

# Kattoju Ravi Kiran

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## EDUCATION

<b>PhD Modeling and Simulation</b> , <i>University of Central Florida, USA</i>	2016-Present
<b>Masters Modeling and Simulation</b> , <i>University of Central Florida, USA</i>	2016
<b>Masters Mechatronics</b> , <i>Loughborough University, UK</i>	2011
<b>Bachelors Electronics and Communications Engineering</b> , <i>Anna University, India</i>	2009
<i>University Fellowship, University of Central Florida</i>	2014-2019
<i>Academic Scholarship, Loughborough University</i>	2009-2011

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## TECHNICAL EXPERIENCE

<b>GRADUATE RESEARCHER</b>	<b>2014 - Present</b>
<i>Interactive Systems and User Experience Lab</i>	<i>University of Central Florida, USA</i>

- Automatic posture correction utilizing electrical muscle stimulation.
- Design, development, and testing 3D printed flexible wearables with embedded sensors.
- Design, development, and testing wearable intervention prototype technology.
- Soldier-Robot teaming for surveillance and reconnaissance.
- Fluid flow modeling for turbine vane design.

<b>HARDWARE ENGINEER</b>	<b>2013 - 2014</b>
<i>Philips Healthcare</i>	<i>India</i>

- Hardware design, prototyping, testing and evaluation of ultrasound probes.
- New product design modeling, conducting comparative performance analysis with existing systems.
- Developed and implemented RFID technology for uniquely identifying different varieties of probes and their compatibility with different ultrasound systems.

<b>MECHATRONICS ENGINEER</b>	<b>2012 - 2013</b>
<i>GE Healthcare</i>	<i>Austria</i>

- Development of real time piezo-acoustic models and simulations for ultrasound wave propagation.
- Design, development, rapid prototyping, testing and evaluation of new ultrasound probes with mechanical and electronic components.
- Development of water ingress and piezo-electric crystal deformation simulations.

<b>TRAINEE</b>	<b>2008 - 2009</b>
<i>Indian Space Research Organization</i>	<i>India</i>

- Telemetry, tracking, and observation of satellite locations.
- Developed an autonomous drilling robot for land slide monitoring and space navigation as part of Bachelors thesis project.

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## SKILLS

<b>Tools and Languages</b>	C, C#, Python, MATLAB / Simulink, SPSS
<b>Mechanical Design</b>	Solidworks, AutoCAD
<b>Electronics Design</b>	Autodesk Eagle/Fusion, Altium PCB design
<b>Simulation</b>	COMSOL, Unity
<b>Other</b>	Microsoft Office Suite, Adobe Photoshop

## PROJECTS

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### **Wearable Intervention Technology and Electrical Muscle Stimulation (EMS)**

#### *PhD Dissertation*

- **Automatic Posture Correction:** Designed and developed a novel automatic physiological feedback loop-based wearable intervention technology to detect and correct poor workplace postures such as wrist extension, neck cradling, slouching, balance asymmetry, and improper lifting techniques utilizing sensors and EMS.
- **Shared Kinesthetic Experiences:** Designed and developed a novel mimicking interaction technique to transfer muscle activity information between two individuals through the use of electromyography and EMS.
- **Voice Actuated Muscle:** Designed and developed a novel interaction technique enabling a voice command-based muscle activation to translate voice commands from one individual to induce involuntary physiological responses in another individual using EMS.
- Integrated mechanical, electronic, control and software components to develop wearable intervention technologies from concept to prototype.
- **Wearable Intervention Technology:** Designed and developed electronics hardware, embedded sensor-based 3D printed flexible wearables, and software applications.
- Conducted user studies with (100+ participants) and statistical evaluation of system/user performance, efficiency, user perception, feasibility, and usability of our interaction techniques and wearable intervention technology.

### **Soldier-Robot Teaming**

- Evaluated human performance in gesture and speech interface technologies to facilitate soldier-robot communication during spatial navigation tasks with an autonomous robot.
- Conducted user studies on human-robot interaction in an intelligence, surveillance, and reconnaissance task through speech commands and gestures.
- Conducted statistical analysis of system/user performance, user perception, and effectiveness of speech and gesture interfaces.

### **Power Harvesting for Low Power Sensors**

#### *Masters Thesis*

- Design, development, testing and validation of a new vibrational energy harnessing prototype for power generation.
- Developed electro-magnetic induction-based energy harvester to generate energy from ambient vibrations during physical activities in humans and in heavy industrial machinery.
- Demonstrated energy generation and harvesting to drive low power sensors.

### **Design of Hybrid Commuter Motorcycle**

- Developed innovative design of fuel efficient hybrid motorcycle that alternates between two energy sources (gas and electricity).
- Proposed employment of regenerative braking coupled to epicyclic gear train to power an electric motor.

### **Autonomous Drilling Robot for Landslide Monitoring and Space Navigation**

#### *Bachelors Thesis*

- Design and development of working prototype of drilling robot for land slide monitoring, navigation and drilling purposes.
- Devised the use of multiple sensors for detecting presence of water, gas, heat, and fire while establishing constant communication to the operator using ANT wireless network based sensors.

## AREAS OF INTEREST

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|------------------------------|------------------------------------|-------------------------------|
| • Human-computer interaction | • Wearable intervention technology | • Augmented cognition systems |
| • Man-machine interfaces     | • Sensors                          | • Bionics                     |