As a DJ at Louisiana State University's college radio station, I learned through constant practice during my radio shows how to communicate my passion for music. After three years of DJing, I realized that I could use my experience in radio and communication to produce a show that demonstrated my passion for the sciences. Over my senior year, **I developed a radio show and podcast called *Experimental***. In this show, I highlighted ongoing research at LSU by interviewing graduate students, post docs, and professors. I wanted to use *Experimental* to show not only the quality of the research performed at LSU, but also the passion and humanity that researchers bring to their craft.

I realized, however, passion does not always translate to an ability to communicate that passion. My subjects often had trouble moving past using jargon to show the listeners why they were interested in their research. I had to learn how to extract that passion from each interviewee. My favorite example of this was when I interviewed Darrell Henry, a geologist who studied tourmaline. On a whim, I asked him what his favorite type of tourmaline was. He responded in a completely unexpected way: his favorite tourmaline was the one named after himself, darellhenryite! These candid moments are what truly communicate their passion, and I learned how to draw these moments out of my subjects. While producing *Experimental*, I created eight different episodes, but my biggest impact was creating a legacy that would last past my time at LSU. Drawing from my initial vision, *Experimental* officially launched on KLSU with a season's worth of episodes on October 18th, 2017, each one promoting LSU's superb research to the broader public.

Science communication is growing in importance daily. Many, who do not have the exposure to science or the issues, wish to dismiss science as partisan or unimportant. It is critical to continue to develop the base of knowledge we already have, but if the public does not believe that our conclusions are important and worth acting upon, policy will not change. I believe it is the responsibility of scientists to expose the public to these issues and their research on them. **A career goal for me is to continue to develop and use my background in radio and podcasting to facilitate this communication**.

During my first year as a teaching assistant at the University of Chicago, I volunteered to be assigned to the general education physics course, aimed at giving a broad understanding of physics concepts to non-STEM majors. The class was seen as a tough assignment, as the students' questions would come from an perspective outside that of a scientist. These questions were, however, the most enjoyable part of the course, as it allowed me to better understand both common misconceptions about physics and how physics is viewed by non-scientists. Through many late-night conversations about quantum computing, rocket science, and nuclear energy, I found ways to convey to the class why physics is important to understand even as a business or humanities major.

My appreciation of seeing a discipline through different eyes only starts at science communication. As someone who obtained both physics and chemistry degrees at LSU, and who engaged in a variety of research opportunities throughout both disciplines, **I saw often how my experiences and knowledge in one field informed me and allowed me to be innovative in another**.

During my freshman year at LSU, I conducted research in organic chemistry under Professor David Spivak. My objective was to synthesize a polymer upon silica powder for use in protecting the surface of other materials from oxidation. I used High-Performance Liquid Chromatography (HPLC) to measure the retention time of this material. Within Dr. Spivak's lab, I learned the basics of organic synthesis and spectroscopy, but most importantly I realized that I

could take what I was learning in class and apply it to research. What I learned about chirality during my organic chemistry class came to use when I learned how to separate stereoisomers using HPLC, and the reaction mechanisms I memorized informed me during my polymer syntheses.

The following summer, I decided to engage in physics research under Professor Phillip Sprunger during an REU at LSU. During this REU, I researched environmentally persistent free radicals (EPFRs), which are harmful chemical structures that appear within smoke pollution. I generated an EPFR upon the surface of ZnO single crystals by deposition of phenol within an ultra-high-vacuum chamber, then ran various spectroscopic tests such as Electron Energy Loss Spectroscopy and Low Energy Electron Diffraction to characterize the surface. I also used LSU's supercomputers to predict the structure of an EPFR on the surface of crystal ZnO. My poster based on this work, entitled "Adsorption of Phenol on Zinc Oxide (1010) & (0001)", **won first place at an REU-wide competition**. I also presented my poster at the American Chemical Society conference in Dallas in Spring 2014. The data I produced that summer were also used in a paper in Chemical Physics Letters on which I am an author. I continued researching in this lab all the way through my graduation at LSU, as I was inspired by the way that I could combine my backgrounds to create my own niche. Having both physics and chemistry in my back pocket meant that I could both synthesize the system I was interested in studying and then probe the system with specialized spectroscopies. This has allowed me to play an active role in every stage of the project.

In the summer of 2015, I participated in the Materials Research Science & Engineering Center REU at Northwestern University. I chose to take on a project in inorganic chemistry under the guidance of Professor Danna Freedman to further my understanding of both physics and chemistry. Within this research, I synthesized and characterized MnBi nanoparticles via a solution-based method**.** I learned how to utilize Powder X-ray Diffraction (PXRD), Scanning/Transmission Electron Microscopy (SEM/TEM), and Energy-dispersive X-ray Spectroscopy (EDS) in order to characterize products, which allowed me to pursue monodisperse, pure intermetallic phase, and single magnetic domain MnBi particles.

