Vedant Puri

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Education

University of Illinois Urbana-Champaign Aug 2015–Dec 2019

B.S. Engineering Mechanics, Secondary Field: *Fluid Mechanics* GPA: 3.66/4.00

B.S. Mathematics (dual degree), Concentration: *Graduate Preparatory*

Minor: *Computational Science and Engineering*

Work Experience

Research Aide, **Argonne National Laboratory** Mar–Jun 2020

- Wall-Resolved Large Eddy Simulations for United States Department of Energy project

Research Aide, **Argonne National Laboratory** May–Jul 2018

- Direct Numerical Simulations of turbulent flows over smooth and rough wavy walls
- Computed Reynolds Stress budgets within spectral element fluid dynamics code *NEK5000*
- Studied turbulence production, transport, dissipation processes for developing wall-models

Intern, **National Center for Supercomputing Applications** Sep 2017–May 2018

- Computed spacetime metric initial data of black hole system for gravitational wave simulations
- Solved nonlinear, elliptic PDEs in parallel within C++ cosmological framework *Einstein Toolkit*
- Implemented relaxation methods for solving elliptic PDEs, significantly reducing solution time
- Wrote Laplacian preconditioners for elliptic PDEs using discrete transforms and PETSc in C

Course Assistant - Introductory Statics, **UIUC** Jan 2016–Dec 2017

- Taught mechanical analysis using free-body-diagrams, control-volumes, and numerical tools
- Conducted 4 weekly discussion sections (32 students each), wrote problem sets

Research Work

(thesis) **V. Puri**, R. Balakrishnan, A. Obabko, P. Fischer, *Reynolds Stress Budgets for Turbulent Flows Over Smooth and Rough Wavy Walls*

(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

- Led organisation of 30 students to complete 'Chocolate 3D Printer', and 'S'mores Machine'
- Improved student engagement in Engineering Mechanics program through tutorials, advising, company meetings, workshops, social events, and department research fair
- Supported student recruitment to Mechanical Science and Engineering department

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

- Designed and built instructional demonstrations such as Ackermann steering system, truss models for Theoretical and Applied Mechanics courses serving 2500 students
- Student advisor to Strategic Instructional Innovations Program group for mechanics courses

Honours & Awards

Theoretical and Applied Mechanics Merit Award 2019

UIUC Mechanical Science and Engineering department award in honour of a student's special contributions to Theoretical and Applied Mechanics, and Engineering Mechanics programs

Skills

Programming	FORTRAN 77/90, C, C++, MATLAB, Python, Shell, PETSc, FFTW
Miscellaneous	LaTeX, Computer Aided Design, woodworking, soldering, photography

Projects

`https://github.com/vpuri3`

- `/Spec`: Numerical methods repository; spectral/spectral element codes for unsteady incompressible Navier Stokes equations in deformed geometries
- `/Notes`: LaTeX notes on mechanics, real analysis, functional analysis, Sobolev spaces
- `/NekTools`: Turbulence budgets and post-processing routines for fluid dynamics code *NEK5000*
- `/IlliniHyperloop`: (UIUC capstone) Passive cooling solution absorbing 300 kJ heat from propulsion system of Hyperloop pod; fabrication handled by sponsor, Novark Technologies, Inc.