

# Ranjeeth R. Naik, Ph.D.

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Citizenship: Canadian | Visa Status: TN and H1B Eligible (EB2-NIW Approved. Priority Date:04/22/2021)

## RESEARCH INTERESTS

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Thermal system design and validation for automotive and electronics cooling applications; Two-phase flow and heat transfer (boiling and condensation); Computational fluid dynamics and conjugate heat transfer; Simulation-driven engineering design methodology.

## EDUCATION

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### Doctor of Philosophy, Mechanical Engineering – Engineering Mechanics

Michigan Technological University, Houghton, MI | August 2015

Advisor: Prof. Amitabh Narain

Dissertation: "Development of Unsteady Two-Dimensional Computational Simulation Tools for Annular Internal Condensing Flows – and their Use for Results on Heat-Transfer Rates, Flow Physics, Flow Stability, and Flow Sensitivity."

### Master of Science, Mechanical Engineering – Engineering Mechanics

Michigan Technological University, Houghton, MI | December 2010

Advisor: Prof. Amitabh Narain

### Bachelor of Engineering, Mechanical Engineering

B.M.S. College of Engineering, Visvesvaraya Technological University, India | June 2008

Graduated in First Class with Distinction

## PROFESSIONAL EXPERIENCE

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### General Motors, Warren, MI

**Senior Thermal Hardware Engineer** | June 2026 – Present

- Thermal lead on Central Compute Unit (CCU) projects supporting GM's next-generation Software-Defined Vehicle (SDV) architecture, driving simulation-based thermal design and validation.
- Perform thermal analysis for exterior lighting applications to assess thermal performance under operating conditions.
- Collaborate with cross-functional design teams to integrate thermal requirements into unit-level hardware design.

### Stellantis (via Barteck), Windsor, Ontario

**Systems Simulation Engineer** | October 2025 – May 2026

- Performed 1-D HVAC system simulations utilizing AMESIM and GT-Suite to evaluate system performance.
- Conducted advanced co-simulations integrating MATLAB Simulink with Cabin CFD simulations (using STAR-CCM+ and TAITHERM) to optimize thermal comfort and control strategies.
- Collaborated with powertrain and propulsion system teams to define boundary conditions and ensure seamless integration of thermal management systems.

### Artmetics Inc., Amherstburg, Ontario

**Consultant** | July 2025 – Present

- Provided consulting services on CFD/CHT simulation projects for university research and industrial projects.
- Partnered with SimScale as a Power User to develop CHT tutorials for complex heat transfer scenarios and provide strategic feedback for software development.
- Served as a technical resource for the user community, resolving complex simulation issues and support requests.

### North American Lighting Inc., Farmington Hills, Michigan

November 2016 – July 2025

**Lead Thermal Engineer and Supervisor** | September 2020 – July 2025

- Led the thermal analysis of exterior automotive lighting projects, ensuring robust and accurate simulation and testing processes.
- Supervised a team of engineers across thermal simulation, thermal testing, and optical simulations for sunlight convergence.
- Managed resource allocation and workload through project prioritization to ensure timely project delivery.
- Represented the thermal engineering group in design reviews, resolving critical technical issues to meet performance targets.
- Reviewed design-validation test results and oversaw resulting design changes to meet performance targets.
- Developed and implemented process improvements that enhanced simulation methodologies and testing accuracy.
- Mentored team members through weekly support meetings covering career development, project challenges, and performance.

**Senior Thermal Engineer** | December 2018 – August 2020

- Led the thermal analysis of exterior automotive lighting projects, mentoring junior engineers and supervising simulation and testing projects.
- Investigated and incorporated tool enhancements and upgrades into current simulation methodologies as part of continuous improvement goals.
- Developed simulation guidelines and methods for process standardization across analysis types.

**Thermal Engineer II** | November 2016 – November 2018

- Performed thermal analysis for automotive lighting using Simcenter3D NX-Thermal and FLOEFD, focusing on radiation and conjugate heat transfer to ensure component durability under high thermal load conditions.
- Evaluated thermal feasibility of electronics/PCBs for LED and LDM boards and studied solar convergence effects on Class A surfaces.
- Developed work instructions for thermal testing based on OEM and Federal Motor Vehicle Safety Standards (FMVSS) specifications.
- Conducted physical testing and experimentation to collect data and validate simulation methods; managed and troubleshoot Design Verification (DV) thermal testing.
- Explored new technologies related to automotive lighting and performed optimization/feasibility studies of new materials and simulation methods.
- Developed scripts using Python to support CAE software technology development.

