

# NILESH MADHAVJI DAMA

1203 University Terrace Apartment E, Progress Street NW, Blacksburg, VA 24060 | [nileshda@vt.edu](mailto:nileshda@vt.edu) | +1 (540)449-7508

## EDUCATION

---

<b>Virginia Polytechnic Institute and State University</b> M.S. in Mechanical Engineering <b>Courses:</b> Mechanical Vibrations, Applied Linear Systems, Advanced Instrumentation, Applied Linear Control, Finite Element in Machine Design, Adv. Robot Motion Planning, Statistics in Research	Aug 2017 - Present <b>GPA: 4/4</b>
<b>K. J. Somaiya College of Engineering, University of Mumbai</b> B.E. in Mechanical Engineering (with Distinction)	Aug 2012 - Jul 2016 <b>CGPA: 8.28/10</b>

## SOFTWARE SKILLS

---

- Modeling: Particle Flow Code (PFC), SolidWorks, CATIA, Gambit, Pro-E, Autodesk Inventor, AutoCAD, Gazebo
- Analysis: Abaqus, ANSYS, Mach-Zehnder Interferometer (MZI), Particle Image Velocimetry (PIV), Ricardo WAVE
- Programming: MATLAB, Python, Robot Operating System (ROS), V-REP
- Other: Simulink, JMP, MS Office, LATEX, Minitab, Mathematica, Tecplot

## PROFESSIONAL EXPERIENCE

---

**Center for Vehicle Systems and Safety (CVeSS), Virginia Tech** *Blacksburg, USA*  
**Graduate Research Assistant - Railway Technologies Laboratory.** Oct 2017 – present

“Discrete Element Modeling of Railway Ballast for studying Railroad Tamping operation - *Graduate Thesis*”

- Calibrated ballast and sleeper material to represent a real-world chaotic system for tamping operation
- Performing DEM of railway ballast using PFC 3D software and parametric analysis to optimise Tamping process

**Indian Institute of Technology Bombay (IIT-B)** *Mumbai, INDIA*  
**Project Research Assistant - Solidification Laboratory.** Aug 2016 - Jul 2017

“Real-time study of natural convection heat transfer during directional solidification of water”

- Studied semi-insulated cubical cavity and measured temperature in stratified water layers using MZI, two component-PIV
- Visualized convective flow of water within layers using two component-PIV (benchmarked the setup)
- Observed solid growth reduction due to natural convection formed by anomalous behaviour of water; MZI and two component-PIV aided in observing same analogous convective flow field
- Paper published - “24th National and 2nd International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTTC-2017)”

**Institute for Plasma Research** *Gandhinagar, INDIA*  
**Project Intern - SST-1 Tokamak Cryogenics Division.** Dec 2015 - Jan 2016

“Characteristics of liquid nitrogen (LN<sub>2</sub>) booster pump for Nuclear Fusion application”

- Analysed output phase of LN<sub>2</sub> in different phases like gas purging, filling, cooling (100K, 70K), steady state phases
- Devised an experimental method to correlate Tokamak system and LN<sub>2</sub> phases for controlled temperature reactions

**Summer School Intern - Multi-cusp Plasma Division.** Jun 2015 - Jul 2015

“Estimation of cooling requirement of magnets in the Multi-cusp Plasma Device”

- Estimate the coolant flow rate parameter to control the temperature of magnets to maintain constant magnetic field
- Optimized cooling and economical aspects of the coolant to achieve controlled magnet temperature

## PROJECTS

---

### **Motion planning for self-driving cars in a dynamic environment**

- Implemented Markov Decision Process (MDP) to guide robot motion (avoiding obstacles) in V-REP/Gazebo-ROS

### **Design an output feedback controller for a black box dynamic system**

- Designed control system to regulate outputs of a single input multi-output dynamic system using System Identification

### **Characterization of Cantilever mechanism of ‘Tonewood Amplifier’ on an Acoustic guitar**

- Performed Laser Vibrometer and Impulse Hammer tests and found effects of changing cantilever dimensions on the FRF
- Compared Frequency response of cantilever mechanism using experimental, FEA code and Abaqus FEA results

### **FEA analysis of Pulpwood loader machine and axisymmetric spinning turbine disk using Abaqus**

- Analysed critical section, maximum deflection location, reaction loads, required factor of safety and convergence

### **Design a full-state feedback control system to improve dynamic performance of overhead gantry crane**

- Designed a system that could drive crane’s payload lateral position to zero with no overshoot

### **Design, fabrication and analysis of a CPVC based novel Flat Plate Collector (FPC) - Undergraduate Thesis**

- Designed and analysed a new, cheaper, lighter, durable FPC with aluminium absorber plate and PVC fluid tubes

### **Design and manufacturing of ultra-energy (fuel)-efficient gasoline vehicle (prototype 2014 and 2013), Team ETA**

- Designed transmission system and Co-headed CAD team to design Aluminium chassis, achieving a 35% weight reduction
- Awarded the 1<sup>st</sup> rank in India and 5<sup>th</sup> in Asia, for prototype with 358.9 (US mpg) mileage, at Shell Eco-marathon Asia 2015