Purdue University
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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
Ph.D., Mechanical Engineering: Renewable Water and Energy, Minor: Entrepreneurship 9/2012 – 5/2015

Cornell University, Ithaca, NY
M.Eng., Mechanical Engineering, **First in Class** 9/2010-12/2010
B.S., Mechanical & Aerospace Engineering; Concentration in Energy & the Environment 9/2006-5/2010

RESEARCH Highlights

- Associate Professor with named title: "Schaefer Outstanding Young Faculty Scholar" as of 8/2025, Assistant Prof from 7/2018-8/2025. Affiliations: Mechanical Engineering, Birck Nanotechnology Center, Herrick Labs, Courtesy Appointment in Civil and Construction Engineering, Affiliate in Ecological & Environmental Engineering
- Authored 86 journal papers (average impact factor: 10.2), 25 conference papers, and 20 full patent applications. Secured >$10 million in funding as lead PI, and presented >50 times on science or technology, winning 10 presenter awards. Completed masters and PhD in a combined 3 years, the fastest in decades for MIT MechE.
- **Stats**: **h-index of 40**, i10 of 79, >1400 citations/year, Earned 11 international young innovator awards.
- Other competitive awards for: citations, entrepreneurship, mentoring, community outreach, and teaching
- Applies thermofluids and nanoengineering techniques to water treatment and the water-energy nexus, focusing on energy efficiency, surface phenomena, and developing world applications with the potential to save lives

PURDUE RESEARCH

Catalysis in Membrane systems 6/2018-present
- Introducing catalytic self-pumping membranes, including the first light-powered ones, for water treatment
- Inventing high-throughput electrocatalytic membranes for PFAS and contaminant destruction
- Photocatalytic air treatment: catalysts, prototype, ASHRAE standard, and startup company 8/2020-present

High Efficiency Desalination 6/2015-present
- Invented most efficient technologies: batch reverse osmosis and high-salinity variants; patents, start-up, pilot, etc
- Implemented membrane nanomaterials and novel condensation technologies to membrane distillation

Combining Desalination with Renewables 9/2018-present
- Integrating renewable energy with desalination via hydraulics (wave, wind), heat engines (solar)
- Enabling renewable grids via salinity gradient energy storage, pressure retarded osmosis, and machine learning

Novel Gas-Separation Membrane Technologies 12/2018-present
- Creating novel membrane-based technologies with high selectivity for HVAC and CO_2 removal applications
- Atmospheric water harvesting: unifying thermodynamics of approaches, higher efficiency design
- Inventing the first acoustic streaming filters for air & water treatment, including piezoelectric acoustic filters

Membrane Heat Exchangers & HVAC 9/2013-present
- Developing combined heat transfer and selective membranes for record efficiency dehumidification & drying
- HVAC Efficiency enhancement: ionocaloric cooling, façade design, VAV retrofit,

YALE RESEARCH

Chemical and Environmental Engineering: Prof.'s Elimelech and Kim (PostDoc, Visiting Prof) 7/2017-6/2018
- Created novel photonic glass photocatalytic membranes for disinfection and advanced oxidation applications
- Collaborative work on thermal desalination, nanofiltration, photothermal disinfection, etc. Grant writing.

MIT RESEARCH

Desalination Technologies with Professor Lienhard (PostDoc) 5/2015-6/2017
- Invented most efficient desalination technology for 0.2-7% salinity via batch reverse osmosis: energy savings up to 64%. Commercializing with startups Sandymount and Harmony Desalting, both originating from lab
- Authored papers on potable water reuse, nanofiltration, thermal desalination, and membrane distillation
- **Harvard** PostDoc part-time: Graphene Oxide membranes, wrote 7 grants with Prof. Vecitis 7/2016-5/2017

Membrane Distillation (MD) Desalination (PhD) 9/2012-5/2015
- Invented configurations and materials to double the efficiency of MD, including superhydrophobic condensing, multistage MD, high salinity MD, low temperature thermal desalination, and conductive gap MD
- Developed thermochemical theory on MD membrane fouling, invented air-layer technique for blocking fouling s

OTHER RESEARCH

Combatting Hunger, Waterborne & Airborne Disease 1/2013-present
- Phase-change thermal storage for off-grid food refrigeration for developing world. Cofounded Coolify as CTO
- Heavy metal water contamination studies an water treatment solutions for Peru & Kenya 1/2019-present
- Photocatalytic disinfection in HVAC: modeling, prototype, startup company 8/2020-present

CORNELL RESEARCH

Scaled Modular Test Platform for Sustainable Building Systems (Undergrad & Masters) 11/2009-12/2010
Undergraduate Research: Oxycombustion, Solar Thermal, Wetlands restoration, Solar Decathlon 2/2008-6/2009

AWARDS

National or Global Innovator/Researcher Early Career Awards (key: • = highly competitive: <5%, and/or 1/year)

- • International Water Association (IWA) Membrane Technology Specialist Group Rising Star Award, **1/year**, 2025
- • Early Career Editorial Board (ECEB) of *Journal of Membrane Science*, 2025
- • ACS Polymeric Materials: Science and Engineering (PMSI) Early Investigator, 2025
- • ASME's Bergles-Rohsenow **Young Investigator Award in Heat Transfer**, $1k, **1/year**, 2024
- • **Austin F. McCormack, Jr. Award** (Young Professional), American Water Works Association, **1/year**, 2024
- • ***Membranes* Young Investigator Award**, Membranes Journal, **1 per 2 years**, 2023
- • **MIT Technology Review 35 Innovators under 35,** 2020
- • NAMS (North American Membrane Society) **Young Membrane Scientist Award**, 2020
- • Universities Council on Water Resources, **Outstanding Dissertation Award** in Science and Engineering, 1/year, 2016

