NOTICE OF THESIS PROPOSAL PRESENTATION

Geodesy and Geomatics Engineering

Master of Science in Engineering

Kaine Black

Tuesday, July 3, 2018 @ 10:00 am
Head Hall – ADI Studio room C-25

Supervisor:	Monica Wachowicz, Geodesy and Geomatics Engineering
Supervisory Committee:	Emmanuel Stefanakis, Geodesy and Geomatics Engineering
	Carlos Granell Canut, UJI, Spain
Chair:	TBA

Clustering Bipartite Graphs to Model IoT Networks

ABSTRACT

The era of the Internet of Things (IoT) is becoming a reality as real-life examples of IoT devices and infrastructures are being deployed in smart cities and having the capability to communicate with one another and make decisions or complete some common goal to improve energy consumption, waste management, lighting, traffic, parking, and public transportation. These devices create a complex network in which they often move together or in conjunction with one another to complete these goals. Understanding how these devices behave around one another is important for sustainable mobility.

Using real world datasets that are representative of IoT networks, the research work will be focus on exploring how the moving IoT devices can be represented as a bipartite graph. The *mobility neighborhood* is introduced in this research as a conceptual artifact that is capable of modelling the proximity of moving IoT devices in a network. Once this network is successfully modelled as a bipartite graph, the Louvain community detection is proposed to uncover communities (i.e. clusters) of IoT devices that are moving close to each other. Analyzing these communities of IoT devices as they change over time will provide new insights on the individual behavior of these devices as well as their group behavior around one another.

The expected results are that the Louvain communities of IoT devices will have a high modularity meaning that each community is inter-related, but the communities are sparsely intra-related. Any network could be represented using a bipartite graph, and I expect that the proposed approach could be generally applied to different networks such as vehicles, vessels or mobile phones.

Faculty Members and Graduate Students are invited to attend the presentation