Aaron John Sabu

Electrical & Computer Engineering | University of California, Los Angeles

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EDUCATION

University of California, Los Angeles, Westwood, CA, United States of America **2021-2023**
Master of Science in Electrical and Computer Engineering *Cumulative Grade Point Average: TBA*

Indian Institute of Technology Bombay, Mumbai, India **2017-2021**
Bachelor of Technology in Electrical Engineering *Cumulative Perf. Index: [redacted]/10.00*

- **Honors** (earned by crediting 4 extra graduate-level courses) in Electrical Engineering
- **Minor** (earned by crediting 5 additional courses) in Aerospace Engineering

RESEARCH AND TECHNICAL EXPERIENCE

Decentralized Spacecraft Assembly of Megastructures in an Elliptic Orbit **Summer '20 - p.**
Prof Dwaipayan Mukherjee *Dept. of Electrical Engg., IIT Bombay*

- Formulated a framework of algorithms for spacecraft formation control to construct a space telescope using sparse information exchanges along with the incorporation of attitude consensus among neighboring spacecraft
- Developed simulations of the chosen/developed algorithms depicting their convergence and other qualities such as collision avoidance and optimal trajectory planning, considering real-life position and attitude characteristics of spacecraft

Radio-based Localization of Drones in GPS-Denied Environments **Summer '19**
Prof Bharadwaj Amrutur *Robert Bosch Centre for Cyber-Physical Sys., Indian Inst. of Science*

- Improved the accuracy of the Time of Flight/Arrival (ToF/ToA) mechanism for the localization of drones in GPS-denied conditions to a few mm by optimizing the shape and size of the configuration of anchors in a three-dimensional space
- Designed an algorithm for the implementation of the Time Difference of Arrival (TDoA) localization scheme adopting ideas from the development of the ToA algorithm alongside similar research work on handshake localization algorithms
- Developed solutions for errors occurring due to issues such as clock drift in ultra-wide-band anchor modules and multipath propagation in the indoor environment for the TDoA mechanism, and further conglomerated these ideas as a preprint

Logic Gates, Neural Networks & beyond from Structurally Multistable Elements **Fall '18 - p.**
Prof Amuthan Ramabathiran *Dept. of Aerospace Engg., IIT Bombay*

- Developing a novel mechanical metamaterial based on bistable elements to emulate information propagation and transformation using mechanical equivalents of concepts such as logic gates or individual neurons of a binary neural network
- Developed logic gates (AND, NOT, etc.) and mechanical translators (inter-axis propagators, etc.) using modeling, multibody dynamics simulations and additive manufacturing and testing of prototypes based on mechanical manipulations
- Working on the generalization of the concept of the logic gate into a neural network where binary signals are transferred via bistable elements and computed on mechanical neurons by linear combination and activation of incoming data

Electrical Engineer **Spring '18 - Fall '19**
IITB Student Satellite Project (Advitiy) *Dept. of Aerospace Engg., IIT Bombay*

- Simulated and analyzed the voltage-current characteristics of a solar cell network and switching-mode power circuits
- Designed circuits for controlling the activation of heating elements used for the deployment of the satellite antenna
- Collaborated in the formalization of quality assurance policies for creating control models in packages such as Simulink

RESEARCH WORKS

1. **Aaron John-Sabu**, Dwaipayan Mukherjee, "*Scalable Techniques for Autonomous Construction of a Paraboloidal Space Telescope in an Elliptic Orbit*," 7th Indian Control Conference (submitted for publication)
2. Rakshit Ramesh, **Aaron John-Sabu**, Harshitha S., Siddharth Ramesh, Vishwas Navada, Mukunth Arunachalam, Bharadwaj Amrutur, "*Robust & Scalable Techniques for TWR & TDoA based localization using Ultra Wide Band Radios*," Preprint: arxiv:2008.04248

TEACHING EXPERIENCE

Teaching Assistant **Fall 2019**
Prof Subhananda Chakrabarti *Digital Electronics (EE221), IIT Bombay*

- Coordinated several groups of students in the weekly lab assignments and mentored teams for their respective projects
- Conducted tutorials on key concepts, and oversaw the lab examination and the viva voce assessment of the students

SCHOLASTIC ACHIEVEMENTS

- Received **Honorary mention** from the instructor (Prof S Gopalakrishnan) for exemplary performance in the Spring 2021 session of the course on 'High Performance Scientific Computing' (ME 766) at IIT Bombay
- **GRE (Sep 2020) Score** : **329/340** (Q: 170/170, V: 159/170, A: 4.5/6.0)
  TOEFL (Sep 2020) Score : **115/120** (R: 29/30, L: 29/30, S: 27/30, W: 30/30)
- Secured **All-India Rank 94 in the Joint Entrance Examination (JEE) Advanced 2017** (and in the top 0.04% in JEE Main 2017) among 1.6 million students with a perfect score of **122/122 in Mathematics**
- **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellow; Dept Science & Tech, GoI [AIR 63 ('17), 100 ('16)]
- Recipient of the **National Talent Search Examination scholarship**; Govt. of India (top 0.11%, 2015)
- **First Rank (487/500) in high school class, '17** (about 250 students), St. Thomas Central School (CBSE)
- Recipient of **Felicitation Letter** from national Minister of Education for outstanding perf. in Grade 10
- Received **Special Mention** for active representation of the hostel in intra- and inter-institute technical events
- Placed in the Winter '20 season at **Siemens Digital Industries Software** for PLM software development

SKILLS

Programming	Python	Matlab/Simulink	Robot Operating System
	C/C++ & Embedded C	Arduino IDE	Assembly
	OpenMP	MPI	CUDA
Design and Simulation	SolidWorks	MSC Adams	AutoCAD
	SPICE	VHDL	EAGLE
Others	Audacity	LaTeX	

RELEVANT COURSEWORK

Robotics, Controls Engineering, and the related (IIT-B)

- Adv. Topics in Mobile Robotics (S20)
- Optimal Control Systems (S21)
- Navigation & Guidance (F20)
- Network Theory (F18)
- Foundations in Intelligent & Learning Agents (F20)
- A First Course in Optimization (F20)
- Design of Mechatronic Systems (F19)
- Robotics (S19)

Other Relevant Courses (IIT-B)

- Sensors in Instrumentation (F20)
- Electronic Design Lab (S20)
- Flight Mechanics II (S21)
- Embedded Systems (S20)
- High Performance Scientific Computing (S21)
- Spaceflight Mechanics (S21)
- Control Systems Lab (S20)
- Microprocessors (F19)

CO-CURRICULAR ACTIVITIES

- Volunteer for Electronics & Robotics Club: student mentor for prototyping electrical circuits and robotic mechanisms
- Presenter on 'An Analysis of the Power System of an Aeroplane': Knowledge Incubation initiative (2018), MHRD, GoI
- Contributor, National Service Scheme (NSS): Developed educational videos for needy school students in Malayalam
- Quizzer, All Asia BournVita Quiz Contest (Derek O'Brien & Associates) at Kolkata, (broadcast on Colors TV)
- Panelist: Freshmen's Newsletter 2017-18 and Insight Flagship Print Ed. 21.2
- Non-academic interests: chess, music arrangement, guitar, drums, piano

RECOMMENDATIONS

Available on request