

Raunak Bardia

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OBJECTIVE

Ph.D. student, looking for **internship** position starting from MAY 2018; Strong fundamental background in fluid dynamics, heat transfer, computational modeling, and numerical analysis

EDUCATION

University of Wisconsin - Madison (SEPTEMBER 2016 - PRESENT)

Ph.D. in Mechanical Engineering

Research Focus: "Study on fundamentals of boiling and numerical methods for phase change"

Relevant Coursework: Computational Mathematics, High Performance Computing, Gas Dynamics, Turbulence

University of Wisconsin - Madison (AUGUST 2016)

Master of Science in Mechanical Engineering

GPA: 3.925/4.0 | *Relevant Coursework:* Computational Fluid Dynamics, Thermal Systems Modeling

IIT - Bombay, India (MAY 2013)

Bachelor of Technology in Mechanical Engineering

GPA: 8.14/10.0 | Minor in Department of Physics

Recipient of two **nationwide** scholarships in India given by **NCERT** and **CBSE**

RESEARCH

Characterization of the Dynamics of Vapor Bubble Collapse (JAN 2016 - PRESENT)

Ph.D. Research Assistant, Multiphase CFD Group | Advisor: Prof. Mario Trujillo

- Explained connection between change in bubble pressure and vapor velocity; directed towards heat transfer enhancement applications due to bubble collapse
- Novel mathematical framework solved using MATLAB; studied thermodynamic variations of collapsing bubble
- Working on implementation of phase change in a geometric Volume of Fluid approach in OpenFOAM to study vapor bubble collapse near solid surfaces

Binary Nanodroplet Collisions (SEP 2014 - MAR 2016)

M.S. Research Assistant, Multiphase CFD Group | Advisor: Prof. Mario Trujillo

- Determined limitations in using continuum simulations to study the coalescence mechanism of two nanoscale droplets; Lead author of a collaborative paper published in *Physical Review E*
- Performed OpenFOAM simulations with relevant source code modifications; determined comparison metrics to characterize the differences in Molecular Dynamics and continuum results

Jet Impingement Cooling (JUL 2012 - JUN 2013)

Undergraduate Thesis Project | Advisor: Prof. Arunkumar Sridharan

- Identified optimum region for jet cooling on an inclined surface for applications in nuclear reactor cooling systems; studied gravity and orientation effects on cooling characteristics
- Performed ANSYS simulations for horizontal surfaces using spatially averaged Nusselt number as a key parameter

Valve Design for G-M Cryocooler (AUG 2011 - MAY 2012)

Additional Undergraduate Project | Advisor: Prof. Milind Atrey

- Designed a linear electromagnetic valve with control mechanism for changing actuation frequency; extra-curricular self motivated project undertaken by a team of two

EXPERIENCE

WHIRLPOOL Global Technology & Engineering Center, India (MAY 2012 - AUGUST 2012)

Summer Internship, *Advanced Refrigeration Group*

- Developed numerical model for thermoelectric module in small-scale portable refrigerators using SIMULINK
- Lead the initiative to test model results with makeshift experimental setup; completed the additional project
- Conceptualized a test to determine efficiency of thermoelectric refrigeration; numerically solved in MATLAB

BOSCH Ltd., India

(MAY 2011 - JULY 2011)

Summer Internship, *Pump Assembling Facility*

- Developed an excel-based inventory management software for more than 1000 part types to monitor the movement of parts in Quarantine Area
- Lead the error rectification process for shim ring selection machine; formulated mathematical expression governing its working

University of Wisconsin - Madison

(SUMMER 2015, SPRING 2016, FALL 2017)

Teaching Assistant

- Course Development Assistant for undergraduate course on thermal design in nuclear reactors; Developed model experiments and ANSYS simulations for improved classroom learning
- Architectural Graphics; Included training students on AutoCAD
- Engineering Graphics; Includes training students on SolidWorks and introduction to Makerspace 3D Printing

BARCLAYS Bank, India

(JULY 2013 - JUNE 2014)

Analyst, Agency Derivative Services – Risk, Prime Services

- Automated several key assignments using Excel & Outlook VBA; reduced daily desk work by 1 hour
- Critiqued on monitoring of certain traded products based on a study performed on Swaps Execution Facilities

TECHNICAL SKILLS

Simulation: Extensive experience with MATLAB, OpenFOAM & EnSight; SIMULINK, ANSYS, LAMMPS, AutoCAD, SolidWorks

Programming: C++, CUDA, JAVA, OpenMP, Excel VBA

Operating System: LINUX, Windows, Mac

Office Tools: Microsoft Word, PowerPoint, Excel, L^AT_EX

COURSE PROJECTS

Parallelization of a Level Set Advection Scheme C++ Code

(FALL 2017)

- Obtained speed-up of up to 40x by using CUDA to parallelize a serial C++ code developed for advection of fluid interface; compared with OpenMP and MPI implementations of the code

Development of 2D Laminar Navier Stokes Solver

(FALL 2015)

- Implemented a complete finite volume Navier-Stokes continuity and momentum equation solver in MATLAB; solver tested for a translating vortex velocity field case

Simulation of Nanodroplets Coalescence using Molecular Dynamics

(SPRING 2017)

- Simulated nano-scale droplet coalescence in LAMMPS on a surface with super-hydrophobic interaction

VOLUNTEER EXPERIENCE

- **Badger Volunteer** for civic and educational community initiatives at University of Wisconsin - Arboretum, Madison Public High School and Adult Literacy Network - Madison
- **Student Mentor** at IIT Bombay for a group of 30 incoming freshmen; selection based on peer reviews
- **Internship Coordinator** at IIT - Bombay; liaised with potential internship employers ranging from technical start-ups to established companies

PUBLICATIONS AND PRESENTATIONS

- [Bardia, R.](#), Liang, Z., Koblinski, P., and Trujillo, M. F. (2016). Continuum and molecular-dynamics simulation of nanodroplet collisions. *Physical Review E*, 93(5), 53104
Presented at [ILASS-Americas](#) (2016) held at Dearborn, Michigan, USA
- [Bardia, R.](#), and Trujillo, M. F. (2017). Characterization of the Dynamics of Vapor Bubble Collapse. Presented at [APS-Division of Fluid Dynamics](#) (2017) Conference
- [R. Bardia](#) and A. Sridharan (2013), "Jet Impingement Heat Transfer on Inclined Surfaces," in *Proceedings of the 13th UK Heat Transfer Conference*, London, UK

INTERESTS

Distance Biking; Playing Badminton; Cooking; Beginner in Ballroom Dancing; Hiking