Please discuss how you identify as being underrepresented and the ways in which you would benefit from and/or contribute to the goals of MURF? How has being underrepresented affected your academic and professional path?

Females are underrepresented but not underappreciated or discouraged within the modern scientific community. Fortunately, women who show interest in the sciences today are supported, but there is a tendency for societal forces to encourage female interest in different directions. In my experience, generalized assumptions about the place of women in society is the only bias maintaining the gender differential in the sciences. My involvement in MURF contributes to the goals of the program by making it more standard practice for women with technical abilities to foster their interest and pursue higher education in the sciences. I benefit from the commitment of the MURF program to increasing the representation of women in scientific graduate programs, and I would benefit as a MURF student from the chance to develop a community with other underrepresented students. The research opportunities that MURF affords would build my confidence in my abilities as a researcher, and would provide numerous advantages in my involvement in the scientific community. Interacting with distinguished researchers in my area of interest and attending technical talks on campus would be infinitely valuable and would give me an advantage in my preparation for graduate studies.

Please tell us your academic and career goals and the ways in which your participation in the MURF program would help you achieve them. In what other ways have you fostered achievement of your goals (participation in other programs, other research experiences, etc.)?

My goal as an undergraduate is to adequately focus and develop my research interests in preparation for selecting a graduate mentor. My involvement in research and design groups, including work in experimental soft condensed matter, optics, and electronics, has demonstrated my commitment to this aim and my love of research and problem-solving. Research through MURF would be invaluable in enabling me to do theoretical work in an area of interest while providing the opportunity for me to interact with faculty with whom I could potentially work as a graduate student. My basic professional desire as a theoretical physicist is to use mathematical reasoning as a guide in exploring essential questions about the world around me. I pursue an aptitude with established physics and mathematics as well as a level of creativity that will allow me to approach unsolved problems with an air of originality. I seek to entertain my curiosity and broaden my understanding of physics by attending research presentations and reading academic papers. The insight gained from the development of a research proposal for the MURF program, as well as the opportunities available at Caltech to expand my horizons in physics and mathematics, would be immensely beneficial to these aspirations.

What are your research interests? What about this area of research interests you?

I am interested in the theoretical study of topology in condensed matter. I like shape and dimensionality, and find it fascinating the way these simple ideas emerge into a mathematical description of the behavior of physical systems. I am drawn especially to the energetic characteristics of phases that cause discontinuities and defects in matter. I am curious about the behavior of topological defect structures and excitations, the topological characteristics of phase, and spin arrangement and geometric frustration.

I am interested in the theory of quantum computation. Computability theory has been of interest to me for some time because I am attracted to the elegance of using mathematical logic to define fundamental boundaries on what is possible. The role of quantum mechanics and topology is quantum computation attracts me especially to the study of computability and algorithm design in quantum systems.

The fundamental nature of high energy physics is a study I also find appealing. I am curious about the implications high energy physics on the nature of forces, the nature of gravitation and the reconciliation of quantum field theory and general relativity, and the beginning of the universe.

**Please elaborate further on your educational and career goals:**

I intend to graduate in 2015 with degrees in Engineering Physics and mathematics and a minor in Computer Science. I then plan to leave the University of Colorado and pursue a position elsewhere as a doctoral student in physics. My professional ambition is to do research in theoretical physics.

I strive to develop my curiosity (entertain my curiosity in…/feed my curiosity in…/satisfy my curiosity in…) (THIS PART GETS REDUNDANT AND AWKWARD. IT MAY NOT BE NECESSARY TO BOTHER WITH HOW YOU “FOSTER” THESE GOALS) and broaden my understanding of modern developments in physics by regularly attending research presentations and guest lectures ~~and~~ (as well as by) reading academic papers.

I benefit generally from research through the MURF program. Involvement in the MURF program benefits me by building my confidence in my abilities as a researcher, by providing opportunities for me to interact with faculty, become more involved in the scientific community, and by giving me an advantage in the preparation for graduate studies. Look at me

Since I determined that I had an interest in the sciences, my academic path and professional research aspirations have only been encouraged and supported by the scientific community.

In my experience, the primary gender bias maintaining the underrepresentation of women in the sciences is the need to overcome or otherwise ignore social assumptions about the place of women in society.

