

# Sashank Krishna Sriram

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## Education

2019–2023 **B.E. Electronics & Instrumentation Engineering**, *BITS Pilani*, Pilani, India.  
First Division, CGPA: 8.32/10

2017–2019 **High School Diploma, Computer Science**, *Vidya Mandir*, Mylapore, Chennai, India.  
Percentage: 95.8%

## Research Positions

April 22 — **Research Assistant**, *Flexible electronics lab*, Under Prof. Navneet Gupta, BITS Pilani.

- May 23
- Defended my thesis titled "Flexible electronics for HMIs: ECG electrodes & flex sensors"
  - Helped fabricate and characterize flexible strain sensors and bioelectrodes
  - Implemented embedded system pipeline for recording flexion and biosignals
  - Modeled strain sensors using COMSOL; proposed experiment for further material modelling
  - 3D printing a robot hand and designed a glove-based controller using fabricated strain sensors

Summer 2021 **Summer Intern**, *Military College of Electronics and Mechanical Engineering, Telangana*, Modeling of MIMO-OFDM communication links for HD Video communications.

- Performed Monte-Carlo simulations of various MxN MIMO-OFDM links
- Employed LDPC channel coding and HEVC source coding using MATLAB and FFMPEG.

Mar 21 — **Electronics Engineer**, *CRISS Robotics*, Mars Rover Team, BITS Pilani.

- May 23
- Founding member of the team, Contributed significantly to the design of the first prototype
  - Lead the embedded subdivision in 21-22 & oversaw the team as a system engineer in 22-23
  - worked on the Rover's drive, arm and science modules & on IRDC, a theoretical design contest

## Technical Proficiencies

Programming C, Python, Arduino, Git, Shell Scripting

Simulation COMSOL, QuantumATK, LTSpice, Matlab, Ansys, Microwind, Simulink, Logisim

## Publications

[1] S. Baloda, S. K. Sriram, S. Singh, et al. "rGO-PDMS based Flexible Dry Electrodes for Electrophysiological Signal Monitoring". In: *IEEE Sensors Journal* (in review, 2023).

Sept 20 — **Articles published**, *BITS academic Periodical Society*, "Freelunch", BITS Pilani.

- May 23
- Synthesizing a Brain: Where Neuroscience meets Electronics, Nov 2020
  - Spintronics: The Efficient Electron Exploit, 4th July 2022
  - When the details get too fine: The Camera and The Eye, 24th July 2021
  - Photon Chronicles: LEDs and lasers, 9th February 2022
  - The Electron Labyrinth, March 13th 2021
  - Photon Chronicles: A brief history of light, 10th June 2021

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## Relevant Projects

- Feb 22 — **Design of rGO-PDMS electrodes for electrophysiological monitoring,**  
May 23 *Research Assistant, Flexible Electronics Lab, BITS Pilani.*
- Prepared PDMS substrates using sylgard-184 kit via peel-off and spin-coating methods
  - Assisted with the preparation of rGO-NMP suspension and its spray-coating on substrates
  - Performed extensive impedance analysis and circuit fitting to characterize electrode-skin interfaces
- Sep 22 — **PDSol FinFET-based LIF Neurons for SNNs,**  
Dec 22 *Reading project: Nanoelectronics & Nanophotonics course, Under Prof. VK Chaubey.*
- Studied Impact Ionization as a mechanism for spike generation via PDSol FinFETs
  - Critically analysed select papers to understand design tradeoffs at the device & circuit levels
- April 22 — **Simulation of MoS<sub>2</sub> GAAFET gas sensors using QuantumATK,**  
Dec 22 *Project Course, Under Prof. Navneet Gupta, BITS Pilani.*
- Assembled & optimized MoS<sub>2</sub> Nanotubes of different chiralities with and without adsorbed NH<sub>3</sub>
  - Performed PDoS and Bandstructure calculations, computed device density of states, transmission functions and hence ballistic currents over a range of bias voltages
  - Contributed key results to the study, that help quantify the influence of NH<sub>3</sub> molecules
- Feb 22 — **Simulation of a Flexible GNP/PDMS based pressure sensor,**  
Dec 22 *Research Assistant, Flexible Electronics Lab, BITS Pilani.*
- Conducted FEM-based calculations using COMSOL to compute resistance changes versus strain
  - Proposed an experiment to extract piezoresistive coupling coefficients from strain sensor samples
  - Presented results to renew COMSOL license provided by the I-STEM catalytic grant
- Sep 22 — **Design of a Glove-Controlled 3D-printed Robot Hand,**  
May 23 *Research Assistant, Flexible Electronics Lab, BITS Pilani.*
- 3D printed and post-processed inmoov open-source robotic hand using PLA with PVA support
  - Designed test scripts for calibration and control of the hand using sensor integrated gloves
  - Fabricated CNT/PDMS-based pressure sensors and peripheral circuitry on latex glove

