Harsh Kumar Singh

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Education

University of Cambridge **Cambridge, United Kingdom**
MPhil in Engineering *2019–Present*
Courses: Control System Design, Robust and Nonlinear Control, Vehicle Dynamics and Vibrations
Research topic: Developing an empirical model of tractor-trailer tire-wear phenomenon and validating it with field data.

National Institute of Technology, Karnataka, Surathkal **Mangalore, India**
Bachelor of Technology, GPA – 8.39 *2012–2016*
Important courses: Basic thermodynamics, Machine Dynamics and Vibrations, Strength of Materials, Metrology, Micro-Electro-Mechanical systems, Mechatronics and Experimental Stress Analysis

Experience

Teaching

University of Cambridge **Cambridge, UK**
Teaching Assistant *January 2020–present*

- Working as lab demonstrator and marker for first year undergraduate mechanics lab experiment.

Research

Indian Institute of Technology, Madras **Chennai, India**
Project Research Associate *July 2018–July 2019*

- Worked on the development of a stability control system for Heavy Commercial Road Vehicles.
- Implemented a rule-based slip controller on Hardware-in-Loop setup and compared its performance with the model-based slip controller, in terms of stopping distance and stability.
- Developed a framework for emulating a wheel-lock event in brake inertia dynamometer.

Industry

Mahindra & Mahindra Limited **Chennai, India**
Brakes Engineer *August 2016–July 2018*

- Worked on the design and implementation of brakes system for personal and commercial segment vehicles.
- Tested and validated parking brake mechanism with an improvement in performance by 25%.
- Developed a stand-alone application for predicting brake performance curves which reduced the calculation time by a factor of 60.
- Completed Mahindra Product Development System project for generating a concept vehicle for 2020.

TVS Motors **Hosur, India**
Summer Intern *May 2015–July 2015*

- Developed an analytical approach to improve the switch harmony of TVS bikes.
- Conducted customer survey for finding the touch and feel characteristics of two-wheelers' switch clusters.

Evomo Research and Advancement Pvt. Ltd. **Ahmedabad, India**
Summer Intern *May 2014–July 2014*

- Analyzed the space-frame chassis of the Rural utility vehicle and compared it with existing ladder frame chassis. Improved designs led to 12% saving in weight and 8% reduction in cost.
- Interacted with target customers from rural areas of Ahmedabad.
- Contemplated upon the business and technical feasibility of introducing a utility vehicle for the sub-continent market with delegates from Nissan.

Certifications

NPTEL
Data Science for Engineers by IIT, Madras, 86% (top 5% of class) *2019*

NPTEL
Control Systems by IIT, Madras, 91% *2018*

Society of Automotive Engineers
Introduction to brake control systems *2018*

Coursera
Control of Mobile Robots by Georgia Institute of Technology, 89% *2018*

Publications

Singh, H. K. and Shinde, B (2019). Development of a standalone application in MATLAB to generate brake performance data (No. 2019-01-0513). *SAE Technical Paper*.
One technical brief under review in Journal of Automobile Engineering.

Skills

Programs: MATLAB, ANSYS, LabVIEW, COMSOL, LaTeX, TruckMaker, CarMaker

Design Tools: CATIA, SolidWorks, Pro/ENGINEER, AutoCAD

Computer languages: C/C++, R

Undergraduate projects

Modeling, testing, and validation of motorbike on a race track
- Successfully created a mathematical model of a motorbike in Simulink and validated the results.

Modeling and simulation of a two degree of freedom system
- Developed a mathematical model for free and forced vibration responses in MATLAB.

Design of a Gear shift indicator
- Implemented the indicator logic considering wheel speed, load and current gear position using Arduino microcontroller.

Design of a pyro-electric energy scavenging device
- Analyzed a bi-material cantilever beam for wastage heat scavenging.

Conceptualized a product *Storm-proof Umbrella*
- Collected data from the target audience and developed several concepts for the product.

Modeling and simulation of four-bar mechanisms
- Developed and simulated a mathematical model of four-bar mechanism in MATLAB.

Academic Achievements

- Awarded the JN Tata Scholarship for Higher Studies, 2019.
- Awarded the NITK Institute Merit Scholarship for consistent academic performance, 2013-2015.
- Secured All India Rank 2741 out of 12 lac candidates in the All India Engineering Entrance Examination, 2012.
- Selected among top students of Gujarat for a seminar at Central Salt and Marine Chemicals Research Institute, Bhavnagar, Gujarat, 2011.
- Selected for the scholarship ALL India Talent Search Examination, 2007.

Extra-Curricular Activities

Leadership roles

- Handling public relations and speaker liaison as a member of the Graduate Student Conference organizing committee, Department of Engineering, University of Cambridge.
- Served as the Assistant Warden of Tapti Hostel, IIT Madras.
- Represented Mahindra and Mahindra Limited in the Automotive Expo, 2018.
- Founding member of team Eagan, collegiate electric go-karting team.
- Successfully led my team to win the remote-controlled car racing event in Engineer-2013 (technical festival of National Institute of Technology Karnataka, Surathkal).
- Played a pivotal role in organizing all the competitions with Mechanical Events Organizing Committee at Engineer 2013 and Engineer 2014, the annual technical events of NITK.

Sports

- Currently a member of the rowing and graduate football teams of St John's College, University of Cambridge.
- Represented Mahindra and Mahindra Limited in the Corporate football tournament, Chennai.

Volunteering and awareness

- Conducted weekend classes for less privileged children as a part of the corporate social responsibility team of Mahindra & Mahindra Limited.
- Successfully led my team to present mime acts on girl child education and traffic safety awareness in the annual meet of Mahindra & Mahindra Limited focusing on girl child education.