



**NOTICE OF  
UNIVERSITY ORAL**  
GEODESY AND GEOMATICS ENGINEERING

**Master of Science in Engineering**

**David Bowater**

**Wednesday, April 3 @ 2:30 pm**

**Head Hall – Room E-11**

**Board of Examiners:**

**Supervisor(s):** Emmanuel Stefanakis, University of Calgary  
**Examining Board:** Shabnam Jabari, Geodesy & Geomatics Eng.  
Michael W. Fleming, Faculty of Computer Science  
**Chair:** Monica Wachowicz, Geodesy & Geomatics Eng.

**EXPLORING THE USABILITY OF THE RHEALPIX DISCRETE  
GLOBAL GRID SYSTEM**

**ABSTRACT**

Discrete Global Grid Systems (DGGs) are important in many geospatial research domains including Digital Earth, the Open Geospatial Consortium (OGC), and big data. Although a considerable amount of research has focused on hexagonal- and triangular-based DGGs, these approaches are not optimal in all applications. Therefore, consideration should also be given to quadrilateral-based DGGs, especially those that exhibit interesting or unique properties. This study focuses on a promising quadrilateral-based approach called the rHEALPix DGG, which conforms to the OGC DGG Abstract Specification and has many interesting properties that distinguish it from other DGGs. In particular, this study explores how cell shape and cell orientation vary on the rHEALPix DGG, and considers how these variations impact grid creation over Canada. Additionally, an open-source web service for creating quadrilateral grids based on the rHEALPix DGG is presented, which aims to increase usability, assist interoperability studies, and increase options for researchers. Lastly, this study explores an interesting property of the rHEALPix DGG that makes it well suited to geospatial applications involving harmonic analysis: distribution of cell nuclei along rings of constant latitude (or isolatitude rings). To facilitate harmonic computations and advance this research direction, a method is presented that extends existing work on the rHEALPix DGG to convert any cell ID to isolatitude ring without recourse to geodetic coordinates.

**Faculty Members and Graduate Students are invited to attend this presentation.**