Vedant Puri

https://www.mcs.anl.gov/~vpuri/

Education

University of Illinois Urbana-Champaign (UIUC) Aug 2015–Dec 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

Data Science Trainee, **CoreCompete**, Durham, NC Jan 2021–Present
- Developing conversational AI agent for supporting phone calls for debt collection
- Tech: Google Cloud Platform, Postman, REST API

Research Assistant, **Carnegie Mellon University**, Pittsburgh, PA Sep 2020–Jan 2021
- Spectral element topology optimization code for inverse design applications
- Tech: Julia automatic differentiation, adjoint optimization

Research Aide, **Argonne National Laboratory**, Chicago, IL Mar 2020–Sep 2020
- Fluid dynamics simulations (LES, RANS) of airflow over buildings
- Pre-processing (mesh generation), and analysis of OpenFOAM, Nek5000 simulations

Research Aide, **Argonne National Laboratory**, Chicago, IL May 2018–Jul 2020
- Fluid dynamics simulations (DNS) of airflow over windfarm terrains on supercomputers
- Analyzed Reynolds stress budgets in canonical flows for turbulence model development
- Wrote FORTRAN77 setup for post-processing and turbulence budgets analysis in Nek5000

Intern, **National Center for Supercomputing Applications**, Urbana, IL Sep 2017–May 2018
- Initial data generation of spacetime metric for gravitational wave simulations in Einstein Toolkit
- Implemented numerical methods for solving nonlinear elliptic PDEs (preconditioning, relaxation)

Course Assistant, **UIUC Mechanical Engineering**, Urbana, IL 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 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

President, **Society for Engineering Mechanics, UIUC** Aug 2018–May 2019
Curriculum Development, **Society for Engineering Mechanics, UIUC** Oct 2016–May 2018

Honours

Theoretical and Applied Mechanics Merit Award, **UIUC** 2019

Skills

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

Projects

https://github.com/vpuri3

- /NekTools: FORTRAN 77 toolbox for turbulence budget computation in NEK5000
- /SEM.jl: Julia spectral element PDE solver with adjoint optimization
- /Spec: MATLAB spectral element solver for the incompressible Navier–Stokes equations
- /Notes: LaTeX notes on mechanics, real analysis, functional analysis
- /IlliniHyperloop: (UIUC capstone) Passive cooling solution to dissipate 300 kJ heat from propulsion system of Hyperloop pod; fabricated by sponsor, Novark Technologies, Inc.