Bhaskarjyoti Sarma

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Seeking a full-time position in R&D, mechanical engineering and thermal/fluid engineering starting Aug 2023.

EDUCATION

Indian Institute of Technology, Guwahati **Jan 2016 – Feb 2021**
PhD, Mechanical Engineering *Guwahati, India*
G.P.A. – 9.17/10

National Institute of Technology, Silchar **July 2009 – May 2013**
Bachelor of Technology (with honors) Mechanical Engineering *Silchar, India*
G.P.A. – 8.87/10

RESEARCH EXPERIENCE

Post-Doctoral Research Associate **Aug 2021 – Present**
Cooling Technologies Research Center, Purdue University *West Lafayette, Indiana*
Advisor: Justin A. Weibel

- **Two-Phase Transport Properties of Sintered Metal Wicks in Vapor Chamber Heat Spreaders**
  - Experimental investigation of the two-phase flow relationships between relative permeability, porosity, local saturation, and capillary pressure for thin sintered metallic wicks in relation to boiling heat transfer in vapor chamber and heat pipes
- **Multi-Scale Surface Enhancement of Two-Phase Immersion Cooling**
  - Understand how fin and surface wettability effects improve boiling heat transfer so that novel heat sinks can be optimized for size or mass
  - Understanding the effect of surface microstructures in the enhancement of pool boiling heat transfer
- **Enhancing Data Center Cooling Efficiency**
  - Design and development of novel and transformative cooling solutions for energy dense data centers

Doctoral Research **Jan 2016 – Feb 2021**
Indian Institute of Technology, Guwahati *Guwahati*
Advisor: Amaresh Dalal and Dipankar Narayan Basu

- **Tuning Wettability of Soft Surfaces in a Magnetic Field**
  - Investigated of the wetting dynamics of paramagnetic droplets on elastic surfaces in a magnetic field
- **Droplet Atomization via Electric Field Discharge**
  - Tuning the confinement of electric discharge inside a liquid droplet, to enhance droplet atomization
- **Low-Cost, Candle Soot-Based Superhydrophobic Surface**
  - Fabrication and characterization of the dynamic wettability of a candle soot-based superhydrophobic surface, a low-cost alternative to the existing surfaces
- **Droplet Generation from a Permeable Yarn**
  - Characterized the critical aspects of droplet generation from a yarn, relevant to drying and coating industries
- **Collaborative Research Projects**
  - Experimental investigation of electrowetting dynamics on a liquid dielectric surface (EWOL)
  - Exploration of electrocoalesence-mediated merging and mixing dynamics of a pair of liquid droplets
  - Numerical investigation of the effect of vortex wing geometry in enhancing the mixing efficiency of two immiscible liquids in a microchannel

Junior Research Fellow **Aug 2015 – Dec 2015**
Anupravaha Lab, Indian Institute of Technology, Guwahati *Guwahati, India*
Advisor: Amaresh Dalal

- Development and testing of a general purpose CFD solver (Anupravaha) over a hybrid unstructured grid

Undergraduate Research **Aug 2012 – May 2013**
National Institute of Technology, Silchar *Silchar, India*

- Design and analysis of a piezoelectric-driven synthetic jet actuator for MEMS Applications

Summer Research Fellow **May 2012 – July 2012**

Indian Institute of Technology, Guwahati *Guwahati, India*
Advisor: Ganesh Natarajan and Dr. Vinayak Kulkarni

- Development of pre-processing and postprocessing tools for CGNS (CFD general notation system) data

Summer Research Fellow **May 2011 – July 2011**
Indian Institute of Technology, Guwahati *Guwahati, India*
Advisor: Uday Shankar Dixit

- Feasibility study of friction stir welding (FSW) of thin aluminum sheets using a vertical milling machine

WORK EXPERIENCE

Research and Development Engineer, **July 2013 – July 2015**
Common Rail Fuel System Group, Maruti Suzuki India Limited, India *Gurugram, India*

- **Design and Development**
  - Parts: Common rail fuel system components (800 CC diesel engine**),** fasteners, sheet metal components
  - FEMA, and NVH (Noise, Vibration, and Harshness) analysis
- **Testing**
  - Design-of-Experiments (DOE) for bench testing of the fuel components
  - Vehicle level testing and post-test analysis of fuel components (driveability testing)
- **Additional Responsibilities**
  - Kaizen and VA/VE analysis
  - Vehicle teardown and benchmarking
  - Vendor Development for engine parts and sheet metal components
  - Liaising with Japanese technical experts

Project Engineer **Feb 2021 – July 2021**
IIT Guwahati Technology Innovation and Development (IITGTIDF) *Guwahati, India*
Project title: - TIH on Technology for Underwater Exploration.
Advisor: Santosha Kumar Dwivedy

- Liaising with 9 COEs in the Centre for Intelligent Cyber-Physical Systems (ICPS), laboratory set-up, and technical capability enhancement
- Course development (M. Tech: Robotics and Artificial Intelligence): Introduction to Python

JOURNAL PUBLICATIONS (10^+ conference publications)

