Vedant Puri

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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
- Computational fluid dynamics and deep learning for inverse design applications
- Deep learning architectures for numerically solving partial differential equations
- Neural Partial Differential Equation deployment in JuliaSIM

CoreCompete | *Data Science Trainee* Jan 2021–May 2021
- Developed logic of conversational AI agent to support collections calls at a financial institution
- Analysis and visualization of inventory forecasting models

Carnegie Mellon University | *Research Assistant* Sep 2020–Jan 2021
- Spectral element adjoint optimization code (cont'd at Julia Computing)

Argonne National Laboratory | *Research Assistant* Mar 2020–Sep 2020
- Fluid dynamics simulations (LES, RANS) of turbulent airflow in urban landscapes
- Pre-processing (mesh generation), and analysis of OpenFOAM, Nek5000 simulations

Argonne National Laboratory | *Research Assistant* 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

National Center for Supercomputing Applications | *Intern* 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)

Department of Mechanical 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

(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

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

Honours

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

Projects

`https://github.com/vpuri3`
- `/diffMesh.jl`: Automatic meshing/mesh optimization algorithms implemented in Julia
- `/SEM.jl`: Differentiable spectral element Navier-Stokes solver for machine learning research
- `/NekTools`: FORTRAN 77 toolbox for turbulence budgets computation in NEK5000
- `/IlliniHyperloop`: (UIUC capstone project) Passive cooling solution to dissipate 300 kJ heat from propulsion system of Hyperloop pod; fabricated by sponsor, Novark Technologies, Inc.