

Scott T. Roche
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Education

Cornell University, College of Arts and Sciences Ithaca, NY
B.A., Dual Major Mathematics and Biology, 2005

Northeastern University Boston, MA
M.S. in Applied and Industrial Mathematics, 2010

Northeastern University Boston, MA
PhD Student (in progress), Computer Science, Theory and Networked Systems Lab, expt. 2014

Research Experience

Epidemic processes on finite networks (June 2011 - January 2013)

Studied rapid, network-wide decentralized information dissemination using an epidemic-style SIS process as an alternative to rumor spreading or simple random walks. Proved a polylogarithmic cover time in well-connected (expander) graphs and linear cover time of trees and other graphs of low connectivity. Wrote code to simulate process on random and real world example graphs. Paper in submission to SPAA 2013.

Scheduling on Directed Acyclic Graphs with volatile computing resources (August 2012 - Present)

Project to find efficient scheduling algorithms for tasks with dependencies under uncertainty in computing platform resources. Developed and simulated approximation algorithm based on a relaxation of a Linear Program for scheduling problem. Adapted existing scheduling algorithms to handle simplified task graphs.

Howard Hughes Medical Institute, Summer Scholar, Cornell University, Summer 2004.

Studied models of evolution of resistance to disease in commercially important Northeastern hardwood tree species. Developed analytical model of disease dynamics and incorporated into large-scale forest simulator.

Work Experience

Northeastern University, in collab. with BAE Systems, BBN/Raytheon, and DARPA

Research Assistant, June 2011 - Present

- Constructed support vector regression model to predict data transmission rates under uncertain jammer activity
- Wrote package to optimize radio anti-jammer strategies using game-theoretic methods (computation of Markov Chain between local Nash equilibria).

Simon-Kucher and Partners, Strategy and Marketing Consultants

Senior Consultant, June 2005 - January 2009

- Served as primary statistical and modeling consultant and advisor on projects
- Designed, analyzed, and interpreted choice prediction models (multinomial logit, probit, hierarchical Bayes discrete choice)
- Built integrated database, modeling, and data visualization software for major customer.

Teaching Experience

Northeastern University

- Instructor, Discrete Mathematics, Spring 2011. Won college's Graduate Teaching Award.
- Teaching Assistant, Discrete Mathematics, Fall 2010.

Simon-Kucher and Partners

- Developed and taught multi-session tutorials: "Statistical Analysis in R", "Writing Macros in Visual Basic", "Optimizing Multi-dimensional Functions", "Introduction to Discrete Choice Prediction." 2006-2009

Coursework

Algorithms, Approximation Algorithms, Network Algorithms and Analysis, Machine Learning, Probability, Point Estimation, Systems, Theory of Computer Science, Principles of Programming Languages, Graph Theory, Combinatorics, Optimization, Real Analysis

Publications

"Coalescing-branching walks on finite graphs." Chinmoy Dutta, Gopal Pandurangan, Rajmohan Rajaraman and Scott Roche. *Earlier version of paper was accepted as Brief Announcement for PODC 12 but we opted not to present it. Available at <http://www.ccs.neu.edu/home/str/publications.html>*

Skills

Languages: Python, R, Java, VBA, LaTeX, Scheme/Racket, C, SQL, Common Lisp

Software: Linux/Unix, Matlab, weka, Excel, MySQL, Access, Hadoop, git, svn