

## Resume

### Interests

Acoustic MEMS, Bio-MEMS, Lab on Chip, Fabrication Strategies, Power Devices

### Education

- 2021–Present **University of Southern California (USC).**
- Ph.D in Electrical and Computer Engineering
  - M.S. in Electrical Engineering; **GPA: 3.85/4.00**
  - M.S. in Computer Engineering; **GPA: 4.00/4.00**
  - **Advisor:** Prof. Eun Sok Kim
- 2015-2019 **Heritage Institute of Technology (HITK).**
- B.Tech in Electronics and Communication Engineering; **GPA: 9.51/10.00**
  - **Specialization rank:** 3/220

### Research

- **Research Assistant, Micro Electro Mechanical Systems Lab, University of Southern California (2021 - Present)**
  - **Advisor:** Prof. Eun Sok Kim
  - **Wearable Stethoscope with MEMS Microphone:**
    - Fabricated Resonant Microphone Array (RMA) using 2  $\mu\text{m}$  device layer such that the resonant frequency peaks from 100 Hz to 700 Hz.
    - Classify wheezing patterns at the edge using low power algorithms on Cypress BLE chipset and inform user through mobile phone notification when abnormality is detected.
  - **Airborne Acoustic Propulsion:**
    - Designed orifice patterns using laser cutter on thin film polyester sheets which were attached to piezoelectric card speaker to test propulsion.
    - Fabricated orifice patterns on Polyester sheets using standard fabrication procedures to compare performance of the two methods.
    - Fabricated orifice patterns on Silicon substrates using standard fabrication to make much stiffer substrate for better propulsion force.
  - **Cell Sorting based on Acoustic Tweezers:**
    - Developed new and precise design of tweezers to trap cells smaller than 100  $\mu\text{m}$ .
    - Performed extensive literature survey on tweezers requirement in lab on chip applications for biological labs.
- **Undergrad Researcher, IEEE EDS Center of Excellence, Heritage Institute of Technology, India (2017 - 2020)**
  - **Advisor:** Prof. Atanu Kundu
  - **Study of Analog/RF and Power Performance of MOS-HEMT Devices (Undergrad thesis)**
    - Developed a calibrated simulation structure for double gate underlap MOS-HEMT structure that was used to perform various studies for optimizing structural parameters which led to multiple publications.

### Publications

- **Ultrasonic Air-Borne Propulsion Through Synthetic Jets**  
Hai Liu, Akash Roy, Matin Barekatin, Eun Sok Kim | *Solid-State Sensor and Actuator Workshop*, 2022 [PDF]
- **Analog/RF and Power Performance Analysis of an Underlap DG AlGaIn/GaN Based High-K Dielectric MOS-HEMT**  
Akash Roy, Rajrup Mitra, Arnab Mondal, Atanu Kundu | *Springer Silicon*, 2021 [PDF]
- **Influence of Symmetric Underlap on Analog, RF and Power Applications for DG AlGaIn/GaN MOS-HEMT**  
Rajrup Mitra, Akash Roy, Arnab Mondal, Atanu Kundu | *Springer Silicon*, 2021 [PDF]
- **Comparative Study of Variations in Gate Oxide Material of a Novel Underlap DG MOS-HEMT for Analog/RF and High Power Applications**  
Arnab Mondal, Akash Roy, Rajrup Mitra, Atanu Kundu | *Springer Silicon*, 2020 [PDF]
- **Impact of AlGaIn Doping Concentration on the Analog/RF Performance of a Double Gate Underlap n-AlGaIn/GaN MOSHEMT**  
Rajrup Mitra, Akash Roy, Atanu Kundu, Mousiki Kar | *International Symposium on Devices, Circuits and Systems (ISDCS)*, 2020 [PDF]

