

# Tanmaey Gupta

Ph.D. Student  
Cornell University

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🎓 Google scholar

## EDUCATION

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### Cornell University

2024 - Present

*Ph.D. in Electrical and Computer Engineering*  
Advisor: Prof. Chris De Sa, Prof. Udit Gupta

### Indian Institute of Technology Gandhinagar

2017 - 2021

*B.Tech. in Electrical Engineering with Minor in Computer Science and Engineering*  
GPA: 8.84/10

## RESEARCH EXPERIENCE

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### Microsoft Research India

2023-2024

*Research Fellow*

Advisor: Dr. Ramachandran Ramjee

- **Distributed DNN training failure recovery:** Designed and implemented an efficient fault recovery mechanism for large-scale DNN training tasks which reduces wasted GPU hours by up to 30x. This work was **accepted at EuroSys'24**.

### Microsoft Research India

2021-2023

*SCAI Research Fellow*

Advisor: Dr. Akshay Nambi

- **Generating reliable IoT sensor data:** Developed **Verified Telemetry**, a scalable IoT sensor fault detection system based on hardware-fingerprinting. This work was **accepted at IoTDI'23** and is being used in **real-world IoT deployments across 1000s of devices**.
- **Modelling pressure signals for water disaggregation:** Developed a method to generate fine-grained water-usage insights on a large scale using pressure wave classification and combinatorial optimization. This work was **accepted at BALANCES, BuildSys'23 and CCAI, NeurIPS'23**.

### IRACS Lab, IIT Gandhinagar

2020 - 2021

*Research Assistant*

Advisor: Prof. Uttama Lahiri

- **Real-time Exercise and Rehabilitation Guidance Platform:** Researched on developing an interactive, real-time exercise guidance and rehabilitation platform based on pose estimation.

## PUBLICATIONS

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1. **Just-In-Time Checkpointing: Low Cost Error Recovery from Deep Learning Training Failures**  
**Tanmaey Gupta**, Sanjeev Krishnan, Rituraj Kumar, Abhishek Vijeev, Bhargav Gulavani, Nipun Kwatra, Ramachandran Ramjee, Muthian Sivathanu  
*accepted at 19th ACM SIGOPS EuroSys, 2024.*
2. **PressureML: Modelling Pressure Waves to Generate Large-Scale Water-Usage Insights in Buildings**  
**Tanmaey Gupta**, Anupam Sobti, Akshay Nambi  
*accepted at 3rd ACM BALANCES Workshop, BuildSys, 2023.*  
*also accepted at Tackling Climate Change with Machine Learning Workshop, NeurIPS, 2023 (poster).*
3. **Verified Telemetry: A General, Easy to use, Scalable and Robust Fault Detection SDK for IoT Sensors**  
**Tanmaey Gupta**, Shubhankar Handa, Akshay Nambi  
*accepted at 8th ACM/IEEE Conference on Internet of Things Design and Implementation (IoTDI), 2023.*

## SOFTWARE

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1. **Just-in-time Checkpointing : Low-cost DNN training fault recovery\***  
**Tanmaey Gupta**, Sanjeev Krishnan, Nipun Kwatra, Ramachandran Ramjee.  
*Microsoft Research India, 2023 - present.*  
\*official Microsoft code-release under progress.
2. **Verified Telemetry : Fault Detection for IoT Sensors**  
Sumukh Marathe, Nishant Shrivastava, Ryan Winter, Akshay Nambi, **Tanmaey Gupta**, Shubhankar Handa.  
*Microsoft Research India, 2021 - 2022.*

## TALKS

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### 1. Just-in-time Checkpointing : Low-cost DNN training fault recovery

- Conference talk at 19th ACM SIGOPS EuroSys, Athens, Greece April 2024

### 2. Verified Telemetry: A General, Easy to use, Scalable and Robust Fault Detection SDK for IoT Sensors

- Conference talk at ACM/IEEE IoTDI'2023 May 2023

### 3. Robust, Scalable Fault Detection for IoT Sensors (Demo Talk)

- MSR India TAB 2022 January 2022

## WORK EXPERIENCE

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### ITC India

April - June 2020

Technology track KITES Intern

- **Energy Efficient Industry:** Researched on existing inefficiencies in energy consumption of 3 flour plants across India and designed sensor aided automation system which could improve energy efficiency by 3%.

### Detect Technologies, IIT Madras Research Park

May - July 2019

Firmware Developer

- **Drone Telemetry:** Developed firmware on STM32 MCU to enable real-time data stream and feedback of custom sensor mounted on drone to the controlling base station using a proprietary RF communication protocol.

### Invent@IITGn (Invention Factory, USA), IIT Gandhinagar

May - July 2018

Inventor

- **Invent for Road Safety:** Developed a novel collision shock absorption system and under-run prevention assembly for high rise vehicles. Built simulation models and prototype and was granted a provisional patent for the same.

## UNDERGRADUATE PROJECTS

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### 1. LSTM based 3D-motion Text and Gesture Recognition

Used LSTM models for text recognition using accelerometer data of an IMU sensor to enable air-writing.

### 2. Git from scratch in C++

Implemented Git version control system in C++ from scratch, using content addressable file system and SHA1 hashing.

### 3. Linux Shell in C

Implemented Linux Shell in C from scratch using system calls.

### 4. FPGA based Two Level Morse Code Encoder-Decoder

Developed a two tier encryption-decryption machine on Basys 3 FPGA board with I/O using Morse code and Base 64.

## SELECTED AWARDS AND HONORS

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- Awarded Irwin Jacobs Fellowship by Cornell University 2024
- Awarded travel grant by Microsoft Research to attend EuroSys 2024 2024
- Awarded travel grant by CCAI to attend NeurIPS 2023 2023
- Winner of Microsoft Global Hackathon, 2021(Future Of Edge Computing Track) 2021
- Selected for Inter- IIT Tech Meet (IIT Madras, IIT Bombay) 2017, 2018
- Enlisted in Dean's List for Academic Excellence at IIT 2017, 2018
- Among top 0.15% of 1.2 million candidates in IIT-JEE Examination 2017

## PROFESSIONAL RESPONSIBILITIES

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- *Mentor:* Peer-Assisted-Learning, IIT Gandhinagar 2021
- *Undergraduate Teaching Assistantship* - ES102 Computing course, CSE, IIT Gandhinagar 2020