

# [Being such as biochemical engineering, material science,](https://assignbuster.com/being-such-as-biochemical-engineering-material-science/)

Being a partof a typical Indian family, my future was set in a few ways. But it is alwaysdifficult to foretell what kind of a person someone would grow up into in thefuture. This axiom applies to me perfectly.

In my primary school education, Iwas quite fascinated with Mathematics and I used to ace all of my math tests. However, as I grew up, I found that my real interest was in Chemistry. Thisinterest motivated me to take up Chemical Engineering for my UndergraduateProgram, which further bolstered my determination to pursue my career in thecore disciplines of Chemical Engineering. My advancededucation in Engineering formally began with my Undergraduate Program inChemical Engineering at the National Institute of Technology Tiruchirappalli. The youth of today, more often than not, believe that learning is a drawn-outand tedious process. On the contrary, to me, acquiring practical knowledge addsto one’s potential.

And this thought combined with my desire to fulfillambitions reigned over any sense of hardship. Simply, on a long run, the effortexerted in my Undergraduate Program had its own satisfying rewards. I took it upas a fundamental task in my Undergraduate studies to identify my field ofinterest and lay a firm groundwork in terms of basic knowledge, boththeoretical and experimental, and the current need of the society so that moreadvanced studies could be pursued. I developed an interest towards HeatTransfer and gave my best to understand the principle underlying each concept. Even though I had an affinity towards Thermodynamics and Heat Transfer, I feltit was important to also have a strong foundation in all the core courses.

Thisawareness helped me to become familiar not only with core courses like ReactionEngineering, Transport Phenomena, Mass Transfer, Process Control, etc. but alsowith supplementary courses such as Biochemical Engineering, Material Science, EnvironmentalEngineering, etc. My diligencepaid off when I secured an opportunity to work in the R sector at BharatHeavy Electricals Limited (BHEL) for my winter project in my junior year. BHELis an engineering company owned by the government, which fell under the elitelist of eight companies that made up the majority of India’s public sectorundertakings and a chance to work with them was rare, especially for a student. BHEL specializes in heat transfer equipment like boilers, turbines and heatexchangers related to power plants and this aligned perfectly with my area ofinterest.

Considering the fact that every industry in the world has some wasteheat associated with it which, commonly, depletes a considerable amount ofresources, I chose to concentrate on converting that waste heat into a usefulone. I decided to make use of Thermo-Electric Generators (TEGs) for the processand selected steam boilers as my target equipment. It was a fairly novel methodin India, and my research would help decrease environmental pollution andimprove cost-efficiency of heat transfer equipment to an extent. Theunderlying principle behind my research was to use the excess energy from heatsources on semiconductors (an essential constituent of TEG) to generateelectricity. As the concept had not been worked upon extensively at the lab, the experiments were based on a flat-plate heater with TEGs working under lowtemperatures. To determine the best experimental setup to advance with, Iconducted mathematical and physical simulations on MATLAB and Visual Basic, andwith the help of my guide, on COMSOL. My models examined the effect ofvariables such as the source temperature, the arrangement of TEGs, the type ofextended surfaces present and the mode of convection. Again, as the researchwas fairly fresh, in addition to the literature survey and setting up thelaboratory, I had to fix technical problems that arose during the experiment.

For example, after the preliminary simulations, the magnitude of error producedby the setup was large as the fins began to sag under their own weight. Irectified this problem by changing the arrangement to compensate for thecontact pressure. Subsequently, within a span of three months, I was inducted by 3M India Limited into theirsummer internship program. This provided me with another shot to explore theworld of Chemical Engineering, and to delve deeper into the field that alluredme.

I did not miss this perfect opportunity to improve upon my previous work. Ijoined the Automotive Aftermarket Department at 3M’s R Center and beganworking on taking my research on TEGs, one notch above. I learned from my guideregarding the usage of insulators in the exhaust systems of variousautomobiles, the elemental reason behind it, and that only less thanone-quarter of a vehicle’s fuel input is being used to propel the vehicle andthat nearly a half of the remaining fuel is lost as waste heat. I had comeacross Phase Change Materials (PCMs) in the survey conducted during my previousproject and this was a chance for me to apply it to a real-world problem. Ideveloped MATLAB simulations that dealt with temperature cycles that variedwith the operating conditions of the vehicle like load, terrain, etc. andcarried out experiments on certain selective PCMs to test their heat capacity. As acrystallization of my research findings, I co-authored a research paper titled” Mathematical and Experimental evaluation of Phase Change Materials (PCMs)on a vehicle exhaust system for waste heat regeneration (using TEGs)” andis under consideration to be published. The research I have conducted, thoughis a tiny fraction in this broad domain, has helped me to visualize my futuregoals.

I have understood that it is imperative for me to probe out into thevast world of the unexplored. I haveresolved to develop myself into a well-trained Chemical Engineer and have animmense interest in Chemical Engineering as a lifelong career. Meantime, I amclearly aware of the efforts I have to make in order to fulfill thisaspiration.

This constitutes the very motivation behind my present applicationfor the M. Eng. Program from the Department of Chemical Engineering of theABC University. There are multiple strong arguments for my choosing youresteemed university, foremost being the well-designed curriculum that allowsstudents to pursue disciplines of their interest apart from the core subjects, helping them to broaden their knowledge. Also, the experience of the facultiesalong with the faculty-student ratio promises to provide plentiful attention toeach student.

All these make me believe that I will receive the best educationI can expect. In mycurrent college education, I have made it a point to take part inextracurricular activities. I am presently serving as the Chairperson ofPragyan, the international techno-managerial organization of my institute witha workforce of 700 odd students and a firm foothold in over 60 countries. Istrongly believe in being well-rounded, and this has enabled me to mature intoa skilled communicator with radical leadership and interpersonal skills, all ofwhich, will prove tremendously practical in your graduate program. I amconvinced that my academic background and my experiences outside the classroomwill make me very successful in your program. This, combined with studying at ABCUniversity, if given the chance, will provide me with a unique range ofexperience which in turn, will give me an exceptional advantage in my career.