Himanshu Mishra

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SUMMARY

I investigate water-hydrophobe interfaces across some twelve orders of magnitude – molecular to kilometer scales – via a broad set of experimental techniques, theory, and computation. Problems of specific interest include, global food-water security through bio-inspired technologies, superhydrophobic insects and plants, chemical reactions "on-water" and in sprays, and nanoconfined liquids (dilute to ultraconcentrated).

EDUCATION

PhD, California Institute of Technology, Department of Applied Physics & Materials Science (2009-2013)
Advisors: William A. Goddard III and Michael R. Hoffmann
Thesis: Proton Transfers at the Air-Water Interface

MS, California Institute of Technology, Department of Applied Physics & Materials Science (2008-2009)

MS, Purdue University, School of Mechanical Engineering (2005-2007)
Advisors: Timothy S. Fisher and Timothy D. Sands
Thesis: Carbon Nanotube Electrical Interfaces for Thermoelectrics

BTech, Mechanical Engineering, Punjab Engineering College, Chandigarh (2001-2005)

PROFESSIONAL EXPERIENCE

Associate Professor of Environmental Science and Engineering & Principal Investigator at Water Desalination and Reuse Center, KAUST (July 2020 – present)

Assistant Professor of Environmental Science and Engineering & Principal Investigator at Water Desalination and Reuse Center, KAUST (November 2014 – June 2020)

Elings Prize Postdoctoral Fellow, California NanoSystems Institute, University of California Santa Barbara, Mentor: Late Prof. Jacob Israelachvili (July 2013 – November 2014)

Peer-Reviewed Journal Articles (h-index: 16, Google Scholar citations: 906; *corresponding author)

1. Nauruzbayeva, J., Sun, Z., Gallo Jr., A., Ibrahim, M., Santamarina, J. C., **Mishra, H.***, "Electrification at Water-Hydrophobe Interfaces", *Nature Communications* 11, 5285, DOI: 10.1038/s41467-020-19054-8 **(Nature Communications Editors' Highlights)**
2. Santana, A., Farinha, A. S. F., Torano, A. Z., Ibrahim, M., **Mishra, H***, "First-principles Based Rationally Designed Materials for treating Wastewaters", *International Journal of Quantum Chemistry*, DOI:10.1002/qua.26501 **(Journal cover)**
3. Arunachalam, S., Ahmad, Z., Das, R., **Mishra, H.***, "Counterintuitive Wetting Transitions in Doubly Reentrant Cavities as a Function of Surface Make-up, Hydrostatic Pressure, and Cavity Aspect Ratio", *Advanced Materials Interfaces*, DOI:10.1002/admi.202001268 **(Journal cover)**
4. Das, R., Ahmad, A., Nauruzbayeva, **Mishra, H.***, "Biomimetic Coating-free Superomniphobicity", *Scientific Reports*, 2020, 10, Article number: 7934 (DOI: 10.1038/s41598-020-64345-1)

