Soumick Majumdar

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Education

International Institute of Information Technology, Bangalore **Aug. 2023 – Present**
MS by Research in VLSI and Embedded Systems *3.2/4.0 CGPA*

Sir M. Visvesvaraya Institute of Technology, Bangalore **Aug. 2019 – May 2023**
B.E. in Electrical and Electronics Engineering *3.4/4.0 CGPA*

Mentorship

Teaching Assistant **Aug 2024 – Dec 2024**
Embedded Systems Design *IIIT Bangalore*

- Prepared resources and taught topics like GPIO pins, Communication Protocols and ADCs. Guiding the flow for building projects on PSoC-4 and PSoC-5 using PSoC Creator software.

Teaching Assistant **Jan 2025 – May 2025**
Electronics System Packaging *IIIT Bangalore*

- Mentoring students on IC packaging, PCB design, EDA tools and soldering techniques. Guiding the flow for PCB Designing in Altium Designer and KiCAD.

Projects

Design and Analysis of a High-Performance Two-Stage Miller Operational Amplifier | *Cadence* **June 2024**

- Achieved 80 dB gain, 100 MHz GBW, and 76° phase margin, ensuring stability for high-frequency applications.
- Designed to handle capacitive loads up to 2 pF using pole-splitting and Miller compensation techniques.

Flexible ECG Patch with BLE for Cardiovascular Monitoring | *Altium Designer* **April 2024**

- Designed a flexible PCB-based ECG pad with dry electrodes for non-invasive cardiac signal monitoring.
- Integrated nRF52820 microcontroller and MAX30003 for low-power, real-time cardiac data transfer via BLE.

Reliability Assessment and Performance Metrics for 6T SRAM in Aging Environments | **December 2023**

- Simulated in 180nm technology to analyze aging effects on access times, power consumption, and latencies.
- Ensured robustness using dual-edge transition detection and stability-checker mechanisms in Cadence Virtuoso.

Publications

hbcLock: Encrypted RF Communication Utilizing Body-Coupled Keys for the Internet of Bodies January 2025

- Our work has been accepted for presentation at **VLSID 2025**, the 38th IEEE International VLSI Design & 24th International Embedded Systems conference. The work focuses on improving the security of RF communication from wearables to off-body hubs using body-coupled secret keys. In this work, the wearables transfer encrypted data over BLE and transmit the encryption key via the subject's body. The hub receives the key and decrypts the data only when the subject makes physical contact with the hub reducing the possibility of nearby hackers snooping the data transmitted.

Technical Skills

Languages: MATLAB, Python, C, Verilog.
Technologies/Softwares: Simulink, Cadence Virtuoso, Altium PCB Designer, Analog Circuit Design, PSoC Creator, LTSpice, LaTex.

Relevant Coursework

- Analog CMOS VLSI Design
- Digital CMOS VLSI Design
- System Design using FPGA
- Electronics System Packaging
- Active Filter Design
- Embedded Systems Design

Achievements

* Selected for the Inaugural **Electrical Engineering Summer School 2022** which was organized by the **Department of Electrical Engineering, IISc Bangalore** for the **top 100 Electrical Engineering students of India**.
* Cleared GATE exam thrice consecutively from 2022 to 2024, with the best rank of **1785 in GATE EE 2024.**
* Won **1st Prize for Best Undergraduate Project** of the Batch during the bachelor's degree.
* Qualified in (Written Test+ Interview) **Build India Scholarship Exam by L&T** in 2023 and secured **IIT Madras**.