**BETA CAE Systems USA, Inc., Farmington Hills, Michigan**

**CFD Engineer** | October 2015 – November 2016

- Conducted CFD and thermal analysis of automotive components using Fluent, OpenFOAM, and Radtherm.
- Prepared high-fidelity CFD grids for external and internal flow analysis using ANSA; contributed to benchmarking projects for ANSA surface wrapping and CFD meshing tools.
- Developed algorithms and innovative uses of the ANSA Kinetics tool for vehicle ride-height setup, demonstrated at the 2016 North America Open Meeting.
- Provided technical support and training to clients on ANSA and META for CFD pre- and post-processing; represented the company at technical conferences and CFD workshops.

## ACADEMIC RESEARCH EXPERIENCE

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**Michigan Technological University, Houghton, Michigan**

**Graduate Research Assistant** | April 2010 – September 2015

*Research area: two-phase flows and their applications, with primary emphasis on boiling and condensing flows in modern thermal management systems. Funding agencies: NSF and NASA. Advisor: Prof. Amitabh Narain.*

- Assessed available condensing-flow correlations to estimate heat-transfer rates and pressure drops; developed and implemented steady and unsteady algorithms for direct numerical simulation (DNS) of internal condensing flows using COMSOL and MATLAB.
- Validated simulations against experimental data obtained at the MTU lab facility; predicted transition from annular to non-annular flow regimes by studying destabilizing wave growth tendencies.

- Studied the significance of gravity and surface tension on flow behavior in space-based thermal management systems, gravity-sensitive applications, and electronic cooling.
- Developed a one-dimensional engineering tool based on coupled non-linear ODEs for simulating annular flow boiling, providing heat-transfer estimates for the design of boiling-flow experiments.
- Estimated heat transfer and pressure drop for system-level flow loop design; authored proposals for federal agencies and industry investigating condensers and boilers for space-based thermal management, data center, and electronic cooling applications.
- Presented research results through papers and presentations at national and international conferences.

## TEACHING EXPERIENCE

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### Michigan Technological University

#### **Instructor – Heat Transfer (MEEM 3230)** | Fall 2013

- Part of the instructor team for Heat Transfer, teaching external convection, internal convection, heat exchangers, and radiation.
- Administered quizzes, assignments, and exams.

#### **Graduate Teaching Assistant – Advanced Heat Transfer (MEEM 5230)** | Spring 2010 – Spring 2015

- Presented Computational Heat Transfer (CHT) topics to graduate students.
- Demonstrated the use of CHT tools to solve unsteady conduction and convection heat transfer problems.
- Designed CHT tutorials and assignments for the class and graded assignments.

#### **Graduate Teaching Assistant – Advanced Fluid Mechanics (MEEM 5210)** | Fall 2010 – Fall 2011

- Presented Computational Fluid Dynamics (CFD) topics to graduate students.
- Demonstrated the use of CFD tools to solve pipe-flow problems, including pressure drop and related variables.
- Designed CFD tutorials and assignments for the class and graded assignments.

#### **Graduate Teaching Assistant – Mechanical Engineering Laboratory** | Fall 2010 – Spring 2014

- Instructed junior and senior-level students in experiments involving data acquisition (DAQ) and calibration of transducers.
- Taught fundamental thermal science concepts through experiments in Joule's mechanical equivalent of heat, bomb calorimetry, tankless water heaters, heat exchangers, and water rockets.
- Provided feedback on students' written reports and assisted in designing experiments and lab manuals.

