



THE FLORIDA ATLANTIC UNIVERSITY

COLLEGE OF ENGINEERING & COMPUTER SCIENCE

announces the

Ph.D. Dissertation Defense

of

Army Ambrose

for the degree of

DOCTOR OF PHILOSOPHY (PH.D.)

OCTOBER 28, 2011 at 4:30 PM

In

EE405

777 Glades Road

Boca Raton, FL

DEPARTMENT: Computer and Electrical Engineering & Computer Science

DISSERTATION TITLE: A Patient-centric Hurricane Evacuation Management System

CHAIR OF THE CANDIDATE'S PH.D. COMMITTEE:

Dr. Mihaela Cardei

PH.D. SUPERVISORY COMMITTEE:

Dr. Imad Mahgoub

Dr. Ionut Cardei

Dr. Xin Wang

Dr. Mirjana Pavlovic

ABSTRACT OF DISSERTATION

A Patient-centric Hurricane Evacuation Management System

The use of wireless sensor networks for a myriad of applications is increasing. They can be used in healthcare for emergency management. In Florida, hurricanes are the main source of natural disasters. There has been a high incidence of hurricanes over the past decade. When a hurricane warning is issued it is important that people, who live in potentially dangerous areas such as along the coast, evacuate for their safety. Nursing homes and other care facilities for elderly or disabled people experience difficulty with the evacuation as their residents require additional assistance. The characteristics and challenges of a hurricane evacuation are investigated. A patient-centric hurricane evacuation management system is proposed to allow healthcare providers the ability to continuously monitor and track patients. During a hurricane there are usually scarce energy resources and a loss of basic communication services such as cellular service and Internet access. We propose the architecture of the system that allows it to operate in the absence of these services. The hardware and software architectures are also presented long with the main phases of operation. The system was then validated and the performance evaluated via simulation using the OPNET Modeler.

BIOGRAPHICAL SKETCH

Born in Castries, Saint Lucia

B.S. May 2007, Florida Atlantic University

M.S. December 2008, Florida Atlantic University

QUALIFYING EXAMINATION & PUBLICATIONS

Time in Preparation: 2009—2011

Qualifying Examination Passed: Fall 2009

Selected Publications:

- A. Ambrose, M. Cardei, and I. Cardei, "Patient-centric Hurricane Evacuation Management System," in *Proc. of IEEE International Performance Computing and Communications Conference (IPCCC)*, December 2010.
- Y. Yang, A. Ambrose, and M. Cardei, "Sensor Scheduling Mechanisms for Composite Event Detection in Wireless Sensor Networks," in *Proc. of IEEE International Conference on Computer Communications (INFOCOM)*, Student Workshop, April 2009.
- M. Fonoage, M. Cardei, and A. Ambrose, "A QoS Based Routing Protocol for Wireless Sensor Networks," in *Proc. of IEEE International Performance Computing and Communications Conference (IPCCC)*, December 2010.
- Y. Yang, A. Ambrose, and M. Cardei, "Coverage for Composite Event Detection in Wireless Sensor Networks," *Wireless Communications and Mobile Computing, Wiley InterScience*, Vol. 11, Issue 8, pp. 1168-1181, Aug. 2011.
- A. Ambrose and M. Cardei, "Sensor Networks in Healthcare, Pervasive Communications Handbook," S. Shah, M. Ilyas, and H. Mouftah (eds.), CRC Press, November 2011, ISBN: 9781420051094.
- A. Ambrose, M. Cardei, and I. Cardei, "HEMS, a Hurricane Evacuation Management System," submitted to *IEEE Transactions on Parallel and Distributed Systems (TPDS)*