

# Ayush Sinha

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## EDUCATION

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### ○ University of Illinois at Urbana-Champaign

MS Mechanical Engineering, GPA: 4.0/4.0

May 2019

### ○ Indian Institute of Technology, Kanpur

BTech Mechanical Engineering, CPI: 9.3/10

June 2017

## PROFESSIONAL AND RESEARCH EXPERIENCE

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### ○ Graduate Assistant | Control Systems Laboratory, UIUC | Urbana, USA

Aug 2018 – Current

- Technical assistance for UAV Navigation and Control, and Computer Control of Mechanical Systems courses
- Performing embedded programming, PCB design, simulation, hardware-software integration and digital control

### ○ 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

## RELEVANT PROJECTS

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### ○ Control and Testing of Soft Exoskeleton

- Constructed anthropomorphically accurate upper-body model for testing soft robotic exoskeleton
- Developed pressure controller using pneumatic valves, pressure sensors and a PID regime on LabVIEW

### ○ Autonomous Robot Navigation

- Programmed microcontrollers on mobile robot to navigate unknown obstacle course and identify objects of interest
- Implemented A\* path planning, LADAR based obstacle detection and computer vision for locating objects

### ○ 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

## NOTABLE SKILLS

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**Programming** – C, C++, MATLAB, Simulink, LabVIEW, Code Composer Studio | **Design** – SolidWorks, Inventor, EAGLE  
**Hardware** – Arduino, TI MCUs and DSP+ARM MPUs, NI myRIO, Quanser DAQ, Orange Pi | **Languages** – English, Hindi

## SELECTED COURSEWORK

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Mechatronics, Digital Control Systems, Introduction to Robotics, Control Systems Theory and Design, Robot Dynamics and Control, Robot Motion Planning, Probabilistic Mobile Robotics, Fundamentals of Computing

## KEY PUBLICATION

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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

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### ○ Teaching Assistant – Upward Bound UIUC

- TA for Physics, Algebra, Grammar at Office of Minority Student Affairs college prep academy

### ○ 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