Vedant Puri

https://vpuri3.github.io/

Education

Carnegie Mellon University (CMU) — Jan 2022 Onwards
Ph.D Mechanical Engineering

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*
Thesis: *Direct Numerical Simulation of Flows Over Wavy Walls at* $\mathrm{Re}_\lambda = 4780$

Experience

Julia Computing | *Intern Engineer* — April 2021–Present
- Developed differentiable geometry representations and automated meshing algorithms
- Developed linear solve interface for Julia `DifferentialEquations.jl` toolkit
- Deployed deep learning surrogate models for Partial Differential Equations in JuliaSim

CoreCompete | *Data Science Trainee* — Jan 2021–May 2021
- Analyzed inventory forecasting models, and developed logic for a conversational AI agent

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

Argonne National Laboratory | *Research Assistant* — Mar 2020–Sep 2020
- Computational Fluid dynamics simulations (LES, RANS) of turbulent airflow in urban landscapes
- Mesh generation, setup, comparison studies, and analysis of OpenFOAM, Nek5000 simulations

Argonne National Laboratory | *Research Assistant* — May 2018–Jul 2018
- Fluid dynamics simulations (DNS) of airflow over windfarm terrains on supercomputers
- Analyzed 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 elliptic 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

Research

(manuscript in preparation) **V. Puri**, R. Balakrishnan, A. Obabko, P. Fischer, *Turbulent Kinetic Energy Budgets of Flows Over Smooth and Rough Wavy Walls at* $\mathrm{Re}_\lambda = 4,780$

(talk) **V. Puri**, R. Balakrishnan, *DNS and LES of Flow Over Smooth and Rough Wavy Walls.* American Physical Society Division of Fluid Dynamics 2021

(talk) **V. Puri**, R. Balakrishnan, *DNS of Flow Over Smooth and Rough Wavy Walls at* $Re_\lambda = 4760$. American Physical Society Division of Fluid Dynamics 2020

(talk) **V. Puri**, R. Haas, E. Bentivegna, *Initial Data Generation Algorithms for 'Einstein Toolkit'.* American Physical Society April Meeting 2018

Activities & Awards

UIUC | *Theoretical and Applied Mechanics Merit Award* — 2019

Society for Engineering Mechanics, UIUC | *President* — Aug 2018–May 2019

Society for Engineering Mechanics, UIUC | *Curriculum Development* — Oct 2016–May 2018

Skills

Programming	FORTRAN 77/90, C/C++, Python, Julia, MATLAB, UNIX, LaTeX
Technologies	Google Cloud Platform, REST API, Postman, Gmsh, Tableau, PETSc, FFTW
Design	Computer aided design, woodworking, soldering, Adobe Lightroom, photography