“The needs of the many outweigh the needs of the few”—Spock, *The Wrath of Khan.*

It should be no surprise (given my first name) that the *Star Trek* shows and films rank among my favorites, but while Kirk and I may share a name I’ve always felt a greater connection to the Enterprise’s science officer. I’ve embraced this collective Vulcan ideology from an early age—family circumstances forced me to grow up faster than I might have liked, and by age 14 I had become a semi-parent as the eldest of four children while my newly single mother worked multiple jobs to provide for us. This sudden transformation from carefree boyhood to pseudo-adulthood provoked a lot of serious introspection—the most powerful result being the realization that even a minute change in initial conditions could have drastically altered who I was, what I believed, and how I interacted with the world. This profoundly simple realization left me with the foundations of a powerful new internal set of ideals but it came at great cost—it ostracized me from the paternal half of my family as I made the difficult choice to leave the fundamentalist religion I was raised in. The core tenants of who I am today are still rooted in that early teenage realization—that our lives are determined largely by circumstances outside our control, and that those gifted with privilege should use that gift to uplift instead of subjugate.

I’ve been fortunate to have many fulfilling opportunities to put these ideals to work, the most powerful of which has been my experience volunteering in our local prisons. Last year I read a moving book by civil rights lawyer and activist Bryan Stevenson entitled *Just Mercy*, which imparted upon me a new belief—we are all better than the worst thing we’ve done. I was inspired by this text to start a program in a local prison teaching physics and coding (in Python) skills to inmates, and it’s been the most rewarding thing I’ve ever done. These are people society has largely discarded, yet nearly all of them are inherently good people who made a bad choice, with many additionally being the victims of poor circumstances, societal prejudices, and unjust laws. I empathize greatly with those of different circumstances like the inmates I’ve worked with because I can see how easily—with a few different choices or circumstances—I could have been among them. The inmates I’ve worked with have expressed more gratitude towards me than I knew possible, and they’ve concretely demonstrated to me the idea that everyone can be better than the worst thing they’ve done—it’s truly transformative to see a glimmer of hope take hold in a population who have been stripped of most possibilities, and if we as a society care about rehabilitation and not just punishment it’s imperative that these inmates know they have options upon release. Since starting this program at the beginning of the year some local news reports have been done on my work, which has enabled me to expand into a second prison as well as recruit new volunteers to offer services in a variety of disciplines for this incredibly underserved population. I hope to keep up this momentum so that when I leave for graduate school there is a strong program in place that will continue without me, and I hope to continue serving in a capacity similar to this in Boulder.

While I have no regrets, my embrace of this collective idealization has not been without personal cost—I’ve forgone opportunities in order to stay close and support my family while my mother has worked tirelessly to rebuild her career. My mother is one of my biggest role models, and I’ve always known that I’ve wanted to follow in her footsteps in pursuing an advanced degree—she recently completed an educational doctorate program and secured her first professorship at a local community college. While I have lived a relatively privileged life, money has always been tight for my family—my mother was very clear with me in high school that in order to attend college I would have to figure out a way to pay for it on my own. I’ve worked hard—often more than 30 hours a week while in school—but unfortunately today that isn’t enough to pay for everything. Without the incredibly generous financial support of scholarships and Pell grants—as well as some very flexible and supportive employers—my degree would not have been possible, and I’m incredibly grateful that so many people have believed in supporting my academic success.

I’ve taken five years to complete my degree largely because I find nearly everything fascinating—as a result I’m a diverse and well-rounded student whose collected minors in both music and applied mathematics. Originally I did not intend to major in physics, but the physical applications of calculus sparked an interest in me, which—after taking my first real physics courses—quickly kindled a great fire. I’ve engorged myself in nearly all the courses our department offered even when not required, and while I’m proud to have maintained a 4.0 GPA in my physics coursework I’m even prouder to feel as if I’ve internalized even the smallest inkling of how our universe works. I relish the opportunities where I get to impart this knowledge to others—seeing the sudden light in someone’s eyes as everything clicks into place in a blissful epiphany is often even better than having the experience yourself, and this is one of the reasons I’m so passionate about teaching and outreach.

While I enjoy being a physics evangelist of sorts, I’m also passionate about exploring the unknown—to boldly go where we haven’t gone before. I’ve been privileged to find a wonderful professor and mentor—Prof. Daryl Macomb—who I’ve worked intimately with over the past year in learning the practical details involved in studying the mysteries of the cosmos. We are searching for and analyzing accreting x-ray binary pulsars using archival CHANDRA and XMM Newton data. For that work, we’ve analyzed likely x-ray time-series observations of putative pulsar sources in the Small Magellanic Cloud to search for changes in period (using Fourier analysis) over many years driven by accretion. The trickiest problem for us has been trying to eek out detections from lower power sources that have thus far gone unnoticed, and my largest individual contribution has been developing an algorithm to test the statistical significance of finding lower-power pairs from a large background observation map I created and thus strengthen our detection confidence. For this project I’ve learned Linux, the command line and shell-scripting, learned a new programming language—Julia, have been exposed to deeper languages like Perl and Fortran, and learned to process and reduce datasets with tools like HEASOFT and SAS. Our careful analysis contributes important new details to our understanding of high-energy accretion events involving dense stellar objects, as well as putting forward new candidates for further study by the astronomical community—we are in the process of writing a paper on our results that we hope will be submitted for consideration by early spring.

I am proud to say that I’m confident I can distill my innate curiosity into tangible data and analysis, and I’m looking forward to continuing to develop these skills at Boulder. I’m particularly interested in Dr. Kazachenko’s work in solar astrophysics—my favorite class of my undergraduate career was E&M, and learning about the complicated electrodynamics surrounding our Sun would be very exciting. I’m also interested in Dr. Burn’s work, specifically with his cosmology group probing the epoch of reionization with observations from the redshifted 21-cm hydrogen line. Both of these projects would allow me to utilize and hone the computational and observational skills I’ve already developed while exploring exciting new topics that are of great interest to both myself and the astronomy community at large.

Astrophysics is the intersection of science and dreaming, and I hope to remain in academia as long as possible—helping both to unlock some tiny part of the cosmos as well as to inspire and uplift others in the field through teaching and outreach. It’s imperative to me that my future work not be done in an echo-chamber, but instead with the input and counsel of a plethora of others from as many backgrounds as possible—I was grateful to see that Boulder is embracing this sentiment as well. There are few places on our pale blue dot where research, collaboration, and the strength of diversity collide like they seem to at Boulder, and to that end I humbly submit my application to your astrophysics program, that together we might gain some new understanding of the cosmos while simultaneously making it a little better for everyone along the way.