

# Antony Albert Raj Irudayaraj

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## Education

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- PhD, Computer Science (Human Computer Interaction) - 3.93/4** *Sep 2018 – Present*  
University of Waterloo ONTARIO, CANADA  
*Advisors: Daniel Vogel and Omid Abari*
- Master of Engineering (Computer Engineering) - 3.92/4** *Sep 2015 – Sep 2016*  
University of Toronto ONTARIO, CANADA  
*Project Supervisor: Steve Mann*
- Bachelor of Technology (Electrical and Electronics Engineering) - 8.99/10** *Aug 2011 – May 2015*  
Vellore Institute of Technology, Chennai TAMIL NADU, INDIA  
*Project Supervisor: Febin Daya*

## Work Experience

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- Graduate Research Assistant** *Sept 2018 – Present*  
University of Waterloo, HCI Lab
- Research on investigation mobile phone interactions through the fabric
  - Building ad-hoc reconfigurable displays
  - Hardware design for touch sensing on the edge of a mobile phone
- Project Associate** *Jan 2018 – Mar 2018*  
Indian Institute of Technology, CREATE Lab
- Software development for IGest, a wearable gestural interaction devices for people with cerebral palsy.
- Research Assistant** *Jan 2016 – Sept 2018*  
University of Toronto, DGP Lab
- Investigation on novel haptic actuation devices
  - Initial Exploration into fabric displays
  - Haptic Learning of free hand semaphoric gestures
- Research Assistant** *Jan 2016 – Sept 2018*  
University of Toronto, Intelligent Sensory Microsystems Lab
- Design of inductive power flow for wireless transfer of power from a transmit wireless coil to a receiving coil to be placed on rodent head for in lab testing.
- Electronics Build Engineer** *Oct 2015 – Feb 2016*  
University of Toronto , Chemistry IT Department
- Troubleshooting of Electrical instruments,Circuit Debugging, Circuit Designing and Soldering

## Publications

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- Antony Albert Raj Irudayaraj, Rishav Agarwal, Nikhita Joshi, Aakar Gupta, Omid Abari, Daniel Vogel **PocketView: Through-Fabric Information Displays** In Proceedings of the 34th Annual ACM Symposium on User Interface Software and Technology (UIST 2020), DOI: <https://doi.org/10.1145/3472749.3474766>
- Yen-Ting Yeh, Quentin Roy, Antony Albert Raj Irudayaraj, Daniel Vogel **Expanding Side Touch Input on Mobile Phones: Finger Reachability and Two-Dimensional Taps and Flicks using the Index and Thumb** Proceedings of the ACM on Human-Computer Interaction 4 (ISS), 1-20 DOI: <https://doi.org/10.1145/3427334>
- Aakar Gupta, Antony Irudayaraj, Ravin Balakrishnan. **HapticClench: Investigating Squeeze Sensations using Memory Alloys** In Proceedings of the 29th Annual Symposium on User Interface Software and Technology (UIST '16). ACM, New York, NY, USA, 219-226. DOI: <https://doi.org/10.1145/2984511.2984558>

- Aakar Gupta, Antony Irudayaraj, Vimal Chandran, Goutham Palaniappan, Khai Truong, and Ravin Balakrishnan, **Haptic learning of Freehand Semaphoric Gesture Shortcuts** In Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology (UIST '17). ACM, New York, NY, USA, 109-117. DOI: <https://doi.org/10.1145/3126594.3126598>

## Projects

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### **Ebike with a smart Helmet**

*Jan 2015 – May 2015*

A normal bicycle was converted into a smart electric bike by integrating a wide range of sensors and actuators to perform intelligent tasks. The cycle included sensors to monitor speed, circuitry to drive and control an electric motor, theft monitoring system using GSM and GPS, and password-based entry for authenticating the driver. A smart helmet synced with the bike enables wider interactions. The helmet can control the indicator lights by tilting the head and speech input can be used to control the bikes' acceleration.

### **Augmented Reality Vibro-Acoustic Helmet for the visually impaired**

*Oct 2015 – Aug 2016*

A helmet was designed to help visually impaired users to navigate through obstacles in indoor and outdoor scenarios. A depth-sensing camera interfaced with a Raspberry pi maps the location of the obstacle to appropriate vibroacoustic feedback, that can be interpreted by the user. Also, a Haar-Cascade classifier was trained to help the users locate trivial objects like water bottles and currency notes. Project Supervisor: Steve Mann

### **Implementation of High Dynamic Range (HDR) Imaging on a GPU**

*Feb 2016 – Apr 2016*

Implemented a High Dynamic Range(HDR) Composition on a GPU GTX980 by combining 10 differently exposed images to capture the dynamic range of the scene. The GPU implementation of the HDR achieved a speedup of 7708x compared to a CPU implementation of it.

### **Cuttistant**

*June 2015 – Sept 2015*

Cuttistant is a smart cutting board, derived from Cutting and Assistant. It has various features which solves problems that people face while preparing their dishes. It has a weighing machine, timer, instruction for making dishes, container to collect the waste and control the music on your phone from the cutting board.

### **Smart Jacket**

*June 2015 – Sept 2015*

This project was built from inspirations from the Sixth sense by MIT media labs. The system has a projector, camera, gesture sensor and touch sensor. The touch sensor is used to navigate between various option in the system. This system will allows to take pictures by a simple gesture, then view pictures using a projector projected onto the wall, get weather updates and play music.

## Teaching

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- Teaching Assistant for CS 349 - User Interface Design *Sept 2018 – Dec 2018*
- Teaching Assistant for CS 105 - Introduction to Programming *Sept 2019 – Dec 2019*

## Awards and Achievements

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- David.R.Cheriton Graduate Scholarship(\$ 20,000) *Sept 2018–Sept 2020*
- Achiever of the University,VIT University *Sept 2014–Sept 2015*
- International Doctoral Student Award

## Talks

- 'Interaction Design for Low-Resolution Displays' in VIT Chennai (Virtual).
- 'Introduction to Electronics Devices and Advancement in Electronic projects' in Laqshya Institute of Technology and Sciences, Khammam.
- 'Basics of Analog and Digital Circuits' as part of my Electronics hobby club activities.

## Selected Press Coverage

- **UWaterloo News** "Smart displays that show information through fabric may be the next wave of wearable tech"
- PocketView news featured in many tech news website: ACM Technews, TechXplore, Newsatlas

## Technical Skills

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**Programming Languages:** C, Python , CUDA , C sharp

**Software Packages:** Multisim, MATLAB, Proteus , LabView , Pspice , Tanner EDA , Quartus , OpenCV libraries, AutoDesk Fusion 360, Kicad, Altium

**Computing Platforms:** Arduino, Raspberry Pi, NVIDIA GTX980