Vedant Puri

https://vpuri3.github.io/

Education

Carnegie Mellon University (CMU) Jan 2022–Present
Ph.D Mechanical Engineering
Advisor: Levent Burak Kara, Yongjie Jessica Zhang

University of Illinois Urbana-Champaign (UIUC) 2015–2019
B.S. Engineering Mechanics, Secondary Field: *Fluid Mechanics* GPA: 3.66/4.00
B.S. Mathematics, Concentration: *Graduate Preparatory* (dual degree)
Minor: *Computational Science and Engineering*

Experience

Carnegie Mellon University | *Research Assistant* Jan 2022–Present
- Turbulence closure modeling with differentiable physics
- Phase field simulations of lithium dendritic growth in solid-state batteries
- Equation-based reduced order modeling for computational fluid dynamics
- Time-series modeling of laser powder bed fusion additive manufacturing process

Julia Computing | *Intern Engineer* April 2021–Nov 2021
- Wrote the linear solve interface for Julia `SciML.ai` ecosystem
- Developed differentiable geometry representations and automated meshing algorithms
- Developed deep learning surrogate models for solving partial differential equations

Carnegie Mellon University | *Research Assistant* Sep 2020–Jan 2021
- Wrote `SpectralElements.jl`, a differentiable PDE solver for machine learning research
- Developed differentiable geometry representations and meshing algorithms

Argonne National Laboratory | *Research Assistant* Mar 2020–Sep 2020
- Fluid dynamics simulations (LES, RANS) of turbulent airflow in urban landscapes
- Meshing, setup, benchmarking, analysis of fluid simulations in OpenFOAM, Nek5000

Argonne National Laboratory | *Research Assistant* May 2018–Jul 2018
- Fluid dynamics simulations of airflow over windfarm terrains on supercomputers
- Analysed Reynolds stress budgets in canonical flows for turbulence model development
- Developed `NekTools`, a FORTRAN 77 toolbox for post-processing Nek5000 simulations

National Center for Supercomputing Applications | *Intern* Sep 2017–May 2018
- Numerical simulation of spacetime metric for gravitational wave simulations in Einstein Toolkit
- Implemented preconditioning, relaxation methods for numerically solving nonlinear PDEs

Mechanical Science & Engineering, UIUC | *Course Assistant* Jan 2016–Dec 2017
- Taught mechanical analysis using free-body-diagrams and control-volumes for *Statics* course
- Created instructional demonstrations for engineering courses serving 2500 students annually

Teaching

Carnegie Mellon University | *Teaching assistant*, numerical analysis Spring 2025
Carnegie Mellon University | *Teaching assistant*, discrete differential geometry Spring 2023
University of Illinois | *Course assistant*, introductory statics Spring 2016–Fall 2017

Activities & Awards

World Conference on Computational Mechanics | *Best poster in fluid dynamics* 2024
University of Illinois | *Theoretical and Applied Mechanics Merit Award* 2019
Society for Engineering Mechanics, UIUC | *President* 2019
Society for Engineering Mechanics, UIUC | *Curriculum Development* 2017–2018

Skills

Programming FORTRAN 77/90, C, Python, Julia, MATLAB, UNIX, LaTeX
Design Computer aided design, woodworking, soldering, Adobe Lightroom, photography