroo, E. N. Wang, "Characterization of Lipid Membrane Properties for Tunable Electroporation," *Proceedings of the ASME 2012 3rd Micro/Nanoscale Heat & Mass Transfer International Conference*, Atlanta, Georgia, March 3–6, 2012.

S. C. Maroo, **H. J. Cho**, E. N. Wang, "Wetting Characteristics of a Phospholipid Membrane using Molecular Dynamics Simulation," *Proceedings of the ASME International Mechanical Engineering Congress & Exposition*, Vancouver, Canada, November 12–18, 2010.

SEMINARS

H. J. Cho (invited speaker), "Shedding New Light on Transport Phenomena and Thermofluidic Applications," Mechanical Engineering Departmental Seminar, University of Texas at Dallas, Richardson, TX, April 13, 2026.

H. J. Cho (invited speaker), "Shedding New Light on Transport Phenomena and Thermofluidic Applications," Mechanical and Aerospace Engineering Department Seminar, University of California, Irvine, Irvine, CA, May 16, 2025.

H. J. Cho (invited speaker), "Leveraging transport perspectives in thermofluidic and soft-matter systems," Mechanical Engineering Departmental Seminar, University of Utah, Salt Lake City, UT, January 26, 2024.

H. J. Cho (featured speaker), "Recognizing Transport-Limited Behaviors in Boiling and Hydrogels," *Thermal Transport Café*, March 14, 2023 (virtual seminar series).

H. J. Cho (invited speaker), "Leveraging transport principles in hydrogels and boiling heat transfer," Mechanical Engineering Departmental Seminar, University of California, Riverside, Riverside, CA, October 27, 2022.

H. J. Cho (invited speaker), "Controlled boiling and cracking: thermal science meets soft matter," Mechanical Engineering Departmental Seminar, University of Nevada, Reno, Reno, NV, September 13, 2019.

H. J. Cho, S. C. Maroo, E. N. Wang, "Wetting and Electroporation of Phospholipid Layers," *Micro Nano Seminar*, MIT, Cambridge, MA, November 11, 2010.

CONFERENCE PRESENTATIONS AND POSTERS

H. J. Cho (invited speaker), "Turning data centers into water producers—a multiphase approach," International Symposium on Interfacial and Multiphase Heat Transfer, Seoul National University, Seoul, Korea, August 11, 2026.

H. J. Cho, "A Geospatial Monte Carlo Method to Compare Atmospheric Water Harvesting Technologies," Third International Atmospheric Water Harvesting Summit, Tempe, AZ, January 15–16 2026.

Amir Kashani, **H. J. Cho**, "Poroelastic diffusion and transient wetting of droplets on hydrogels," BIOT-8 Salt Lake City, UT, October 7–10, 2025.

H. J. Cho (keynote speaker), "Solid-Liquid Hybrid Mass Exchangers for Atmospheric Water Harvesting and Dehumidification," 5th Conference on Micro Flow and Interfacial Phenomena (μFIP), Santa Barbara, CA, June 15–18, 2025.

H. J. Cho (invited speaker), "Tapping into the hidden ocean with hydrogel membrane "skins"," *First International Atmospheric Water Harvesting Summit*, Tempe, AZ, February 8–9, 2024.

H. J. Cho, Y. Gao, R. A. Phung, "Using hydrogels to reach advection-limited atmospheric water capture," *APS March Meeting*, Las Vegas, NV, March 5–10, 2023.

Y. Gao, **H. J. Cho**, "Room-temperature condensation of water vapor through hydrogel membranes," *Gordon Research Conference: Micro & Nanoscale Phase Change Heat Transfer*, Lucca (Barga), Italy, January 8–13, 2023.

Y. Gao, **H. J. Cho**, "Polymer strand spacing relates permeability to stiffness in hydrogels," *ACS Western Regional Meeting*, Las Vegas, NV, October 19–22, 2022.

H. J. Cho, Y. Gao, R. A. Phung, B. Navarro, G. Marcial-Lorza, S. Wachs, "Water transport through hydrogel membranes at low relative humidities," *APS March Meeting*, Chicago, IL, March 14–18, 2022.

H. J. Cho, S. S. Datta, "A scaling law to determine cracking lengths in shrinkable granular packings," *APS March Meeting*, Denver, CO, March 2–6, 2020 (virtual due to COVID-19).

H. J. Cho, S. S. Datta, "Cracking and self-healing of shrinkable, granular materials," *ACS Fall 2019 National Meeting*, San Diego, CA, August 25–29, 2019.

H. J. Cho, N. B. Lu, S. S. Datta, "Controlling Crack Evolution in Drying Suspensions," *AIChE Annual Meeting*, Pittsburgh, PA, October 28–November 2, 2018.

H. J. Cho, N. B. Lu, S. S. Datta, "Crack this: These particle networks keep healing!" *9th Northeastern Complex Fluids & Soft Matter Workshop*, Philadelphia, PA, May 25, 2018.

H. J. Cho, N. B. Lu, S. S. Datta, "Using Drying to Heal Cracks in Soft Materials," *Princeton Research Day*, Princeton, NJ, May 9, 2018.

H. J. Cho, N. B. Lu, S. S. Datta, "Crack this: These particle networks keep healing!" *Soft Materials Coffee Hour*, Princeton, NJ, April 30, 2018.

H. J. Cho, N. B. Lu, S. S. Datta, "How surfactants mobilize oil trapped in a 3D porous medium," *APS March Meeting*, Los Angeles, CA, March 5–9, 2018.

H. J. Cho, V. Sresht, D. Blankschtein, E. N. Wang, "Prediction of Pool Boiling Enhancement with Surfactants," *ASME 2017 Summer Heat Transfer Conference*, Seattle, WA, July 9–12, 2018.