5. Mahadik, G. A., Hernandez Sanchez, J. F., Arunachalam, S., Gallo Jr., A., Farinha, A. S., Thoroddsen, S. T., **Mishra, H.***, Duarte, C. M., "Superhydrophobicity and size reduction enabled Halobates (Insecta: Heteroptera, Gerridae) to colonize the open ocean", *Scientific Reports*, 2020, 10, Article number: 7785, DOI: 10.1038/s41598-020-64563-7
6. Pillai, S., Santana, A., Das, R., Shrestha, B.R., Manalastas, E., **Mishra, H*,** "A Molecular to Macro Level Assessment of Direct Contact Membrane Distillation for Separating Organics from Water", *Journal of Membrane Science*, 2020, Vol. 608, 118140 (https://doi.org/10.1016/j.memsci.2020.118140)
7. Gonzalez-Avila, S. R., Nguyen, D. M., Arunachalam, S., Domingues, E., **Mishra, H.***, Ohl, C-D., "Mitigating Cavitation Erosion Using Biomimetic Gas-Entrapping Microtextured Surfaces (GEMS)", ***Science Advances***, 2020, Vol. 6, No. 13, eaax6192 (DOI: 10.1126/sciadv.aax6192)
8. Das, R., Arunachalam, S., Ahmad, Z., Manalastas, E., Syed, A., Buttner, U., **Mishra, H.*,** "Proof-of-Concept for Gas-Entrapping Membranes (GEMs) Derived from Water-loving SiO_2/Si/SiO_2 Wafers for Green Desalination", ***Journal of Visualized Experiments***, 2020, Issue 157, e60583 (doi:10.3791/60583)
9. Shrestha, B. R., Pillai, S., Santana, A., Donaldson, Jr., S. H., Pascal, T. A., **Mishra, H.***, "Nuclear Quantum Effects in Hydrophobic Nanoconfinement", ***Journal of Physical Chemistry Letters,*** 2019, 10, 5530-5535 **(Journal cover)**
10. Arunachalam, S., Domingues, E. M., Das. R., Nauruzbayeva, J., Buttner, U., Syed, A., **Mishra, H.***, "Rendering SiO_2/Si surfaces omniphobic by carving gas-entrapping microtextures comprising reentrant and doubly reentrant cavities or pillars", ***Journal of Visualized Experiments***, 2020, 156, e60403, (DOI:10.3791/60403)
11. Gallo Jr., A., Farinha, A. S., Emwas, A-H., Santana, A., Nielsen, R. J., Goddard III, W. A., **Mishra, H.***, "Reply to the 'Comment on "The chemical reactions in electrosprays of water do not always correspond to those at the pristine air–water interface", by A. J. Colussi and S. Enami", ***Chemical Science,*** 2019, 10, (DOI: 10.1039/c9sc00991d)
12. Das, R., Arunachalam, S., Ahmad, Z., Manalastas, E., **Mishra, H.***, "Bio-inspired Gas-entrapping Membranes (GEMs) Derived from Common Water-wet Materials for Green Desalination", ***Journal of Membrane Science***, 2019, Vol 588, 117185
13. Gallo Jr., A., Farinha, A. S., Dinis, M., Emwas, A-H., Santana, A., Nielsen, S., Goddard III, W. A., **Mishra, H.***, "The Chemical Reactions in Electrosprays of Water Do Not Always Correspond to Those at the Pristine Air-Water Interface", ***Chemical Science,*** 2019, 10, 2566-2577 **(Journal cover)**
14. Subramanian, N., Al-Saadi, A., Qamar, A., Gallo Jr., A., Ridwan, M. G., Lee, J-G., Pillai, S., Anjum, D., Ghaffour, N., Sharipov, F., **Mishra, H.***, "Evaluating the Potential of Superhydrophobic Nanoporous Alumina Membranes for Direct Contact Membrane Distillation", ***Journal of Colloid and Interface Science,*** 2019, 533(1), 723-732
15. Arunachalam, S., Das, R., Nauruzbayeva, Domingues, E. M., **Mishra, H.***, "Assessing Omniphobicity by Immersion", ***Journal of Colloid and Interface Science,*** 2019, Vol. 534, 156-162
16. Domingues, E. M., Arunachalam, S., Nauruzbayeva, **Mishra, H.***, "Biomimetic Coating-free Surfaces for Long-term Entrapment of Air under Wetting Liquids", ***Nature Communications,*** 2018, 9, Article Number: 3606.
17. Bera, B., Shahidzadeh, N., **Mishra, H.,** Bonn D., "Wettability of Water on Graphene Nanopowders of Different Thicknesses", ***Applied Physics Letters*** 2018, 112, 151606
18. Domingues, E. M., Arunachalam, S., **Mishra, H.*,** "Doubly Reentrant Cavities Prevent Catastrophic Wetting Transitions on Intrinsically Wetting Surfaces", ***ACS Applied Materials & Interfaces,*** 2017, 9, 21532-38

19. Yutkin, M. P., Lee, J. Y., **Mishra, H.,** Patzek, T. W., Radke, C. J., "Bulk and Surface Aqueous Speciation of Calcite: Implications for Low-Salinity Waterflooding of Carbonate Reservoirs", ***Society of Petroleum Engineers Journal,*** 2017, Vol 23(1), pp 84-101
20. Kaufman, Y., Chen, S-Y., **Mishra, H.**, Schrader, A. M., Lee, D. W., Das, S., Donaldson Jr., S. H., Israelachvili, J. N., "Simple to Apply Wetting Model to Predict Thermodynamically Stable and Metastable Contact Angles on Textured/Rough/Patterned Surfaces", ***Journal of Physical Chemistry C,*** 2017, 121, 5642-56
21. **Mishra, H.*,** Schrader, A. M. , Lee, D. W., Gallo Jr., A., Chen, S-Y., Kaufman, Y., Das, S., Israelachvili, J. N. "Time-Dependent Wetting Behavior of PDMS Surfaces with Bioinspired, Hierarchical Structures", ***ACS Applied Materials & Interfaces*** 2016, 8, 8168−8174 **(Journal cover)**

