Ayush Sinha

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EDUCATION

- **University of Illinois at Urbana-Champaign**
  MS Mechanical Engineering, GPA: ***4.0*** *May 2019*
- **Indian Institute of Technology, Kanpur**
  BTech Mechanical Engineering , CPI: ***9.3/10*** *June 2017*

PROFESSIONAL AND RESEARCH EXPERIENCE

- **Research Assistant | University of Illinois at Urbana-Champaign | Urbana, USA** *Jun 2018 – Current*
  - Characterizing dynamic behavior of soft pneumatic actuators for enhancing response for robotic applications
  - Recording actuator displacement, velocity and acceleration using image processing techniques
- **Intern | Kyushu Institute of Technology | Kitakyushu, Japan** *Dec 2016*
  - Wrote ROS modules for implementing specific motions on open source PLEN robot
  - Processed EEG signals using Simulink, Arduino to move robot at human's intent detection
- **Guest Scientist | Max Planck Institute for Intelligent Systems | Stuttgart, Germany** *May 2016 – July 2016*
  - Designed, built and characterized spider-inspired pneumatic and cable driven robotic actuator
  - Fabricated parts using 3D printing, laser cutting and silicone rubber molding
- **Supplier Quality Summer Trainee | Tata Motors Limited | Lucknow, India** *May 2015 – June 2015*
  - Improved and retrofitted riveting fixture for a chassis part at an ancillary plant
  - Resolved recurring fitment issue with chassis part and prevented assembly line stoppage

RELEVANT PROJECTS

- **Control and Testing of Soft Exoskeleton**
  - Constructed anthropomorphically accurate upper-body model for testing soft exoskeleton
  - Developed pressure controller using pneumatic valves, pressure sensors and a PID regime on LabVIEW
- **Autonomous Robot Navigation**
  - Programmed mobile robot to navigate an unknown obstacle course and identify objects of interest
  - Implemented A* path planning, LADAR based obstacle detection and computer vision for locating objects
  - Programmed OMAP-L138 DSP+ARM processor, TMS320F28335 and MSP430G2553 microcontrollers
- **Positioning and Impedance Control of Robot Arm**
  - Designed an inverse dynamics controller for accurate end-effector positioning to follow given course
  - Utilized simple impedance controller while traversing grooves and interacting with fragile objects
- **Teleoperated Bionic Hand**
  - Recorded user hand movement using a glove equipped with IMU and flex sensors
  - Actuated bionic hand using servo motors and cables to replicate user's hand

KEY PUBLICATION

A. Spröwitz, C. Göttler, **A. Sinha**, C. Caer, M. U. Öztekin, K. Petersen and M. Sitti; "Scalable Pneumatic and Tendon Driven Robotic Joint Inspired by Jumping Spiders", **IEEE International Conference on Robotics and Automation (ICRA) 2017**

ADDITIONAL EXPERIENCE

- **Teaching Assistant** – Upward Bound UIUC
  - TA for Physics, Algebra, Grammar at Office of Minority Student Affair's college prep academy
  - Co-taught, delivered lessons in teacher's absence and tutored 30 high school students
- **Volunteer** – Physics Van UIUC
  - Perform "Science Shows" to encourage students at elementary schools in and around Urbana-Champaign
- **Senior Member** – Team RCON IIT Kanpur
  - Led team of fifteen freshmen to create two badminton playing robots for National Robocon 2015
  - Organized exhibitions, acquired sponsors and conducted recruitment for the team

TECHNICAL SKILLS

Programming Languages – C, C++, MATLAB, LabVIEW | **Solid Modeling –** SolidWorks, Autodesk Inventor