Academic Awards

- • Top Scholar by ScholarGPS: lifetime top 0.5% citations for all scholars worldwide, annually, 2024-present
- • Seeds for Success Acorn Award (for fundraising with large proposals), Purdue University, 2023, 2025
- • 2nd Best Paper Award, Purdue University Refrigeration and Air Conditioning Conference (as last author), 2022
- • 2nd Best Paper Award, Purdue 202One Conference, (as last author), 2021
- • DOE SCGF Finalist, 2012 (PhD Fellowship)
- • Outstanding Achievement Award (Cornell, for **highest GPA** among 85 graduating MechE masters students), 2010
- • Bart Conta Prize in Energy and the Environment (Cornell, best research or design project), 2010

Academic Presentation Awards

- • 2022 **1st Prize**, $6k**,** Innovation Forum, International Desalination Association World Congress, Sydney Australia
- • 2020 MIT A+B Applied Energy Symposium Best Poster Award, (co-author), Boston, MA (Remote)
- • 2016 IDW Best Oral Presentation Award (International Desalination Workshop, Abu Dhabi, UAE)
- • 2015 IDA Best Poster Award (International Desalination Association, biennial premier conference in field)
- • 2015 IDA Best Presenter Award (as 2nd author) (San Diego, CA)
- • ACE15 Conference 1st (coauthor) and 2nd Best Poster Presentation (10,000 attendees, Anaheim, CA)
- • 2015 MIT Water Night Best Poster Honorable Mention
- • Sibley Graduate Research Conference People's Choice Award (Cornell), 2010

Engineering Competition Awards

- • Best Design-Build, Hydropower Collegiate Competition (HCC), (NREL/DOE, as team co-mentor), 2025
- • 2nd Place Marine Energy Collegiate Competition (MECC) (NREL/DOE, International, as team mentor), $6k, 2024
  1st Place for best outreach and 1st place for best poster at 2024's MECC
- • 3rd Place Marine Energy Collegiate Competition (MECC) (NREL/DOE, International, as team mentor), 2023
- • 1st Place, Malott Engineering Design Competition, (as instructor) 5/2022
- • 1st Place Marine Energy Collegiate Competition (MECC) (NREL/DOE, International, as team mentor), 2021
- • 1st Place Mechatronics Artificially Intelligent Battlebot Tournament (Cornell competition, ~150 students), 2009

Teaching/Mentoring Awards

- • College of Engineering Faculty Excellence Award in **Exceptional Early Career Teaching** ($4,000, 1/year), 2025
- • UCOWR 2024 **Early Career** Award for **Extension/Outreach/Engagement, 1/year**, national, 2024
- • 2015 MIT **Outstanding UROP Graduate Mentor** (institute award, 1 given among 5,800 MIT graduate students)
- • Hansen Masters of Engineering Fellowship (Cornell, teaching fellowship, $5,000), 2010

Service Awards

- • 2023 Diversity, Inclusion and Belonging Faculty Excellence Award Finalist (1 of 4 university-wide), Purdue
- • 2020 Community Change Hero Recognition, Voices for Water Awards by J. B. Dondolo

Selected Awards of mentees

- • Fellowships: NSF GRFP 2 (Aragones 2020; Lange, 2024), DOE IBUILD (Fix, 2022), Future faculty fellowships: 5 total: Saudi (Alsaati, 2021), Kuwait: 2 (Alnajdi, 2020; Alkandiri, 2024), South Korea (Jo, 2024), GEM (Lange, 2022) Purdue Fellowships: Institute for a Sustainable Future Fellowship (Cordoba, 2024), Fountaine Fellowship (Anandan, 2024, Rahman, 2025), Dean's Teaching Fellowship (Fix, 2024), Vanier Scholarship, (Parmar, 2022)
- • Best Poster: (iTHERM 2020, Alsaati), SURF (2020, Pamintuan, 2024 Honorable mention, Hu), AIAA (2022), NAMS (2nd, Fang, 2022), MECC (2024),
- • Best Oral Presenter: Bioenergy and Biotech (2nd, Wu, 2022)
- • Outstanding mentor of undergrads: SURF (Fix, 2020, Rahman, 2025)
- • Misc: Best Overall Senior (Raya, 2023), Best Junior in ME (Pandya, 2024)

FUNDING

Scientific Grants

- • Water XPrize, "qualified" team, co-PI of Renaissance Water, $36k
- • Ralph W. and Grace M. Showalter Research Trust **Early Career Award**, PI, $75,000, 7/2025-6/2026
- • ONR Blue Integrated Partnership (BIP 2.0): A Consortium for Mentoring a Vibrant STEM Workforce Ready to Solve Tomorrow's Grand Challenges. Office of Naval Research. $9,892,031, $970k for self, 5/2025 -4/2030