Before joining KAUST

22. Colussi, A. Yabushita, S. Enami, M. R. Hoffmann, W.G. Liu, **H. Mishra**, W. A. Goddard III, "Tropospheric Aerosol as a reactive intermediate", ***Faraday Discussions,*** 2013, 165, 407-420
23. **H. Mishra**, S. Enami, L. A. Stewart, R. J. Nielsen, M. R. Hoffmann, W. A. Goddard III, A. J. Colussi, "Brønsted basicity of the air-water interface", ***Proceedings of the National Academy of Sciences,*** 2012, 109(46) 18679-18683 (Commentary in *Nature Chemistry*: *https://www.nature.com/articles/nchem.1556*)
24. **H. Mishra**, S. Enami, R. J. Nielsen, W. A. Goddard III, M.R. Hoffmann, A. J. Colussi, "Anions dramatically enhance proton transfer across aqueous interfaces", ***Proceedings of the National Academy of Sciences,*** 2012, 109(26), 10228-10232
25. **H. Mishra**, R. J. Nielsen, S. Enami, M. R. Hoffmann, A. J. Colussi, W. A. Goddard III, "Quantum chemical insights into the dissociation of nitric acid on the surface of aqueous electrolytes", ***International Journal of Quantum Chemistry***, 2012, *113(4) 413-417*
26. **H. Mishra**, C. J. Yu, D. P. Chen, W.A. Goddard III, N. F. Dalleska, M. R. Hoffmann, M. S. Diallo, "Branched polymer resins with high binding capacity and selectivity for boron in aqueous solutions", ***Environmental Science & Technology***, 2012, 46(16), 8998-9004
27. S. Enami, **H. Mishra**, M. R. Hoffmann, A. J. Colussi, "Dry deposition and oligomerization of gaseous isoprene on mildly acidic surfaces", ***Journal of Physical Chemistry A,*** 2012, 116 (24), 6027-6032
28. S. Enami, **H. Mishra**, M. R. Hoffmann, A. J. Colussi, "Hofmeister effects in micromolar electrolyte solutions", ***Journal of Chemical Physics***, 2012, 136(15), 154707 (pg 1-7)
29. G. Acharya, S. C. Shin, M. McDermott, **H. Mishra**, H. Park, I. C. Kwon, K. Park, "The hydrogel template method for fabrication of homogeneous nano/micro particles", ***Journal of Controlled Release***, 2010, 141(3): 314-9
30. **H. Mishra**, B. A. Cola, V. Rawat, P. B. Amama, K. G. Biswas, X. Xu, T. S. Fisher, T. D. Sands, "Bismuth telluride films electrodeposited onto carbon nanotube arrays for mechanically compliant, low resistance interfaces in thermoelectric microdevices", ***Advanced Materials***, 2009, 21, 1-4
31. **H. Mishra**, S. Mukherjee, "Examining the best-fit paradigm for FEM at element level", ***Sadhāna - Journal of Engineering***, 2004, 29(6), 1-16

Articles Under Preparation/Review/Revision

32. Gallo Jr., A., Odokonyero, Mousa, M. A., A., Reihmer, J., Morton, M. J. L., Al-Mashharawi, S., R. Marasco, Daffonchio, D., McCabe, M. F., Tester, M., **Mishra, H***, "Superhydrophobic Sand Mulches Increase Productivity and Reduce Water Demand in Dryland Agriculture" (under review)

33. Ridwan, M. G., Shrestha, B. R., Maharjan, N., **Mishra, H.***, "Modulation of Electrostatic and Hydrophobic Interactions by Zwitterionic Osmolytes" (under preparation)
33. Shi, M., Das, R., Arunachalam, S., **Mishra, H.***, "Unexpected Suppression of the Leidenfrost Phenomenon on Superhydrophobic Surfaces" (under preparation)
34. Odokonyero, K., Gallo Jr., A., **Mishra, H***, "Nanoengineered, Low-cost Hydrophobic Jute Bags for Post-harvest Seed Storage" (under preparation)
35. Odokonyero, K., Arunachalam, S., Gallo Jr., Ibrahim, M., Jaleel, N. M. A., **Mishra, H***, "Wax-coated Jute Fabrics as Green Durable Mulches" (under preparation)
36. Gallo Jr., Zhang, P., Musskopf, N., X. Liu, Z. Yang, Thoroddsen, S., Im, H., **Mishra, H.***, "On the formation of H_2O_2 in water microdroplets formed via spraying and condensation" (under preparation)
37. Ahmad, Z., Das, R., **Mishra, H.***, "Coating-free and Scalable Gas-Entrapping Membranes (GEMs)" (under preparation)
38. Ahmad, Z., Qamar, A., Das, R., Arunachalam, S., **Mishra, H.***, "Breaking through Gas-entrapping Microtextured Surfaces (GEMS)" (under preparation)
39. Arunachalam, S., Qamar, A., Das, R., **Mishra, H.***, "Zipper Cavities" (under preparation)
40. Arunachalam, S., Ahmad, Z., **Mishra, H.***, "Breathing Surfaces" (under preparation)

