Dr. Kartik Regulagadda

Room 138, NAC-2, IIT Madras – Chennai 600036, Tamil Nadu, India

kartik@iitm.ac.in

Current Employment

- **Assistant Professor Grade I** — **Department of Mechanical Engineering**
  IIT Madras — *January 2025–till date*
  Research areas: Interfacial phenomena, Surface science and engineering

Previous Employment

- **Post doctoral Scientist** — **Department of Mechanical Engineering**
  MTSN, UC Berkeley — *March 2024–December 2024*
  Research areas: Solid and liquid repellent surfaces
  Supervisor: Prof. Dr. Thomas Schutzius

- **Post doctoral Scientist** — **Department of Mechanical and Process Engineering**
  LTNT, ETH Zurich — *September 2019–December 2023*
  Research areas: Nanoscale 3D printing, Leidenfrost droplets, Ice adhesion on soft surfaces, Condensation heat transfer
  Supervisor: Prof. Dr. Dimos Poulikakos

Education

- **Master of Science and Doctor of Philosophy** — **Mechanical Engineering**
  Indian Institute of Technology, Madras — *July 2014–August 2019*
  CGPA: 8.91/10
  Research topic: Rapid bouncing of a water drop on superhydrophobic surfaces with macro-structures
  Advisor: Prof. Dr. Sarit Kumar Das
  Co-Advisor: Prof. Dr. Shamit Bakshi

- **Bachelor of Technology** — **Mechanical Engineering**
  Jawaharlal Nehru Technological University Hyderabad — *September 2009–May 2013*
  Aggregate percentage: 84.04%

Research Experience

- **Surface Fabrication and Coating Techniques:**
  - Deep Reactive Ion-Etching (DRIE) of silicon wafers
  - SU8 structuring on silicon wafers
  - Mask aligner
  - Nano- and Micro-scale 3D printing (Nanoscribe)

- e-beam evaporator
- Gold and Platinum sputtering
- Oxygen plasma treatment
- PDMS & Polystyrene moulding
- Fabricating soft viscoelastic solids
- Etching of Copper and Aluminum
- CVD
- iCVD
- Spray coating
- Dip coating
- Spin coating

- **Characterization:**
  - Atomic Force Microscopy (AFM)
  - Scanning Electron Microscopy (SEM)
  - Goniometer
  - Non-contact Optical Profilometer
  - Contact Profilometer

- **Experimental Setups:**
  - Fluorescence microscopes
  - High speed cameras
  - sCMOS camera
  - 3D microcontrolled stages
  - Stroboscope
  - Cryostage
  - Femto tool
  - Force sensors
  - Optical Microscopes
  - Custom built interferometers
  - Custom built inverted microscopes
  - Custom built environmental chambers
  - Custom built condensation loops
  - Custom built ice adhesion setup
  - Electrohydrodynamic drip printing
  - Glass pipette puller
  - Modified speaker cone setup for substrate oscillation
  - Compact Lasers
  - Syringe Pumps
  - Hot plates
  - Fume hoods
  - Laboratory oven
  - Glove bags

Teaching Experience

- **Teaching** & **Assistance:**
  Course instructor of ME3484: UG Lab for Jan-May 2026.
  Course instructor of ME3101: Heat transfer for July-Nov 2025.
  Delivered few lectures as a part of MECENG-40 Thermodynamics course for undergrads in fall 2024 at UC Berkeley.
  Prepared tutorials and conducted online forum discussions for the fluid dynamics course offered by NPTEL (a joint initiative from IITs and IISc to offer online courses and certification in various topics).

Assisted undergrads in the tutorials session of energy conversion systems course at IIT Madras.
Assisted undergrads in the tutorials session of heat transfer course at IIT Madras.

- **Workshops attended:**
  Successfully completed a one day PACT (Program for Aspiring College Teachers) workshop to gain preliminary training in teaching conducted at IIT Madras.
  Successfully completed two day TLC (Teacher Learning Center) workshop to gain experience in advanced teaching techniques conducted at IIT Madras.