- DOE BENEFIT, Active Membrane Energy Exchanger-Integrated DOAS, Lead PI, $2,460,000, 4/2025-12/2028
- ONR: Portable Seawater Pulse Flow RO w/ Flow Reversal, Lead PI, $487,000, 1/2025-12/2026
- NSF CASIS, Testing Thermophoresis of Microflyers on the ISS, Co-PI, $571,000, 09/2023-08/2027
- Bureau of Reclamation, DWPR, Batch Counterflow RO ($462,000), Lead PI, 2023-2025
- DOE/NAWI, Desalination Pilot Program, Reciprocating Piston Batch RO ($1,674,000), Lead PI, 2023-25
- DOE/EERE AMO, Multi-Topic FOA, Vapor-Selective MemDry Cycle, ($2,380,000) Lead PI, 2022-26
- DOE/NREL Marine Energy Collegiate Competition, Advisor/Lead PI, (2020: $20,000, 2021: $27,000, 2022: $20,000, 2023: 20,000. 2024: $20,00)
- DOE Solar Desalination Competition, quarterfinalist, Lead PI, ($50,000), 2020
- Bureau of Reclamation, DWPR, Solar Batch Reverse Osmosis, Lead PI, ($500,000), 2020
- NSF MRI, ($417,970) (coauthor), 2020
- Purdue Ag-Eng Day, Co-PI, ($50,000), 2020
- Shah Innovation Lab, Borehole water treatment in Kenya, Lead PI, ($32,000), 2020
- Purdue Big Idea 2.0, ($210,000), (coauthor), 2019
- MIT Sandbox Innovation Fund ($4,500) (coauthor), 2017
- More Water Less Concentrate Challenge, US Bureau of Reclamation ($25,000) (coauthor), 2017
- Ignition Grant, MIT&MICP Innovation Program (MMIP) Deshpande Center ($100,000) (coauthor), 2014
- Innovation Grant, MIT&MICP Innovation Program (MMIP) Deshpande Center ($300,000) (coauthor), 2015
- Small research awards to support undergraduate researchers:
  - -DURI program ($3,000 each): 2023: 3, 2021: 2 2020: 1. 2019: 1. 2018: 1
  - -SURF program ($3,000 each): 2024: 4, 2023: 2, 2020: 1½. 2019: 2. 2018: 1
  - -BRIDGE program ($3,750): 2020: 1
  - -Indiana Space Grant: $1,000
  - -Dewitt Research Awards ($500)
- Travel grants
  - -Purdue Faculty International Faculty Travel Grant ($1,500), 2019
  - -Study abroad OUR support grant ($5,000), 2019
  - -Study abroad C4E support ($10,0000), 2018
- Student Fellowships: Helped secure fellowships covering 7 years FTE for graduate students (2018-present)

Industry Center Grants

- Purdue CHPB(Center for High Performance Buildings), Acoustic filtration, Lead PI, ($48,000x3), 2023-25
- Purdue CHPB, Ionocaloric cooling, Lead PI, ($48,000x3), 2024-26
- Purdue CHPB, Vapor-selective membrane heat exchangers, Lead PI, ($48,000x3), 2020-22
- Purdue CHPB, Photocatalytic Air Purification for HVAC Systems, Lead PI, ($48,000x3), 2019-21

Direct Industry Funding

- Carrier ($113,585) 202), ($121,500), 2021
- Porous Materials Inc. ($70,000), 2020

Entrepreneurship Pitch Awards

- Lee Prize for Innovation and Entrepreneurship, with Promethium (As project mentor) $250,000, 2020
- MIT Clean Energy Prize, 1st prize, ($25,000), (project mentor), 2018
- 1st prize in the MIT materials design competition (MADMEC) $10,000 (project mentor), 2018
- Harvard Innovation Lab 2015 Dean's Food System Challenge Co-Grand Prize Winner ($27,500, 164 teams)
- Agricultural Innovation **Grand Prize** ($100,000, national startup pitch competition), 2014 (Madison, WI)

Other Funding

- Private donor gifts: ($25,000), 2019

Pending Support From: DOE, DARPA, NSF, BoR, WRF, Purdue CTRC, Purdue CHPB

TEACHING

Teaching Experience

• Professor for ME 505 Intermediate Heat Transfer, for grad students in ME, Aero.	Fall 2022-23
• Professor for ME 463 Engineering Design, for seniors. 20-25 students. **(4.2-4.9/5)**	Spring 2020-24, 26
• Professor for ME 315: Heat and Mass Transfer, for juniors & seniors. >70 students	Fall 2018-21, SP 25
-Median instructor eval: **(4.0/5)**, often highest eval among 3-6 sections	Lab: Fall 2024
• Professor for ME 497: Renewable Energy Study Abroad, brought 14 students to Peru **(4.9/5)**	12/2019&6/2019
• TA for Thermodynamics: taught weekly section, more students attended (35) than registered (30) Designed curriculum, review sessions; received highest rating among class's TA's (**4.63/5**)	8/2011-12/2011
• Grader for Dynamics, held regular office hours, planned and led review sessions	1/2008-5/2008
• Volunteer after-school Science Teacher at underprivileged Beverly J. Martin **Elementary School**	9/2007-12/2007
• Tutored freelance for math, physics, and engineering for grades 6 through graduate students	8/2003-present

Teaching Certifications: Engineering TA Development Program (Cornell, 2010), Kaufman Teaching Certificate (MIT, 2016)

Teaching Courses Taken: The Art of Teaching (Cornell, 2007), Teaching College-Level Science and Engineering (MIT, 2015), Learner's Workshop (MIT), An Introduction to Evidenced-Based Undergraduate STEM Teaching (MOOC, 2015), Fundamentals of Teaching Science (Yale, 2017)

Teaching Workshops: Effective College Teaching, 2019, Engineering Diversity & Inclusion Workshop 2019

PATENTS

Desalination: new configurations and efficiency of MD (4) and RO (5), MD membranes (1); membrane fouling prevention (1)

Heat Transfer and Energy: geothermal cooling (1), heat transfer surfaces (1), building heating and cooling (2), industrial drying (1), HVAC air treatment (1), wind turbines (2), and other technologies

