Matthew Williamson

Curriculum Vitae

January 2015

Department of Computer Science and Information Systems
West Virginia University Institute of Technology
405 Fayette Pike, Room 101 Engineering
Montgomery, West Virginia 25136
(304) 442-3272
matthew.williamson@mail.wvu.edu

Education

Ph.D. Computer Science, May 2013
West Virginia University, Morgantown, West Virginia
Advisor: K. Subramani

M.S. Computer Science, May 2009
West Virginia University, Morgantown, West Virginia

B.S. Computer Science and Mathematics, May 2007
Marietta College, Marietta, Ohio
Minor: Leadership Studies
Magna Cum Laude

Academic Year Appointments

Assistant Professor, Tenure-Track
Department of Computer Science and Information Systems
West Virginia University Institute of Technology
Montgomery, WV
August 2013 - Present

Research and Teaching Interests

Algorithms
Design, Implementation, Analysis, Empirical Studies, Parallel Algorithms, Randomized Algorithms, Approximation Algorithms, Verification.

Graph Theory
Shortest Paths, Minimum Spanning Trees, Planar Graphs, Network Theory, Negative Cycle Detection.

Academic Work Experience

Graduate Research Assistant
Lane Department of Computer Science and Electrical Engineering
West Virginia University
January 2013 - May 2013
Responsibilities: Discover problems and design algorithms related to shortest paths and detecting negative cycles in undirected graphs.

Graduate Teaching Assistant
Lane Department of Computer Science and Electrical Engineering
West Virginia University
August 2012 - December 2012
Responsibilities: Teach three sections of a 100 level Computer Science lab per semester.

Graduate Research Assistant
NASA Space Grant Consortium
West Virginia University
August 2010 - April 2012
Responsibilities: Develop new algorithms for the Optimal Length Resolution Refutation Problem, publish any results found in research, provide progress reports at the end of each semester.

Graduate Teaching Assistant
Lane Department of Computer Science and Electrical Engineering
West Virginia University
August 2007 - May 2010
Responsibilities: Teach two sections of a 100 level Computer Science course per semester, assist students in the CS 101 Open Lab.

Lab Assistant/Tutor
Math/Computer Science Department
Marietta College
August 2006 - December 2006
Responsibilities: Oversee the Computer Science Lab, tutor students who requested help in Computer Science and Mathematics courses.

Teaching Assistant
McDonough Leadership Program.
Marietta College
August 2004 - May 2006
Responsibilities: Teach a group of 4-6 students about the processes of Facilitation and Deliberation in organizations, assist with program-designed simulations for freshmen classes, take a Pedagogy course each fall semester to improve teaching techniques.

Academic Project Work Experience

Physical Plant Work Order System
August 2006 - January 2007
Marietta College
Senior Capstone Project
Redesigned outdated web user interface.

Publications

Papers in Refereed Journals

[1] Matthew Williamson and K. Subramani. A New Algorithm for the Minimum Spanning Tree Verification Problem. *Combinatorial Optimization and Applications (COA)*, 2014.

[2] Matthew Williamson, Pavlos Eirinakis, and K. Subramani. Fast Algorithms for the Undirected Negative Cost Cycle Detection Problem. *Algorithmica*, 2014.

[3] Matthew Williamson and K. Subramani. A Parallel Algorithm for the Optimal Length Resolution Refutation in Difference Constraint Systems. *International Journal of Parallel Programming (IJPP)*, 2014.

[4] K. Subramani, Matthew Williamson, and Xiaofeng Gu. Improved Algorithms for Optimal Length Resolution Refutation in Difference Constraint Systems. *Formal Aspects of Computing (FAC)*, 25 (2), pp. 319-341, Springer Science Publishers, 2013.

[5] James B. Orlin, Kamesh Madduri, K. Subramani and M. Williamson. A Faster Algorithm for the Single Source Shortest Path Problem with Few Distinct Positive Lengths. *Journal of Discrete Algorithms (JDA)*, 8 (2), pp. 189-198, Elsevier Science Publishers, 2010.

