

Varshini Subhash

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EDUCATION

- **Manipal Institute of Technology** Manipal, India
Bachelor of Technology in Mechanical Engineering, CGPA: 9.09/10.0 *Aug 2014 – July 2018*
Minor in Mechanical Design

RESEARCH PUBLICATIONS

- **Varshini Subhash**, Karran Pandey, Vijay Natarajan, “GPU Parallel Computation of Morse-Smale Complexes”, *Short Paper, IEEE VIS 2020. (Accepted)*

RESEARCH EXPERIENCE

- **Indian Institute of Science** Bangalore, India
Research Assistant *June 2019 - Present*
Mentor: Professor Vijay Natarajan
 - **GPU Parallel Computation of Morse-Smale Complexes:**
 - Designed parallel algorithms for the efficient computation of a topological descriptor called the Morse-Smale Complex, which improve upon the state-of-the-art pipeline by upto **7x**.
 - Individual algorithms demonstrate speedups upto **4.5x** and **129x** each.
 - This work was accepted for publication and presentation at the IEEE VIS 2020 conference.
 - Presented results at the Bangalore VIS Workshop 2020.
- **Indian Institute of Science** Bangalore, India
Research Assistant *May 2018 - December 2018*
Mentor: Professor Ramsharan Rangarajan
 - **Parallel Performance in Mesh Optimization:**
 - Enabled **100%** scalability (**40x** speedup) in a parallel mesh optimization algorithm named DVR by conducting scalability and performance analysis.
 - Reduced parallel execution time by **47.4%**.
 - Used CGAL, Hypermesh and TetGen to prepare large scale meshes that demonstrate parallel optimization.
- **Indian Institute of Science** Bangalore, India
Research Intern *January 2018 - May 2018*
Mentor: Professor Ramsharan Rangarajan
 - **Adaptive Mesh Refinement Using Quadrees:**
 - Developed a C++ implementation of the paper 'Provably Good Mesh Generation' which uses quadrees [code] for adaptive mesh refinement in Finite Element Analysis (FEA).
 - The mesh generation algorithm selectively refines erroneous FE regions based on a specified error function or point cloud, thus improving the accuracy of the FEA solution.
 - Successfully demonstrated the reduction of error by an **order of magnitude** in an obstacle problem.
- **Indian Institute of Technology** Mumbai, India
Research Intern *May 2017 - June 2017*
Mentor: Professor Arindrajit Chowdhury
 - **Spray Ignition Setup for Combustion of Hypergolic Propellants:**
 - Developed a spray ignition setup for the combustion of hypergolic propellants in rocket propulsion.
 - Modeled the combustion chamber on SolidWorks & conducted structural analysis on ANSYS.
 - A theoretical injector system was designed and validated.
 - Experiments were performed using High Speed Imaging to study impingement characteristics of a triplet injector.

PROJECTS

- **Global Initiative to End Gender-Based Violence:** Heading the research effort by the Coronavirus Visualization Team to study gender-based violence during the COVID-19 pandemic.
 - Obtained street-level and time-series visualizations for several cities in the United States, which compare violent crimes against women during 2019 and 2020.
 - A podcast and policy paper comparing policies across states is in the pipeline.
- **Visualization of Fractals:** Visualized the Mandelbrot Set and Julia Sets using the Python Imaging Library [code].
- **Fourier Transforms:** Computed Fourier Transforms for input signals and visualized the constituent pure signals by wrapping input signals around a circle at varying frequencies [code].

WORK EXPERIENCE

- **Deloitte** Bangalore, India
Business Analyst Aug 2018 - June 2019
 - Led the deployment of PTC Windchill configurations on client servers and worked on Windchill performance tuning.
 - Developed an application to automate Part Creation in Windchill.
 - Awarded a perfect performance scatterplot during the Annual Talent Review.
- **Fiat Chrysler Automobiles** Pune, India
Summer Intern June 2016 - July 2016
 - Worked on 'WPI Implementation in Car Assembly' by studying assembly line process sheets, preparing spaghetti charts, PFMEAs, MURI charts and performing NVAA analysis.
- **PTC** Pune, India
Summer Intern June 2015 - July 2015
 - Assisted the MPMLink Scrum Team with the Sprint testing of stories.
 - Conducted regressive testing as well as testing of new stories of PTC Windchill MPMLink.

AWARDS AND HONORS

- **Deloitte Annual Talent Review:** Received a perfect performance scatterplot for excellence in performance (2019).
- **Rank Holder, SSC Board Examination:** Award for securing **3rd position** in the Merit List of the SSC Board Examination (2012).
- **Dr. Doctor Memorial Scholarship:** Recipient of the award for excellence in academics and securing **1st position** in a class of **120** (2011).
- **State Rank 4, International English Olympiad:** Awarded a **Silver Medal** in the International English Olympiad for securing **State Rank 4** (2010).
- **Quarter Finalist, All-India Tata Energy Q-Quiz:** Qualified for the quarter-finals of the national level Tata Energy Q-Quiz (2009).

VOLUNTEER EXPERIENCE

- **Coronavirus Visualization Team (CVT)** June 2020 - Present
Project Planning Co-Director | Project Co-Lead | Community Manager
 - CVT is a student-run non-profit at Harvard University that aims to fight the COVID-19 infodemic with visualization and data analysis.
 - Leading the Project Planning Team which oversees all CVT projects, helps plan project timelines and feasibility.
 - Leading the 'Global Initiative to End Gender Based Violence' project.
 - Managing member activity and community engagement in the Social Media team.
- **Testbook** March 2018 - September 2018
Subject Matter Expert
 - Testbook is an IIT Bombay alumni startup focused on providing competitive coaching for rural students attempting Indian government examinations.
 - Designed **500+** English mock test questions for enrolled students.

PROGRAMMING SKILLS

- **Languages:** C, C++, Java, Python **Packages:** OpenMP, CUDA, cuSPARSE, cuBLAS, CGAL, Hypermesh