

CONTACT INFORMATION	Scientific Computing & Imaging Institute, 72 S Central Campus Dr, University of Utah, Salt Lake City, Utah, USA, 84112	+1 385 528 4611 siva.viknesh@sci.utah.edu sivaviknesh14@gmail.com
RESEARCH INTERESTS	Scientific Machine Learning, Computational Fluid Mechanics, Unsteady Aerodynamics, Wildfire Dynamics	
EDUCATION	University of Utah , Salt Lake City, Utah, USA Ph.D. , Mechanical Engineering, CPI: 3.88/4 08/2022 – 05/2026 (Expected) Advisor: Dr. Amirhossein Arzani <ul style="list-style-type: none"> <i>Towards Interpretable & Differentiable Machine Learning for Fluid Flows</i> Indian Institute of Technology Kanpur , India M.S. , Aerospace Engineering (Aerodynamics), CPI: 8.33/10 01/2018 – 07/2020 Advisor: Dr. Kamal Poddar & Dr. Tapan K. Sengupta <ul style="list-style-type: none"> <i>Control of Separated Flow on a Symmetric Airfoil by Pitching Oscillation</i> Anna University , Chennai, India B.E. , Aeronautical Engineering, CPI: 8.30/10 08/2012 – 05/2016 Advisor: Dr. Shanmugaraja M <ul style="list-style-type: none"> <i>Numerical Simulation of Fluid Flow over a Rectangular Wing – Wingtip Slots</i> 	
WORK EXPERIENCE	Graduate Student Researcher 05/2025 – Present CAI-2 Group, Los Alamos National Laboratory, New Mexico, USA <ul style="list-style-type: none"> Statistical Shape Modeling of DEM terrains for Wildfire simulations. Graduate Research Assistant 08/2022 – Present SCI Institute, University of Utah, Utah, USA <ul style="list-style-type: none"> Differentiable Autoencoding Neural Operator combining mesh-invariant dimensionality reduction with differentiable PDE solvers. GPU-accelerated 2D Wildfire Transport PDE solver, leveraging CUDA and Finite Difference Method. ADAM-SINDy, a differentiable optimization framework for Nonlinear Dynamical System Identification. Aerodynamics Engineer 09/2021 – 08/2022 The ePlane Company, IIT Madras, Chennai, India <ul style="list-style-type: none"> Formulated an FVM solver template for 3D URANS MRF simulations, reducing validation error by $\sim 30\%$. Developed Custom UDF programs, generate unsteady freestream conditions for calculating dynamic stability derivatives. Senior Research Associate 01/2021 – 08/2021 Department of Aerospace Engineering, IIT Kanpur, India Associate – Content Development 08/2020 – 01/2021 BYJU'S, Bengaluru, India	

Student Research Associate

01/2018 – 07/2020

Department of Aerospace Engineering, IIT Kanpur, India

- Implemented **2D - Orthogonal grid generation** in Fortran.
- Developed a **2D DNS/LES compressible PDE solver** using MPI-Fortran.
- Built a **Data-Driven Unsteady Aerodynamic Model** based on Fourier basis.
- Wrote MATLAB scripts to evaluate the **Spectral Resolution of numerical derivative schemes**.
- Performed **Unsteady Pressure, Hot-wire** and **Time-resolved PIV** measurements on oscillating wings.

CFD Engineer

05/2016 – 11/2017

FlowXplore - CAE Associates, Coimbatore, India

PUBLICATIONS

1. **Differentiable Autoencoding Neural Operator for Interpretable and Integrable Latent Space Modeling**, S. Viknesh, A. Arzani, Submitted, 2025.
2. **Data-Driven System Identification in Cancer Systems Biology: A Multiscale Modeling Approach to Melanoma**, C. Christenson, S. Viknesh, R. Judson-Torres, A. Arzani, Submitted, 2025.
3. **ADAM-SINDy: An Efficient Optimization Framework for Parameterized Nonlinear Dynamical System Identification**, S. Viknesh, Y. Tatari, C. Christenson, A. Arzani, Submitted, 2025.
4. **Role of flow topology in wind-driven wildfire propagation**, S. Viknesh, A. Tohidi, F. Afghah, R. Stoll, A. Arzani, **Physics of Fluids**, May 2025.
5. **Active control of separated flow on a symmetric airfoil by pitching oscillation**, S. Viknesh, K. Poddar, **Physics of Fluids**, August 2021.
6. **Grid sensitivity and role of error in computing a lid-driven cavity problem**, V. K. Suman, S. Viknesh, M. K. Tekriwal, S. Bhaumik, T. K. Sengupta, **Physical Review E**, Jan 2019.

TECHNICAL SKILLS

- | | | |
|-----------|---------------|-------------------|
| • PyTorch | • NI LabVIEW | • GPU/CPU solvers |
| • CuPy | • MPI Fortran | • MATLAB |

TEACHING EXPERIENCE

ME EN 2450 – Numerical Methods for Engineering Systems	Fall 2024
Instructor: Dr. Rob Stoll, University of Utah	
AE 698A – Intro to Virtual Instrumentation	Spring 2020
Instructor: Dr. Kamal Poddar, IIT Kanpur	
AE 351A – Experiments in Aerospace Engineering I	Fall 2019
Instructor: Dr. Dehobam Das, IIT Kanpur	
AE 698A – Intro to Virtual Instrumentation	Spring 2019
Instructor: Dr. Kamal Poddar, IIT Kanpur	

ACTIVITIES & ACHIEVEMENTS

- Reviewed research papers for the **Physics of Fluids** journal.
- **President & Admin**, Tamil Club at IIT Kanpur (Jan 2019 – Sep 2021).
- Awarded a **Full Scholarship** for pursuing the M.S. program at IIT Kanpur.
- Achieved All India Rank **141** & **540** in GATE AE 2017 and 2016.
- Secured **Undergraduate University Rank 38** across Tamil Nadu state.
- **Inter-department Chess Champion** – 2013-2015.
- **Inter-department Badminton Runner** – 2014 & 2015.