INTELLECTUAL PROPERTY (Patents and applications for patents)

1. Mishra, H., Odokonyero, K., Gallo Jr., A., "Wax-coated jute bags for applications in food storage and mulching", KAUST TTO, December, 16, 2020
2. Mishra, H., Ahmad, Z., Manalastas, "A device for applying pressure during confocal microscopy", KAUST TTO, October 7, 2019
3. Ohl, C-D., Mishra, H., Gonzalez, R., Ngugen, M. "Surface protection against cavitation erosion" European Patent Application EP 0752-5518, March 7th, 2019.
4. Mishra, H., Arunachalam, S., Domingues, E., Das, R., "Membranes with mushroom-shaped (reentrant and doubly reentrant) pores and their applications in liquid-vapor extraction" (KAUST Technology Transfer Office) May, 2018
5. Mishra, H., Subramanian, N. "Iridium Oxide Microelectrodes for Sensing Moisture and Humid Fumes of Acids and Bases" (KAUST Technology Transfer Office) Dec, 2016
6. Mishra, H., Reihmer, J., Gallo Jr., A. "Compositions and Methods Relating to Functionalized Sands" (USPTO Application #62/404,958) Oct 6, 2016
7. Mishra, H., Farinha, A. S. F., and Sinha, S. "Functionalized SiO_2 Microspheres for Extracting Oil from Produced Water", (USPTO Application # PCT/IB2016/055358) Filed on September 9th, 2015
8. Diallo, M. S., Yu, C. J., Mishra, H., "High Capacity Oxoanion Chelating Media from Hyperbranched Macromolecules", US Patent #20130118986 A1

HONORS AND SCHOLARLY AWARDS (Student or post-doc advisees are underlined)

- Editors' Highlights, *Nature Communications* (2020) DOI: 10.1038/s41467-020-19054-8
- Cover Article, *Advanced Materials Interfaces* (2020) DOI:10.1002/admi.202001268
- Cover Article, *International Journal of Quantum Chemistry* (2020) DOI:10.1002/qua.26501
- Student delegate to the 70th Lindau Nobel Laureate Interdisciplinary Meeting (2020): Adair Gallo Jr., PhD student
- Invited lecture: Physical Chemistry Seminar, College of Chemistry, University of California Berkeley, CA, USA (October 15th, 2019)

- Invited lecture: Chemical Physics Seminar, Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA, USA (October 8th, 2019)
- Best Poster Prize, 45th International Conference on Micro and Nano Engineering, Rhodes, Greece (September 23-26, 2019) (Zain Ahmad, MS student) (Out of 404 entries; cash prize: 400 Euros)
- Session Chair, Wetting on Soft or Microtextured Surfaces, Bad Honnef, Germany (Host: Max Planck Institute for Polymer Research, Mainz, Apr 11-13, 2019)
- Cover Article, *Journal of Physical Chemistry Letters* (2019) DOI:10.1021/acs.jpclett.9b01835
- Cover Article, *Chemical Science* (2019) DOI: 10.1039/C8SC05538F
- Lecture at the United Nations COP-24 meeting on climate change at Katowice, Poland (Dec, 2018) got >92k views on Facebook through Institute of Sustainable Development (IISD) reporting.
- Elsevier Best Poster Award, 7th International Colloids Conference, Sitges-Barcelona, Spain (2017) (Three selected out of a pool of 277 entries)
- First Place, Doctoral Level Students Poster Contest, 5th Water Arabia Conference and Exhibition, Al Khobar, Saudi Arabia (2017) (Mr. Adair Gallo Jr., PhD student)
- Cover Article: *ACS Applied Materials & Interfaces* (2016) DOI: 10.1021/acsami.5b10721
- Elings Postdoctoral Fellowship, California NanoSystems Institute, UC Santa Barbara (2013)
- Gilbert Ling Prize, 7th Conference on the Physics, Chemistry and Biology of Water, VT (2012)
- The Young Investigator Award (50,000 Yen cash award) Seventh Congress of the International Society for Theoretical Chemical Physics, Tokyo (2011)
- Division Fellowship, California Institute of Technology (2008)

RESEARCH FUNDING (King Abdullah University of Science and Technology)