- **B. Sarma**, A. Dalal, and D. N. Basu, "Interfacial dynamics of viscous droplets impacting a superhydrophobic candle soot surface: overview and comparison." *Physics of Fluids* (2022), **34**, 012121.
- R. Deb*, **B. Sarma***, and A. Dalal, "Magnetowetting dynamics of sessile ferrofluid droplets: A review." *Soft Matter* (2022), **18**, 2287-2324. (*- equal contribution).
- **B. Sarma**, S. Kumar, A. Dalal, D. N. Basu, and D. Bandyopadhyay, "Electric-discharge-mediated jetting, crowning, bursting, and atomization of a droplet." *Physical Review Applied* (2021) **15**, 014005.
- **B. Sarma,** V. Shahapure, A. Dalal, and D. N. Basu, "Magnetowetting dynamics of sessile ferrofluid droplets on soft surface." *Soft Matter* (2020) **16**, 970-982.
- **B. Sarma**, V. Shahapure, A. Dalal, and D. N. Basu, "Experimental characterization of the growth dynamics during capillarity-driven droplet generation." *Physical Review E* (2019) **100**, 013106.
- S. Kumar, **B. Sarma**, A. Dalal, D. N. Basu, A. K. Dasmahapatra, and D. Bandyopadhyay, "Field induced anomalous spreading, oscillation, ejection, spinning, and breaking of oil droplets on a strongly slipping water surface." *Faraday Discussions*, (2017) **199**, 115-128.
- **B. Sarma**, "Friction stir welding of thin aluminum alloy plates using milling machine: a basic compatibility study." *IOP Conference Series: Materials Science and Engineering*, (2018) **377**, 012012.
- **B. Sarma**, A. Dalal, and D. N. Basu, "Dynamics of viscous jets during droplet impact on a fractal superhydrophobic surface. (*Under review*)
- R. Deb**, B. Sarma**, and A. Dalal, "Magnetic-field mediated active propulsion of ferrobots on a wire." (*In preparation)*
- **B. Sarma,** S. Sudhakar, D. T. Nasilowski, and J. A. Weibel**,** "Measurement of capillary pressure and relative permeability relations for two-phase air-water cross flow in thin sintered metal wicks." *(In preparation)*

- A. Silvia, **B. Sarma,** S. Sudhakar, S. N. Joshi, and J. A. Weibel**,** "A pump-assisted capillary loop evaporator design for high heat-flux dissipation." *(In preparation)*
- Y. Huang, **B. Sarma**, and J. A. Weibel, "Multi-scale surface enhancement of two-phase immersion cooling." *(In preparation)*

SKILLS

Extensive expertise in microfabrication such as preparing superhydrophobic and superhydrophilic surfaces

○ *Cleanroom experience*	○ Micro-nano Fabrication based on two-photon polymerization ○ Metal electrodeposition ○ Thin-film fabrication	
○ *Instruments*	○ Photonic Professional GT2 (Nanoscribe) ○ Goniometer ○ Temperature measurement ○ Iko Jr Electroplater	○ Interferometer ○ Data acquisition ○ Spin Coater ○ Optical microscope
○ *Software*	○ ANSYS Fluent ○ COMSOL Multiphysics ○ MATLAB ○ LabVIEW ○ ImageJ ○ SPSS	○ SOLIDWORKS ○ Fusion 360 ○ Linux tools ○ EES ○ Tecplot ○ OriginPro
○ *Coding languages*	○ C/C++	○ Python

AWARDS AND RECOGNITIONS

Purdue Post-Doctoral Association conference travel grant	**2022**
Best Ph.D. Thesis in Mechanical Engineering Award from IIT Guwahati	**2021**
International Union of Theoretical and Applied Mechanics' conference grant for the *ICTAM 2021 Meeting.*	**2021**
American Physical Society Forum for Early Career Scientists (FECS) Mini Grant for *APS March Meeting 2021*	**2021**
International Society for Porous Media conference grant for *InterPore 2020*	**2020**
MIT Department of Civil and Environmental Engineering's Travel Grant (Full Grant) for attending the *Fluids and Health 2019: Fluid Dynamics of Disease Transmission conference* held at Cargese, France	**2019**
M. G. Deshpande Memorial Prize in the "**Best Paper Award**" category during *7th International and 45th National Conference on Fluid Mechanics & Fluid Power (FMFP 2018***)** held at IIT Bombay	**2018**
Award of Appreciation from **Royal Society of Chemistry** for conducting a workshop during *Complex Dynamical Systems and Applications conference (CDSA-2017)* held at IIT Guwahati	**2017**

COURSES

Thermal Hydraulics in Power Generation Technology, Computational Fluid Dynamics, Convective Heat and Mass Transfer, Refrigeration and Air Conditioning, Heat Transfer in Electronic Systems

ACADEMIC SERVICE

- Serve as a reviewer for *Physics of Fluids*
- Volunteered in the 75th Annual Meeting of American Physical Society division of Fluid Dynamics

EXTRACURRICULAR ACTIVITIES

- Creative Writing
- Travelling
- Hiking