I took this experience home and incorporated it into my research at LSU. I created CuO and ZnO nanoparticles on a SiO_2 powder via incipient wetness for my senior thesis, and characterized them using the SEM, TEM, PXRD, and EDS at LSU's shared instrument facility. These powders were taken to Oak Ridge National Laboratory, where I used the VISION beamline at the Spallation Neutron Source to obtain vibrational data from the powders with EPFRs, which a valuable experience at a national laboratory. This research was the culmination of everything that I learned from my time in organic chemistry, inorganic chemistry, and physics, which led to my second authorship on a paper in Chemical Physics Letters. My honors thesis included both this research along with a guide written for producing an *Experimental* radio piece. For my work in the classroom, in the lab, and in the production room, **LSU awarded me with the distinction of being the Outstanding Senior in the College of Science**, the culmination of my dedication to both interdisciplinary science and science communication.

My love and experience merging my varied backgrounds for interdisciplinary research took me to The University of Chicago's physics PhD program. UChicago's physics research boasts a wide variety of interdisciplinary research, such as biophysics, soft matter, and materials engineering. During my first year, I took on a research project from Professor Heinrich Jaeger, using ultrasound to probe the onset of shear jamming in gelatin. I enjoyed drawing upon my previous experiences in physics and chemistry in a new way, setting up a synthesis for gelatin particles, and developing a method to use an ultrasound transducer to both induce a shear wave and track the shear wave's movement through gelatin particles deep in the jamming regime.

Through this experience, **I realized that being able to study soft materials with an eye on their physical properties was my calling**. The following summer, I was excited to study soft materials in the newly-formed Institute of Molecular Engineering at UChicago.

A new professor to the institute, Dr. Shrayesh Patel, had started up a lab studying the physical properties of polymers to create electronically conducting organic materials, which can be used in batteries and thermoelectrics. My backgrounds in polymer science and physics makes me a great fit for this lab, and I have wholeheartedly dug into this research since the beginning of the summer. The energy applications of my research for solar cells and thermoelectrics allow my research to have immediate, environmentally impactful results, but still allow me to analyze the fundamental properties of the materials I am studying. My work studying the dynamics of doping a polymer matrix *in situ* has shown immediate results, and has led to research at the 8-ID-E beamline at the Advanced Photon Source at Argonne National Lab, where we used Grazing-Incidence Wide-Angle X-ray Scattering (GIWAXS) to study the short-range order of our doped polymer matrix. **My experience at combining physics and chemistry as well as my experience with polymers have both informed my research and spurred me to become immersed in learning and to do my dissertation in polymer physics**, where I have found my niche.

If chosen as an NSF GRFP fellow, I would have more of an opportunity to engage in science communication projects that will allow me to grow as a communicator. Using STAGELab at the Institute of Molecular Engineering, a collaboration which creates and develops multi-media pieces inspired by science and technology, I will be developing a science web series that highlights the research done by scientists here in Chicago. If I were to receive this fellowship, I would use my NSF funding to work five hours a week on this project. I will also build on my undergraduate experience with *Experimental* through the Institute's collaboration with the Museum of Science and Industry. This will allow me to relate to the public the science behind today's crises in a way that they will learn from and take to the voting booth. I see opportunities at UChicago that will allow me to grow into the scientist and the science-communicator I want to be, and the NSF GRFP would give me the opportunity to embrace these opportunities open-armed.

Intellectual Merit: My career goal in research is to use my expertise in combining physics and chemistry to both develop and characterize novel materials. My broad research experiences, ranging from polymer synthesis to nanoparticle synthesis to surface science and soft condensed matter, makes me especially prepared to tackle research at the interface between these two fields. As an Outstanding Senior in LSU's College of Science, I have taken this momentum with me to do research in the Institute of Molecular Engineering at UChicago, which allows me to take advantage of their unique connection to Argonne National Lab and the research that occurs at the Advanced Photon Source.

Broader Impacts: Ever since I made the connection between my radio production skills and my love of science, I have been pursuing science communication. I am inspired to share my passion for science and its impact on our daily lives to the world. Through projects such as *Experimental*, I have honed my science communication skills both in myself and by coaching others. America has struggled against the developments of science in topics of great importance such as global warming, and I feel passionately drawn to use my position as a science communicator to bridge the gap between academia and the public, one podcast, one interview, one talk at a time.