

# Raunak Bardia

320 W Wilson St, Apt # 2, Madison WI 53703 US  
raunakbardia@gmail.com | +1-608-556-6275 | <https://raunakbardia.wordpress.com/>

## OBJECTIVE

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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

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**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

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### Characterization of the Dynamics of Vapor Bubble Collapse

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
- Derived a unique mathematical framework solved in MATLAB; Used to differentiate several bubble collapse cases occurring with varying degrees of severity

*Manuscript submitted for peer review to Journal of Fluid Mechanics*

### Binary Nanodroplet Collisions

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

- Determined limitations in using continuum simulations to study droplet collision for sizes below 36 nm; 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

Undergraduate Thesis Project | Advisor: Prof. Arunkumar Sridharan

- Identified optimum region for jet cooling on an inclined surface; studied gravity and orientation effects on cooling characteristics
- Validated ANSYS model for horizontal surfaces using spatially averaged Nusselt number as a key parameter

### Valve Design for G-M Cryocooler

Additional Undergraduate Project | Advisor: Prof. Milind Atrey

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

## EXPERIENCE

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**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 certainty of swaps clearing based on a study performed on Swaps Execution Facilities

## TECHNICAL SKILLS

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Simulation:	Extensive experience with MATLAB, OpenFOAM & EnSight; SIMULINK, ANSYS, LAMMPS, AutoCAD, SolidWorks
Programming:	C++, JAVA, OpenMP, Excel VBA, CUDA
Operating System:	LINUX, Windows, Mac
Office Tools:	Microsoft Word, PowerPoint, Excel, L <sup>A</sup> T <sub>E</sub> X

## COURSE PROJECTS

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Development of 2D Laminar Navier Stokes Solver

(FALL 2015)

Course Instructor: Prof. Christopher Rutland

- Implemented a finite volume formulation in MATLAB with strong focus on correct implementation of inflow and outflow boundary conditions; solver tested for translating vortex velocity field

Simulation of Nanodroplets Coalescence using Molecular Dynamics

(SPRING 2017)

Course Instructor: Prof. Izabela Szlufarska

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

## VOLUNTEER EXPERIENCE

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- **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

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- [Bardia, R.](#), Liang, Z., Keblinski, 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. Manuscript submitted to *Journal of Fluid Mechanics*  
Accepted for presentation 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 13<sup>th</sup> UK Heat Transfer Conference*, London, UK

## INTERESTS

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Distance Biking; Hiking; Cooking; Beginner in Ballroom Dancing