INDUSTRY EXPERIENCE

Cofounder and CTO, Coolify, Cambridge MA 11/2012-2/2016
- Cofounded startup, invented phase change thermal battery, raised funds, built and demonstrated prototype
- Implementing tech in India, for refrigerating food in areas with intermittent power
- Led team of 6 engineers in the design of the HVAC system, thermal storage, controls, and enclosure

Consulting for Startups, Cambridge MA, West Lafayette, IN 9/2012-present
- Thermofluids analysis, design, patenting, websites, fundraising, and/or cofounding for startups Promethium, AquaOne Technologies, EcoVent, Curiositate, FiatFlux, and EcoKitty. Mentor for the Water Innovation Accelerator (WIA)

Mechanical Engineer at Arup, Washington D.C. 3/2011-6/2012
- Designed solar thermal, PV, cogeneration, geothermal, chilled beam, building envelope, and other systems
- Consulted on net-zero Ecodistrict; the 22 building, 11 million square foot US Government sustainability showcase
- Designed HVAC systems, performed sustainability analysis for offices, art museums, university laboratories, hotels, performing arts centers, restaurants, spas, and embassies, including 6 LEED platinum projects

Intern at Pareto Energy, Washington D.C. 6/2007-8/2007
- Start-up for micro-grids and energy, work included trigeneration and a $100 million solar power station in Israel

LEADERSHIP & SERVICE

University Service

Chair, Heat Transfer Area Exams (Mechanical Engineering) 12/2018-04/2022
- Lead problem creation, exam running, and organize grading for department's subject qualifying exams
- Initiated a single-course area exam waiver, a policy which was adopted for all other areas

Founder, Chair of ME Diversity Subcommittee (of admissions committee) 10/2018-12/2019
- Achieved **Purdue-wide** grad application fee waiver policy for **all low-income students** and more diverse students

Member, ME Taskforce on Equality, Anti-Racism, and Inclusion 12/2018-1/2020

Member, Mechanical Engineering Admissions Committee 9/2023-present

Chair, Fellowship Committee (Mechanical Engineering) (Chari 9/2023-present, Member, 12/2018-present)
- Doubled award rate for primary university-wide fellowship (17 of 20 nominees), the most of any department

Project Team Mentor, DOE/NREL Marine Energy Collegiate Competition (MECC). 1/1/2021-present

Teaching service: co-led effort to include statistics in ME undergrad curriculum and Math Area Exam 2024

Conference Leadership

Primary Conference Organizer, Celebrating the Career of Prof. John H. Lienhard, MIT 6/2025

Discussion leader, Membranes: Materials and Processes GRC 7/2024-8/2024

Session Co-chair, NAMS 2020, Molecular and Process Modeling 8/2020-8/2021

Primary speaker (6 talks: 3 English, 3 Spanish) Congress Cientifico Internacional: Sistema De Multiples Barreras Para la Preservacion del agua Segura Y Saludable, Cusco Peru 5/2020

Session Co-chair, IDA 2019, Thermal Desalination Session, Dubai UAE. 11/2019

Session Co-chair, NAMS 2019, Membrane Distillation Session, Pittsburg PA 5/2019
- Chose topics, invited speakers, created description for North American's Membrane Society Annual Conference

Conference Committee, MIT Low Carbon Desalination Workshop 9/2016-12/2016
- Codirected international conference and writing to develop a white paper on renewable desalination for COP22

Director, MIT Water Night 11/2015-3/2016
- Directed, organized, and ran MIT's primary water research conference for Boston researchers & industry

Session Chair, Herrick Conferences:
- R&AC Conference and I gave you "R-34 Drying & Dehumidification II." 7/2024

Engineering Team Leader, Solar House Team Project 9/2007-10/2009
- Coordinated 150-member team for the high-tech, sustainable, international "Solar Decathlon" competition. 8/2006-10/2009

• Designed and built innovative and efficient HVAC system with advanced control algorithms 8/2006-10/2009

Global outreach 2/2017-present

• Pursuing applied research, training local researchers, giving educational seminars, and leading workshops in low-income countries, including Egypt, Peru, Kenya, and Senegal

Youth Outreach

• Potential and Kinetic Energy marble activity with 3 local elementary schools (via MECC) Spring 2021
• Purdue MINDS event (via PESC). K-7 filter competition, 50 students (via MECC) Spring 2022
• Water wheel activity for 7th graders, 60+ students in competition Spring 2023
• Water wheel activity for 7th grade, sailboat competition Engineering kits for 7-8th (via MECC) Spring 2024
• Research group engaged in annual Nanodays (K-12) at the Birck Nanotechnology Center 2019-Present
• Taught MITxplore, a free after-school math and problem-solving program for 4th-6th graders 3/2015-4/2017

Water Centers:

Purdue Lead/Point of Contact DOE Energy and Water Desalination Hub- NAWI (National Alliance for Water Innovation). ($110M+$85M). Review of grants applications, attending workshops, funded research

Contributor for NSF Engine Great Lakes ReNeW Engine ($160M): performing PFAS research, very minor role in grant application itself

Review for journals: Nature Nanotechnology, Nature Water, Nature Chemical Engineering, Science Advances, Joule, npj Clean Water, Desalination, Journal of Membrane Science, Applied Energy, Frontiers in Energy, Desalination and Water Treatment, Environmental Science & Technology, Applied Thermal Engineering, others

