Mohan Ananth

103 Eagle Heights Apt. L – Madison, WI – 53705
📱 +1 (608) 421 4172 • ✉ mananth2@wisc.edu
in https://www.linkedin.com/in/mohan-ananth/

Summary

Experienced reseacher with 5 years experience in computational fluid dynamics (CFD), heat transfer and data analysis.

Education

University of Wisconsin-Madison	**Madison, WI, USA**
PhD Dissertator in Mechanical Engineering, CGPA – 3.9/4.0,	*January 2024*
Minor in Mathematics	
Indian Institute of Science	**Bangalore, KA, India**
Master of Engineering in Mechanical Engineering, CGPA – 6.8/8.0,	*2016*
R. V. College of Engineering	**Bangalore, KA, India**
Bachelor of Engineering in Mechanical Engineering, CGPA – 9.42/10	*2013*

Research Experience

Multiphase Computational Fluid Dynamics Lab, UW-Madison
Graduate Research Assistant   *2018-present*

-: **Stability analysis tools for multi-phase flows:** Developed tools to solve *hydrodynamic instabilities* in *single-phase* and *two-phase* fluid flows in *Cartesian* and *Cylindrical* coordinates using *Spectral methods*.

-: **Understanding the primary modes responsible for high-speed liquid sheet breakup:** *Large-scale asymmetric modes* are primary factors for breakup of liquid sheets and Kelvin-Helmohltz (KH) instability model do not predict these modes. The underlying physics is explained using stability analysis and numerical simulations.

-: **Data-driven techniques to analyze the modes in jet atomization:** Analysed the *spray characteristics* in 3D cylindrical jets using two techniques; a *machine learning technique* called *Dynamic Mode Decomposition (DMD)* and *Continuous Wavelet transforms (CWT)*.

-: **Improvements in curvature and surface tension predictions in OpenFoam solver interFoam:** *Distance-based function* implemented to predict the surface tension force better and avoid the issue of spurious currents.

-: **Development of Hybrid Solver to model urea water solution (UWS) spray and evaporationin cross flow:** A new *hybrid* solver was developed in the Openfoam framework. This included *Volume of Fluid (VoF)* method for large spray dynamics and *Lagrangian-Eulerian (LE)* for small droplets. Major additions to the solver include:
  ○ Implemented multicomponent vaporization model for UWS droplets.
  ○ Energy and species transport equations was implemented to accommodate for the phase change.

-: **Studies on urea injection to reduce NO_x in an engine exhaust system:** Lagrangian-Eulerian (LE) simulations of urea sprays along with evaporation, thermolysis, and hydrolysis reactions of the vapors. The simulations are used to study the concentration of ammonia at the catalyst inlet of engine exhaust to reduce emission of nitrogen oxides.

Indian Institute of Science, India
Graduate Research   *2014-2016*

-: **Multi-component evaporation of Heavy Fuel Oil using Fluent:** Developed a *user defined function* in Ansys Fluent software to model *evaporation of multicomponent droplet*. Simulation of *Heavy Fuel Oil (HFO) evaporation* and the effect of concentration of HFO residue on the evaporation rate.

Work Experience

Mahindra Research Valley, India
Senior Engineer   *2016-2017*

-: **Powertrain and fuel intake system**

  ○ Developed tools to calculate the *position and stiffness of the mounts* for 3-point and 4-point mount systems, using *moment of inertia* and *center of mass* of powertrain.
  ○ Computer Aided Designing of fuel intake system and its integration into the vehicle body.

Tata Technologies, India
Graduate Engineer Trainee *2014*
-: **Design of Manufacturing systems**
 ○ Computer aided design (CAD) and geometric design and tolerance (GDT) for positioning robotic arms in the manufacture and assembly of automotive parts.

Publications and Presentations

-: **Mohan Ananth** and Mario F. Trujillo, *Breakup of Planar Liquid Sheets Injected at High Speed in a Quiescent Gas Environment*, Journal of Fluid Mechanics, 2023.

-: **Mohan Ananth** and Mario F. Trujillo, *2PJIT: Two-phase 3D jet instability tool in cylindrical coordinates*, SoftwareX, 2022.

-: Arpit Agarwal, **Mohan Ananth** and Mario F. Trujillo, *Evaluation and Improvements to Interfacial Curvature Predictions in interFoam*, Fluids, 2022.

-: **Mohan Ananth** and Mario F. Trujillo, *Study of large scale modes in the break-up of 2D planar jets*, Institute for Liquid Atomization and Spray Systems, 2022.

-: **Mohan Ananth** and Mario F. Trujillo, *Large-scale instabilities in the breakup of liquid sheets*, Institute for Liquid Atomization and Spray Systems, 2023.

-: Chia-Wei Kuo, **Mohan Ananth**, Andrea Strzelec and Mario F. Trujillo, *VoFLE simulations to model UWS spray evaporation*, ASME-ICEM, 2022.

Leadership Experience

-: **Board member** of **Graduate Engineering Mechanics Society (GEMS)**, which organizes weekly graduate student seminars related to mechanics.
 ○ Orientation for new graduate students and organizing weekly seminars in Fall and Spring semesters.
-: **Board member** of **Indian Graduate Student Association (IGSA)**, which is a registered student organization that aims to represent all Indian graduate students at the University of Wisconsin-Madison.
 ○ Organizing events, including an annual cultural event, applying for grants, and helping new graduate students by providing information about housing, travel, and other related queries.
-: **Member** of **ASHA for education** - **Madison Chapter**: A fund raising organization for NGOs working towards providing education to underprivileged children in India.
 ○ Organizing events to raise funds. Reviewing proposals from NGOs and disbursing funds. Raised funds by cycling 40 miles in 2021 and 80 miles in 2022.

Coursework

Mechanical Engineering: Fluid Mechanics, Advanced Heat Transfer, Gas Dynamics, Combustion, Computational Fluid Dynamics (CFD), Solid Mechanics

Computer Science: High Performance Computing

Mathematics: Numerical Linear Algebra, Computational Methods-Finite Element, Finite-Difference and Spectral Methods, Applied Mathematics-Solutions to ODEs and PDEs.

Technical Skills

Programming: Matlab, CUDA, Python, C++, Latex

Computational Fluid Dynamics (CFD): OpenFoam, Ansys Fluent

Computer Aided Design (CAD): Unigraphics, SolidWorks, Catia

References

Prof. Mario F. Trujillo	Prof. Shiva Rudraraju	Prof. R.V. Ravikrishna
Mechanical Engineering	Mechanical Engineering	Mechanical Engineering
University of Wisconsin-Madison	University of Wisconsin-Madison	Indian Institute of Science
Madison, WI, USA - 53706	Madison, WI, USA - 53706	Bangalore, KA, India - 560012
Email: mtrujillo@wisc.edu	Email: shiva.rudraraju@wisc.edu	Email: ravikris@iisc.ac.in