1. Field Trials of Superhydrophobic Sand Mulches with Local Saudi Trees. Saudi ARAMCO (under review) **Principal Investigator: H. Mishra**
2. Probing Membrane-Water Interfaces to Improve Water Purification Efficiency. KAUST's Center Partnership Fund Program 2019. Principal Investigator: Richard Saykally (University of California Berkeley); **Co-Principal Investigator: H. Mishra** 2019-2020 (US$ 125,000)
3. Field Trials of Superhydrophobic Sand Mulches with Crops and Trees Towards Boosting Vegetation in Drylands. Office of Sponsored Research, KAUST. **Principal Investigator: H. Mishra**; Co-Principal Investigators: Profs. Magdi Mousa, A.Qurashi (KAU, Jeddah). 2018-2021 ($590,999/3yrs).
4. Characterizing Condensation in Doubly Reentrant Cavity Microtextures using Neutron Imaging using DINGO. Australian Center for Neutron Scattering (ANSTO). **Principal Investigator: H. Mishra**; Co-Principal Investigators: Dr. Floriana Salvemini and Dr. Jitendra Mata, ANSTO. 2018 (Value: AU$ 37,600).
5. Exploring the Origins of Hydrophobic Interactions via a Complementary Experimental and Theoretical Approach. Competitive Research Grant, Office of Sponsored Research, KAUST. **Principal Investigator: H. Mishra**; Co-Principal Investigator: Tod Pascal (UC San Diego). 2018-2020 ($400,000/2yrs).
6. Electronic Properties of Water near Large Extended Hydrophobic Interfaces. KAUST Supercomputing Laboratory Grant. **Principal Investigator: H. Mishra**; Co-Principal Investigator: Dr. Ali Hassanali, International Center for Theoretical Physics, Trieste, Italy. 2017-2019. (25 Million CPU hours)
7. Ion interactions with Membranes and Surfactants. KAUST Supercomputing Laboratory Grant. **Principal Investigator: H. Mishra**; Co-Principal Investigator: Prof. Ran Friedman, Linnaeus University, Sweden and Dr. Steve Donaldson, École Normale Supérieure, Paris. (10 million CPU hours Grant value: US$ 91,000)

8. Exploring Proton-catalyzed Reactions at Water-hydrophobe Interfaces via Ultrasensitive Mass-spectrometry and Ultrafast Surface-specific Spectroscopy. Competitive Research Grant, Office of Sponsored Research, KAUST. **Principal Investigator: H. Mishra**; Co-Principal Investigator: Prof. Richard Saykally (University of California Berkeley). 2016-2018 ($400,000/2yrs).
9. Understanding the hydrogen-bonded percolation networks in water. KAUST Supercomputing Laboratory Grant. **Principal Investigator: H. Mishra**; Co-Principal Investigator: Prof. Vishwanath Dalvi, Institute of Chemical Technology, Mumbai, India. 2016-2017 (3 million CPU hours of value: US$ 40,000)
10. KAUST Conference: International Conference on Chemistries and Physics at Hydrophobic Interfaces. Office of Sponsored Research, KAUST. **Principal Investigator: H. Mishra**. 2015-2016. ($150,000)
11. Wetting of Graphene and Graphene Oxide Films: Implications for Desalination. KAUST SED Funding, Office of Sponsored Research, KAUST. Principal Investigator: Daniel Bonn (University of Amsterdam); **Co-Principal Investigator: H. Mishra** 2016-2017 (US$ 100,000)

SELECTED PRESENTATIONS (*refers to talks and **refer to posters)

