ABHISHEK BAMOTRA

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA **Dec 2020**
Master of Science in Computational Design and Manufacturing GPA **4.0/4.0**
♦ *Fund Math for Robotics* ♦ *Computer Vision* ♦ *Machine Learning for Large Dataset* ♦ *Linear Control Systems*

Thapar Institute of Engineering & Technology, India **Jun 2019**
Bachelor of Engineering in Mechatronics Engineering GPA **9.09/10.0**
♦ *Robotics Engineering* ♦ *Industrial Automation* ♦ *Digital Signal Processing* ♦ *Machine Design*

WORK EXPERIENCE

Course Assistant, Intro to Scientific Computing (24-281), **CMU** **Jan 2020 – Present**
♦ *Assist professor with Homework, Quizzes, Projects and Tests.*
♦ *Communicated problems and updates with fellow course assistants and professor.*

Robotics Intern, BioMechatronics Lab**, National University of Singapore**, Singapore **Feb 2018 - Jul 2018**
♦ *Hand-on experience with soft material fabrication.*
♦ *Designed robotic hand gripper and an ultra-sensitive tactile sensor using 3-D printing and soft material.*
♦ *Soft gripper could lift 200 times its own weight and sensor was sensitive to 0.5 mN force.*

Robotics Intern, Robotics Lab, **Universidad Carlos III de Madrid**, Spain **May 2017 - Jul 2017**
♦ *Hands-on experience with ROS, C++, and Linux.*
♦ *Programmed Arduino to control mini robots.*
♦ *Developed automatic wireless communication between micro and mini robot*

SKILLS

Advanced: PTC Creo, C/C++, Python, MATLAB, Arduino, 3-D Printing
Intermediate: Spark, Festo Fluid SIM, RSLogix, AutoCAD, Solidworks, OpenGL, Keras
Basic: Java, NI Multisim, ROS, Keil

PROJECTS

KeyDetect - Detection of anomalies and user based on Keystroke Dynamics (CMU) **Oct 2019 – Dec 2019**
♦ *Developed a 2-step authentication model to learn and verify the user based on the typing patterns.*
♦ *Algorithms based on SVM, Neural Networks (1-D Conv., with Negative Class), Decision Trees.*

Controller Design for an Autonomous Vehicle to track the route(CMU) **Oct 2019 – Dec 2019**
♦ *De-noised the input sensor data using Kalman Filter.*
♦ *Developed PID, Feedback, Optimal controller for the vehicle and bagged position in top 20 %.*

Lightweight OpenGL General Purpose Math Software (CMU) **Oct 2019 – Dec 2019**
♦ *Developed a tiny package to take on screen inputs without using external library.*
♦ *Integrated both numerical and graphical problem solving.*

Spine Adjustable Smart Bed (Thapar Institute of Engineering & Technology) **Aug 2018 – Apr 2019**
♦ *Invented a prototype to show working of a novel real-time spinal adaptive smart bed.*
♦ *Integrated Inertial Measurement sensors, Infrared sensor, wireless control, Arduino.*

Garbage Cleaning Robot (Thapar Institute of Engineering & Technology) **Oct 2015 – Nov 2016**
♦ *Analyzed the mechanics and electronics integration.*
♦ *Integrated with proximity sensors, gyroscope, and wireless control.*

PATENTS & PUBLICATIONS

Kirigami-Inspired soft end-effector with layer jamming for stiffness control (Patent) **Under review**
***Abhishek Bamotra**, Pushpinder Walia, A.V. Prituja & H. Ren* Jun 2018

Tri-axial Force Sensor (Patent) **Under review**
*Pushpinder Walia, **Abhishek Bamotra** & H. Ren* Jun 2018

Layer-Jamming Suction Grippers with Variable Stiffness **ASME JMR**
***Abhishek Bamotra**, Pushpinder Walia, A.V. Prituja & H. Ren* Jan 2019

Fabrication and Characterization of Novel Soft Compliant Robotic End-Effectors with Negative Pressure and Mechanical Advantages **IEEE ICARM** Jul 2018
***Abhishek Bamotra**, Pushpinder Walia, A.V. Prituja & H. Ren*

Design and Fabrication of Soft-bodied 3-D Tactile Sensors with Magnetometers **IEEE ICIA**
*Pushpinder Walia, **Abhishek Bamotra**, A.V. Prituja & H. Ren* Aug 2018

Piezoresistive Fabric based Flexible Tactile Sensors for Rigid-Soft Hybrid Modular Grippers **IEEE CASE**
*G. Ponraj, A.V. Prituja, **Abhishek Bamotra**, Zhu G., H. Ren, et al.* Aug 2019