

Ranit Mukherjee

810 Cascade Ct.
Blacksburg, VA-24060
☎ +1 (540) 676 6404
✉ mrانيت33@vt.edu

Education

- 2016–present **PhD, Engineering Science and Mechanics, Virginia Tech**, Blacksburg, Virginia.
GPA: 3.6/4.0
Advisor: Prof. Jonathan B. Boreyko
- 2010–2014 **B.S, Mechanical Engineering, Jadavpur University**, Kolkata, India.
GPA: 8.9/10.0

Research Experience

Virginia Tech, Blacksburg, Virginia

- 2016–present **Oil-impregnated Hydrocarbon-based Polymer Films.**
We implemented a robust lubrication layer on low-density extruded polymer films. The motivation behind the project was to minimize product wastage from single-serving ketchup pouches.
- Orientation Effect on Jumping-Droplet Condensation.**
This is the first thorough study of how surface inclination affects droplet dynamics in jumping-droplet condensation on superhydrophobic surfaces. Such knowledge can be useful in the design of heat transfer devices in more efficient power plants and HVAC systems.
- Jumping Frost.**
A study on the surprising phenomena of ice particles breaking off from a frosted surface and jumping towards liquid droplets. Understanding the physics behind the phenomena can be useful in designing a passive defrosting technique.
- Wheat-to-Wheat Pathogen Transport by Jumping Droplet Condensation.**
Rust disease is one of the most devastating and economically significant fungal diseases in wheat plants. In this study, we are assessing the importance of the jumping-droplet condensation on the short and long-distance dispersal of rust pathogens.

Work Experience

- 2014–2016 **Process Engineer, Thermax Limited**, Pune, India.
Fired heaters are an integral part of petrochemical industries where a thermal fluid is heated to a desired temperature and pressure which is then used in subsequent processes like cracking. My job was to optimize the heater design from the client specific criteria while remaining within the guidelines of API 560 for the fired heaters.

Teaching Assistantship

- Spring 2017 **ESM 2304, Introduction to Dynamics, Virginia Tech**, Blacksburg, Virginia.
Instructor: Prof. Scott Hendricks and Dr. Jared Gregg
- Fall 2016, **ESM 2104, Introduction to Statics, Virginia Tech**, Blacksburg, Virginia.
- Fall 2020 Instructor: Prof. Scott Hendricks, Dr. Sneha Davison

Publications

Journal Publications

- 2018 **R. Mukherjee**, M. Habibi, Z. T. Rashed, O. Berbert, X. Shi, and J. B. Boreyko, "Oil-Impregnated Hydrocarbon-Based Polymer Films", *Scientific Reports*, 8, 2018 DOI:[10.1038/s41598-018-29823-7](https://doi.org/10.1038/s41598-018-29823-7).
Featured in [UK Daily Mirror](#), [Yahoo News](#), [MSN](#), [Science Daily](#)
[Top 50 most highly accessed Materials Science articles in 2018](#) in *Scientific Reports*
- 2019 **R. Mukherjee**, A. S. Berrier, K. R. Murphy, J. R. Vieitez, and J. B. Boreyko, "How Surface Orientation Affects Jumping-Droplet Condensation", *Joule*, 3, 2019 DOI:[10.1016/j.joule.2019.03.004](https://doi.org/10.1016/j.joule.2019.03.004).
Highlighted in a preview article in *Joule*, DOI:[10.1016/j.joule.2019.04.008](https://doi.org/10.1016/j.joule.2019.04.008)
- 2020 **M. Edalatpour**, K. R. Murphy, **R. Mukherjee** and J. B. Boreyko, "Bridging-Droplet Thermal Diodes", *Advanced Functional Materials*, 2020.
DOI:[10.1002/adfm.202004451](https://doi.org/10.1002/adfm.202004451)
- 2020 **R. Mukherjee**, S.F. Ahmadi, H. Zhang, R. Qiao and J. B. Boreyko, "Jumping Frost", *in review*.

Conference Proceedings

- 2018 **R. Mukherjee**, A. S. Berrier, J. R. Vieitez, K. R. Murphy, and J. B. Boreyko, "Effects of Surface Orientation on Jumping-Droplet Condensation", *Proceedings of the 16th International Heat Transfer Conference (IHTC-16)*, 2018.

Provisional Patents

- 2017 **R. Mukherjee**, M. Habibi, Z. T. Rashed, O. Berbert, X. Shi, and J. B. Boreyko, "Slippery Hydrocarbon-Based Polymer Films via Lubricant Impregnation", U.S. Provisional Patent Application No.: 62/531,635, filed 2017.
- 2020 **M. Edalatpour**, K. R. Murphy, **R. Mukherjee** and J. B. Boreyko, "Planar Bridging-Droplet Thermal Diodes", U.S. Provisional Patent Application No.: 63/044,135, filed 2020.

Conference Presentations

- 2017 "**Oil-infused Polyethylene Films**", *70th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Denver, CO, November 19–21, 2017 (Oral).
- 2018 "**Effect of Surface Orientation on Jumping-droplet Condensation**", *16th International Heat Transfer Conference (IHTC-16)*, Beijing, China, August 10–15, 2018 (Poster).
- 2018 "**Oil-infused Polyethylene Films**", *III Technical Conference and Review*, Virginia Tech, Blacksburg, April 16–18, 2018 (Poster).
- 2019 "**Effect of Surface Orientation on Jumping-Droplet Condensation**", *Micro and Nanoscale Phase Change Heat Transfer, Gordon Research Conference*, Lucca, Italy, February 3–8, 2019 (Poster).
- 2019 "**Jumping Frost**", *72nd Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Seattle, WA, November 23–26, 2019 (Oral).

Participation in Outreach Programs

- 2017, 2018 **Kids Tech University (KTU)**, *An educational outreach program to inspire children between ages 9–12 years in STEM education, Blacksburg, Virginia.*
- 2017–19 **C-Tech² Summer Camp**, *Interactive activity involving recent high school graduates to help them explore the engineering and research options at Virginia Tech. Organized by the Center for the Enhancement of Engineering Diversity (CEED), Blacksburg, Virginia.*
- 2020 **Virginia Tech Science Festival**, *Teleconferenced Meetups between learner groups and researchers to instill a love for science. Organized by Virginia Tech and the Science Museum of Western Virginia, Blacksburg, Virginia.*