Jillian S. Gauld
Freshman
Queen's University
Major: Biology

Faculty Advisor: Angela Buckman

Program:
Research Alliance in Math & Science

Email: gauldjs@ornl.gov
Home: goldiejiggs@hotmail.com

Research Area: Computational Sciences and Engineering

Femoropopliteal (fem-pop) bypass is a medical procedure that treats peripheral vascular disease due to atherosclerosis by surgically bypassing the diseased portion of the artery with a graft. One potential side effect of the fem-pop is the development of intimal hyperplasia (IH), in the area where the graft is joined to the blood vessel. IH is characterized by the influx of cells from the middle portion of the artery into the innermost portion of the artery, resulting in an obstruction or restenosis of the artery. IH seems to occur with greater frequency in post-menopausal women who have undergone fem-pop bypass than in pre-menopausal women who have undergone the same procedure. This observation lends its weight to the theory that estrogen has vascular protective effects. Alarmingly, hormone replacement therapy (HRT) appears to have an opposite effect on IH after fem-pop bypass. Instead of minimizing IH in post-bypass patients, HRT appears to aggravate its consequences. Currently the Computational Sciences and Engineering Division (CSED) is partnering with the University of Tennessee (UT) Medical Center to design a computational model to explain this, and other phenomenon related to IH.

Previous work on this topic has shown the need for a more defined set of physiological parameters that would indicate success or failure of fem-pop bypass in post-menopausal women with or without HRT. I will be working toward determining the statistical significance of factors relating to fem-pop bypass success in post-menopausal women by conducting a data mining analysis of patient record information at UT Medical Center and developing a statistical model. My goals are to statistically determine whether estrogen has protective effects on the outcome of IH, and to develop a statistical model using a software package to determine the relevant parametric predictors that may play a role in the causation of fem-pop bypass success or failure with HRT.

Research Mentor:

Kara Kruse, M.S.E
Computational Sciences and Engineering Division
Oak Ridge National Laboratory
(865) 574-5154
krusekl@ornl.gov