Publications

- Moisés H Ibarra Miranda, Lars W Osterberg, Dev H Shah, Kartik Regulagadda, Lisa V Poulikakos. *3D-architected gratings for polarization-sensitive, nature-inspired structural color*. **Nanophotonics** (2025).
- CWE Lam, **Kartik Regulagadda**, Matteo Donati, Abinash Tripathy, Gopal Chandra Pal, Chander Shekhar Sharma, Athanasios Milionis, and Dimos Poulikakos. *Condensate droplet roaming on nanostructured superhydrophobic surfaces*. **Nature Communications** (2025).
- Matteo Donati, **Kartik Regulagadda**, Cheuk Wing Edmond Lam, Athanasios Milionis, Chander Shekhar Sharma, and Dimos Poulikakos. *Metal surface engineering for extreme sustenance of jumping droplet condensation.* **Langmuir** 40, (2024).
- Shuai Li, Cheuk Wing Edmond Lam, Matteo Donati, **Kartik Regulagadda**, Emre Yavuz, Till Pfeiffer, Panagiotis Sarkiris, Evangelos Gogolides, Athanasios Milionis, Dimos Poulikakos, Hans-Jürgen Butt, Michael Kappl. *Durable, ultrathin, and antifouling polymer brush coating for efficient condensation heat transfer.* **ACS Applied Materials and Interfaces** 16, (2024).
- Abinash Tripathy, **Kartik Regulagadda**, Cheuk Wing Edmond Lam, Matteo A Donati, Athanasios Milionis, Chander Shekhar Sharma, Efstratios Mitridis, Thomas M. Schutzius, and Dimos Poulikakos. *Ultrathin Durable Organic Hydrophobic Coatings Enhancing Dropwise Condensation Heat Transfer.* **Langmuir** 38, (2022).
  Notes: Equally contributing first author. Selected for the journal front cover.
- **Kartik Regulagadda**, Julia Gerber, Thomas M. Schutzius, and Dimos Poulikakos. *Microscale investigation on interfacial slippage and detachment of ice from soft materials.*
- Gustav Graeber, **Kartik Regulagadda**, Pascal Hodel, Christian Küttel, Dominic Landolf, Thomas M. Schutzius, and Dimos Poulikakos. *Leidenfrost droplet trampolining*. **Nature Communications** (2021).
- **Kartik Regulagadda***, Shamit Bakshi, and Sarit Kumar Das. *Droplet ski-jumping on an inclined macro-textured superhydrophobic surface.* **Applied Physics Letters** 113, (2018).
  Notes: *Corresponding author.
- **Kartik Regulagadda**, Shamit Bakshi, and Sarit Kumar Das. *Triggering of flow asymmetry by anisotropic deflection of lamella during the impact of a drop onto superhydrophobic surfaces.*

- **Kartik Regulagadda**, Shamit Bakshi, and Sarit Kumar Das. *Morphology of drop impact on a superhydrophobic surface with macro-structures.* **Physics of Fluids** 29, (2017).

Conference Presentations

- **Kartik Regulagadda**, Shamit Bakshi, and Sarit Kumar Das. *Droplet ski-jumping on an inclined macro-ridged superhydrophobic surface.* **Droplets**, July 24-26, 2017, UCLA, Los Angeles, California, USA.

- **Kartik Regulagadda**, Shamit Bakshi, and Sarit Kumar Das. *Droplet gliding.* **APS Division of Fluid Dynamics**, November 18-20, 2018, Atlanta, Georgia, USA.

- Matteo Donati, **Kartik Regulagadda**, Cheuk Wing Edmond Lam, Athanasios Milionis, Chander Shekar Sharma, and Dimos Poulikakos. *Ultradurable superhydrophobic surfaces for sustained jumping dropwise condensation.* **ICOM**, September 29-October 1, 2023, IIT Madras, Chennai, India.

Institute Activities

- Served as the Mechanical department organizing committee in-charge, jointly with Dr. Manoj Myneni, for the institute open house 2026.

Honors

- Post doctoral Scientist.

  Position offered at Laboratory of Thermodynamics in Emerging Technologies at ETH Zurich after international competitive search.

- MHRD fellowship to pursue MS & PhD.

  Ranked amongst the **top 1**% in GATE (mechanical engineering) which is a nationwide common examination for admission to Master's/Doctoral programs in India.

- Institute Pre-doctoral fellowship.

  Six month fellowship awarded at IIT Madras for submission of PhD thesis before 5 years.

- Rudra Memorial Prize.

  Awarded INR 10,000 for securing 557/600 is SSC board examinations.

Professional Activities

- Reviewer for journals
  - **Science Advances** published by AAAS.
  - **Physical Review E** and **Physical Review Letters** published by APS.
  - **Nanoscale** published by RSC.

- **Physics of Fluids** published by the AIP.
- **Langmuir** published by the ACS.
- **Experimental Heat transfer** published by Taylor & Francis.

Technical Skills

- Programming languages and mathematical packages: Matlab, C, C++, Python.
- Software familiar with: Inventor, Solidworks, ImageJ, L-Edit, Imaris for tracking, Labview (basic), Latex, Adobe-Illustrator, Adobe-Indesign, Adobe-Premier Pro, Adobe-Experience manager.
- Other: Mac OS, Windows OS.

Extra Curricular Activities

- Hiking, Travelling, Yoga
- Digital art
- Electronic gaming, Cricket, Football, Table tennis, and Badminton
- Volunteer for Engineers Conclave 2016, ILASS-Asia 2016, and ASCHT-2017 conferences

Languages

- Telugu: Fluent
- Hindi: Proficient
- English: Proficient

References

- **Dimos Poulikakos, Chair of Thermodynamics (Retired) and Professor Emeritus**
  Laboratory of Thermodynamics in Emerging Technologies
  Department of Mechanical and Process Engineering
  ETH Zurich
  Tel: +41 79 788 7076
  email: dpoulikakos@ethz.ch
- **Thomas M. Schutzius, Assistant Professor**
  Energy Science and Technology
  Department of Mechanical Engineering
  University of California Berkeley
  email: tschutzius@berkeley.edu

- **Sarit Kumar Das, Institute and V. Balakrishnan Chair Professor**
  Heat Transfer and Thermal Power Laboratory
  Department of Mechanical Engineering
  Indian Institute of Technology, Madras
  Tel: +91 44 2257 4655 (Office)
  email: skdas@smail.iitm.ac.in

- **Shamit Bakshi, Professor**
  I.C. Engines Laboratory
  Department of Mechanical Engineering
  Indian Institute of Technology, Madras
  Tel: +91 44 2257 4700 (Office)
  email: shamit@iitm.ac.in