1. **Please provide a brief statement of your research interests and goals.**

My research interest is in the major area of theoretical physics and also particle and nuclear physics. My interest is working to understand the fundamental building blocks of matter. During my first master’s degree my research had a focus on radiation detection. I worked heavily with a variety of detectors with a focus on alpha, beta, gamma and neutron radiation. This research further added to my desire to understand what constitutes matter at an even smaller scale. After having spoken with and read a lot of research being engaged in at the University of British Columbia I found a large range of research groups and faculty engaged in areas of physics I would deeply desire to research.

For the major research area of particle and nuclear physics the work being done by Kris Sigurdson, Joanna Karczmarek, Alison Lister, Moshe Rozali and Mark Van Raamsdonk is very fascinating. The areas that stand out to me include Particle Dark Matter, Dark Energy, String theory and Experimental Subatomic Physics. I would like to understand more why some matter remains so elusive and difficult to detect. In the area of theoretical physics the research of Jeremy Heyl, Robert Raussendorf, [Gordon Semenoff](http://www.phas.ubc.ca/users/gordon-semenoff) and Douglas Scott is very interesting. The research they are doing that stands out includes Theoretical Elementary Particle Physics and String Theory.

I hope to use my background in radiation detection and instrumentation to find new ways to detect and understand matter. My master’s thesis involved using my research findings to design software and my goal would be to have a smaller component of my research utilize principals of computational physics and computer simulations. I have a strong interest in the power of computation and hope to continue with utilizing and developing algorithms as a tool of my research.

The University of British Columbia would be able to provide me with ideal faculty and resources to excel and gain the tools to become a leading physics researcher. Some of the resources that stand out to me include Canada's High Performance Computing network, the Pacific Institute of Theoretical Physics, and TRIUMF.My goal is to gain my PhD in physics at the University of British Columbia and then to work as a Professor in Physics. I am drawn to this field because of the quantitative challenge and mathematical complexities of the field but also due to my sense of wonder of the world around us. Most scientists dream of contributing a major breakthrough in their field and I am driven by the same passion, but even to make a small contribution to physics would be an honor.

1. **Please discuss any other information you feel would be important to the Admission Committee in evaluating your application to the Faculty of Graduate Studies. If you feel that your credentials and any other information you have already provided on this form or will be submitting to the Department in support of your application represents you fairly, you should feel no obligation to write anything further here.**

I feel it is important to address my background, why and how I became interested in theoretical physics and how these experiences, which are rather unique, will allow me to excel as a graduate student at the University of British Columbia. I also would like to address my reasons for applying at the master’s degree level and how it is my hope, if accepted, to remain for a PhD.

Being a first generation college student when I came to University I was unaware of graduate school or how academia is structured. I was however, fascinated with the structure of matter. Questions that involve how our universe is built and what is the structure of matter captivated my interest. The more I learned the more I wanted to know and understand. I spoke with faculty in the Nuclear Engineering Department at Oregon State University and began to pursue a Nuclear Engineering degree. It was during this time that I took many of the math and physics courses that will allow me to be successful as a master’s candidate at the University of British Columbia. However, I was not sure about career prospects in Nuclear Engineering and decided to transfer to and finish a degree in Health Management and Policy since my father had done well in healthcare. After working an internship I realized my real passion was science and working as a Professor at a research University.

I spoke with faculty in the Department of Nuclear Engineering and Radiation Health Physics and applied for and started my master’s degree. This was an incredible experience; I was selected for a full ride through the Nuclear Regulatory Commission and our Department. I was chosen to design software for digital radiation detection and measurement. I also was chosen as a teaching assistant and applied for and was selected to work as a part time instructor in the Diagnostic Imaging program at LBCC. As an instructor I taught and completely designed all the tests and course materials for two courses, Radiation Production and Characteristics and Radiation Biology. I was positive I wanted to gain my PhD and was accepted into a PhD program in Medical Physics through a joint program with Oregon State University and the Oregon Health and Science University. I was given a full ride and also nominated by faculty and chosen as an ARCS Fellow, there is generally only one student chosen per Department. The fellowship provides an additional $6,000 a year and mentorship from leaders in the field. The program and research into oncology was interesting but after setting up and completing a practicum in Good Samaritan’s Oncology Department I knew that I did not want to have a career as a Medical Physicist at a hospital.

I was also offered another full ride as an Employer Relations Assistant that would fund me completing an MBA as I had been taking graduate business courses during my first master’s degree. I decided to choose this and finished my MBA planning to still apply for a Ph.D. but realizing that an opportunity for a full ride does not come along very often and that an MBA was something that would be very useful. During my MBA I constantly spent my spare time working on math, physics and computer science problems and continued to read and learn about Dark Matter and String Theory.

**I know for a fact that even though my road has been winding my goal is to gain a PhD. I feel strongly about it and after talking to many faculty members know that I need to apply for a program that fits my interest. My academic path was foreshadowed by an experience I had as a child. When I was a young my two older brothers and I would always stare, fascinated at a large radio tower on a high mountain near a store where we would go shopping. We determined that we would hike up the mountain and see this tower up close.**

**The hike up the mountain proved much longer and difficult then we imagined. It got incredibly hot, we had to cross a mountain stream and the undergrowth was almost impassable in many places. We often had to turn back and go further through the forest to find places we could continue upwards to reach the top. It took us all day but we made it and the view below and of the radio tower was worth all the troubles. We also found out that there was a fire road up the back of the mountain; we could have come up that in less than about a fifth of the time without the cuts and trouble. I however, would not change the experience for anything; it is one of my fond memories of childhood. My path to get where I am has been unique, but the path to my PhD is a lot like that experience. Gaining my Ph.D. in physics will be a lot like reaching the top of the mountain and from there I feel that many more exciting adventures will begin. My experiences have given me a breadth of knowledge and a lot of tools that will make me a strong PhD candidate with the ability to approach problems with a background that allows me to see them from a variety of perspectives.**

My background is unique and I am aware of that, but I know strongly that it will allow me to excel as a researcher at the University of British Columbia. There are a number of reasons that I am well prepared and would do well here as a graduate student. The first is that I have completed two master’s degrees while working as an instructor, research assistant and teaching assistant. These both involved completing a thesis. This has furthered my ability to engage in research and work well with a wide range of faculty. My computer science course work and thesis designing software will allow me to bring a computational aspect to my research. Also, my heavy research into detection and work with detectors including gas-filled, scintillation and semiconductor detectors working with alpha, beta, gamma, and neutron radiation would be especially useful for a lot of research being engaged in at the UBC.

My rationale for applying at the master’s level is due to the following. I feel that since my undergraduate is not in physics it will allow me to really strengthen my mathematics skills before beginning a PhD. It will also allow me to engage with faculty and begin research that hopefully will carry into my PhD. While researching the UBC website I found that the program offers a direct transfer to PhD which I would be possibly interested in, if my Committee felt it would be a good idea.

It is the unknown that drives me. I want to work to help unravel mysteries. The teams working on dark matter and string theory hold my attention and make me excited at the possibility of joining them. Having completed two master’s degrees I know that graduate school requires a lot of perseverance and hard work. It can also require intense focus on large amounts of data while also paying attention to small details. I have always managed to maintain a strong work life balance that has made graduate school very enjoyable. Part of what makes graduate school exciting is the friendships you make along the way. If accepted at UBC, I would be actively engaged in the Department as I work to learn as much as I can while making new friends and exploring a beautiful city. Hopefully this has shown my incredible passion to pursue this field and to do so at the University of British Columbia.