Review for grant agencies: USA EPA (United States Environmental Protection Agency), AAAS (American Association for the Advancement of Science), US DOE (United States Department of Energy), NAWI (National Alliance for Water Innovation), LASER PULSE (for USAID), Israel Science Foundation, KAUST Research Translation Proposal, ACS New Investigator, TEAMER (DOE WPTO),

Professional Organizations

Committee Member: AWWA: Membrane Processes Committee (MPC) and Membrane Technology Research Committee (MTRC), ASHRAE SPC 185.5

Member of: ASME (American Society of Mechanical Engineers), ACS (American Chemical Society), AWWA (American Water Works Association), IDRA (International Desalination and Reuse Association), NAMS (North American Membrane Society), ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers)

Editorial Roles

Early Career **Editorial Board** (ECEB) of *Journal of Membrane Science*, 5/2025-present

Editor, Oxford Encyclopedia of Water Resources Management, part of the collection: Oxford Research Encyclopedia of Environmental Science. Oxford University Press, 2018-2024

Guest Editor, Desalination (IF = 9.9): Special Issue on Membrane Distillation. 2021-2022

Certifications

• Secret Security Clearance (US State Department) • Six Sigma Black Belt Certification (statistical analysis)

INSTRUCTION IN RESEARCH

Purdue advisor for:

- **PostDocs (3 + 4 *alumni*):** Hye-Jin Cho, Seong-Yong Cheon, Manavi Yadav Alumni: Jinwoo Oh, Anand Balaraman, Saba Shahvari Zakeri, Adewale Giwa
- **PhD students (14 +5 *alumni*):** Tariq Alsawy, Eiman Alkhadhir, Kyungkeun Jo, Ashiqur Rahman, Makena Thompson, Setareh Heirdi, Junyan Ren, Debraliz Isaac-Aragones, Waqas Alum, Ali Naderi Beni, Xavier Morgan, Sandra Cordoba, Hamid Fattahi Juybari, Mateo Roldan-Carvajal, Alumni: Sultan Musaad, Albraa Alsaati, Abhimanyu Das, Andrew J Fix, Yuhang (Joy) Fang,
- **Masters students (1 + 11 *alumni*)**: Jarrod Robbins, Alumni: Derek Anderson, Songhao Wu, Bryan Pamintuan, Karl Akert, Akshay Rao, Sudharshan Anandan, Michael Roggenburg, Yashwant S. Yogi, Sandra P.Cordoba, Ajay S. Chandrasekaran, Harsharaj Parmar
- **Visiting scholars (2 + 7 *alumni*):** Mojtaba Zarei, Sathish Rajendran Alumni: Sina Nejati, Eduardo Fenollal, Gulsum Melike, Mohammad Rezaei, Yangyuan Ji, Jihyeok Choi, Hamid Fattahi Juybari,
- **Undergrads: (24 +128 *alumni*) in lab:** Sajal Malhotra, Kazim Jafri, Adeetya Upadhyay, Nistha Shrestha, Sohum Sodhi Netra Shah, Ishan Nair, Hassan Mustafa Tagar, Lily Farmer, Tyler Hughes, Benjamin

Martin, Nishtha Singh, Isaac Parks, Vaishnnavi Purram, Mackenzie Hathaway, Arnab Paul, Riadh Alhumaidan, Jeet Jagad, Mihir Samanyu Talamudipi, Samuel Zapata, Ashton Bush, Mirza Orunav Shahper, Dev Joshi, Samarth Rastogi, Will Warden

Alumni: Christopher Ray, Zhichen Guan, Joyce Hu, Nistha Shrestha, Lily Avery Waterman, Max Herro, Sohum Sodhi, Oscar Eduardo Botía Sierra, Nikitha Sam, Clark Lay, Sahda Haroon, Nishtha Singh, Diya Banerjee, Ryan San Juan, Trysta Chiang, Ben Martin, Alex Nagel, Zihao (Kevin) Qin, Jackie De Leon, Lindsay Sutherland, Sohan Pramanik, Devesh Mehra, Andrew Angold-Stephens, Ryan San Juan, Ethan Kovalan, Anna Laramore, Jon Perillo, Muskan Choudhary, Maria Augusta Correa Martins, Jackie De Leon, Andrew Freeman, Lance Miller, Alec Lanter, Lahiri Chitturi, Andrew Showalter, Shivam Gupta, Meghan Thai, Jared Nathan, Aaron Harp, Ethan Buck, Isabel Panicker, Jeff Lee, Zoe Yang, Manav Jhaveri, Shruti Irap, Dominick Maiorano, Maisha Mumtaz, Samantha R Jaeckel, Meera Pala Puthussery, Shenghao Zhang, Darren Lie, Samantha R Jaeckel, Meera Pala Puthussery, Ryan Shepherd, Brennan Birn, Aditi Edlabadkar, Hanwen Gu, Maulin Shah, Nikhil Davé, Owen B. Bailey, Arvind Pujari, Romita Biswas, Yixu Huang, Joshua Porter, David Gustafson, Jia Lin Cheoh, Aidan Chappell, Julie Nguyen, Nathan Daniel, Mary Reilly, Marisa Grubb, Michel Raskin, Alec Booth, Ameya Ghai, Cameron Wright, Alliyan "Ally" Nou, Evan Jamieson, Cole Willoughby, Kyle Wisler, Karol Lipiszko, Ryan Jacob, Paige Rich, Jason Jeon, Jacob Brejcha, Hoang Son "Sonny" Pham, Rafay Imran, Katherine Young, Cameron Harvey, Hamza Fakhruddin, Carly Mendenhall, Katie Brodersen, Anna Rausch, Hamza Ali, Hemanth Aroumougam, Matthew Tao, Carolina Bernal Botero, Pei Sien Tan, Kumansh Furia, Deepika Ramchandani, Payton Miller, Jason Jung, Harry Cho, Kenny Smoak, Alliyan Nou, Aliah Adriana Binti Khairul Hisham, Alondra Ramos, Cole Heald, Vivek Singh, Imaan Qazilbash, Eugenio Frias Miranda, Akshay Rao Adia Raya, Shruti Irap, Seong Bin Choi, Manav Jhaveri,