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## Other projects

- Jan 22 — **Nanomaterials for high-speed ethanol sensing: Drones for source localization,**  
May 22 *Reading Project, Intro to Nanoscience, BITS Pilani, Under Prof. Krishna Etika.*  
Explored Metal-Oxide options, Examined low-power solutions like Triboelectric Nanogenerators and Optical gas sensors, Proposed a Silicon Microcavity based optical Sensor.
- Mar 22 — **Fuzzy Logic based Stabilization of an Inverted Pendulum System,**  
May 22 *Course Project, Industrial Instrumentation & Control, BITS Pilani.*
- Solved differential equations using backward difference method and generated video visualizations
  - Designed a rule base, tuned a PID controller and compared performances
- Aug 21 — **Layout-level Design of an 8-bit Parity Checker,**  
Oct 21 *Course Project, Analog & Digital VLSI Design, BITS Pilani.*
- Used the 180 nm node to implement a fast 16T XOR circuit layout using Microwind
  - Utilized the designed XORs to implement an 8-bit parity checker circuit
  - Specifications achieved:  $t_p = 232ps$  at no load,  $P = 262\mu W$ ,  $A = 2430.4\mu m^2$ .
- Oct 21 — **Transistor-level Design of a 1MHz Active Low-Pass Filter Circuit,**  
Dec 21 *Course Project, Analog & Digital VLSI Design, BITS Pilani.*  
Used the TSMC 180 nm node on LTSpice to implement a differential folded cascode operational amplifier, Designed feedback circuit to realize 1 MHz LPF.
- Jan 22 — **Carbon-based flexible and wearable supercapacitors,**  
May 22 *Reading Project, Flexible & Stretchable Electronics, BITS Pilani.*  
Contributed to a review on carbon-based flexible supercapacitors: rGO-based options, the use of Hydrogel and Aerogel structures to improve ionic mobility, and low-cost biomass-based alternatives.

- Jan 22 — **Electroosmotic flow-based micropumps for biomedical applications**,  
 May 22 *Reading Project, Medical Instrumentation*, BITS Pilani.  
 Consolidated commercially available EOPs, Commented on lab-on-chips & dosing pump applications.
- Nov 21 — **Design of 2 GHz microstrip patch antenna using Ansys HFSS**,  
 Dec 21 *Course Project, Antenna Theory & Design*, BITS Pilani.  
 Specifications achieved:  $S_{11} = -39.3dB$ ,  $Bandwidth = 23MHz$ ,  $Gain = 8.06dB$ .
- Feb 22 — **Wavelet-based baseline filtering of electrooculogram signals**,  
 May 22 *Course Project, Biomedical Signal Processing*, BITS Pilani.  
 Estimated the frequency bands of baseline wandering and designed appropriate wavelet filter
- Jun 21 — **Triboelectric charge buildup and discharge mechanisms in Mars rovers**,  
 Sep 21 *International Rover Design Challenge*, CRISS Robotics, BITS Pilani.  
 Reviewed literature & proposed to create discharge paths by ionizing the air using Am-241 needles
- 2018 — 2019 **Bulletstorm: a 2D space-shooter game**, *Computer Science Project, Vidya Mandir*.  
 Designed a space shooter game with 2D motion controls, spiralling enemies, multiple game mechanics, sound effects and attack animations using turboC3 and graphics.h.

## Seminars & Symposia

### Presented

- 14/12/22 **PDSol LIF Neurons for Spiking Neural Networks** , *Course Seminar, Nanoelectronics*.
- 02/05/23 **CMOS Cascode LNAs: Intermodulation Distortion Sinking & Modified Cascode Topologies** , *Course Seminar, RF Microelectronics*.
- 25/04/22 **Flexible electronics for soft robotics**, *Course Seminar, Flexible & Stretchable Electronics*.
- 01/12/21 **Vivaldi Antennas for mmWave imaging**, *Course Seminar, Antenna Theory & Design*.
- 26/04/21 **Sol & FinFET devices**, *Course Seminar, Modelling of field-effect Nanodevices*.