Submitted Papers in Refereed Journals

[1] Bugra Caskurlu, Matthew Williamson, and K. Subramani. On the Weighted Optimal Length Resolution Refutation in Difference Constraint Systems. *Journal of Logic and Computation (JLC)*, 2014.

[2] Pavlos Eiriakis, Matthew Williamson, and K. Subramani. A Critique of the Shoshan-Zwick Algorithm for the All-Pairs Shortest Path Problem. *Journal of Discrete Algorithms (JODA)*, 2014.

[3] Matthew Williamson and K. Subramani. On the Negative Cost Girth Problem in Planar Networks. *Journal of Discrete Algorithms (JODA)*, 2013.

Acknowledgments in Refereed Journals

[1] K. Subramani and Kamesh Madduri. Two-Level Heaps: A New Priority Queue Structure with Applications to the Single Source Shortest Path Problem. *Computing*, 90 (3-4), pp. 113-130, Springer Science Publishers, 2010.

Dissertation and Theses

[1] Matthew Williamson. On the Design, Analysis, and Implementation of Algorithms for Selected Problems in Graphs and Networks. Ph.D. Dissertation, Lane Department of Computer Science and Electrical Engineering, West Virginia University, May 2013.

[2] Matthew Williamson. A Faster Algorithm for the Single Source Shortest Path Problem with Few Distinct Positive Lengths. M.S. Thesis, Lane Department of Computer Science and Electrical Engineering, West Virginia University, May 2009.

Presentations

Invited Talks

[1] An Overview of the Stochastic Shortest Path Problem.
Lane Department of Computer Science and Electrical Engineering.
West Virginia University, July 10, 2014.
Host: Prof. K. Subramani

Conference Presentations

[1] A New Algorithm for the Minimum Spanning Tree Verification Problem.
The 27th Cumberland Conference on Combinatorics, Graph Theory and Computing.
Department of Mathematics, West Virginia University, May 17, 2014.

[2] A Faster Algorithm for the Single Source Shortest Path Problem with Few Distinct Positive Lengths.
The 84th Annual Meeting of the West Virginia Academy of Science.
Department of Science and Mathematics, Glenville State College, March 28, 2009.

[3] Predicting the Prisoner's Dilemma.
The Spring Meeting of the Ohio Section of the Mathematical Association of America.
Department of Mathematical Sciences, Shawnee State University, April 13, 2007.

Grants

Internal Research Grants

[1] Title: Improving Algorithms for Graphs with Few Distinct Edge Costs and Resolution Refutation of Difference Constraint Systems
Position: Principal Investigator
Agency: NASA West Virginia Space Grant Consortium
Contract Number: NNX10AK62H
Duration: 05/11 - 04/12. Amount: $12,000
Contact: Professor Majid Jaraiedi

[2] Title: Improved Algorithms for Optimal Length Resolution Refutation in Difference Constraint Systems.
Position: Principal Investigator
Agency: NASA West Virginia Space Grant Consortium
Contract Number: NNX10AK62H
Duration: 08/10 - 04/11. Amount: $12,000
Contact: Professor Majid Jaraiedi

Equipment Grants

[1] Title: Improved Algorithms for Optimal Length Resolution Refutation in Difference Constraint Systems
Position: Investigator
Agency: National Center for Supercomputing Applications (NCSA), Urbana-Champaign
Project: TG-CCR100036
Duration: 09/10 - 09/11
Total Service Units: 50000 units on Frost

Awards

William Bay Irvine Award, Marietta College, 2007.

Rhonda E. King Memorial Award, Marietta College, 2007.

Theodore Bennett Mathematics Award, Marietta College, 2006.

Honoraria

Upsilon Pi Epsilon (Computer Science Honorary), West Virginia University, 2013.

Pi Mu Epsilon (Mathematics Honorary), West Virginia University, 2011.

Golden Key International Honor Society, West Virginia University, 2009.

Omicron Delta Kappa (Leadership Honorary), Marietta College, 2005.

Kappa Mu Epsilon (Mathematics Honorary), Marietta College, 2005.

Alpha Lamda Delta (Freshmen Honorary), Marietta College, 2004.

Dean's High Honors List, Marietta College, 2003-2007.