## PUBLICATIONS

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### Journal Articles

1. Narain, A., Bhutka, H., Naik, R., Mohite, N., and Belikoff, Y. (2026). "Piezo-Actuated Enhanced Nucleate Boiling: From Saturated to Controlled Flash Regimes in Two-Phase Direct-to-Chip Cooling for AI Superchips and Data Centers." *ASME Journal of Heat and Mass Transfer*, 148(9), 091605.
2. Ranga Prasad, H., Narain, A., Bhasme, S., and Naik, R. (2017). "Shear Driven Suppressed Nucleation Annular Flow-boiling in Millimeter-scale Channels: Direct Numerical Solutions and Heat Transfer Correlations." *International Journal of Transport Phenomena*, 15(1), 1–35.
3. Naik, R., Narain, A., and Mitra, S. (2016). "Steady and Unsteady Simulations for Annular Internal Condensing Flows, Part I: Algorithm and its Accuracy." *Numerical Heat Transfer, Part B: Fundamentals*, 69(6), 473–494.
4. Naik, R., and Narain, A. (2016). "Steady and Unsteady Simulations for Annular Internal Condensing Flows, Part II: Instability and Flow Regime Transitions." *Numerical Heat Transfer, Part B: Fundamentals*, 69(6), 495–510.
5. Narain, A., Naik, R.R., Ravikumar, S., and Bhasme, S.S. (2015). "Fundamental Assessments and New Enabling Proposals for Heat Transfer Correlations and Flow Regime Maps for Shear Driven Condensers in the Annular/Stratified Regime." *Journal of Thermal Engineering*, 1(4), 307–321.
6. Kivisalu, M.T., Gorgitrattanagul, N., Narain, A., Naik, R., and Hasan, M. (2013). "Sensitivity of Shear-Driven Internal Condensing Flows to Pressure Fluctuations and its Utilization for Heat Flux Enhancements." *International Journal of Heat and Mass Transfer*, 56(1–2), 758–774.

7. Kivisalu, M., Gorgitrattanagul, N., Mitra, S., Naik, R., and Narain, A. (2012). "Prediction and Control of Internal Condensing Flows in the Experimental Context of their Inlet Sensitivities." *Microgravity Science and Technology*, 24(3), 147–155.
8. Mitra, S., Narain, A., Naik, R., and Kulkarni, S.D. (2011). "A Quasi One-Dimensional Simulation Method and its Results for Steady Annular/Stratified Shear and Gravity Driven Condensing Flows." *International Journal of Heat and Mass Transfer*, 54(15), 3761–3776.
9. Kurita, J.H., Kivisalu, M., Mitra, S., Naik, R., and Narain, A. (2011). "Experimental Results on Gravity Driven Condensing Flows in Vertical Tubes, their Agreement with Theory, and their Differences with Shear Driven Flows' Boundary Condition Sensitivities." *International Journal of Heat and Mass Transfer*, 54(13), 2932–2951.

### Conference Papers / Proceedings

10. Naik, R.R., Narain, A., and Mitra, S. (2014). "Steady and Unsteady Computational Simulations for Annular Internal Condensing Flows in a Channel." ASME IMECE 2014, Montreal, Canada. Paper No. IMECE2014-38445.
11. Kivisalu, M., Narain, A., Gorgitrattanagul, P., and Naik, R. (2014). "Innovative Realizations of High Heat-Flux Boiling and Condensing Flows for Milli-meter and Micrometer Scale Applications." ASME IMECE 2014, Montreal, Canada. Paper No. IMECE2014-37319.
12. Narain, A., Kivisalu, M., Gorgitrattanagul, P., Naik, R., and Shankar, N. (2013). "Results for High Heat-flux Realizations in Innovative Operations of Millimeter Scale Condensers and Boilers." 22nd National & 11th International ISHMT-ASME Heat and Mass Transfer Conference, IIT Kharagpur, India. Paper No. HMTTC1300183.
13. Naik, R., Mitra, S., Narain, A., and Shankar, N. (2013). "Steady and Unsteady Computational Results of Full Two-dimensional Governing Equations for Annular Internal Condensing Flow." COMSOL Conference, Boston, MA.
14. Narain, A., Kivisalu, M., Naik, R., Gorgitrattanagul, N., Mitra, S., and Hasan, M.M. (2012). "Comparative Experimental and Computational Studies for Annular Condensing and Boiling Flows in Millimeter Scale Horizontal Ducts." ASME 2012 Summer Heat Transfer Conference, Rio Grande, PR. Paper No. HT2012-58602.
15. Kivisalu, M., Gorgitrattanagul, N., Mitra, S., Naik, R., and Narain, A. (2011). "Shear/Pressure Driven Internal Condensing Flows and their Sensitivity to Inlet Pressure Fluctuations." ASME IMECE 2011, Denver, CO. Paper No. IMECE2011-63281.
16. Kivisalu, M., Gorgitrattanagul, N., Mitra, S., Naik, R., and Narain, A. (2011). "Prediction and Control of Internal Condensing Flows in the Experimental Context of their Sensitivities." EURO THERM Seminar on Gravitational Effects on Liquid-Vapour Phase Change, Presqu'île de Giens, France.
17. Mitra, S., Naik, R.R., and Narain, A. (2010). "Numerical Simulation of Exact Two-Dimensional Governing Equations for Internal Condensing Flows." COMSOL Conference, Boston, MA.
18. Mitra, S., Narain, A., Kulkarni, S.D., Naik, R., and Kurita, J.H. (2009). "Annular/Stratified Internal Condensing Flows in Millimeter to Micrometer Scale Ducts." ASME 2nd Micro/Nanoscale Heat & Mass Transfer International Conference, Shanghai, China. Paper No. MNHMT2009-18507.

