Statement of Purpose

"There is no chance, no destiny, no fate, that can hinder or control the firm resolve of a determined soul." Ella Wheeler Wilcox

I can never forget the pleasure of the day when my brother and I assembled a simple transmitter using a didactic electronic package. Several years later, I entered Imam Sadegh high school, one of the best schools in the city with a desire to learn more about my childhood interests. At high school, my teacher of "Physics II" course, Mr. Mazrooee, taught me how taught me how to get rid of repetition. We learned how to leave the first and simplest way for solving a problem and try to find a new and more tangible solution even if it resulted in a less accurate answer. We learned how to make our mental horizons go beyond formulas and prearranged solutions. I admire him because this way of thinking and attitude toward solving a scientific problem caused lots of my successful activities in my later academic life. For example this attitude led me to learn the fundamentals of Optical devices and circuit analysis in Physics II and field and waves in Physics III with a great interest. This recognition with the basics of Electrical engineering along with my childhood interest in simple electronic circuits convinced me to major in electrical engineering at B.Sc. level. In spring 2006, I got my high school Diploma with Honors in Mathematics-Physics with total GPA of 19.89/20. The desire to study Electrical engineering prompted me to participate in a highly competitive national examination for admission to the best Iranian Universities. I was ranked in the top one percent of nearly 300,000 students who took the examination and entered the B.Sc. program of university of Tehran, the best engineering school in the country. In the first year of B.Sc., I knew that deep understanding of regular courses would provide a strong basis for the more specific courses which were to come in the years after. So I did my best in my courses both in theory and related projects. In addition, I taught Physics and Mathematics to high school students and managed the scientific community of my high school. Although these extra activities took part of my time, I acquired useful experiences in managing a scientific group and teaching scientific matters which helped me during my later activities in university as TA of 6 courses and a member of Nanotechnology group. In the second year of the B.Sc., I had the chance to participate in "Electronic I" course under supervision of Professor Mohajerzadeh. The primary focus of the course was on electronic devices. After some sessions, I used to go to thin film laboratory (TFL) which helped me a lot in getting familiar with experimental methods of Semiconductor device fabrication. Besides electrical engineering students, there were some students majoring in Physics, therefore I was very curious to find out how cooperation between students majoring in physics and engineering could result in mechanical and electronic elements fabrication in Nano-scale. After several weeks of observing the procedure of their projects, I found Nanoelectronics a field which provides me the possibility to learn more complex theories and concepts of Physics along with experimental fundamentals of Nano science. Taking other electronic courses such as solid state, transistor fabrication laboratory and Nanotechnology (as two optional courses) motivated me to do research in the mentioned field. They were incentives for my later activities in this field especially in TFL.

As the first step, I decided to pass my internship in TFL. In that project, I was responsible for some parts of a mass flow controller (MFC) fabrication as a member of a research group. My conversation with Professor Mohajerzadeh at the beginning of the project was inspiration for the main idea which flowed in my later projects. Prof. Mohajerzadeh told me that "our main purpose is to use a new idea to solve the drawback of previous MFCs which is their need to be calibrated for each kind of gas. If you spend time on a project, try to do it in a way that solves a problem and helps others in their projects as you may use their experiences". So I read several papers on different methods of flow measurement and found that using a

venture and a pressure sensor can eliminate the demand for calibrating. In another project, while learning how to work with SEM instrument with my teammates, we concluded that a user manual in Farsi which could provide a step by step instruction for working with SEM instrument could save time for students who are interested in working with SEM instrument, so we codified a user manual for that. Working on several projects brought me valuable experiences. After several failures in a monotonous deposition using our new LPCVD instrument, I found out that the disappointment after a failure is wasting time and that I can use this time for thinking on solution, so I spent several days finding the solution whereas no one in our group was experienced to help me. In MFC project, I shouldered the extra duty of assembling digital circuit for controlling the valves and understood how we can use different abilities of group members in a project. Working with teammates in these projects, I learned many things about teamwork from its difficulties to the joy of working with others. Besides the mentioned projects and activities in thin film laboratory, I have the experience of teaching assistance in 6 courses. As the TA of Electronics I and II, I was responsible for designing homework and Spice projects and teaching in extra sessions. In the Signals and systems and Computer Architecture courses, I was responsible for preparing and grading homework, teaching in problem solving sessions and designing software-based projects. At last, in microprocessor course and Electronic I and II laboratory I was responsible for helping students in their experimental projects and grading final exams. Now I believe that I have the ability to do these tasks according to my previous experience, my interest in teaching and my language skills.

