Dr. Chirodeep Bakli
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Research Interests

Microfluidics and Nanofluidics, Interfacial Phenomenon, Electrohydrohynamics, Molecular Dynamics Simulations, Renewable Energy, Thermal and Fluid Sciences, Building Energy

Education

Exam	University / Institute	Year	Specialization	% or CGPA
Ph.D (Engg.)	Indian Institute of Technology, Kharagpur	2016	Mechanical Engineering	-
B.Tech (Hons)	Indian Institute of Technology, Kharagpur	2010	Energy Engineering	8.87/10

Appointments

Assistant Professor at Department of Mechanical Engineering IIT Ropar (Aug, 2016-Jun, 2018)

Assistant Professor at School of Energy Science and Engineering IIT Kharagpur (Jun, 2018-Present)

Publications

Nilanjan Mondal, Abhirup Chaudhuri, **Chirodeep Bakli,** Suman Chakraborty. Upstream events dictate interfacial slip in geometrically converging nanopores. The Journal of Chemical Physics 154, 164709 (2021)

Meneka Banik, Shaili Sett, **Chirodeep Bakli**, Arup Kumar Raychaudhuri, Suman Chakraborty, Rabibrata Mukherjee. Substrate wettability guided oriented self assembly of Janus particles

Scientific reports 11, 1 (2021)

Ajit Singh, Ramanujam Lenin, Naimat Kalim Bari, **Chirodeep Bakli**, Chandan Bera. Mechanistic insights into surface contribution towards heat transfer in a nanofluid. Nanoscale Advances 2, 3507 (2020)

Chirodeep Bakli and Suman Chakraborty. Anomalous interplay of slip, shear and wettability in nanoconfined water. Nanoscale 11, 11254-11261 (2019)

Chirodeep Bakli, Sreehari P.D., and Suman Chakraborty. Mimicking Wettability Alterations using Temperature Gradient for Water Nanodroplets. Nanoscale 9 (34), 12509-12515 (2017)

Sreehari P.D., **Chirodeep Bakli** and Suman Chakraborty. Fractional Separation of Polymers in Nanochannels: Combined Influence of Wettability and Structure. Journal of Polymer Science, Part B: Polymer Physics 54 (20), 2118-2125 (2016)

Chirodeep Bakli and Suman Chakraborty. Rapid capillary filling via ion-water interactions over nanoscale, Nanoscale 8, 6535 (2016)

Chirodeep Bakli and Suman Chakraborty. Slippery to Sticky Transition of Hydrophobic Nanochannels, Nano Letters, 15, 7497-7502 (2015)

Chirodeep Bakli and Suman Chakraborty. Effect of entrapped phase on the filling characteristics of closed-end nanopores Soft Matter ,11,161 (2015)

Chirodeep Bakli and Suman Chakraborty. Electrokinetic energy conversion in nanofluidic channels: Addressing the loose ends in nanodevice efficiency. Electrophoresis. 36, 675 (2015).

Suman Chakraborty, Dipankar Chatterjee and **Chirodeep Bakli**. Nonlinear Amplification in Electrokinetic Pumping in Nanochannels in the Presence of Hydrophobic Interactions" Physical Review Letters, 110,184503(2013).

Chirodeep Bakli and Suman Chakraborty. Effect of presence of salt on the dynamics of water in uncharged nanochannels." The Journal of chemical physics, 138,054504(2013).

Chirodeep Bakli and Suman Chakraborty. Capillary filling dynamics of water in nanopores." Applied Physics Letters, 101,153112(2012).

Patents

- Storage Based Solar Cooker With Sensor-Less Dual-Axis Tracking Application no. : 201931033729, dated : 21st, aug 2019 Inventor(s) : **Chirodeep Bakli** ; Jayant Agarwal ; Khusharaj Khaddeo ; Vinay Arya. (Patent filed)
- Granted Design No. 319066-001 Storage Based Solar Cooker With Sensor-Less Dual-Axis Tracking

Awards

- J.C. Ghosh Scholarship, August, 2009
- Institute Silver Medal, IIT Kharagpur Convocation, 2010
- Graphical abstract selected as cover art in 2015 Special Issue on Fundamentals of Electrophoresis

Sponsored Research Undertaken

- DST Sponsored Project Indo-Korea Joint Network Center on Computational Material

  2018-21. The project deals with molecular simulations of material with the aim to design smart surfaces. Role: Co-principal Investigator. Grant: 38 lakhs INR
- IMPRINT-II Project on Micro Green Roofing. 2018-21. Design of automated vegetative modules based on renewable energy systems with the twin aim of reucing buiding energy consumption and to enhance sustainable living. Role: Co-Principal Investigator Budget: 1.05 crore INR
- Energy Harvesting using Droplets on Slippery Surfaces, SRIC IIT Kharagpur 2019-22. Using combined simulations and experiments, fluid-surface interfacial interactions would be tuned and used to power small circuits. Role: Principal Investigator Budget 28 Lakhs INR
- Confinement-inducted Dynamics in Nanoscale Phase Transition Apex Committee of SPARC2019-20. Modeling of phase transition phenomena from a multiscale approach and the findings of the

same can be applied to the fields of electronic cooling and manufacturing smart interfaces for energy applications Role: Co-principal Investigator. Grant: 37 lakhs INR

- Projects submitted to DST, ICSSR, United Nations under consideration.

Courses offered at IIT Kharagpur and IIT Ropar [As an Assistant Professor]

Fluid Machines (2 times), Electric Power Generation (2 times), Control System Engineering (2 times), Renewable Energy Systems (3 times), Energy Conversion Processes (2 times), Energy Systems Modelling (3 times), Thermofluids Lab (3 times)

Seminars and Workshops

- Biomimetics for Pumpless fluid Transport: Non-conventional Irrigation Techniques, IIT Ropar December 2019
- Exploring nomalous Thermal Conductivity in Nanofluids: A Molecular Approach, INST Mohali December 2019
- Charge-Wettability Interactions at Interfaces: Microions, Nanofluids and Membranes: India-Korea VNC workshop, SN Bose National Centre for Basic Sciences, Kolkata, November 2019.
- Water Under Confinement: From Interfaces to Bulk, One-day Meeting on Materials Simulation from Classical to Quantum, Department of Physics, IIT Kharagpur, July 2019
- Organized Indo-UK SPARC Workshop on Multiscale Modelling Approach in Micro/Nano-fluidics

Student Supervision

- Undergraduate: Completed-3 Ongoing-6
- Masters: Completed-5 Ongoing-3
- Ph.D.: Ongoing-8

Additional Information

Other Professional Contributions:

- Chair for the Student Branch Activities for IEEE Kharagpur Section
- Organizer of Fluids Under Confinement 2021 Web Symposium and workshop under the SPARC scheme with collaboration of University of Warwick held during 15-31 March 2021 at IIT, Kharagpur, India
- **Served as Reviewer**
    - **Journals:** Nature Scientific Reports, Soft Matter, Macromolecules, Energy Conversion and Managment **,** etc
    - **Funding Bodies** SPARC, DST SERB
    - **And several conferences**

Membership of Professional Bodies:

- Member IEEE
- Member American Physical Society
- Member American Society of Mechanical Engineers