Vedant Puri

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Education

University of Illinois Urbana-Champaign 2015–2019

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** May–Jul 2018

- Conducted Direct Numerical Simulations of separated flows in undulating geometries utilising up to 1024 compute nodes for 200 hours at Argonne supercomputers using spectral element code NEK5000
- Wrote setup to compute of wall stresses, spatial averages, and budget terms for the tensor Reynolds Stress Transport Equation to study mechanisms of turbulent energy production
- Modelled the effect of unresolved boundary features by adding small-amplitude sinusoidal roughness

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

- Extended relaxation methods for solving linear partial differential equations to nonlinear problems
- Computed initial data for spacetime metric of binary black hole system for gravitational wave simulations
- Wrote Laplacian preconditioners for elliptic PDEs using discrete transforms in PETSc

Course Assistant, Introductory Statics, **University of Illinois** Jan 2016–Dec 2017

- Conducted four weekly discussion sections where 32 students collaboratively worked on problem sets
- Wrote problem sets, assisted with course logistics, and taught students to use numerical tools

Research Work

(thesis) **V. Puri**, R. Balakrishnan, A. Obabko, P. Fischer, *Reynolds Stress Budgets for Wall-Bounded Flows in Wavy Geometries*

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

Collegiate Involvement

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

- Led an organisation of 30 students to complete 'Chocolate 3D Printer', and 'S'mores Machine' projects
- Augmented student participation in Engineering Mechanics program through tutorials, advising sessions, company information sessions, workshops, social events, and annual department research fair
- Supported student recruitment to Mechanical Science and Engineering department

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

- Student advisor to Strategic Instructional Innovations Program group for three TAM courses
- Led a student group to design and build instructional demonstrations such as Ackermann steering system, truss models for Theoretical and Applied Mechanics courses serving 2500 students

Honours and 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

Technical Skills

Programming Fortran 77, C, C++, MATLAB, Python, Shell

Miscellaneous LaTeX Typesetting, Computer Aided Design, woodworking, soldering, photography

Projects

`https://github.com/vpuri3`

- `/Spec`: MATLAB spectral, spectral element codes for fluid flow problems
- `/Notes`: Compiled notes on mechanics and mathematical analysis
- `/NekTools`: Turbulence budgets and post-processing routines for CFD code NEK5000
- `/IlliniHyperloop`: (Capstone Project) Implemented a passive cooling solution absorbing 300 kJ of heat from propulsion system of a Hyperloop pod; fabrication handled by sponsor, Novark Technologies, Inc.