

## STATEMENT OF PURPOSE

After three years of diligent coursework at the Colorado School of Mines (CSM), my dreams of bringing my understanding of the natural world to the forefront of modern science are finally coming into fruition. As a junior in the electrical engineering program, my coursework revolves around topics in the telecommunications industry that have the potential to make infrastructure smarter. However, as I get closer to obtaining my bachelor's, more and more I do not see myself having the level of technical knowledge that I dream about by the time I enter the workforce. For this reason, I am interested in a non-thesis master's degree.

Though my undergraduate studies did not turn out to be as rigorous as I had imagined, they are highly technical nonetheless and serve as a foundation for my further exploration of antennas and wireless communications. One such study was a project on estimating the direction of arrival for multiple signals. In this study, I gained a thorough understanding not just of the underlying algorithm, but of more general concepts including the signal orthogonality and the limitations of direction of arrival estimation techniques. A similar study I completed focused on the beamforming capabilities of a particular type of antenna array. In doing so, I developed the basis for a nonlinear model that antenna designers can use to quickly determine appropriate arrays to use for their applications.

Developing a basic yet fundamental understanding of antennas and wireless communications has led me to truly appreciate the work conducted by the faculty at CSM. Dr. Haupt's work on genetic algorithms in antenna design, for instance, is one of the most interesting applications in telecommunications engineering that I have seen as of yet. Dr. Nayeri's research on MIMO antenna systems and Dr. Elsherbeni's research on FDTD modeling of electromagnetic fields are two further areas of study which both inspire my efforts as I move forward in my professional career and show potential in the future of wireless network design. The electrical engineering department's work on adaptive antennas, my preferred topic, is cutting edge with obvious applications in 5G network.

Given the distinguished faculty and the awesome culture at CSM, I think this institution would be an excellent place to pursue my graduate degree. Moreover, the relationships I already have with the professors in the electrical engineering department would facilitate both my transition into the master's program and my performance within it. I am confident that I can obtain a far more intimate understanding of wireless systems than would be possible with only a bachelor's degree by studying adaptive antennas, microwave and radio frequency circuit, and wireless network infrastructure alongside faculty members such as Dr. Nayeri and Dr. Haupt. With the knowledge I obtain from the master's program, I will finally be able to tackle high impact projects in the real world, from guiding the driverless cars of tomorrow to providing augmented reality technologies to first responders or providing a whole stadium of people with uninterrupted connectivity. Regardless of what I may work on one day, I believe that the master's program at CSM is the next step in my career.