1. H. Mishra*, et al., "Exploring Fast Chemistries "On-Water": Emulsions, Sprays, and the Air-Water Interface", Invited Physical Chemistry Seminar, College of Chemistry, University of California Berkeley, CA, USA (October 15th, 2019)
2. H. Mishra*, et al., "Exploring Fast Chemistries "On-Water": Emulsions, Electrosprays, and the Air-Water Interface", Invited Chemical Physics Seminar, Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA, USA (October 8th, 2019)
3. H. Mishra* et al., "Insect-inspired Translational Research", Special Seminar, NanoEngineering and Chemical Engineering Departments, University of California San Diego (Oct 4, 2019)
4. H. Mishra* et al., "Insect Inspiration: Fundamentals to Technologies", Special Seminar, Department of Chemistry and Biochemistry, University of Maryland (Oct 2, 2019)
5. H. Mishra* et al., "Are Electrosprays Suitable for Investigating Chemistries at the Air-Water Interface?", Gordon Research Conference on Liquids, Aug 5-9, 2019, Holderness, NH (One of the eight posters selected from 150 poster-abstracts for 10-min talks)
6. H. Mishra** et al., "Electrification at Water-hydrophobe Interfaces", *Gordon Research Conference on Liquids*, New Hampshire, USA (Aug 5-9, 2019)
7. *The 45th Micro and Nano Engineering Conference*, Sept 10, 2019 (Greece): Arunachalam, S.**, "Putting *Cassie* Under Pressure"; Das, R* et al., "Biomimetic architectures for entrapping air underwater using wetting materials"; Ahmad, Z.**, "Inexpensive and Scalable Perfluorocarbon-free Gas Entrapping Surfaces/Membranes" (Best Poster Prize: Four posters recognized out of 404 entries)
8. H. Mishra*, et al., "On the Assessment of Omniphobicity Derived from Intrinsically Wetting Materials", Poster presentation at the Heraeus Conference: Wetting on Soft or Microtextured Surfaces, Bad Honnef, Germany (Apr 11-13, 2019)
9. Nauruzbayeva, J.* et al., "Nature-inspired Coating-free Membranes for Desalination", 28th Annual Meeting of the North American Membrane Society (NAMS), May 11-15, 2019 (Pittsburgh, PA, USA)
10. Das, R.*, "Bio-inspired Gas-entrapping Membranes (GEMs) for Coating-free Desalination", 6th Nano Today Conference, June 16-20, 2019 (Lisbon, Portugal)
11. *93rd ACS Colloid & Surface Science Symposium*, Georgia Institute of Technology, June 16-19, 2019: Ghifari, M. G.* et al., "Long-range attraction between glycine-coated mica surfaces in ultra-dilute electrolytes"; Pillai, S.* et al., "Molecular Insights into the Loss of Hydrophobicity of Desalination Membranes by Amphiphilic Contaminants"
12. Mishra, H* et al., "Hydrophobic Interactions Between Rigid Surfaces in Light and Heavy Water, Alcohols, and Various Electrolytes", *XVI Surface Forces Conference*, Kazan, Russia (August 20-25, 2018)
13. *Gordon Research Conference on Water and Aqueous Solutions*, New Hampshire, USA (July 25-29, 2018), entitled: Santana, A.** "Hydrophobic Interactions Between Rigid Surfaces in Light and Heavy

Water", Nauruzbayeva, J.** "Contact Electrification at Extended Interfaces of Water and Hydrophobic Materials", Gallo, Jr., A.** "Chemistries in Electrosprays Do Not Represent Those at the Air-Water Interface", Ibrahim, M.** "Fries on-Water", Pillai, S.** "Hydrophobic Interactions Between Rigid Surfaces in Non-Aqueous Systems", Shrestha, B. R.** "Specific-ion Effects on Hydrophobic Interactions Between Rigid Surfaces", Mishra, H.** "Biomimetic Coating-free Surfaces for Desalination"

14. Mishra, H* et al., "Coating-free Desalination Membranes from Mushroom-shaped Pores", *8th International Colloids Conference,* Shanghai, China (June 2018) (Invited Showcase Oral presentation)
15. Gallo Jr., A* et al., "Inexpensive Superhydrophobic Sand Mulches for Dryland Agriculture", *255th American Chemical Society National Meeting and Expo,* New Orleans, USA (March, 2018)
16. *International Congress and Expo on Agriculture & Horticulture* 2018, Amsterdam: Gallo Jr., A.** "Superhydrophobic Sand Mulches Reduce Water Needs and Improve Yields in Desert Agriculture"; Odokonyero, K.** "Economical Analysis of Biochar Derived from Maize Straw for Use as Soil Amendment", and Odokonyero, K.** "Paraffin Wax Coated Jute Bags Reduce Moisture-induced Food Grain Storage Loss"
17. H. Mishra** et al., "Bio-inspired Non-wetting Microtextures: Exploring New Avenues", *Living Light 2018,* Cambridge University, UK (March 11-14, 2018)
18. H. Mishra** et al., "Inexpensive Superhydrophobic Sand Mulches for Desert Agriculture", *7th International Colloids Conference,* Sitges, Barcelona, Spain (2017) (Elsevier Best Poster Award)
19. A. Gallo Jr.,** et al., "Superhydrophobic Sand Mulches", *5th Water Arabia Conference and Exhibition*, Al Khobar, Saudi Arabia (2017) (First Prize, Doctoral Students Category)
20. Shrestha, B.* et al., "Surface Force Apparatus in Hydrophobic Interactions", *International Chemical Congress for Sustainable Development*, Nepal (2018) (Young Scientist Award)
21. Mishra, H.* et al., Isotope Effects on Hydrophobic Interactions, *The 8th Biennial Australian Colloid and Interface Symposium*, Coffs Harbor, Australia (January 29-February 3, 2017)
22. Mishra, H* et al., "On Time-Dependent Filling of Doubly Reentrant Cavities", *EMN Meeting on Texture and Microtexture*", Hong Kong, (December, 2016) (Invited talk)
23. Mishra, H* et al., "Mechanistic Insights into Acid-catalyzed Reactions 'On-water'", *International Conference on Science and Technology of Engineering Materials* Pattaya, Thailand (July, 2016) (Best Presentation Award)
24. Mishra, H* et al., "The Hydrophobic Interaction: Effects of H-bonding Networks, Heavy vs Light Water, and Ions", *Conference on Ions in Solutions: Biology, Energy and Environment*, Telluride Science and Research Center, Colorado (July 11-17, 2016)
25. Mishra, H* et al., "Wetting of Surfaces with Reentrant and Doubly Reentrant Cavities", *6th International Colloids Conference,* Berlin (June 19-22, 2016)
26. H. Mishra* et al., "A predictive, unified model for contact angles for surfaces with reentrant features", *5th International Colloids Conference*, Amsterdam, The Netherlands (June, 2015)