### HONORS & AWARDS

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- Doctoral Finishing Fellowship, Michigan Technological University (2014–2015)
- Exceptional Graduate Student Scholar Award, Graduate School, Michigan Technological University (2014)
- Outstanding Scholarship Award, Graduate School, Michigan Technological University (2014)
- Best Paper Award, COMSOL Conference 2013, Boston, MA, USA
- Outstanding Graduate Student Teaching Award, Michigan Technological University (2011)

### PROFESSIONAL SERVICE & AFFILIATIONS

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- Technical Paper Reviewer, SAE World Congress (2019–2026)
- Member and Volunteer, Society of Automotive Engineers (SAE)
- Peer Reviewer, ASME IMECE (2009, 2012, 2013, 2014) and ASME Summer Heat Transfer Conference (2013)

## CERTIFICATIONS

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### AI & Generative AI

- IBM AI Product Manager – In Progress
- Certificate of Completion: AI Fluency Framework & Foundations, Anthropic – May 2026
- Generative AI: Foundation Models and Platforms, IBM – July 2025
- Google Cloud Generative AI Specialization (4 courses), Google Cloud – January 2026
- RAG and Fine-Tuning Explained, LinkedIn Learning – November 2025
- Vibe Coding Fundamentals: Tools and Best Practices, LinkedIn Learning – August 2025

### Data Analytics & Programming

- Google Data Analytics Specialization: Professional Certificate (6 courses) – January 2023
- Python for Data Science, AI & Development, IBM – August 2025
- Introduction to Data Science in Python, University of Michigan – February 2023
- Understanding and Visualizing Data with Python, University of Michigan – October 2019
- Python for Data Science, University of California San Diego – April 2019
- Python Programming Specialization, University of Michigan – January 2017
- R Programming, Johns Hopkins University – October 2015
- Kaggle Micro-Courses: Python, Pandas, Introduction to Machine Learning – December 2022

### Project & Product Management

- Product Management: An Introduction, IBM – July 2025
- Foundations of Project Management, Google – August 2021

### Other

- DaVinci Resolve 16: Certified End User, Blackmagic Design – May 2020
- DaVinci Resolve 15: Advanced Editing Certified End User, Blackmagic Design – May 2020
- MTI001x: Managing Disruptive Change, RWTH Aachen University – November 2017

## TECHNICAL SKILLS

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- Simulation Software: STAR-CCM+, TAITHERM, AMESIM, GT-Suite, SimScale, Simcenter3D NX-Thermal, COMSOL, FLOEFD, ANSYS Fluent, OpenFOAM, ANSA/META, Radtherm
- Engineering & Programming Tools: CATIA, NX, Hypermesh, Python, MATLAB, NI LabVIEW
- Technical Domains: Computational Fluid Dynamics (CFD), Conjugate Heat Transfer, Finite Element Methods, Data Acquisition Systems, Thermal Testing & Validation