

## Graduate student profile:

### Roxy Fournier

PhD, 2<sup>nd</sup> Year, Harrison Group

#### Previous degrees:

B.Sc Biology, University of Victoria

#### Tell us about your research at UTSC:

*Astronauts face a serious challenge in space: how do they prevent their bones from becoming weak and fragile due to microgravity? Recently, it has been theorized that osteocytes play a central role in astronaut bone loss and other disuse-related bone pathologies. However, research on this cell type has been greatly limited as they are deeply embedded in the dense, calcified matrix of bone tissue. Osteocytes are therefore difficult to purify and impossible to see under light microscopy.*

*My project will address this limitation by developing a novel 3D osteoid-like matrix and culturing an osteocyte cell line within it to produce an environment more closely resembling osteocyte organization in vivo. This 3D matrix will be exposed to either: simulated microgravity, static conditions or simulated loading/weight-bearing. The 3D environment is important because it allows the cultured osteocytes to extend their dendrites, the membrane “branches” where most mechanosensing occurs, to extend in all directions — improving sensitivity to mechanical forces and the physiological relevance of the model.*

*Genes affected in simulated microgravity will then be identified and studied to elucidate the mechanisms responsible for astronaut bone loss. Once these mechanisms are established, therapeutic intervention can be explored to mitigate bone loss in astronauts and perhaps even patients afflicted with osteoporosis. This research will have a profound impact on astronaut health and their ability to undertake long-term space missions.*

#### Tell us about why you chose your graduate program or lab:

*My intention for my graduate studies was to work with a PI with experience in cell biology in space or microgravity. Dr. Rene Harrison’s lab was a perfect fit for me as she has previously lead a space mission involving osteoblasts and osteoclasts. She and I share common interests such as space exploration and astronaut bone health.*

#### Tell us about any fellowships you hold / have held in grad school:

*U of T Tuition Fellowship 2015-2016*

*U of T Tuition Fellowship 2016-2017*



*Aiken-Woods Memorial Graduate Scholarship in Cell and Systems Biology 2016-2017*

**What are your future career goals and how has your graduate work set you up to achieve those goals?**

*My goals will definitely be assisted by my graduate studies at U of T. I intend to apply the skills I've learned and the knowledge I've gained to expanding Canada's space life sciences program at the Canadian Space Agency.*

**Tell us about life in Toronto:**

*I fell in love with Toronto as soon as I arrived from my previous hometown of Vancouver. It is an incredibly fast-paced, vibrant, multi-cultural city. I am never bored here.*

**Complete the sentence:**

*In my free time I like to train for trail ultramarathons*

**Do you have any advice for prospective students?**

*Don't let the graduate work consume you. Get out there and live the experiences of this amazing city.*

**Tell us about your craziest experimental finding or experience:**

*Traditional 3D collagen matrices are too fragile for mechanical loading experiments. The first time I successfully produced mechanically stable matrices, I got so excited that I made videos and showed it to all my family and friends.*

**Tell us something about where you are from:**

*I grew up in Victoria, B.C. I truly miss the natural beauty of the ocean and mountains, especially the fantastic running trails and hikes that cannot be found here in Toronto.*