Now as a senior student in B.Sc., I am going to pursue my education as master student. For me, the undergraduate program was a chance to gain the requirements for this end. I am sure that creativity and success in an industrial work or doing a well updated project in a university research group as a professor needs specialism in the related field. I like to move beyond ordinary applications of semiconductors and nano science. My purpose of cooperating in a research group is not only to carry out the experimental tasks of a project but also I want to be an expert, to make innovation in order to improve the procedure of project and even to suggest new projects compatible with today's and future's demands of electronic industries. I want to be named as a person who had a great effect on the headway of Nano science. I can do these only by acquiring special skills and knowledge in my field of interest. I believe that a student especially master student must reach such a thinking level and attitude to cooperate with social groups for the purpose of solving some social problems in society. Because of this belief, in the final years of my B.Sc., I cooperate with the social council group of our dormitory to solve non-educational problems of students in dorm. We hold several meetings every month in which students could talk about their non-educational problems which had negative effect on their educational life and we tried to solve their problems using beneficial experiences of people in the meeting. During my educational life in university of Tehran, I lived for 3 years in the dormitory. There were lots of students from different parts of Iran who had diverse cultural beliefs. I learned how I can live in such a multicultural life environment and how to adapt myself with this situation. Considering the mentioned activities and experiences, I believe that I have enough ability to help University's diversity mission.

When I looked at Erasmus Mundus master of nanoscience website for the first time and found out that four universities including Katholieke University Leuven and Chalmers University cooperate with this program, I decided to have a look at websites of these universities and as a result, a number of faculty members in device research laboratories and groups attracted me. I studied previous projects of these groups in Novel silicon and carbon based devices, MEMS, optoelectronics and thin film semiconductor devices and Bionanotechnology and realized that I can pursue my research interest in these groups. Since I deeply perceived the effect of smart and motivated classmates on my academic headway in B.Sc., I tried to find the same place for my graduate studies. By perusing academic background of students, I think both

universities provide a better situation for me. Also, I perused clean room facilities and nanofabrication laboratories in both universities and found out that investment of these universities in Nanoelecronics is remarkable. Now I am sure that my research interests are compatible with the main research route of some professors and also experimental facilities in Katholieke University Leuven and Chalmers University. For example, I am interested in diverse projects on Novel vertical devices, Nanowire-based devices, Carbon-based devices, MEMS and optoelectronics and Bionanotechnology which are being done by professors at both universities. I have experience in nanofabrication and I believe that I have the ability for research in each of the mentioned projects based on my background in B.Sc. Although I am exempt from university entrance exam for M.Sc. and I can continue my M.Sc. at university of Tehran, I prefer to pursue my education in Erasmus Mundus program of Nanoscience at Katholieke University Leuven. I am always looking for new experiences. To pursue my master in a university with honorable faculty, high quality of study and strong research facilities will give me useful experiences for my future life in addition to great scientific results. I am confident that given the opportunity, I will be able to make significant contributions to the ongoing research at Katholieke University Leuven as a member of Erasmus Mundus program. I'm also fully aware of the hard work and perseverance required for a successful career in research and I believe that I have the aptitude and drive to meet the challenge. I am eagerly looking forward to a long and mutually profitable association with the Science Faculty at the Katholieke University Leuven.