H. J. Cho, V. Sresht, D. Blankschtein, E.N. Wang, "Predicting Nucleate Pool Boiling Enhancement with Surfactants" *Gordon Research Conference: Micro & Nanoscale Phase Change Heat Transfer*, Galveston, TX, January 8–13, 2017.

H. J. Cho, J. P. Mizerak, E. N. Wang, "On Demand and Tunable Pool Boiling," *Gordon Research Conference: Micro & Nanoscale Phase Change Heat Transfer*, Galveston, TX, January 11–16, 2015.

H. J. Cho, E. N. Wang, "Dynamically Tuning Pool Boiling with Charged Surfactants," *MTL Annual Research Conference*, Bretton Woods, NH, January 29–30, 2014.

H. J. Cho, E. N. Wang, "Tunable Nucleate Boiling Using Electric Fields and Charged Surfactants," *Proceedings of the ASME 2013 4th Micro/Nanoscale Heat & Mass Transfer International Conference*, Hong Kong, December 11–14, 2013.

H. J. Cho, E. N. Wang, "Wetting and Phase Behavior of Phospholipids," *Materials Day 2012*, Cambridge, MA, October 16, 2012.

H. J. Cho, S. C. Maroo, E.N. Wang, "Wetting Phenomena of Phospholipid Films for Electroporating Membranes," *MRS Fall Meeting*, Boston, MA, November 28–December 2, 2011.

H. J. Cho, S. C. Maroo, E. N. Wang, "Surface Morphology, Interfacial Energy, and Wetting of DPPC Monolayers," *Materials Day 2011*, Cambridge, MA, October 18, 2011.

H. J. Cho, S. C. Maroo, E. N. Wang, "Wetting and Electroporation Behavior of Phospholipid Layers for Desalination Membranes," *ASME International Mechanical Engineering Congress & Exposition*, Vancouver, Canada, November 12–18, 2010.

PATENTS

H. J. Cho, A Mansourimarand, H. Cho, University of Nevada, Las Vegas, "Desalination System And Method," US patent filed June 13, 2025.

H. J. Cho, University of Nevada, Las Vegas, "Iron Electrowinning Reactor", US patent filed May 17, 2025.

H. J. Cho, Y. Gao, R. A. Phung, University of Nevada, Las Vegas, "Atmospheric Water Capturing Device, And Systems And Methods Of Using Same," US patent filed Oct 28, 2022.

H. J. Cho, E. N. Wang, Massachusetts Institute of Technology, "Tunable nucleate boiling using electric fields and ionic surfactants," Patent No. 9841186. Dec 12, 2017.

GRANTS & FUNDING SECURED

NSF STTR (external) *2026–2027*
$305,000

Southwest Sustainability Engine (NSF Type 2 Engine) UNLV shovel-ready (external) *2024–2026*
$150,000

ARPA-E ROSIE program (PI; external) *2024–2027*
$2,102,353

NSF CAREER Award (PI; external) *2023–2028*
$596,487

ACS Petroleum Research Fund Doctoral New Investigator (PI; external) *2023–2024*
$110,000

UNLV Top Tier Doctoral Graduate Research Assistantship Award (PI; internal) *2023–2026*

$90,000

Barrick Gold Mines Fellowship (PI; external) *2023*
$15,000

Koshee Innovation (PI; external) *2022*
$15,000

UNLV Faculty Opportunity Award (PI; internal) *2022*
$20,000

UNLV Technology Commercialization Award (PI; internal) *2022*
$28,147

Undergraduate Research Stimulus Program (PI; internal) *2021*
$5,000

UNLV Top Tier Doctoral Graduate Research Assistantship Award (PI; internal) *2019–2023*
$80,000

AWARDS & HONORS

UNLV Barrick Scholar Award *2025*

UNLV College of Engineering Distinguished Teacher Award *2023*

NSF CAREER Award *2022*

ACS Petroleum Research Fund Doctoral New Investigator *2022*

Faculty advisor award for senior design PV COOL (1st place in Mechanical Engineering) *2022*

Faculty advisor award for senior design Hydroponic Cart (1st place in Interdisciplinary) *2022*

UNLV CSUN Faculty Achievement Award *2022*

UNLV Office of Economic Development Technology Commercialization Award *2021*

Faculty Opportunity Award, UNLV *2021*

Best Poster Award in the Transport in Disordered Environments workshop, Princeton Center for Theoretical Science *2019*

ReMatch+ mentorship program fellow, Princeton *2018*

First place in the de Florez Competition for Graduate Science, MIT *2015*

Summer Undergraduate Research Award, University of Michigan *2008*

Pi Tau Sigma Mechanical Engineering Honor Society *2007*

OTHER ACTIVITIES

Editorial Board Member at *Scientific Reports*	*2023–present*
Session convener and technical committee member	*2025*
Steering Committee Member of the Second Atmospheric Water Harvesting Summit	*2025*
Member of Pacific Rim Thermal Conference Scientific Committee	*2024*
Co-Organizer of the First Atmospheric Water Harvesting Summit	*2024*
Track Chair of MicroFIP Conference	*2023*
Program Co-Chair of the ACS Western Regional Meeting	*2022*
Track Chair of MicroFIP Conference	*2022*
Member of Pacific Rim Thermal Conference Scientific Committee	*2019*
2017 Northeast Asia Economic Forum Young Leaders Program Fellowship at the University of Hong Kong	*2017*
2011 Northeast Asia Economic Forum Young Leaders Program Fellowship at the University of Hawai‘i	*2011*
Senior Photo Editor and Photojournalist at The Michigan Daily	*2005–2009*