I identify as being underrepresented as a female in physics and mathematics, but do not feel that our underrepresentation is caused by modern discrimination. While females are underrepresented in the sciences, I do not feel that they are underappreciated / discriminated against. Directly address that women are underrepresented but that we are not discriminated against, instead of splitting it vaguely into two ideas. It is my belief that lingering societal presumptions about the abilities of women in these avenues maintain the gender differential in the sciences by tending to divert female interest in other directions before it is firmly established. While women who show interest in the sciences are not discouraged, there is a societal tendency to encourage women in other directions. My involvement in MURF, and the involvement of other women, contributes to the goals of the program by setting a precedent (? Making it more common practice) for women with technical abilities to foster their interest and pursue higher education in the sciences. Since I determined that I had an interest in the sciences, my academic path and professional research aspirations have only been encouraged and supported by the scientific community. Involvement in the MURF program benefits me by building my confidence in my abilities as a researcher, by providing opportunities for me to interact with faculty, become more involved in the scientific community, and by giving me an advantage in the preparation for graduate studies. Look at me

Every research experience I have had has gotten me closer to what I want to do forever, so I seek experiences to further that trend. My long-term professional goal as a theoretician is to puzzle and wonder about the world, and to use reason, mathematics, and logic as a guide in exploring fundamental questions about the character of the universe. I am curious by nature, but my goals are academically rigorous because I want to have enough experience with modern physical thought and enough knowledge of the extent of the discipline to be originally and innovatively curious. I pursue a greater understanding of physics by regularly attending research presentations and guest lectures. I develop my creativity outside of physics as an artist, and my curiosity through physics and through philosophy. The MURF program would help me further this interest by giving me the chance to develop a research proposal, and by supplanting me in an environment with much possibility for attending lectures and interacting with faculty in the discipline.

and to have the academic preparation and credentials to do my graduate work with the mentor that will best facilitate my interests.

As a student my extracurricular aim is to get the research experience necessary to make an informed selection of material to focus on in my honors thesis and graduate studies. My curricular aim is to have the academic preparation and credentials to not be unnecessarily constrained in my ability to do my graduate work with the mentor and in the research group that will best facilitate my interests.

I have graduate school and research ambitions, the specifics of which have been elaborated upon elsewhere in this application. The crucial interpretation of these desires is that I hope to build a career on puzzling and wondering about physical and mathematical realities; to give answers about central philosophical questions. The aptitude with the explored sciences necessary to be originally and innovatively curious in the unexplored sciences makes this a competitive and academically ambitious goal. My commitment to research and love of problem-solving is demonstrated in my involvement in extracurricular research and design, including work in electronics, optics, and chemical physics, and in my regular attendance at research presentations and colloquiums. My experience has broadened my understanding of the state of modern physics, research as a discipline, and my own strengths and weaknesses. The MURF program is an opportunity for me to continue and expand this commitment

Be very brief in the other one: degrees to pursue, and to do research after graduation. Elaborate on why you want to do these things, what you hope to get out of physics, etc. in this one.

My involvement in MURF contributes to the goals of the program by continuing to set a precedent for women with technical interests and abilities to pursue higher education in the sciences. The involvement and success of women in the MURF program furthers the cause of eradicating the notion that women are less mathematically capable and do not belong as contributors in a community still dominated by their male counterparts.

The mechanics of my academic and professional ambitions have been elaborated upon elsewhere in this application, but predominantly my desire is to make a career of puzzles and curiosity. The aptitude with the explored sciences that is required for original curiosity, to delve into what is unknown, makes these competitive and academically ambitious goals. I have demonstrated a love of problem-solving and a commitment to being a researcher by my continuous involvement in extracurricular research and design since my first semester at the university. The MURF program is an opportunity to explore the academic world, to enhance my mechanical advantage as a graduate student in the field, but most importantly it is a chance to be involved directly in the intellectual originality and ingenuity of leading professors and research groups in the field. This is an opportunity to see and experience the strategies of people being and living what I strive to be.

My goal is to make a profession of wondering and puzzling about the world. My academic ambition is to acquire the aptitude and knowledge of the explored sciences to be originally curious and delve with my work into what is not known. Participation in the MURF program is an opportunity to explore, but is, more importantly, an opportunity to foster the academic means for original curiosity: to be involved with professors and in research groups doing intellectually original things, to expand my understanding of the studied world, and to improve my chances in (1) knowing what I want to do in graduate school and (2) getting into the graduate school that does that best. I have already demonstrated my curiosity and love of research by being involved in extracurricular design and research continuously since my first semester at the university.

because it is a young discipline with much room for theoretical advancement, with grand physical implications. Notably, to know more about the nature of forces, to know more about the beginning of the universe, to reconcile the nature of gravitation between quantum field theory and the general theory of relativity.

and then to pursue a position as a doctoral student. I would like to spend some portion of my professional career in the national laboratory system doing applied theoretical work for the energy or defense departments. Eventually I would like to return to academia as a researcher, mentor, and teacher.