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| CONTACT INFORMATION | Scientific Computing & Imaging Institute,<br>72 S Central Campus Dr, University of Utah,<br>Salt Lake City, Utah, USA, 84112  | +1 385 528 4611<br>siva.viknesh@sci.utah.edu<br>sivaviknesh14@gmail.com |
| RESEARCH INTERESTS  | Scientific Machine Learning, Computational Fluid Mechanics, Unsteady Aerodynamics, Wildfire Dynamics  |   |
| EDUCATION           | <b>University of Utah</b> , Salt Lake City, Utah, USA<br><b>Ph.D.</b> , Mechanical Engineering, <b>CPI: 3.88/4</b> 08/2022 – 05/2026 (Expected)<br><b>Advisor:</b> Dr. Amirhossein Arzani <ul style="list-style-type: none"> <li><i>Towards Interpretable &amp; Differentiable Machine Learning for Fluid Flows</i></li> </ul> <b>Indian Institute of Technology Kanpur</b> , India<br><b>M.S.</b> , Aerospace Engineering (Aerodynamics), <b>CPI: 8.33/10</b> 01/2018 – 07/2020<br><b>Advisor:</b> Dr. Kamal Poddar & Dr. Tapan K. Sengupta <ul style="list-style-type: none"> <li><i>Control of Separated Flow on a Symmetric Airfoil by Pitching Oscillation</i></li> </ul> <b>Anna University</b> , Chennai, India<br><b>B.E.</b> , Aeronautical Engineering, <b>CPI: 8.30/10</b> 08/2012 – 05/2016<br><b>Advisor:</b> Dr. Shanmugaraja M <ul style="list-style-type: none"> <li><i>Numerical Simulation of Fluid Flow over a Rectangular Wing – Wingtip Slots</i></li> </ul>   |   |
| WORK EXPERIENCE     | <b>Graduate Student Researcher</b> 05/2025 – Present<br>CAI-2 Group, Los Alamos National Laboratory, New Mexico, USA <ul style="list-style-type: none"> <li><b>Statistical Shape Modeling</b> of DEM terrains for Wildfire simulations.</li> </ul> <b>Graduate Research Assistant</b> 08/2022 – Present<br>SCI Institute, University of Utah, Utah, USA <ul style="list-style-type: none"> <li>Developed a <b>Differentiable Autoencoding Neural Operator</b> combining mesh-invariant dimensionality reduction with differentiable PDE solvers.</li> <li>Built a <b>GPU-accelerated 2D Wildfire Transport PDE solver</b>, leveraging CUDA and Finite Difference Method.</li> <li>Proposed <b>ADAM-SINDy</b>, a global optimization method for Nonlinear Dynamical System Identification.</li> </ul> <b>Aerodynamics Engineer</b> 09/2021 – 08/2022<br>The ePlane Company, IIT Madras, Chennai, India <ul style="list-style-type: none"> <li>Formulated an <b>FVM solver template</b> for 3D <b>CFD URANS simulations</b> of electric air vehicles, reducing validation error by <math>\sim 30\%</math>.</li> <li>Developed <b>Custom UDF programs</b> to generate unsteady freestream conditions for calculating <b>dynamic stability derivatives</b>.</li> </ul> <b>Senior Research Associate</b> 01/2021 – 08/2021<br>Department of Aerospace Engineering, IIT Kanpur, India<br><b>Associate – Content Development</b> 08/2020 – 01/2021<br>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**, S. Viknesh, A. Arzani, in preparation
2. **ADAM-SINDy: An Efficient Optimization Framework for Parameterized Nonlinear Dynamical System Identification**, S. Viknesh, Y. Tatari, C. Christenson, A. Arzani, Submitted, 2025.
3. **Role of flow topology in wind-driven wildfire propagation**, S. Viknesh, A. Tohidi, F. Afghah, R. Stoll, A. Arzani, **Physics of Fluids**, May 2025.
4. **Active control of separated flow on a symmetric airfoil by pitching oscillation**, S. Viknesh, K. Poddar, **Physics of Fluids**, August 2021.
5. **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, **Phys. Rev. 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** of 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** at Park College of Technology (2013).