Research Interests

- Robotics, Artificial Intelligence (Planning and Localization)
- Digital Electronics, VLSI Design, High Level Synthesis

Current Projects

- **AUVSI Robosub 2013, San Deigo, CA** *(September 2012 to Present)*
  Designing and developing an unmanned autonomous underwater vehicle (AUV) that localizes itself and performs realistic missions based on feedback form visual, inertial, acoustic and depth sensors using thrusters/propellers [`http://auv-iitb.org`]
    - Working with the software sub-division on planning, localization and navigation of the vehicle by fusing various sensor data using kalman filtering and updating the motion controller
    - Using ROS (Robot Operating System) architecture to integrate several parts of the system
- **epsilon-to-verilog : An Educational HLS tool** *(Guided by Prof. S. Patkar, September 2012 to Present)*
    - epsilon-to-verilog synthesizes programs written in a new custom minimalistic high level language epsilon to hardware description languages
    - The tool parses the cfg (control flow graph) generated by epsilon and does scheduling and allocation to generate hardware description in verilog.

Google Summer of Code - GSoC'12

Worked on a FOSS project **Gnucap plugin for schematic files** *(May 2012 to August 2012)*

- Worked with the organisation 'GNU Project' on the project 'Gnucap' (GNU Circuit Analysis Package) under the mentorship of Albert Davis. [`http://gnucap.org`]
- My work involved the following :
    - Reading through the existing codebase to understand it
    - Figuring a way to map schematic file to Verilog-AMS and vice-versa
    - Implementing a plugin which will import a schematic file and convert into a Verilog-AMS netlist and also export an existing circuit in schematic format

Key Academic Projects

- **Technology Mapping - VLSI CAD** *(Guided by Prof. S.Patkar, EE677 - Autumn 2012)*
    - Modeling the problem of technology mapping as a tree covering problem using pattern trees of the library gates.
    - Implementing using python graph-tool library

- **Traveling Message Display** *(Guided by Prof. M.B.Patil and J.John, EE214- Spring 2012)*
  - Worked in a team of 3 members
  - Display a scrolling message taken using keypad on an LED Array
  - Used an FPGA board: DE0 NANO and programmed using Verilog-HDL
  - My work involved writing verilog modules for taking input from the keypad and processing
- **Simulation of Micromouse** *(Guided by Prof.Deepak B. Phatak, CS101 - Autumn 2010)*
  - Led the team of 12 members.with 3 subteams of 4 members each
  - Designed n×n mazes, Solved them for the shortest path using Bellman-ford algorithm in C++ and Simulated the solution using EzWindows GUI.
  - My work involved programming the display over GUI and interlinking the different parts

Scholastic Achievements

- **All India Rank 61** in IIT-JEE (Joint Entrance Examination) - 2010 of 0.455 million students
- Awarded **Certificate of Merit** by Central Board of Secondary Education (**CBSE**) for being among **top 0.1 %** in 'Science' and 'Social Science' in All India Secondary School Examination - 2008.
- Secured **All India Rank 15** in 10th National Science Olympiad (NSO) - 2007 conducted by Science Olympiad Foundation(SOF).

Technical Skills

- **Programming Languages**: C++,Java,Python,Ruby **Operating Systems**: Ubuntu, Windows
- **Tools**: Latex, Scilab, Mathematica , Photoshop **Web development**: HTML, CSS, JS, Django
- **EE tools**: ngspice, gnucap, gEDA tools, Eagle, Verilog-HDL, Verilog-AMS, Icarus verilog Bluespec System Verilog (BSV), Modelsim, Altera Quartus

Technical Activities

- Yahoo! HackU -2012: Built an android app and web interface, 'MapIt' which can be used to create customizable maps of localities with greater information
- Line-follower competition-2011 : Designed and built a line-following bot using IR sensors and coding the microcontroller using Arduino software
- Trackmania-2010 : Built a remote-controlled four-wheeled car (bot).

Extra Curricular Activities and Achievements

- Participated in **Unnati**, the **NSS** (National Service Scheme) group of IIT Bombay.
  - Has been involved with the **GRA** (Group for Rural Activities) as part of curriculum in I year
  - Went to Village trips in Autumn 2010 and Spring 2011.
  - Continued as a voluntary member of the NSS Team in the subsequent year.
- Worked as 'Organiser' in **Techfest-2011** in the Lecture Series department.
- Participated in the Inter-hostel Hockey GC.

Additional Courses taken / currently taking

- Foundations of VLSI CAD
- Artificial Intelligence
- Data Structures and Algorithms
- Discrete Structures
- Introduction to Quantum Mechanics
- First Course in Optimisation