- **Effect of Doped AlGaN Width Variation on Analog Performance of Dual Gate Underlap MOS-HEMT**  
Anindita Mondal, Sneha Ghosh, *Akash Roy*, Mousiki Kar, Atanu Kundu *IEEE Calcutta Conference (CALCON), 2020* [PDF]
- **Influence of Channel Thickness on Analog and RF Performance Enhancement of an Underlap DG AlGaN/GaN based MOS-HEMT device**  
*Akash Roy*, Rajrup Mitra, Atanu Kundu | *Devices for Integrated Circuit (DevIC), 2019* [PDF]

## Experience

- Jun 2019 - **Tata Consultancy Services, India, Software Engineer.**
- Dec 2020
  - Developed APIs with AWS automation using Python as the backend and Amazon SDK extensively working on Amazon Web Services such as EC2, S3, Dynamodb, IAM, cloudformation, organization, servicequota, support.
  - Developed FrontEnd Webpage with integration to local, AWS and Azure servers for Disaster Recovery backfill project.
  - Developed Backend Microservices and linked them to State Machine for successful creation and setup of AWS Account for the client.
  - Developed both Frontend and Backend for SDDC Automation to automate server processes which need manual intervention.
- Jan 2019 - **Tata Consultancy Services, India, Software Intern, [Certificate].**
- Mar 2019
  - Developed API Gateway Generator using Angular and Flask to seamlessly link Microservices to create State Machine.
  - Created unit test cases for each component and end to end test cases for the whole User Interface.
- Jun 2018 - Jul 2018 **Electronic Sector Skill Council of India, VLSI Intern, [Certificate].**
  - Acceptance rate: 10%
  - VLSI Design Engineer (QP No. - ELE/Q1201) conforming to National Skill Qualifications Framework Level-5
  - Developed 4 bit processing unit for basic arithmetic functions on Spartan 6 FPGA Board using Xilinx IDE.
- Jun 2017 - Jul 2017 **Airports Authority of India, Electronics Trainee, [Certificate].**
  - Learnt the electronic systems in an Airport including Air Traffic, Baggage Scanning, Flight Status Display System etc.

## Skills

- **Languages:** Python, C, C++, Javascript, HTML, Angular, React
- **Cleanroom Equipments:** Photolithography, Sputtering, RIE, Asher, CVD, Parylene Coater, Wire Bonder, Profilometer
- **Tools:** COMSOL, Synopsys TCAD, Silvaco TCAD, AutoCAD, GIT
- **Platforms:** Cypress BLE, TI BLE, Raspberry, AWS, GCP, Jupyter

## Projects

- **Sunchargers**
  - IoT based Smart Street solution for SoS, Light Saving and Traffic Mapping using Solar Power.
  - Won Judges' Choice Award from Capgemini Global Hackathon among participants from 13 countries.
  - Became part of top 3000 startups in India honored by IIM Calcutta. [Certificate]
- **GO Playing AI agent (CSCI 561, USC) [Code]**
  - Obtained a class rank of 8 among 272 students in the course
- **CoronaBot**
  - Created a contextual Chatbot that works over WhatsApp to respond to basic Covid 19 statistics and helpline numbers
  - Got coverage from local media being the first in the state to launch such a chatbot service on the messaging application

## Teaching Experience

- Apr 2018 - Jul 2018 **Unacademy, India, Electronics Educator Intern, [Certificate].**
  - Created a total of over 150 video lessons on Undergraduate level Electronics Engineering content that had gained wide acceptance with over 200k views during the period.

## Professional Service

- **Journal Review:** Springer Silicon, Elsevier Microelectronics
- **Mentorship:** Mentored 3 senior USC students for introducing them to the concepts of research.
- **IEEE:** Graduate Chair (USC), Undergrad Chair (HITK)

## Accolades:

- **2021:** Awarded **Annenberg Fellowship** by **University of Southern California** .
- **2020:** **Appreciation Award** by **TCS, India** for contributions in AWS Account Creation project.
- **2019:** **Outstanding Volunteer Award** by **IEEE, Kolkata Section, R10** for continued efforts to the Kolkata section student growth and development.
- **2019:** **Bronze medallist** at **Heritage Institute of Technology** for ranking 3<sup>rd</sup> among students of Bachelors in Electronics and Communication Engineering.