Department of Systems Engineering and Engineering Management

Seminar Series

Reliability Models in Healthcare Logistics

Dr. Jose Emmanuel Ramirez-Marquez

School of Systems & Enterprises
Stevens Institute of Technology

Date:	15 June 2015 (Monday)
Time:	10:30am (Tea/Coffee service at 10:15am)
Venue:	P6921, 6/F, AC1

Abstract

This presentation will describe applications of reliability models to current problems in healthcare logistics. In particular, two specific problems will be addressed:

1. Optimal Placement of Public-Access AEDs in Urban Environments: Use of public-access Automated External Debrillators (AEDs) is showing promising results in decreasing collapse-to-shock times among Sudden Cardiac Arrest (SCA) patients which is associated with improved patient outcomes. Bystander access to these medical devices ensure that the necessary care to victims of SCA is provided prior to arrival of emergency responders. The novelty of this research is as follows: 1) the use of route-based walking time instead of straight-line approximations; 2) introduction of temporal availability in deployed devices to account for location hours-of-operation; 3) use of a multi-

objective optimization to balance decision-maker objectives; 4) the implementation of an interactive decision-maker tool for observing effects on benefits and costs.

2. Optimal Scheduling of outpatient care: This talk describes the optimization process for scheduling visits of outcare hospital patients using the rules in the manual of standard operations of a partner hospital. The objective of the optimization is to maximize the number of patients to visit and to minimize the number of staff members. This is done by minimizing the routes between patients that need to be visited by the same staff members and by pairing staff members with patients using geographical information. Additionally, the algorithm balances the work-load of staff members and takes into account the preferences of the patients in terms of hours for visitations.

About the Speaker

Dr. Jose Emmanuel Ramirez-Marquez is Director of the Engineering Management program and Associate Professor in the School of Systems & Enterprises at Stevens Institute of Technology. A former Fulbright Scholar, he holds degrees from Rutgers University in Industrial Engineering (Ph.D. and M.Sc.) and Statistics (M.Sc.) and from Universidad Nacional Autonoma de Mexico in Actuarial Science. His research efforts focus on the development of mathematical models for the analysis and computation of system operational effectiveness; reliability and vulnerability analysis as the basis for designing system resilience. He also works at the intersection of evolutionary computation for the optimization of complex problems associated with system performance and design. In these areas, Dr. Ramirez-Marquez has conducted funded research for both private industry and government and, has published over 100 refereed manuscripts in technical journals, book chapters and industry reports. Dr. Ramirez-

Marquez has presented his research findings nationally and internationally in conferences such as INFORMS, ISERC, INCOSE, CESUN and, ESREL. He has served as the President of the Quality Control and Reliability division board of the Institute of Industrial Engineers and he is a member of the Technical Committee on System Reliability for the European Safety and Reliability Association.

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All are Welcome!

SEEM Seminar 2014-2015/034