

## RESEARCH INTERESTS

---

I'm interested in creating new ways for people to interact with the world using my background in *design, sensing and machine learning*.

## EDUCATION

---

- Indian Institute of Technology Madras (IIT Madras)** Chennai, India  
*B.Tech in Engineering Design and M.Tech in Data Science* 2017–Present  
**CGPA: 9.57/10.0 - Department Rank 2**
- Technical University of Denmark (DTU)** Lyngby, Denmark  
*Exchange student in Computer Science and Applied Mathematics* Fall 2019

## EXPERIENCE

---

- Future Interfaces Group, Carnegie Mellon University** Pittsburgh, USA  
Research Assistant | Mentors: *Karan Ahuja, Dr. Chris Harrison* Sept 2021 - Present
- I'm currently exploring full body digitization in extended reality environments. In particular, I'm focusing on minimal on-body user instrumentation for full body pose estimation.
- Smash Lab, Carnegie Mellon University** Pittsburgh, USA  
Summer CMU HCII REU Intern | Mentors: *Karan Ahuja, Dr. Chris Harrison, Dr. Mayank Goel* Summer 2021
- Led the development of a *novel, privacy-sensitive activity recognition system* that works in real time and achieves an average accuracy of 92% on 26 activities.
  - Designed and conducted a user study to collect a novel, multimodal daily activity recognition dataset.
  - Built and tested various Deep Learning based classifiers.
  - Plan to submit a paper to *UIST '22* as a first author.
- Human Computer Interaction Lab, Saarland University** Remote, Saarbrücken, Germany  
Research Intern | Mentors: *Adwait Sharma, Dr. Jürgen Steimle* May 2020 - August 2021
- Explored *novel microgestural interaction techniques*.
  - Proposed a rapid method to generate minimal IMU layouts for microgesture recognition
  - Paper under review at *TOCHI '22*
- Honeywell Technology Solutions** Bangalore, India  
Robotics and Computer Vision R&D Co-Op Dec 2020 - May 2021
- Most work is classified under an NDA, but on a high level, I worked on designing computer vision systems that could help aircrafts become more autonomous, during multiple stages of flight.
  - Used tools ranging across Robotics (ROS, embedded system design, PTP Time synchronization) and Computer Vision
  - This internship counted towards my degree and I was awarded the highest grade, along with a return full time offer.

## I<sup>3</sup>D Lab, Indian Institute of Science

Research Intern | Mentors: *Vinay K Sharma, Dr. Pradipta Biswas*

Bangalore, India

Summer 2019

- Explored gaze as to create new interaction techniques. I led the development of a gaze controlled robotic system for use by children with severe speech and motor impairment.
- I designed and built the complete robotic system, and wrote control algorithms to enable gaze control of the robots. I also designed and conducted a user study to test the feasibility of the system.
- This work led to a paper that we presented at *ETRA '21*

## IIT Madras Robotics Lab

Research Intern

Chennai, India

Winter 2018

- I was an embedded systems engineer as a part of the Cargo Ground Buildup System (CGBS) project, mentored by Anupam Chandra and Dr. Asokan Thondiyath.

## Nimaya Robotics

Summer Intern

Chennai, India

Summer 2018

- I was the first intern at Nimaya, where I worked on developing the first prototypes of their *Robotics Training System*.
- Specifically, I worked on the development of 3 robotic systems aimed at helping children with autism spectrum disorder attain psychomotor, cognitive and life skills. Nimaya was a spinoff of a social roboticist's PhD work.

## PUBLICATIONS

---

- [1] **V. Mollyn**, K. Ahuja, D. Verma, C. Harrison, and M. Goel, in *In Submission to ACM UIST'22*.
- [2] A. Sharma, C. Salchow-Hömmen, **V. Mollyn**, A. Nittala, M. Hedderich, M. Koelle, T. Seel, and J. Steimle, in *In Submission to ACM TOCHI*.
- [3] V. Krishna Sharma, K. Saluja, **V. Mollyn**, and P. Biswas, "Eye gaze controlled robotic arm for persons with severe speech and motor impairment", in *ACM Symposium on Eye Tracking Research and Applications*, 2020, pp. 1–9.
- [4] V. K. Sharma, L. Murthy, K. Singh Saluja, **V. Mollyn**, G. Sharma, and P. Biswas, "Webcam controlled robotic arm for persons with ssmi", *Technology and Disability*, vol. 32, no. 3, pp. 179–197, 2020.

## TEACHING AND MENTORING

---

**Teaching Assistant** at IIT Madras

*Analog and Digital Electronics (ED 2130)*

Fall 2021

**Section Leader** - Code in Place (Stanford University)

*Programming Methodologies (CS106A)*

Summer 2021

**Tutor** - Chegg Tutors

*Tutored undergraduate math, physics, electrical engineering, mechanical engineering and computer science. Average rating of 5/5 with over 50 students.*

Dec 2018 - Jan 2020

**Student Mentor** - Avanti Fellows

*IIT-JEE mentoring for students from underprivileged backgrounds.*

August 2017 - Sept 2018

## SCHOLARSHIPS AND AWARDS

---

|   |      |
|---|------|
| Half Time Teaching Assistant (HTTA) award (INR 12,500 per month)  | 2021 |
| NSF REU Stipend of \$8000 to participate in the CMU HCII Summer Research Program                          | 2021 |
| ACM CHI 2021 Student Volunteer Award  | 2021 |
| Highest CGPA in 4 <sup>th</sup> year (10.0/10.0) - IIT Madras 2020.                                       | 2021 |
| Participated in a tuition-funded semester exchange at DTU, Denmark  | 2019 |
| Karnataka State Rank 9 (12 <sup>th</sup> grade)- 100/100 in Math, Physics, Chemistry and Computer Science | 2017 |
| KVPY Fellow (IISc Bangalore)  | 2017 |
| NTSE State Scholar (Karnataka, India)   | 2015 |

## PROJECTS

---

See full list of projects (and demos!) on [vimal-mollyn.com/projects](http://vimal-mollyn.com/projects)

- **DIY Stirling Engine**  
*Created a working prototype of a stirling engine from a couple of soda cans - final project for the course Design of thermal and fluid systems.*
- **Hostel IoT System**  
*Created a Siri Enabled IoT system to control and monitor various things in my dorm room.*
- **3D Music Visualizer**  
*One of the course projects for the course Form and Aesthetics in Design. Built using Processing.*
- **Gaze controlled RC Car**  
*Fun side project at the I3D lab.*

## COURSES TAKEN

---

- **Machine Learning and Signal Processing**
  - Intro to Machine Learning and Data Mining
  - Image Signal Processing
  - Digital Signal Processing
  - Mathematical Foundations of Data Science
  - Medical Image Analysis
  - IoT Prototyping
  - Signals and Systems
  - Fundamentals of Deep Learning (Spring 2022)
- **HCI and Cognitive Science**
  - Human Factors in Design
  - Intro to Cognitive Science
  - Experimental Design in Cognitive Science
  - Intro to Statistics

- **Robotics**

- Mechatronics System Design
- Control Systems
- Design of Mechanical Systems
- Intro to Robotics (Spring 2022)

## EXTRACURRICULAR ACTIVITIES

---

- Robotics Club, CFI - IITM 2017–Current  
*Member of the Robotics at the Center for Innovation (CFI), IIT Madras. Taught various sessions on intro to robotics and electronics. Mentored over 10 students across a year long project.*
- Hostel and Department Basketball team 2018–Current  
*Part of the Narmada Hostel and the Department of Engineering Design Basketball teams*