

Tanuj Kumar

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Class of 2020 at BITS, Pilani with a B.E. (Hons.) in Electrical and Electronics and an M.Sc. (Hons.) in Chemistry. CGPA: 7.79/10 (3.52/4.0)

INTERNSHIPS/ THESES

[Nano Lab, Tufts University](#)

Aug 2019 - Ongoing | Boston, MA, USA | [Prof. Sameer Sonkusale](#)

Thesis on fabrication of flexible Thread-Based Transistors (TBT) with ionogels. Developed a high-throughput cleanroom-free fabrication method to increase TBT production by 100 times. Currently working on a journal paper.

[GeePs, CentraleSupélec](#)

May 2019 - Jul 2019 | Paris, Ile-de-France, France | [Prof. Caroline Lelandais-Perrault](#)

Designed an asynchronous Neuromorphic ADC for use in ECG monitoring; Developed a new mathematical model for its figure of merit. Discovered trend of decreasing maximum error of ADC with time.

[ISRO \(Indian Space Research Organization\) - U.R. Rao Satellite Center \(URSC\)](#)

May 2018 - Jul 2018 | Bengaluru, Karnataka, India

Designed a target prediction system to track moving objects in real-time. Developed the mathematical model using an Extended Kalman Filter. Also designed a software camera model to test the prediction system.

[IGCAR \(Indira Gandhi Center for Atomic Research\)](#)

May 2017 - Jul 2017 | Kalpakkam, Tamil Nadu, India

Developed an 8 channel (DMA + Interrupts) DAQ system as prototype for nuclear reactor monitors to check parameters such as pH, temperature, pressure and radiation levels using LabVIEW and an NI card.

ACADEMIC PROJECTS AT BITS PILANI

Electronic properties of materials in radiation environments

January 2019 - May 2019 | [Dr. Mrinmoyee Basu](#)

At IGCAR in 2017, I learned about radiation-hardened semiconductors, which I researched further in this project by studying models in Sentaurus TCAD. Simulated the effects of radiation typically found in the Large Hadron Collider on SiC and GaN MOSFETs.

[On-Board Computer of a satellite](#)

January 2016 - December 2018 | [Prof. \(Emeritus\) Chandra Shekhar](#), [Mr. Devesh Samaiya](#)

Team Anant is the nanosatellite team of BITS, Pilani. I designed and implemented a Linux based On-Board Computer system for Low Earth Orbit and the drivers and sensor interfaces using I2C and SPI protocols. The OBC is built on the Zynq-7000 SoC (Tested on a Zedboard). Satellite to launch in 2021.

I also built the team's [website](#).

Differential Power Attack Immune Circuits Against Hardware Hacking (Submitted to DST)

August 2018 - May 2019 | [Prof. Anu Gupta](#)

Designed a dynamically scaled, differential pull-down circuit with a current flattening circuit. The system consumed nearly constant power (~0.03% current variation), thereby shielding information from hardware hackers. I authored our group's project proposal that was submitted to the Department of Science & Technology (DST), Government of India.

PUBLICATIONS AND TALKS

[68th International Astronautical Congress](#)

Sep 2017 | *International Astronautical Federation*

Co-authored a publication on the On-Board Computer (OBC) Architecture of my [nanosatellite team](#). The OBC features an FPGA to compress hyperspectral images taken by the satellite and a processor running Linux for the flight plan.

[Open Source Cubesat Workshop](#)

Sep 2018 | *European Space Astronomy Center (ESAC/ESA), Madrid, Spain*

Talked about open-source software applications in my satellite team. Satellite systems such as the flight plan run on open source systems such as Petalinux which are invaluable to the research-first approach of Team Anant.

[TEDx](#)

Jan 2019 | *BITS, Pilani, India*

As a speaker at TEDx BITS Pilani, I shared my experiences of building a satellite as an undergraduate.

Journal Publication

Under preparation | Nanolab, Tufts University

Journal paper on high throughput fabrication of TBTs and circuit design

TEACHING EXPERIENCE

Teaching Assistant - EEE F244 Microelectronic Circuits

January 2019 - May 2019 | [Prof. Anu Gupta](#)

Taught microelectronic circuit theory and SPICE & Cadence simulation techniques.

Teaching Assistant - CS F111 Computer Programming

August 2018 - December 2018 | [Prof. Sundaresan Raman](#)

Taught Linux commands and C programming to freshman year students.

TECHNICAL PROFICIENCY

Lab Skills

Fume hood work, laser cutting, microscopy, Raman, SEM, Semiconductor analysis

CAD and IDE

Cadence tools, LTSpice, Vivado, MATLAB, LabVIEW, EagleCAD, AutoCAD, Inventor

Programming Languages

Verilog, C, C++, Assembly, Java, Python, Git