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Suhas Rao Tamvada

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Graduate student with experience in mechanical design, thermal, and fluid sciences, looking to work in a challenging environment. Adept at grasping concepts with an ability to complete projects in stipulated time. Proficient in fundamentals of engineering analysis, numerical methods, and 3D modeling.

Experience

Airity Technologies, Redwood City, CA May 2023 - Aug 2023
Mechanical Engineering Intern

- Designed, fabricated, and tested mechanical components for high voltage power electronic systems. Selected Thermal interface materials (TIMs), heat sinks, potting compounds, based on thermal design principles.
- Contributed to product development of power electronic modules to bring technology to market. Created Bills of Materials (BOM), drawings for high volume production. Assisted in submitting patent applications.

University of Florida, Gainesville, FL Aug 2020 - present
Graduate Research Assistant, *Nanoengineered Energy Systems Laboratories*

- Conceptualized, designed, and fabricated two-phase heat sinks to enhance heat transfer from electronics in Data Center environments. Enhanced heat sink performance by 400% compared to current industry standards.
- Designed and conducted experiments to investigate physics behind heat transfer limits between a metal surface and surrounding fluid. Employed energy balance analysis to explain physics and predict experimentally validated limits for maximum heat flux during boiling. New limits exceed existing propositions by 300%.

University of Illinois at Chicago, Chicago, IL Jan 2018 - Mar 2020
Graduate Research Assistant, *Anand Research Group*

- Investigated incomplete merger of oil drops with water bodies during oil spills. Designed experimental setups in Solidworks, and established scaling laws to predict size of detached drops and spreading behavior of oils.
- Investigated freezing and rebound of drops on sublimating surfaces to aid design of self-cleaning surfaces. Conducted experiments and formulated models to predict rebound characteristics of drops.

Satyam Venture Engineeering Services Pvt. Ltd., Hyderabad, India Nov 2016 - May 2017
Design Intern, *BMW Division*

- Designed 3D CAD models of guide rods of an automobile head restraint in Solidworks using standard OEM guidelines and GD&T specifications. Performed dynamic structural stress analysis using ANSYS Workbench for a rear end collision on a BMW sedan. Optimized design and material usage to minimize severity of whiplash effect on an adult passenger by 8%, prepared Bill of Materials (BOM), and submitted a full technical report and presentation to an external Jury.

Education

Ph.D, Mechanical Engineering, University of Florida, Gainesville, FL May 2024
Focus - Phase-change heat transfer, Fluid mechanics, Surface engineering GPA: 4.0/4.0

MS, Mechanical Engineering, University of Illinois at Chicago, Chicago, IL Jan 2020
Thesis - *Partial Coalescence of Oil and Water: Spreading Behavior and Material Synthesis* GPA: 3.7/4.0

B.Tech, Mechanical Engineering, Jawaharlal Nehru Technological University, Hyderabad, India Jun 2017
Thesis - *Design, and analysis of automobile head restraint to mitigate whiplash effect* GPA: 3.6/4.0

Relevant Coursework

Fluid mechanics I & II; Advanced transport phenomena; Phase-change heat transfer; Finite element methods; Energy storage; Thermodynamics; Applied stress analysis; Conduction heat transfer; Convection heat transfer; Heating, Ventilation & Air Conditioning; Mechanics of solids; Fundamentals of Machine learning.

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Skills

- **Laboratory** - Photolithography; Physical vapor deposition (sputtering, E-beam); Wet etching; Electroplating; SEM; High-speed imaging; Confocal microscopy; Tensiometry; Interferometry; Rapid prototyping
- **Mathematics** - Numerical methods; Scaling analysis; Linear ODEs; Asymptotic analysis
- **Design & Analysis** - Solidworks; AutoCAD; Fusion 360; GD&T; COMSOL; ANSYS Fluent; Python (matplotlib, SciPy, numPy, OpenCV); MATLAB; Fortran; C; ImageJ; OriginPro
- **Documentation** - MS Word, Excel, Powerpoint; Adobe Illustrator; Adobe Premiere Pro; LaTeX

Selected Journal Publications

(See Google Scholar page for full publication list)

1. **Tamvada, S.**, Attinger, D., and Moghaddam, S., "On critical heat flux and its evaporation momentum and hydrodynamic limits", *Int. J. Heat Mass Transf.*, Vol 203, 2023.
2. **Tamvada, S.R.** and Moghaddam, S., "Data center energy efficiency enhancement using a two-phase heat sink with ultra-high heat transfer coefficient", *arXiv preprint arXiv:2207.12508*, 2022.
3. **Tamvada, S.R.**, Alipanah, M., and Moghaddam, S., "Membrane-Based Two Phase Heat Sinks for High Heat Flux Electronics and Lasers", *IEEE Trans. Compon. Packag. Manuf. Technol.*, Vol 11, 2021.
4. Kulkarni, V., Lolla, V.Y.*, **Tamvada, S.R.***, Shirdade, N.S., and Anand, S., "Coalescence and spreading of drops on liquid pools", *J. Colloid Interface Sci* , Vol 586, 2021. (* equal contribution)

Curricular Projects

- **CFD, FEM** - Developed numerical solvers for Euler and Burger's equations for compressible shock waves using Fortran, and solved for properties across stationary and traveling shock waves. Oct 2017
- **HVAC** - Calculated energy demands of a residential complex in Minnesota based on ASHRAE 90.2 2007 standards and designed insulation, ducting layouts and air handling units. May 2018

Awards

- Third place - 2022 MAE Student poster competition, University of Florida, Gainesville, FL. Apr 2022

Volunteer/Leadership activities

- Currently maintain the Interdisciplinary Microsystems Group and NESL websites at University of Florida.
- Critically evaluated undergraduate research presentations across diverse STEM fields as judge at the Chicago Area Undergraduate Research Symposium (CAURS) 2019.
- Led a team of 8 graduate students in organizing semi-annual cultural festivals and international student pick-up services as President of Indian Graduate Student Association (IGSA) at University of Illinois at Chicago from June 2018 to August 2019.
- Led a team of 5 volunteers in developing teaching modules and conducting co-curricular workshops for middle school students as Project coordinator at Becoming I Foundation, India, from January 2016 to July 2017.

Media Coverage

- Ben Crosbie, March 23 2023, "Grad student Suhas Tamvada achieves influential discovery in heat transfer".
- David Staudacher, April 1 2021, Researchers looking at oil and water interaction to prevent water contamination".