

I have always possessed an inherent aptitude for electronics and my passion in this area accelerated during my undergraduate period when I was introduced to the subject of Microelectronics. In this course, I learned about transistors, their working, and the ways in which they are used to build complex circuits, which paved the way for me to study Analog and Digital VLSI Design. Gradually, I began honing my skills in design and simulation of circuits using CAD tools such as Pspice, MATLAB, and Cadence-Virtuoso through research projects and internships. Working on projects related to design and simulation of complex circuits helped me acquire clarity in my concepts and build a strong skill set in analog design. I further gained knowledge in the integration of hardware and software components during my internship at TONBO Imaging, which helped put my career interests into perspective. This was when I realized that I wanted to continue learning and exploring the field rather than take up a full-time job, and in order to pursue my passion, I took up a research position at the Indian Institute of Science (IISc) where I have been working on the fabrication and characterization of diodes, transistors, and MSM detectors. This position has helped me gain an in-depth understanding of the physical concepts that govern the working of electronic devices and I have realized the actual effort that goes in the design and fabrication of a transistor. Having worked at IISc for over a year now, I feel the need to pursue my postgraduate education in the field of Analog and Mixed Signal VLSI Design so that I can acquire advanced knowledge of the recent developments in the field and attain expertise in working as an Analog IC Design Engineer.

Having grown up seeing the shift from the large and bulky telephones to small and portable mobile phones, I have nurtured a deep love and curiosity for electronics all through my childhood. I always used to look for opportunities where I opened up gadgets and studied the internal complex structures and mechanisms. Hence, after completing high school, I decided to pursue my undergraduate studies in Electronics and Instrumentation at BITS, Pilani, so that I could learn and explore the design and functions of electronics in further depth. During this period, I developed immense interest in the design and simulation of circuits and took every opportunity to understand the basic concepts and tools used such as Pspice and MATLAB. Other courses that perfectly aligned with my interests were Electronic Devices, Microelectronics, Analog Electronics, and VLSI Technology. These subjects helped intensify my passion for complex circuits and analog design, and helped me understand the physics behind their basic operation mechanism. My favourite practical courses were Analog and VLSI Design, and Microelectronics where I received hands-on experience in the design and characterization of circuits using Cadence-Virtuoso.

Eager to implement my theoretical knowledge of circuit design after I completed my course on Microelectronics, I worked on the design of a transconductor using FinFET technology. For this, I designed a low GM transconductor which was implemented and analyzed using Cadence-Virtuoso. I also optimized the design to get a high range of input voltage and a lower GM after comparing the FinFET and CMOS counterparts of the transconductor. Apart from acquiring insights into the basic working of a transistor, I also achieved expertise in tools such as Cadence-Virtuoso and technologies such as FinFET.

After acquiring knowledge and experience in designing a simple transconductor, I wanted to move on to more complex and challenging circuits, and so, using my previously designed transistor as a

base, I designed an intricate and complex GM-C filter. For this project, I used Cadence-Virtuoso to simulate the circuit and calculate cutoff frequencies and poles, and finally compared the CMOS and FinFET-based designs with respect to linear range, THD, and power consumption. Through this project, I developed a strong understanding of the different parameters that are involved in design and simulation of circuits, at the same time acquiring in-depth understanding of filter operation concepts that I had learned in my theoretical classes.

Interested in achieving a thorough understanding of all the concepts I had learned in my previous projects, I decided to undertake a theoretical research-oriented project where I compared the design of various sub adder systems using transistor logic. I carried out comprehensive research about logic designs that can be implemented for a single-bit full adder subsystem and compared the efficiencies of the designs on the basis of parameters such as power consumption, delay, and transistor count. Through my research study, I was able to conclude that the design of transmission gate logic was the most efficient design as compared to CMOS logic and pass transistor logic. This project gave me advanced knowledge of the functioning of digital circuits and helped me acquire clarity in the design of various analog and digital systems. After working on these projects, I realized the ocean of knowledge I was yet to acquire in this field which motivated me to pursue a postgraduate program.

During my undergraduate program, I had developed a deep interest in subjects such as Electronic Devices, Digital Design, and Microelectronics, and I was looking for a suitable platform where I could correlate my theoretical knowledge with real world scenarios. Eventually, I got the opportunity to do an internship at the 505 army base workshop where I studied the VDO unit of the T-72 tank that was controlled by a microcontroller. This unit housed the electronic circuitry for automatic changing of gears along with the GPS navigation system, and I got the chance to explore the internal mechanisms of this unit and perform appropriate debugging. The opportunity to work and ride with the defence personnel of my country was an exhilarating experience and I was able to understand various technicalities involved in the design and operation of their equipment.