Before joining KAUST

27. H. Mishra** et al., "Why is the air-water interface negatively charged?", *7th Annual Conference on the Physics, Chemistry and Biology of Water*, Vermont, USA (Oct. 2012) (Gilbert Ling Prize)
28. H. Mishra* et al., Anions Dramatically Enhance Proton Transfer across Water Interfaces", *International Society for Theoretical Chemical Physics-VII*, Waseda, Japan, September, 2011 (The Young Investigator Award)
29. H. Mishra* et al., Boron-selective chelating resins from dendritic macromolecules, 9th Symposium on Nanotechnology and the Environment: Green Nanotechnology, *ACS National Meeting,* California, USA (March, 2011)

30. H. Mishra** et al., Functional porous microspheres from hyperbranched polymers: synthesis, characterization and applications to boron removal from water, *NSF CMMI Research and Innovation Conference*, Georgia Institute of Technology, Atlanta, USA, Jan, 2011 (NSF Travel Award)
31. H. Mishra** et al., "Electrodeposition of bismuth telluride films onto carbon nanotube arrays", *Cooling Technologies Research Center Annual Meeting*, Purdue University, (Jun, 2008) (Best Poster Award)
32. H. Mishra*, "Applying projection theorem to an equilibrium equation", *Proceedings of the 10th Annual Conference on Mathematical Modeling organized by the Vijnãna Parishad of India*, National Institute of Technology, Bhopal, India (May, 2004) (The Best Paper Award)

RESEARCH SUPERVISED AT KAUST

Primary Supervision - Masters	**Primary Supervision – PhD**	**Post Doc Supervision**
Completed: 8 In Progress: 2	Completed: 1 In Progress: 5	Total: 10

King Abdullah University of Science and Technology

PhD advising

1. Dr. Sreekiran Pillai, EnSE; Investigating hydrophobic interactions between extended surfaces (Aug, 2015 – Dec, 2019). Current position: Assistant Professor, Saintgits Engineering College, Kottayam, Kerala (India)
2. Adair Gallo Junior, EnSE; Superhydrophobic Sand (SHS) mulches: development and translation (expected to finish in 2021)
3. Jamilya Nauruzbayeva, EnSE; Contact electrification at water-hydrophobe interfaces: fundamentals and applications (expected to finish in 2021)
4. Muhammad Ghifari Ridwan, EnSE; Probing Slippery Liquid-infused Surfaces at the Nanoscale (expected to finish in 2023).
5. Zain Ahmad, EnSE; Couplings between wetting and heat & mass transfer in bio-inspired microtextures (expected to finish in 2023).
6. Sankara Arunachalam, EnSE; Bio-inspired gas-entrapping microtextures: fundamentals and applications (expected to finish in 2023).

MS advising

1. Aniela Zarzar Torańo, Chemical Science; Chemical surface modifications of silica for the removal of textile dyes in wastewater (Fall 2015 – Summer 2017). Current position: Reliability Engineer, Saudi Aramco, Dhahran, KSA.
2. Joel Reihmer, EnSE; Synthesis and characterization of hydrophobic granules and application in desert agriculture (Fall 2015 – Spring 2017) Current position: Chemist, Jim Bean, Kentucky, USA
3. Kuang-Hui Li, Materials Science; Surface functionalization of mica (Spring 2015 – Summer 2016). Current position: Research Engineering, TSMC, Taiwan.
4. Maria Fernanda Nava Ocampo, EnSE; Investigating effects of hypertonic saline solutions on lipid monolayers at the air-water interface as surrogates for lung surfaces (Fall 2015 – Summer 2017). Current position: PhD student, WDRC, KAUST.
5. Adair Gallo Junior, EnSE; An investigation of chemical landscapes in aqueous electrosprays by tracking oligomerization of isoprene (MS: Summer 2016 – Fall 2017)). Current position: PhD student.
6. Muhammad Ghifari Ridwan, EnSE; Zwitterion molecule contribution on electrostatic interaction (Fall 2018 – Fall 2019; MS Student, WDRC, KAUST). Current position: PhD student.
7. Zain Ahmad, EnSE; An experimental and theoretical investigation of pressure-induced wetting transitions, (Fall 2018 – Fall 2019). Current position: PhD student.

