

# Kattoju Ravi Kiran

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## EDUCATION

<b>PhD Modeling and Simulation</b> , <i>University of Central Florida, USA</i>	2015-Present
<b>Masters Modeling and Simulation</b> , <i>University of Central Florida, USA</i>	2015
<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>

- Collaborated with interdisciplinary teams to design, develop, and prototype novel interaction technologies.
- Designed and developed multimodal input/output interface prototypes for VR/AR/XR interactive systems.
- Designed, developed, and evaluated performance of flexible 3D printed wearables with embedded sensors.
- Designed, developed, and tested wearable intervention prototype technology for automatic posture correction utilizing electrical muscle stimulation.
- Designed sensor hardware and machine learning algorithms for poor posture detection.
- Demonstrated capabilities to design, develop, and integrate hardware/software solutions from concept design to prototype, validation, and testing.
- Designed and conducted user studies to measure and evaluate system/user performance with wearable intervention technology. Prepared and presented first-authored publications as part of research activities.

<b>HARDWARE R&amp;D ENGINEER</b>	<b>2013 - 2014</b>
<i>Philips Healthcare</i>	<i>India</i>

- Collaborated with cross functional teams for hardware design, prototyping, testing of ultrasound probes.
- New product design modeling, conducting comparative performance analysis with existing systems.
- Designed, developed and integrated wireless RFID input interfaces for uniquely identifying different varieties of probes and their compatibility with different ultrasound systems.

<b>MECHATRONICS R&amp;D ENGINEER</b>	<b>2012 - 2013</b>
<i>GE Healthcare</i>	<i>Austria</i>

- Developed real-time piezo-acoustic models and simulations for ultrasound wave propagation.
- Designed and developed rapid prototypes, testing and evaluation of new ultrasound probes with mechanical and electronic sensor 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.

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## SKILLS

<b>Tools and Languages</b>	C, C#, Python, MATLAB / Simulink, SPSS
<b>Mechanical Design</b>	Solidworks, AutoCAD, Autodesk Fusion 360
<b>Electronics Design</b>	Autodesk Eagle, Altium PCB design
<b>Simulation</b>	COMSOL, Unity
<b>Other</b>	Microsoft Office Suite, Adobe Photoshop

## PROJECTS

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### **Wearable Intervention Technology: Input/Output Interfaces (*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 Electrical Muscle Stimulation (EMS).
- **Shared Kinesthetic Experiences:** Designed and developed a novel mimicking input/output interface technique to transfer muscle activity information between two individuals through the use of electromyography (EMG) and EMS in physical/virtual/augmented/mixed reality systems.
- **Voice Actuated Muscle:** Designed and developed a novel input/output interface 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, PCB design and fabrication, embedded sensor-based 3D printed flexible wearables, and software applications to enable input/output interaction in VR/AR/XR systems.
- Conducted user studies with (100+ participants) and statistical evaluation of system/user performance, efficiency, user perception, feasibility, and usability of our input/output interfacing techniques and wearable intervention technology.

### **Soldier-Robot Teaming**

- Designed and developed gesture and speech input 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 an 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 an 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 input sensors for detecting presence of water, gas, heat, and fire while establishing constant communication to the operator using ANT wireless networks.

## AREAS OF INTEREST

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|------------------------------|------------------------------------|-------------------------------|
| • Human-computer interaction | • Input/Output interfaces          | • VR/AR/XR Applications       |
| • Sensors and Bionics        | • Wearable intervention technology | • Augmented cognition systems |