In my final year, when I was contemplating the company where I wanted to work on my thesis project, I decided to go with the startup Tonbo Imaging, as I saw this as an opportunity to work on unique and innovative projects which would have direct implementation in the upcoming technology releases. Also, my aim is to establish my own company in the future, and this project would not only help me acquire technical expertise but also show me the intricate details involved in taking a company to success. Tonbo Imaging develops custom-made electronic products for the defence and commercial sectors ranging from surveillance systems and weapons to other smart devices. During my time here, I was involved in the design and debugging of hardware components and UI operating system for company devices. I specifically worked on the integration of 9-axes motion unit sensors for a built-in compass and calculated its yaw, pitch and roll. These results were also implemented in other devices of the company due to its ease of use and efficient operation. Through the integration of other pressure, humidity, and temperature sensors in several other devices, I not only acquired strong coding skills but also developed an understanding of the interplay between hardware and software components.

The highlight of my work period at Tonbo Imaging was when I visited the Northern Command in Jammu and Kashmir as an official member of the Embedded Systems team, and demonstrated the working and capabilities of my company products to the military personnel. I not only learned how to present my work in a way that non-technical people could easily understand, but also acquired essential marketing skills in selling our products to potential consumers. I also demonstrated, tested, and debugged the product in a real-time setting and addressed other hardware-related issues raised by the customers. Apart from this, I visited SFO Technologies, Kochi, as a member of the Embedded Hardware team, where I looked after the hardware and software aspects of the company product based on queries and issues raised by potential customers. As a part of Tonbo Imaging for my final year thesis project, I acquired immense insights into the business and technical aspects of managing a company and the marketing strategies required to sell technology products to the relevant audience.

Having demonstrated a keen interest and inquisitiveness about my undergraduate courses, I was given the opportunity to work as a formal teaching assistant for the courses ADVD and Microelectronics. I not only explained theoretical concepts, but also conducted practical sessions, and evaluated and guided students regarding their assignments and tests. During the practical sessions, I gave my students problem sets on using Cadence-Virtuoso for designing and simulating circuits and this helped me acquire clarity in my concepts and learn unique approaches to solve a problem by observing my students. This role required a deep commitment from my side and sometimes it was difficult to manage classes with my own projects; however, looking back, this has been the best learning experience for me as my students were full of questions and exciting inferences regarding the concepts.

While working at Tonbo Imaging, I realized that although the work was extremely exciting, I was more inclined towards working on research-oriented projects rather than product development and marketing. Hence, soon after completing my undergraduate studies, I took up a research position at IISc at the Centre for Nano Science where I am currently working on the design, fabrication, and characterization of devices using GaN as substrate such as high electron mobility transistors, MSM devices, and diodes. I spent my initial few months there learning about all the tools and equipment that were used for research projects, following which I successfully fabricated a high current switch using GaN and I am hoping to publish the results of this work in the near future. The research lab facilities at IISc are one of the best in the country and working with professors and students possessing an intense passion for the field has been overwhelming and humbling at the same time. Apart from acquiring technical knowledge, I have developed self-confidence, public speaking, and presentation skills through weekly meetings and group discussions that have moulded me into a strong and outgoing person.

Working with some of the country's finest faculty and colleagues at exemplary research facilities has strengthened my desire to gain a deeper understanding of my research work through a rewarding postgraduate program in Analog and Mixed Signal VLSI Design. After completing my higher studies, I would like to work at one of the renowned semiconductor companies such as Qualcomm, Samsung, Intel, or Apple as an Analog Design Engineer. Eventually, I would like to pursue my PhD in order to attain expertise in my field of interest after which I would like to establish my company in the field of semiconductor electronics and develop technologically competent products for the benefit of the society.

In order to fulfill my goal of designing superior analog and digital circuits, I wish to take up a postgraduate program in Analog and Mixed Signal VLSI Design at _____ University. The numerous research projects that I have worked on and the internships I have attended during my undergraduate period have given me a strong command over the concepts. I now wish to deepen my understanding of the field and become up-to-date with the most recent trends in the field of circuit design. I intend to acquire a strong technical skill set by pursuing several exciting and challenging projects at your state-of-the-art research facilities. Being guided by accomplished faculty such as _____ and _____ at your premises will help me take my projects to the next level and acquire a more comprehensive understanding of the field.

My experiences in using my knowledge and skills for research projects in my field of interest have given me a strong knowledge of my subjects, and I am confident that my aptitude and passion for the field will help me stand out at your campus.