I am interested in theoretical and computational nuclear physics, and particularly in the dynamics of quantum fluids and their implications in our understanding of nuclear interactions. A diverse research background, including projects in theoretical and experimental physics and engineering (has made me confident in my choice to pursue a research career in blah) , gives me confidence in my informed choice of discipline for graduate study and in my commitment to research. Each of my research experiences has reinforced my desire to pursue a career as a professor and researcher in order to continue my research and share mentorship relationships with passionate students and future researchers (Too many “research” – investigation, science). Furthermore, significant research in nuclear theory ( don’t use parentheses) (computational hydrodynamics of unitary Fermi gases) with supplementary involvement in the hydrodynamics of shocks and magnetic reconnection in solar flares gives me confidence in my preparation for this program of study (this is an awkward way too end this paragraph – a laundry list of big words. Don’t end with a sentence starting with “furthermore”, which is not conclusive).

I dabbled in several degree programs as a first-year student at the University of Colorado, ~~but a few too many of “why is it that way?”~~ (don’t use quotations in an essay) but the urge to dig deeper into my coursework, alongside (not satisfied with the topical explanations from intro-level courses) ~~and~~ a persistent love of problem-solving led me to a tiny honors section of freshman electricity and magnetism in which we were challenged to push our curiosity and use reason to solve problems beyond our education (beyond the usual coursework?). The experience ~~promoted my curiosity about~~ piqued my interest in research, and as a result I accepted an REU in Professor Joseph Shaw’s Optical Remote Sensing group at Montana State University for the summer after my freshman year and a research ~~assistantship~~ apprenticeship with Asst. Professor Ivan Smalyukh and the Liquid Crystal Materials Research Center at the University of Colorado for the following academic year. These experiences convinced me that I wanted to pursue a career in research, yet I found myself strongly attracted to the underlying theory of the problems I encountered. The central role of topology and abstract algebras in describing the dynamics of structures and objects in the liquid crystal medium sparked my fascination with pure mathematics, which I have pursued in parallel with my physics curriculum ever since. In the Liquid Crystal Materials group I became involved in writing simulations of liquid crystal dynamics and became interested in computational physics and theoretical fluid dynamics. To satiate (awk) my growing interest in computational physics and algorithm development, I returned to the Optical Remote Sensing group the following summer to design a set of algorithms to automate the complicated image analysis for an airborne imager.

Early in the spring of 2013, motivated by interests in theoretical physics and fluid dynamics and curiosity about high energy physics, I became involved with Dr. Paul Romatschke’s Nuclear Theory group at the University of Colorado writing simulations based on lattice kinetic theory of the Fermi gas at unitarity. Through these simulations we are able to study shear viscosity, thermal transport in these gases, ~~as well as elliptic flow~~, and elliptic flow. This project is characteristic of the approach to physics that most appeals to me: to study how the most simple / elementary of a system’s interactions convene to reveal complex macroscopic physics, and ~~furthermore~~ how modern computational resources can be cleverly used to most effect (?) for uncovering interesting physics that cannot be adequately modelled macroscopically. To explore my interests in theoretical / (so many /’s……) computational hydrodynamics in more detail and to place my simulations of hydrodynamics for nuclear theory on a stronger conceptual basis, as a junior I enrolled in introductory graduate plasma physics and subsequently elected to spend 8 weeks of my summer simulating shocks in solar flares and studying the total energy release in magnetic reconnection events with Dr. Dana Longcope at Montana State University. These brief introductions to plasma physics solidified my commitment to computational physics, broadened my understanding of modern computing and hydrodynamics simulations, and allowed me to return to Colorado with a new and exciting set of perspectives on my simulations of cold quantum gases, and on the research that I propose to continue in graduate school.

I believe that the University of Washington’s Department of Physics would be an excellent locale in which I could pursue my passions in physics and strive to attain these goals. I am drawn by the large community of nuclear theorists in the physics department and at the Institute for Nuclear Theory, and am particularly interested in the works of Drs. Aurel Bulgac and Sanjay Reddy. I ~~would potentially~~ (am ) interested in studying the shear viscosity or superfluid transition in the unitary Fermi gas with Dr. Bulgac, or in a project focused on vorticity and turbulence in quantum fluids. ~~On the other hand,~~ I would (also) be interested in a project with Dr. Sanjay Reddy studying hydrodynamics and transport in neutron stars. (BE MORE SPECIFIC ABOUT THESE PROJECT PROPOSALS, BUT NAME MORE PROFESSORS?). (SO much fluff in this paragraph. Could shorten significantly without loss of content.) Although research is my primary attraction to the UW, I would furthermore welcome the opportunity to enjoy Seattle’s excellent jazz scene and to explore the local outdoors.

**THIS READS LIKE AN ESSAY ABOUT YOUR PAST RESEARCH. THAT IS AN IMPORTANT PART BUT SHOULDN’T BE THE ONLY THING.**