Engineering Design w/ lab projects (85 *alumni*): 2025: (MECC): Diya Banerjee, Zihao Qin, Alex Joseph Nagel, Dhimas Bagaskara Warsito, Benjamin C Martin, Trysta Dephin Chiang, Nishtha Singh, ISS: Grant Dierking, Carter Roekle, Kai Wessel, Meagan Figler, Jacob Velazquez 2024: Charlotte Jones, Avneesh Viswanath, Sree Panuganti, Nikitha Sam, Akash Mattupalli, Abigail Zahm, Sofia Loucks, Maia Catterall, Jeffrey Huang, Sajal Malhotra; 2023 Senior Design (MECC): Ford, Cooper Ford, Camden Frieling, Joel Veihl, Mariya Savchenko, Ryan Vulich, Austin Howse,

2022 Senior Design (MECC): Cole Mitchell Heald, Vivek Ranjan Singh, Aliah Adriana Binti Khairul Hisham, Ryan Jacob Soltis, Kaitlin Elizabeth Kelsey, Paige Beck, John Pacholski, Matthew Sheridan,

2021 Senior Design (MECC, Air quality, AWH): Imaan Qazilbash, Dylan Balter, Hayden Schennum, Hamza Ali, Evan Jamieson, Cole Willoughby, Shaan Patel, Jeremy Costelle, Payton Miller, Jason Jung, Curtis Eckstein, Reese Asato, Allison Spear, Seth Nail, Oliver Santangelo, Kyle Wisler, Karol Lipiszko, Sam Edgerton, Matthew Pisoni, Josh Zubik, Brian Chung, Muhammad Arif Aiman Mohd Zainurin, Emily Ann Bywater, Kumansh Furia, Cameron Harvey, August Caito, Nathaniel Kiefer

2020 (BRO & air treatment): Stephen Coan, George Elias, Owen Li, Luke Wrede, Matthew Tao, Madelyn Ackerman, Duncan Houpt, Alec Booth, Yixu Huang. 2019 (BRO & disinfection) Alumni: Maulin Shah, Nikhil Davé, Nathan Kassab, Leo Kullman IV, Patrick C Page, Hanwen Gu, Andres Barrio-Zhang, Evan Sattler, Kyle Mahoney, Owen B. Bailey, Arvind Pujari, Arul Srinivas, Aman Sheth

Committee Member for: 20 PhD Theses, 5 Masters Theses

At MIT: Mentored 25 undergraduate students, earned **MIT institute premier mentorship award** 12/2012-6/2017
Helped students with desired skills, knowledge, career planning, courses, and recommendations

- Taught the UROP luncheons on *How to Mentor Undergrad*s for graduate students and PostDocs 10/2015-5/2017
- Contributed to MIT UROP (Undergraduate Research Opportunities Program), including lab tours, presenting to students on how to do research, and providing undergraduate research guidelines 10/2014-5/2017

Successful Outcomes of Research Mentees: Graduate schools including Purdue (many), MIT(3), Stanford(2), Berkeley (4), UIUC, UPenn, UMD, CMU, UMich; UofCambridge, UofToronto, etc. Companies including: RWL Water, SpaceX, Tesla, Google, Intel, NVIDIA, Stroud, Accenture, IDE, PA Consulting Group, Epsilon, Cummins, & ExonMobil. **Faculty jobs at:** UT Austin, Purdue Fort Wayne, U of Sharif, Kuwait University, Korean Military Academy, Umm Al-Qura University, Rose Hulman University, Chungnam National University, Abdullah Al Salem University

PUBLISHED WORK

Peer Reviewed Journal Papers

Published

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[17] **David M. Warsinger**, Batch Reverse Osmosis, NAWI Spring meeting, virtual, 5/25/2023

[18] **David M. Warsinger**, Jinwoo Oh, Anand Balaraman, Adewale Giwa, Meghan Thai, Andrew Fix, Davide Ziviani, Jim Braun, Thin-film hygroscopic polymer membranes for selective air dehumidification, ACS Spring 2023. Indianapolis, Indiana, March 29th.

[19] **David Warsinger**, Developing Batch Reverse Osmosis Processes for exceptional efficiency and recovery, The International Desalination Association World Congress, Innovation Forum, Sydney Australia, October 13, 2022, **First Place, Grand Prize 6,000€**

[20] A. Das, C. B. Botero, A. N. Beni, **D. M. Warsinger**, Temporally Multi-staged Batch Counterflow Reverse Osmosis for High Recovery Desalination, The International Desalination Association World Congress, Sydney Australia, October 10, 2022 (Conference Paper)

[21] **D. M. Warsinger**, Water & Sustainability, ONR Summer Institute in Sustainability & Climate Change—Purdue Climate Scholars, Purdue Virtual Talk, 6/24/2022

