
EDUCATION

Cornell University, Ithaca, NY

- Ph.D. in Electrical and Computer Engineering, expected January 2015.
Thesis Title: Optimal Topologies and Algorithms for Minimizing Data Retransmissions in Wireless Networks.
Thesis Advisor: Prof. Zygmunt J. Haas.
- M.S. in Electrical and Computer Engineering, January 2014, GPA: 3.88

Courses: CS - Structure of information networks, Heuristic optimization, Approximation algorithms, Parallel computers applications; ECE - Fundamentals of networks, Digital communications; PSYCH - Sensory construction;

SUNY: College at Brockport

- B.S. in Computer Science, B.S. in Mathematics, Minor in Physics, May 2009, GPA 3.95, *Summa Cum Laude*

Select courses: CS - Operating systems, Algorithms, Artificial intelligence, Programming languages, Object oriented design; MATH: Probability and statistics, Abstract algebra, Real analysis, Calculus III;

RESEARCH EXPERIENCE

Research Assistant Wireless Networks Laboratory, Cornell University Fall 2009 - Fall 2014

Wireless Networks Design: <http://www.mnikolov.com/tc> November 2012 - March 2014

- Investigated automated positioning of devices in wireless networks for optimal throughput and latency.
- Showed optimal algorithm runtime is $O(2^n)$. Designed 97%-effective $O(n^2)$ heuristic.

Data Reporting in Sensor Networks: <http://www.mnikolov.com/es> June 2011 - October 2012

- Formulated new data encoding algorithms leveraging correlation models of measurements.
- Improved radio energy consumption by a factor of two over the existing schemes.

Broadcast in Mobile Networks: <http://www.mnikolov.com/bc> October 2009 - May 2011

- Developed a new distributed algorithm based on graphical models for wireless broadcast.
- Improved broadcast efficiency by at least 20% and reduced device cost by 30% over competitive algorithms.

Interdisciplinary Projects Cornell University

Modeling Inequality in Social Interactions: <http://www.mnikolov.com/sn> Spring 2011 - Fall 2011

- Interdisciplinary collaboration to model social interaction inequality as a function of graph degree distributions.
- Mined large-scale data from social networks, e.g. 539,800+ individuals on CouchSurfing.

On-chip Routing: <http://www.mnikolov.com/nc> Fall 2010

- Collaborated w/ team of 4 to design and evaluate new routing algorithms for multi-core chips.

Research Assistant CS Department, SUNY: College at Brockport Fall 2007 - Fall 2009

MANET for Ubiquitous Connectivity: <http://goo.gl/Cu1j8s> Fall 2008 - Spring 2009

- Designed a communication framework to provide heterogeneous connectivity in the NYC Subway system based on the deployment of Mobile Ad-hoc Networks (MANET).

Game Theory for Security and Efficiency in MANET: <http://goo.gl/bM3gHG> Fall 2008 - Spring 2009

- Described novel applications of game theory results to security and QoS problems in Mobile Ad-hoc Networks (MANET).

Routing in MANET: <http://goo.gl/T50IC3> Fall 2007 - Spring 2008

- Proposed a novel hybrid Mobile Ad-hoc Network (MANET) routing protocol implementation to decrease network control overhead and improve MANET's load balancing policy.

TEACHING EXPERIENCE

Teaching Assistant Cornell University Spring 2013

- Course: Wireless Networks - led weekly problem sessions for students (class of 30+).
- Course: Wireless Networks - supervised course graders.

Teaching Assistant Cornell University Fall 2011

- Course: Fundamentals of Networks - graded homeworks for the graduate level class on networks modeling.

Tutor **SUNY: College at Brockport** **Fall 2008**
• Course: Fundamentals of Computer Science II - assisted 30 students in the class; explained introductory concepts in abstract data structures, object oriented programming, and Java.

Teaching Assistant **SUNY: College at Brockport** **Fall 2007, Spring 2008**
• Led study sessions and graded homeworks for Discrete Mathematics and Linear Algebra.

WORK EXPERIENCE

Web Developer, Web Services **SUNY: College at Brockport** **2006 - 2009**
• Designed, implemented and deployed 10+ client-server web applications utilizing the Model-View-Controller user interface paradigm. Projects' code in Object Oriented PHP, MySQL, JavaScript.
• Created and maintained more than 10 departmental websites.

Supervisor, ITS Helpdesk support **SUNY: College at Brockport** **2006 - 2009**
• Helped students and faculty with computer usage problems at the college computer facilities.

