

# Varshini Subhash

LinkedIn : varshinisubhash

Website: svarshini

GitHub : svarshini

Email : varshinis@iisc.ac.in

varshini96@gmail.com

Mobile : +91-9420219463

## 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 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.
    - Replaced the existing OpenCL implementation with CUDA.
    - Submitted results to the IEEE VIS 2020 conference. Presented them at the annual 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 quadrees [code] used 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.
    - Experiments were performed using High Speed Imaging to study impingement characteristics of a triplet injector.

## 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

June 2016 - July 2016

Summer Intern

  - 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

June 2015 - July 2015

Summer Intern

  - 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.

## RESEARCH SUBMISSIONS

---

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

## 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.
- **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].

## 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 while ensuring timely deliverables.
  - 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