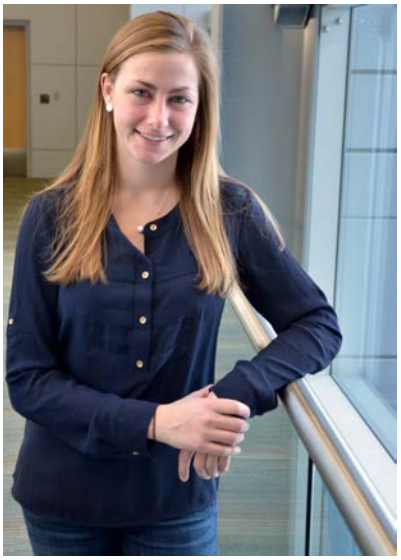
Alberta SPOR SUPPORT Unit

Danielle Whittier



Biography

Leading up to graduate studies, Danielle has had a dynamic career path. She completed her Bachelor's degree in Engineering Physics at Queen's University. Upon graduation she returned to Calgary, her hometown, where she pursued a career in operations & management consulting at a boutique consulting firm. During this time, she helped major commodity-based facilities across Canada implement operational changes to improve efficiencies and to cut costs. Although she gained valuable experience through this role, she wished to seek out a career that better aligned with her personal interests.

As an avid skier and mountaineer, Danielle soon found her passion in bone & joint health. More specifically, she saw an opportunity to apply engineering principles to solve challenging problems faced in musculoskeletal healthcare. As a result, she joined the Bone Imaging Laboratory at the University of Calgary to pursue her Master's in Biomedical Engineering. Since commencing her studies in May 2016, Danielle has collaborated with clinical researchers to successfully author three abstracts which have gone on to be accepted at local, national, and international conferences. Today, she strives to bring a patient-oriented approach to her research and the laboratory setting. Her thesis project will investigate the correlation between hip fractures and bone microstructure in hopes of developing better screening techniques for osteoporosis. By taking on a patient-oriented approach in the early stages of this project she in hopes to better align research outcomes with patient interests.

Project Summary

Prediction and Systematic Prevention of Fragility Fractures at the Hip using HR-pQCT as a Novel Method for Diagnosis of Osteoporosis

Hip fractures caused by osteoporosis have a devastating impact; over one third of individuals who suffer a hip fracture die within the following year. For those who survive, quality of life is drastically reduced. Unfortunately, it is very difficult to predict who will have a fracture with current clinical

bone imaging methods. This is because they are low-resolution and only provide a two-dimensional image, which cannot directly measure bone strength.

Alternatively, emerging three-dimensional (3D) imaging methods can show bone structure at very high resolutions, and presents a promising way to accurately assess bone fragility beyond clinical methods used today. This research project will use state-of-the-art 3D imaging techniques to determine how bone microstructure affects individual bone strength. We will determine what specific features of bone microstructure underpin bone fragility by comparing the bone structure of hip fracture patients to healthy individuals.

By working with the patients involved in this study we will identify gaps in patient care where screening for osteoporosis could have occurred before such a fracture occurred. With their help, we will propose systematic changes to healthcare practices that will ensure at-risk individuals are appropriately screened, and treated for osteoporosis as early as possible. Improvements will be tested and implemented in collaboration with the Fracture Liaison Services (FLS), recently established in Alberta. This project provides an exceptional opportunity to make an important leap towards the development of better screening tools and practices to ultimately reduce the impact of fragility fractures on our health care system.