SELECTED INDEPENDENT TECHNICAL PROJECTS

Mirlix: Lyrics Revisited: <http://www.mirlix.net> Spring 2013 - Spring 2014
• Extracted 800,000+ songs from the web into a key-value database, augmented with tf-idf based search engine.
• Implemented ad-free web-interface running on Amazon EC2 instance. (JavaScript, PHP and Java)

PUBLICATIONS

Conferences and Workshops

- with Zygmunt J. Haas, "Collaborating with Correlation for Energy Efficient WSN", ACM MobiCom International Workshop on Mission-Oriented Wireless Sensor Networking, Istanbul, Turkey, August 2012.
- with Milena Tsvetkova, "Mechanisms for Long-Tailed Degree Distributions in Social Interaction Networks." International Sunbelt Social Networks Conference, Redondo Beach, CA, March 2012.
- with Zygmunt J. Haas, "Towards Optimal Broadcast in Wireless Networks", ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems, Miami Beach, FL, November 2011.
- with Nithin Michael, Ao Tang, G. Edward Suh, Christopher Batten, "Analysis of Application-Aware On-Chip Routing under Traffic Uncertainty", ACM/IEEE International Symposium on Networks-on-Chip, PA, May 2011.

Journals

- with Zygmunt J. Haas, "Towards Optimal Broadcast in Wireless Networks: Algorithms and Bounds", IEEE Transactions on Mobile Computing, vol.13, no.11, Nov. 2014.
- with Zygmunt J. Haas, "Encoded Sensing for Energy Efficient Wireless Networks", ACM Transactions on Sensor Networks, *in submission*.
- with Zygmunt J. Haas, "Optimal Topology for Relays in Wireless Networks", *in preparation*.
- with Milena Tsvetkova, "Mechanisms for Long-Tailed Degree Distributions in Social Interaction Networks", *in preparation*.

TALKS AND PRESENTATIONS (SUBSET)

- Presenter, "Encoded Sensing for Energy Efficient Wireless Networks", ACM MobiCom International Workshop on Mission-Oriented Wireless Sensor Networking, Istanbul, Turkey, August 2012.
- Presenter, "Towards Optimal Broadcast in Wireless Networks", ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems, Miami Beach, FL, November 2011.
- Presenter, "A Game Theoretical Approach to Improve Security and Resource Utilization in Mobile Ad-hoc Networks", National Conference Undergraduate Research, University of Wisconsin-La Crosse, La Crosse, WI, 2009
- Presenter, "Exploiting Mobile Ad Hoc Networking to Provide Connectivity in New York City Subway Stations System", National Conference Undergraduate Research, University of Wisconsin-La Crosse, La Crosse, WI, 2009
- Presenter, "Dynamically Switched Protocol (DSP): A New Hybrid Reactive Routing Protocol For Mobile Ad Hoc Networks", National Conference Undergraduate Research, Salisbury University, Salisbury, MD, 2008

GRANTS

Data Centers Power Management: <http://www.mnikolov.com/dc> Spring 2013 - Fall 2014
• Drafted a new strategy and research proposal on job-centered power management policies for data centers.
• Awarded \$160,000 NSF EAGER Grant. (Principal Investigator: Prof. Zygmunt J. Haas)

AWARDS AND HONORS

- *Best Paper Award*, ACM MobiCom, Workshop on Mission-Oriented Wireless Sensor Networking. 2012

- *Chancellor's Award for Student Excellence*, State University of New York (inc. all 64 campuses). 2009
- *Computer Science Program Scholar Award*, SUNY: College at Brockport. 2008
- *Winner, Symbian Ltd. International Essay Contest*, Breakthrough Technology Improvements, £1000. 2008
- *Sigma Xi Award for Computer Science Research*, SUNY: College at Brockport. 2008
- *Honor societies*: Alpha Chi, Pi Mu Epsilon, Sigma Xi.
- *Honors Liberal Arts Delta Program Scholar Award*, SUNY: College at Brockport. 2008
- *Computer Science Departmental Award*, SUNY: College at Brockport 2007
- *Mathematics Departmental Award*, SUNY: College at Brockport 2007
- *The College at Brockport Distinguished Scholar in Residence Scholarship*, Tuition, Room & Board. 2005 - 2009
- *The College at Brockport Scholar Recognition Award*, 2005 - 2009
- 2nd place, ACM SIGCSE, CCSC Eastern, Team Programming Contest, 2006.

SERVICE

- *Reviewer*, IEEE Transactions on Parallel and Distributed Systems. 2012 - present
- *Treasurer*, Cornell University Engineering Graduate Student Association. 2011 - 2012
- *Webmaster*, Brockport Student Government (BSG), BSG employee of the month Nov. 2008. 2008

SKILLS

Technology: Java, Python, MATLAB, PHP, JavaScript, MySQL, C · AJAX, CSS, HTML · Eclipse, Vim, Xcode.

Languages: Bulgarian (Native) · English (Fluent) · German (Basic).

Sports: Rock Climbing (5.11 lead) · Running (2013 Snohomish River Run 10K, 2nd in div.; 9th out of 325 total).