

C. Your Programs and Activities

- List past and present research activities associated with your interests in mathematics/science/engineering in which you regularly participate. Explain the duration, degree, and significance of your involvement, including what responsibilities you had in the project. In the absence of formal research experience, describe briefly any other skills or accomplishments, i.e. posters, presentations, publications, etc. significant and relevant to this application.

I work under [redacted] in the Department of Materials Science & Engineering at [redacted]. I have worked in [redacted] lab since August [redacted] and plan to continue to do so for the duration of my undergraduate studies. I have focused on the uses of Titanium Nitride as an adhesion layer between Copper and Barium-Strontium Titanate (BST). I am proficient in sputtering techniques as well as x-ray diffraction characterization. It is my responsibility to determine the ideal conditions for sputtering titanium nitride films which are crystalline upon deposition and which yield good electrical conductivity. Once we have developed the deposition process that is ideal for Copper's adhesion to BST, ferroelectric devices can be assembled.

During Summer [redacted] I participated in the NSF's Research Experience for Undergraduates (REU) program at [redacted]. I conducted research in [redacted]'s Electronic and Photonic Materials group. My primary responsibilities included characterization of epitaxially grown single-crystals of Barium Titanate for use in electro-optic waveguide modulators. I conducted temperature dependent x-ray diffraction as well as temperature-dependent measurements of domain polarization. My work contributed to characterization of two distinctly different thin-films which will be developed into waveguide modulators for use in high-frequency communication devices.

During the Fall [redacted] semester I participated on [redacted] steering committee for the [redacted] Undergraduate Research Symposium. We organized and ran this symposium with students from three local universities. Our goal was to create an interdisciplinary symposium in which students might become aware of research being conducted in our universities. I managed the registration process for the symposium. For the coming symposium I will lead the [redacted] steering committee. We are expanding the scope of the symposium to include institutions across the state.

I am also active on the executive board of the [redacted] student chapter of Materials Research Society (MRS). Our goal is to present Materials research being conducted on campus by our own faculty. I publicized meeting dates and presentation abstracts for the invited speakers.

Starting this semester I am an editor for the [redacted] Undergraduate Research Journal. My duties include editing student papers and verifying scientific validity of the results presented. These activities allow me to become more aware of research taking place outside of my field and to share my results with others.

- List activities in which you have participated at your school (such as clubs, publications, debating, dramatics, music, art, and student government). Place an "X" in front of those activities you consider most important.

College Activity	Dates participated	Offices held
Engineers' Council	[redacted] present	MSE Representative
X [redacted] Undergraduate Research Journal	[redacted] - present	Associate Editor
X [redacted] Undergraduate Research Symposium	[redacted] - present	Chair, 2005; Registration, 2004
Materials Research Society	[redacted] - present	Publicity Chair, 2004
X [redacted] Honors Program	[redacted] - present	Fundraising Committee co-chair, 2004-2005
[redacted] Civic Symphony	[redacted] [redacted]	violin

- D. What are your professional aspirations? Indicate in which area(s) of mathematics, science, or engineering you are considering making your career and specify how your current academic program and your overall educational plans will assist you in achieving this goal.

I plan to become a MSE faculty member at a research university. As such, there will be not only the satisfaction from my own work, but also from teaching and nurturing students. I am an undergraduate in the Department of Materials Science & Engineering, and I plan on attending graduate school in the same field. Materials research is a broad field; however, my current interests concern research in electronic materials with a focus on microwave electronic devices for wireless technology. I enjoy finding ways to improve current technologies with lower costs making wireless technology more affordable rather than a luxury available only to the wealthy. I am working on ferroelectric materials research under the supervision of [REDACTED] will enroll in a Ph.D. program after graduating from [REDACTED]. I want to conduct research in the university setting for two reasons. Meaningful research with a practical purpose offers its own rewards, and to do so in an environment that thrives on intellectual development and the sharing of knowledge would be a privilege. I believe that research in an academic setting fosters the growth and sharing of new ideas and provides the flexibility of conducting a variety of experiments without the strictures of private industry. In addition to conducting research, I find it appealing to teach university classes and help prepare the next generation for careers in the sciences. My educational plans will provide me with the expertise and skills necessary to achieve my goals of conducting materials research with a global impact and of teaching and nurturing shared knowledge from which many may benefit.

- E. Describe an activity or experience that has been important in clarifying or strengthening your motivation for a career in science, mathematics, or engineering.

The Research Experience for Undergraduates (REU) program in which I participated had a significant impact on strengthening my motivation for a career in Materials Science & Engineering. During Summer [REDACTED] I was selected to participate in a nine-week NSF-funded program at [REDACTED] University. I worked in the Electronic and Photonic Materials group under [REDACTED]. For nine weeks I experienced life as a graduate student and conducted meaningful research in an academic setting. I gained valuable experience using the x-ray diffractometer as well as a keen sense of research ingenuity when equipment needed modification for proper electrical measurements. I learned a great deal about ferroelectric materials and the exciting applications of these materials in everyday products. This was my first true research experience and introduced me to a side of my studies about which I had very little knowledge when I began them. By the end of the program, I had an increased desire to pursue my undergraduate degree in Materials Science as well as a newfound motivation to pursue a career in academic research and teaching. By gaining hands-on experience in graduate level research through the REU program, I became even more aware of the benefits of pursuing a Ph.D. in a field as broad and critical as Materials Science & Engineering. Classroom instruction often does not do justice to the exciting research being conducted in adjacent laboratories. The REU program provided insight into the exciting and challenging careers that lie in the area of Materials Research and truly clarified and redefined my motivation to follow this career path.

- F. Goldwater Scholars will be representative of the diverse economic, ethnic, and occupational backgrounds of families in the United States. Describe any characteristics or other personal information about yourself or your family that you wish to share with the review committee.

My parents immigrated to the United States [REDACTED] only two years before my birth. They sacrificed so much to begin a new life in a foreign land and provide me with great opportunities. I strive to take advantage of the opportunities available to me on a daily basis. The tradition of excellence set forth by my parents motivates me to achieve academic accomplishments. I can only hope to realize the resolute work ethic and dedication to occupational success that I see in my parents. These qualities have only recently become more clear to me, but have become so at a pivotal point in my life. I was graduated from [REDACTED] High School with an International Baccalaureate (IB) diploma. The IB experience provided me with an opportunity to succeed while facing a challenging curriculum. At [REDACTED] I am enjoying my work not only in the classroom and lab but also in campus organizations and team athletic events allowing me to further enrich my undergraduate experience.