[22] **D. M. Warsinger**: 6 Conference talks: 1) Necesidades de agua en Cusco, 2) Nanotecnología en el tratamiento del agua potable en Cusco, 3) Desalinización térmica: destilación de membrane para aguas de alta salinidad, 4) Nanomateriales de membrana: uso de estructura jerarquica para nuevas capacidades, 5) Tecnologías de desinfección para los patógenos eliminados 6) Instituto Arequipa: Colaboración de Universidad Nacional de San Agustín y la Universidad de Purdue, Sistema De Multiples Barreras Para la Preservacion del agua Segura Y Saludable, Cusco Peru, October 28-31, 2019 (**all Plenary Presentations**)

[23] Y. S. Yogi, S. Nejati, A. K. Rao, R. Roy, L. Li, S. Sett, A. Das, N. Miljkovic, J. A. Weibel, **D. M. Warsinger**, Nanoengineered condenser surfaces for enhancing transport in thermal desalination by air gap membrane distillation, The 2nd Pacific Rim Thermal Engineering Conference, Maui USA, December 13-17, 2019. (Conference Paper)

[24] S. P. Córdoba, A. Das, **D. M. Warsinger**, Improved Batch Reverse Osmosis Configuration For Better Energy Efficiency, IDA 2019 World Congress World Congress on Water Reuse and Desalination, Dubai, UAE, October 20-24, 2019. (Conference Paper)

[25] **D. M. Warsinger,** Emily Tow, J. H. Lienhard V, Energy Savings and fouling resistance of batch reverse osmosis, Universities Council on Water Resources (UCOWR) & National Institutes of Water Resources (NIWR), 2018 Annual Water Resources Conference, June 26-28, Pittsburgh, PA, 2018

[26] **D. M. Warsinger,** J. Swaminathan, L. L. Morales, and J. H. Lienhard V, "Improving the energy efficiency of membrane distillation desalination with jumping-droplet condensation," *Poster Presentation, Gordon Research Conference on Micro & Nanoscale Phase Change Heat Transfer, January 8-13, 2017, Galveston Texas, USA*, 2016.

[27] **D M. Warsinger,** Jaichander Swaminathan, and John H. Lienhard V. Visualization of droplet condensation in membrane distillation desalination with surface modification: hydrophilicity, hydrophobicity, and wicking spacers. *In Proceedings of The 4th International Workshop on Heat Transfer (IWHT), "Advances for Energy Conservation and Pollution Control," Las Vegas, Nevada, USA,* April 2017.

[28] **D. M. Warsinger**, "Batch reverse osmosis: the final frontier for efficiency," *Tech Idol Session of the American Watehr Summit, Miami, Florida, December 6, 2017*, 2016. **National Competition**

[29] **D.M. Warsinger,** "Energy R&D needs for Electrical and Thermal Desalination," In *Workshop: Challenges And Potential Opportunities Of Renewable Energy And Water Resources In Egypt, Fayoum University, Egypt, Feb 1-6*, 2017. **Plenary Presentation, Workshop Instructor**

[30] **D. M. Warsinger,** Emily W. Tow, Kishor Nayar, and John H. Lienhard V. *Enhancing energy efficiency of reverse osmosis with batch and semi-batch processes. In Proceedings of the IDA international Desalination Workshop (IDW2016), Abu Dhabi, UAE,* November 2016. **Session co-chair, Best Presenter Award**

[31] **D. M. Warsinger.** Membrane technologies for potable water reuse. *In The Proceedings of Universities Council for Water Resources and National Institutes for Water Resources (UCOWR/NIWR) Conference, Oral Presentation, Pensacola Beach, Florida, USA,* June 2016.

[32] **D. M. Warsinger**. "The global need for desalination," *In The Proceedings of Universities Council for Water Resources and National Institutes for Water Resources (UCOWR/NIWR) Conference, Plenary Oral Presentation, Pensacola Beach, Florida, USA,* June 22nd 2016. **Plenary Presentation**,

[33] **D. M. Warsinger,** Emily W. Tow, and John H. Lienhard V. *Inorganic fouling resistance of membrane distillation vs. reverse osmosis. In Proceedings of Singapore Water Week 2016 (SIWW), Singapore,* July 2016.

[34] **D. M. Warsinger**, A. Servi, G. Connors, J. Gonzalez, J. Swaminathan, H. W. Chung, H. A. Arafat, K. K. Gleason, J. Lienhard V, "A novel air-cleaning method for membrane distillation," in *Oral Presentation, Proceedings of the AMTA Membrane Technology Conference & Exposition (MTC16), February 1-5, 2016, San Antonio, Texas*, February 2016.

[35] **D. M. Warsinger**, K. G. Nayar, E. Tow, and J. H. Lienhard V, "Efficiency and fouling of closed circuit reverse osmosis and a novel variant: Pushing the limits on desalination efficiency," in *Oral Presentation, New England Graduate Student Water Symposium (NEGSWS), Amherst, MA, USA*, 2015.

[36] **D. M. Warsinger**, J. Swaminathan, , H. W. Chung, S. Jeong, and J. H. Lienhard V, "The effect of filtration and particulate fouling in membrane distillation," in *Poster Presentation, Proceedings of The International Desalination Association World Congress on Desalination and Water Reuse, San Diego, California, USA*, Aug. 2015. **Best Poster Award**

[37] J. Swaminathan, **D. M. Warsinger**, and J. H. Lienhard V, "Experimental investigation of high efficiency single-stage membrane distillation configurations," in *Oral Presentation, Proceedings of The International Desalination Association World Congress on Desalination and Water Reuse, San Diego, California, USA*, Aug. 2015. **Best Presenter Award**

[38] **D. M. Warsinger**, J. V. Gonzalez, S. M. Van Belleghem, A. Servi, J. Swaminathan, and J. H. Lienhard V, "The effect of air layers and membrane superhydrophobicity on fouling in membrane distillation," in *Poster Presentation, Proceedings of The American Water Works Association Annual Conference and Exposition, Anaheim, California, USA*, 2015. **2nd Place, Best Poster Award**

[39] J. Swaminathan, **D. M. Warsinger**, and J. H. Lienhard V, "Produced water treatment with multi-stage membrane distillation and humidification dehumidification systems," in *Proceedings of The American Water Works Association Annual Conference and Exposition, Anaheim, California, USA, Oral Presentation,*, 2015. **1st Place, Best Poster Award**

[40] **D. M. Warsinger**, J. Swaminathan, and J. H. Lienhard V, "Effect of module inclination angle on air gap membrane distillation," in *15th International Heat Transfer Conference, IHTC-15*, Kyoto, Japan August 11th, 2014.