### Attended

- 10/04/21 **Advances in Wide Bandgap Semiconductor Materials, Devices and Applications**.  
 Helped design certificates for the attendees of the event.
- 12/02/22 **Lectures on Thin Films & Applications**, BITS Pilani.
- 30/01/21 **RF & Microwave Propagation**, BITS Pilani.
- 20/03/21 **5G and Beyond Communications: Key Technologies and Role of AI**, BITS Pilani.

## Relevant Coursework

### UC San Diego

Ongoing Biophysics, Principles of Nanoscience & Nanotech, Solid State Electronics 1

### BITS Pilani

Materials Modelling of Field-Effect Nanodevices, Nanoelectronics & Nanophotonics Tech, Intro to & Devices Nanoscience, Flexible & Stretchable Electronics, Fibre Optics & Optoelectronics

Instrumentation Transducers & Measurement Techniques, Intro to MEMS, Medical Instrumentation, Biomedical Signal Processing, Antenna Theory & Design, Industrial Instrumentation & Control

Circuit design Analog & Digital VLSI Design, Analog Electronics, Digital Design, RF Microelectronics

### Coursera

Smart Materials: Microscale and Macroscale Approaches, Energy Harvesting, Deep Learning

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## Project Grants

- 2022 **On-rover PID control using analog computer**, *Student Project Grant*, \$300.
- 2021 **Autonomous odour source localisation drone**, *Student Project Grant*, \$600.
- 2021 **On-rover NLOS communication system with 2km range**, *Student Project Grant*, \$600.

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## Teaching Experience

- Spring 2023 **Teaching Assistant**, *Flexible & Stretchable Electronics*, BITS Pilani.  
Assisted with the conduction of the course's lab component
  - Designed a bioelectrode-based lab activity, demonstrating its fabrication & taking measurements
  - Conducted two sessions on COMSOL Multiphysics, showcasing fundamental analysis problems
  - Taught one lecture on the application of Flexible Electronics in Human Machine Interfaces.
- Fall 2022 **Teaching Assistant**, *Digital Signal Processing*, BITS Pilani.  
Conducted lab component, Guiding 2 classes of 10 students through MATLAB and C assignments
  - Introduced students to fundamental concepts at the start of lab sessions via mini lectures
  - Clarified student doubts and provided personalized hints to facilitate students' learning
  - Designed and Introduced hardware labs based on the TMS320C5515 kit into the course
- Fall 2022 **Teaching Assistant**, *Electronic Devices*, BITS Pilani.  
Clarified student doubts, Prepared simulation demos for illustrating the concepts taught.
- Spring 2022 **Teaching Assistant**, *Microelectronic Circuits*, BITS Pilani.  
Conducted a session on current mirrors as a part of an LTSpice workshop, Assisted with problem sheet design, Clarified student doubts, Helped students implement circuits on LTSpice,

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## Honors and Awards

- 2017 IAYP Silver standard
- 2019 First place: Computer Science Project Display
- 2017 Participation certificate: Guinness World Record for the Largest Keyboard Ensemble

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## Extracurricular Activities

- 2007–2019 **Carnatic Keyboard class**, *Melifluous Melodies on Keyboard*, Chennai, Tamil Nadu.  
Attended classes for 12 years, Performed over 40 concerts, including on 8 prestigious stages, and once on television. Achieved Annamalai University's grade 8 standard with distinction.
- 2019 – 2023 **Ragamalika**, *Classical Music & Dance Club*, BITS Pilani.  
Lead the club for the year 2021-22 as the Secretary, Performed on 8 occasions, Conducted 6 major concerts, and helped the club transition back to normal after the Pandemic.
- 2020 – 2023 **Instrumentation Forum**, *Electronics and Instrumentation Association*, BITS Pilani.  
Lead the forum as the president for the year 2022-23, Conducted the Analog Design Challenge in BITS' tech fest. Designed problems to be solved using LTSpice and got inputs from professors, handled logistics, Evaluated Designs, Provided constructive feedback to participants.
- 2020 – 2023 **Freelunch**, *Academic Periodical Society*, BITS Pilani.  
Wrote a total of six articles on complex topics, and simplified them for more general readers to read. Started an article series titled "Photon chronicles".
- 2019 – 2023 **SpicMacay**, *Society for promotion of Indian Classical Music and Arts*, Pilani Chapter.  
Volunteered and helped organize 1-2 events per semester every semester
- 2020 – 2023 **CRISS Robotics**, *The Mars Rover Team*, BITS Pilani.
- 2021– 2023 **TRAC**, *The Radio Astronomy Club*, BITS Pilani.
- 2020–2021 **Toastmasters**, *The Public Speaking Club*, BITS Pilani.