8. Abdulaziz A. Alruwaithi, Chemical Science; Investigating "On-water" Reactions using Microfluidics (Fall 2019 – Spring 2020). Current position: Business Analyst, Monz (Saudi Arabia).
9. Vinicius dos Santos, Chemical Science (Fall 2020 -)
10. Nayara Musskopf, EnSE (Fall 2020 -)

Postdoctoral scholars advising

1. Dr. Andreia S. F. Farinha (2015-2016)
   - Current position/location: Research Engineer Position, WDRC, KAUST.
2. Dr. Patricia Martins (2017-2018)
   - Current position/location: Postdoc University of Coimbra
3. Dr. Cristina Chiutu (2015-2016)
   - Current position/location: Master Student in Robotics, University of Craiova
4. Dr. Buddha Shrestha (2017-2021)
   - Current position/location: Research Scientist, WDRC, KAUST
5. Dr. Adriano Sanchez (2017-2020)
   - Current position/location: Postdoctoral Fellow, WDRC, KAUST
6. Dr. Ratul Das (2017-2020)
   - Current position/location: Research and Development Manager, ACWA Power, Saudi Arabia
7. Dr. Mahmoud Ibrahim (2018-2020)
8. Dr. Kennedy Odokonyero (2018-)
9. Dr. Meng Shi (2019-)
10. Dr. Peng Zhang (2019 -)

Lab Technicians

1. Dr. Eddy Domingues (June, 2015-Oct, 2017); Current position: Scientist, Universidade de Aveiro (Portugal)
2. Dr. Navaladian Subramanian (October, 2015-2017). Current position: Entrepreneur (India)
3. Mr. Sankara Arunachalam (2015 - 2020). Current position: PhD student, KAUST
4. Mr. Edelberto Manalastas (2017 - present)

UNIVERSITY SERVICE

University Committees

- President's Academic Council (2019 - 2020)
- Chairperson, Environmental Science and Engineering Admissions Committee (2017 - present)
- Representative of the Biological and Environmental Science and Engineering Division for the Faculty Learning Program (FLP), Berkeley Center for Teaching and Learning, University of California Berkeley (August 2018)
- Faculty Committee Member: Plant Growth Core Lab (2019- present); Nanofabrication Core Lab, KAUST (2018- 2020); Analytical Core Lab, KAUST (2016-2018)

PUBLIC OUTREACH ACTIVITIES

1. The KAUST School Curriculum Committee (2019 - present); speaker at The KAUST School
2. H. Mishra, Lecture and demonstration of our patent-pending Superhydrophobic Sand (SHS) technology at the Global Forum for Innovators in Agriculture (GFIA), Abu Dhabi (Apr 1-2, 2019)
3. Panel Discussion: KAUST Sci Café on Water Security (March 8, 2019). https://www.youtube.com/watch?v=Zgn8kiRVAqQ&t=122s
4. Lecture at the United Nations' COP-24 Conference, Katowice, Poland (Dec 5-6, 2018). https://www.facebook.com/watch/?v=715664815547200
5. Writing: Nature Research Chemistry Community Blogs:

a. https://chemistrycommunity.nature.com/users/174953-himanshu-mishra/posts/44910-calling-on-to-women-meches
b. https://chemistrycommunity.nature.com/users/174953-himanshu-mishra/posts/38606-our-journey-towards-coating-free-liquid-repellent-surfaces

6. Press release on SandX field-trials: https://www.youtube.com/watch?v=R3EIB4hgB8E&t=15s

PROFESSIONAL SERVICE

Organizer of the International Conference on Physics and Chemistries at Hydrophobic Interfaces at KAUST during February 14-17, 2016 (US $ 150,000 award from the Office of Sponsored Research)

REVIEWERSHIP FOR JOURNALS

Nature Reviews Chemistry, Journal of the American Chemical Society, Chemical Science, Advanced Functional Materials, Advanced Materials Interfaces, Scientific Reports, Langmuir, Analyst, Journal of Colloid and Interface Science, Petroleum Science, Chemical Engineering Science, Journal of Physical Chemistry Letters, International Journal of Heat and Mass Transfer, Frontiers in Mechanical Engineering.