

# *Statement of Purpose*

## **Department of Mechanical Engineering**

*"Live as if you were to die tomorrow. Learn as if you were to live forever." Mahatma Gandhi*

I always have differentiated between the process and results of studying. Many would prefer to pass the education period just for its end. However, I think in a different way. I love the process of learning itself and with this thought I do my best regardless of the result. In order to satisfy my desire for comprehending the world and learning its operation, application of the principles of physics in mechanical engineering attracted me. Therefore, I attempted with eagerness at high school and due to my high rank in nationwide university entrance exam, I was the 1<sup>st</sup> rank among the students who entered ME department at University of Tehran.

I passed my undergraduate study in an increasingly diligent manner. This attempt culminated in great success when I ranked 1<sup>st</sup> at the last semester with the GPA of 19.35/20. I believe that graduate study is the time for research and probing in sciences. Therefore, I devoted a great amount of time to research in advance of graduate period in mentioned fields since I knew that I need something more than study and that was applying what I have, to obtain what I should have. In this way I pursued CFD and optimization methods since they are powerful instruments. In the junior year I became familiar with optimization methods such as calculus and searching ones in some projects. In addition, I was fascinated by evolutionary methods like Genetic Algorithm and other modern techniques such as Particle Swarm Optimization (PSO). Solving inverse problems with these methods was a new approach for me to problem modeling. At the same year, designing a battery thermal management system was a comprehensive example that I could utilize my thermal, fluid and CFD knowledge simultaneously. As a junior research scientist at Vehicle, Fuel, and Environment Research Institute, I was involved in fluid modeling and simulation with Finite Element Method (FEM) and conducted optimized design of the elements in a battery pack. This work has been presented in the most prominent international vehicle conference FISITA and published in the journal of Lecture Notes in Electrical Engineering.

In my view, the graduate program is designed to educate engineers who will be in the forefront of the mechanical engineering profession, leading the way to new and improved engineering systems to meet the needs of society. I started to recognize these needs at my undergraduate and develop some skills to prepare myself for graduate program. I broadened my skills by taking "Turbomachinery" course and subsequently designing piping network of cooling system for the hybrid electric bus. In this project, pump sizing was done and validated with simulation software. This work accompanied with my internship at Nardis Energy Company where I improved my knowledge of piping design. Working with PDMS software led to an increase in my skill and proficiency in oil, gas, and petrochemical industry. I think that my experience in working with fluid modeling software is a positive point in my academic capabilities.

After that, I got involved in energy studies in particular. Because of the fact that energy is the matter of the world these days, that was an appropriate time to apply my knowledge in this field. I designed a zero-energy building for Tehran in Solar Energy course which is considered to be the first one in Iran. I focused more on heating and cooling system of this solar home and became specialized in absorption heat pumps. Conducted research in a twelve-student group, culminated in publication of a paper in International Conference for Enhanced Building Operations and submission of another paper to International Journal of Solar Energy. This was really an eye opening for me to prepare for this field of study. In order to become more expert, I focused on environmental and economic features of solar homes. I am honored to say that American Solar Energy Society has accepted our new paper for their National Conference in the following year.

To clearly express my goals, I believe that in order to play an effective role in this competitive world, one should specialize in a specific field. Therefore, I made my strong decision to pursue what I have learnt until now in order to make use of my knowledge efficiently. So, I think that my knowledge is not still profound enough and I should study for a graduate degree to do anything significant in energy sciences.

As a future perspective, I would like to be a university professor with holistic and innovative approach to research works. This hope cannot be fulfilled without strong research background which entails meticulous research in graduate period. According to my advisors and my own inquiry, Michigan Technological University provides me with such a competitive atmosphere for research and study because equipped laboratories and cutting-edge research in a variety of areas has made your ME to be recognized for its excellence in research. The history of Michigan Tech is full of honors and great achievements of professors who dedicated their lives to science. I wish to be considered for a Graduate Research Assistantship under the direction of prodigious professors like Fernando Ponta, Mahdi Shahbakhti, and Ossama Abdelkhalik in mentioned research interests. I intend to pursue my area of study at a well-established university. Therefore, outstanding studying chances at your university encouraged me to apply for this university so as to experience a new world of which I would be proud.