Invited Talks

[41] **David Warsinger** and Kishor Nayar, Emerging Water Challenges and Technology Solutions, EESN & J-WAFS, MIT Alumni Network, 4/9/2025, Virtual

[42] **David Warsinger**, Reciprocating Piston Batch Reverse Osmosis: Pushing the limits of efficiency and fouling resistance, NAWI Pilot teams brief USBR, 12/4/2024, Virtual

[43] **David Warsinger,** ACS Clean Water Summit: 12/11/2024, Virtual

[44] **David Warsinger**, Enhancing Heat and Mass Transfer for the Water Energy Nexus, Graduate Student Lecture Series, UW-Madison, Madison WI, 1/25/24

[45] **David Warsinger**, Sustainability and the Water-Energy Nexus, Water and Sustainability - Summer Institute, Virtual talk, 6/29/2023

[46] **David Warsinger**, Enhancing Transport for the Water Energy Nexus, George Mason University Spring Seminar, Manasas VA, April 7th 2023

[47] **D. M. Warsinger**, Batch and Counterflow Reverse Osmosis Processes for Extreme Salinity with High Efficiency, Membrane CoP at Cranfield Water Science Institute, 5/26/22

[48] **D. M. Warsinger**, Albraa Alsaati, Mustakeem Mustakeem. Day 1: Creative Water Production, and Day 2: Water from renewable energy sources. Winter Enrichment Program (WEP2020), KAUST, 1/18/22-1/19/22

[49] **D. M. Warsinger**, How Desalination can Enable Renewable Energy, **Frontiers in Mechanical Engineering and Sciences**, 11/24/21

[50] **D. M. Warsinger**, Material innovations for improving thermal desalination by membrane distillation, WDRC/EnSE Fall Seminar, KAUST, 9/21/21

[51] **D. M. Warsinger**, IDANoAir: Super-Vacuum Gap NanoMembrane Distillation via TVC hybridization, IDA - NREL Teaming Webinar,11/30/20

[52] **D. M. Warsinger**, Shihong Lin, Qilin Li, Guillermo Zaragozo, Thermal Desalination by Membrane Distillation, MIT Innotherm Colloquiua, (Remote), 11/16/2020. **>350 attendees**. link

[53] **D. M. Warsinger**, Desalinating for our water future, EmTech MIT 2020, Plenary, Boston, MA (Remotely) 10/19/2020 **Plenary**

[54] **D.M. Warsinger,** Desalienación para Peru, given at: 1) UNSAAC (Universidad Nacional de San Antonio Abad del Cusco) Cusco, 2) Peru 6/6/2019; UNAP Puno, 6/13/2019, 3) UNSA (Universidad Nacional de San Agustin de Arequipa), Arequipa, Peru, 6/18/19

[55] **D.M. Warsinger,** Purificación de agua y desalinización, given at 1) 5/6/2019 Office of Gobernador Juan Tonconi, Tacna, Peru, 2) 5/7/2019, Regional Governers Office and UNAM (National University of Moquegua), Moquegua, Peru. 3) 5/6/2019 UNSA (Universidad Nacional de San Agustin de Arequipa), Arequipa, Peru

[56] **D.M. Warsinger,** The New RO: A Game Changer for Water and Energy, USCD, San Diego, 6/29/2019

[57] **D.M. Warsinger,** Bridging the gap between large and small: Thermofluids and Nanoengineering for the Water-Energy-Food Nexus. given at: UCLA, UCA, in Singapore: NTU and NUS, and Australia: University of Technology Sydney and University of Melbourne, Summer 2018

[58] **D.M. Warsinger,** "Can we save lives with thermodynamics? Thermofluids and nanoengineering for the water-food-energy nexus," Stanford University, *Paulo Alto, CA*, February 23, 2017. (Faculty interview, talk also given at 4 other institutes)

[59] **D. M. Warsinger**, "Combating growing water scarcity: the potential and need for desalination and water reuse," in *Invited talk, Rochester Institute of Technology, September 21*, 2016.

[60] **D. M. Warsinger**, Panelist, in *MIT Building Technology Startup Panel, Cambridge Massachusetts*, Aug. 2015.

[61] **D. M. Warsinger**, Panelist, in *MIT Undergraduate Research Opportunities Program Freshman Pre-Orientation Program (UROP FPOP), Cambridge Massachusetts*, Aug. 2015.

[62] **D. M. Warsinger**, "Coolify, a decentralized micro cold storage solution," *Social Innovator Spotlight, Ag Innovation Showcase, St. Louis, MO*, September 9th, 2014. **Plenary Presentation**

[63] **D. M. Warsinger**, "Fouling and thermodynamic design of membrane distillation systems," *MIT Water Club, Cambridge MA*, October 8th 2014.