

VARUN NALAM

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EDUCATION

Arizona State University
PhD in Mechanical Engineering.

August 2015 - May 2020
CGPA: 4.0/4.0

Indian Institute of Technology, Madras
B.Tech and M.Tech in Mechanical Engineering.

July 2009 - May 2014
CGPA: 7.89/10.00

RESEARCH EXPERIENCE

Neuromuscular Modeling of Human Ankle

August 2015 - May 2020

- Developed a neuromuscular model of the ankle using a robotic platform that would serve as a basis for lower limb exoskeletons and rehabilitation protocols
- Developed a robotic platform capable of simulating various environments and analyzing ankle behavior while humans interact with these environments.

Ankle Rehabilitation in Stroke Survivors

August 2018 - December 2020

- Conceptualized, implemented and validated a robotic training protocol aimed at improving paretic ankle motor control in stroke survivors.
- The 6 week study resulted in improvements in both the test subjects as observed in kinematic and clinical evaluations.

Flexible Robotic Endoscope for Cardiac Surgery

October 2014 - July 2015

- Developed the embedded system and control algorithm of a novel flexible endoscope designed for cardiac surgeries.
- The device is expected to reduce the recovery time and complexity of micro invasive cardiac surgeries.

Development of Motion Adaptation Device

May 2013 - May 2014

- Developing a device that can analyze, record and adapt human hand motion to different robotic systems.
- Demonstrated the utility of the system by successfully controlling a 6 DoF Robotic Arm.

Portable Gait Analysis and Rehabilitation System

May 2013 - May 2014

- Developed an economic device costing \$40 for gait rehabilitation in low income countries by implementing the embedded system and a learning algorithm for abnormality detection.

FIRA Robosoccer

May 2011 - May 2013

- Represented the country and Led a Team of 11 members at FIRA, an International Robosoccer competition by leading the development of a multi-agent system including embedded systems, controllers and decision making algorithms

TECHNICAL EXPERTISE

Embedded Systems
Software
Languages

STM32, ATMEGA, Simulink Real Time Systems, RTOS
Solidworks, EAGLE, SIMULINK, MATLAB, LabVIEW
C, C++, Python

PUBLICATIONS AND PATENTS

- [1] Hennington L., Nalam V., Eikenberry M. C., Kinney C. L., Lee H., 2019, IEEE Transactions on Medical Robotics and Bionics, 1, 237
- [2] Li Z., Zin Oo M., Nalam V., Duc Thang V., Ren H., Kofidis T., Yu H., 2016, Journal of Mechanisms and Robotics, 8
- [3] Nalam V., Lee H., 2017, in 2017 IEEE International Conference on Robotics and Automation (ICRA). pp 511–516
- [4] Nalam V., Lee H., 2018, Systems and methods for a multi-axis robotic platform for studying neuromechanics of an ankle joint (Patent)
- [5] Nalam V., Lee H., 2019, IEEE/ASME Transactions on Mechatronics, 24, 459

LEADERSHIP ROLES

Co-founder, Sol Robotics *October 2019 - May 2020*

- Co-Founder and technical lead for an early stage robotic venture incubated at Intel
- Part of a 4 member team which was selected into the final 8 out of 600 potential ventures

GPSA Assembly Member and Engineering Committee Chair *April 2018 - February 2020*

- Elected to represent IRA Fulton Schools of Engineering as an assembly member in the graduate student government at ASU.
- Founded Engineering committee to better serve graduate engineering students and advocate for mental wellness initiatives for PhD students.

Research Engineer at SINAPSE, National University of Singapore *October 2014- July 2015*

- The lead controls engineer for multiple robotic surgical devices in a team comprising of surgeons, engineers and designers.
- Developed a novel control mechanism that can be intuitively learned by surgeons with minimal training while mentoring 4 undergraduate interns.

CFI Administration and Student Relations Core *2011 - 2014*

- CFI is a student run initiative which nurtures technical creativity and provides the necessary guidance and resources for the students of IIT Madras to pursue their endeavors in engineering.
- Coordinated a 3 phase strategy which increased the number of successful student driven innovative projects from 5 to 12 in 2014.

Team leader for ROBOCON 2011 IIT Madras Team *2010 - 2011*

- Led a team of 22 members in a national level robotic competition held by Asia-Pacific Broadcasting Union and placed 5th out of a group of 56 teams.

EXTRACURRICULAR ACTIVITIES

- Awarded the best student paper at Ubiquitous Robotics Conference, Hawaii. (2018)
- Volunteered at ASU Rehabilitation Robotics Workshop and ASU Southwest Robotics Symposium, which is a platform for showcasing robotics research at ASU. (2016-2018)
- Volunteered at the Carnival for MS, organized in Tempe for spreading awareness about Multiple Sclerosis. (2017)