Teaching Experience

Courses Taught

West Virginia University Institute of Technology

Course	Semester and Year	Level	Number of Students
CS 122: Computer Science 2	Spring 2015	UG	24
CS 122: Computer Science 2 Lab	Spring 2015	UG	11
CS 350: Computer System Concepts	Spring 2015	UG	6
CS 410: Compiler Construction	Spring 2015	UG	5
CS 121: Computer Science 1	Fall 2014	UG	20
CS 121: Computer Science 1 Lab	Fall 2014	UG	9
CS 265: C Programming	Fall 2014	UG	13
CS 365: Programming Languages - ACM Programming Contest Practicum	Fall 2014	UG	4
CS 493I: Portable Software Development	Fall 2014	UG	6
CS 122: Computer Science 2 Lab	Spring 2014	UG	18
CS 270: Linux	Spring 2014	UG	14
CS 350: Computer System Concepts	Spring 2014	UG	11
CS 112: Computer Science for Engineers	Fall 2013	UG	20
CS 121: Computer Science 1 Lab	Fall 2013	UG	21
CS 410: Compiler Construction	Fall 2013	UG	8

West Virginia University

Course	Semester and Year	Level	Number of Students
CS 101: Introduction to Computer Applications	Spring 2010	UG	37
CS 101: Introduction to Computer Applications	Spring 2010	UG	49
CS 101: Introduction to Computer Applications	Fall 2009	UG	47
CS 101: Introduction to Computer Applications	Fall 2009	UG	46
CS 101: Introduction to Computer Applications	Summer 2009	UG	15
CS 101: Introduction to Computer Applications	Spring 2009	UG	47
CS 101: Introduction to Computer Applications	Spring 2009	UG	49
CS 101: Introduction to Computer Applications	Fall 2008	UG	47
CS 101: Introduction to Computer Applications	Fall 2008	UG	48
CS 101: Introduction to Computer Applications	Summer 2008	UG	25
CS 101: Introduction to Computer Applications	Spring 2008	UG	50
CS 101: Introduction to Computer Applications	Spring 2008	UG	50
CS 101: Introduction to Computer Applications	Fall 2007	UG	41
CS 101: Introduction to Computer Applications	Fall 2007	UG	48

Courses as Teaching Assistant

West Virginia University

Course	Semester and Year	Level	Number of Students
CS 110: Introduction to Computer Science	Fall 2012	UG	53
CS 220: Discrete Mathematics	Fall 2011	UG	43
CS 220: Discrete Mathematics	Fall 2010	UG	53

Campus and Department Service

West Virginia University Institute of Technology

ACM Faculty Advisor, 2014-present
Convocation Committee, 2013-present

Marietta Colllege

Omicron Delta Kappa, 2006-2007
President: 2006-2007

Technology Advisory Group, 2006-2007

Commuter Council, 2005-2007
President: 2005-2007

Student Conduct Board, 2005-2007

Alpha Lambda Delta, 2004-2007
Vice President: 2005-2006

Student Senate, 2004-2007
Commuter Commissioner: 2004-2007

Professional Service

Reviewer for Journals

IEEE Transactions on Knowledge and Data Engineering, 2014 (1)
The Scientific World Journal, 2014 (2)
Journal of Zhejiang University SCIENCE C, 2014 (1)
Journal of Discrete Algorithms, 2014 (1)
Filomat, 2013 (1)
Applications and Applied Mathematics, 2013 (1)
Scientific Research and Essays, 2013 (1)
IEEE Transactions on Computers, 2011 (1)

Reviewer for Conferences

Symposium and Workshops in Algorithm Theory (SWAT), 2012 (1)

Professional Work Experience

Server Administrator
Davis, Pickering & Co., Inc.
Marietta, OH
September 2006 - August 2007
Responsibilities: Oversee the network to make sure it is working properly, update software, troubleshoot hardware and software errors.

Intern
Davis, Pickering & Co., Inc.
Marietta, OH
July 2006 - August 2006
Responsibilities: Updating data in software, creating new spreadsheets to improve work efficiency, troubleshooting software and hardware errors

Intern
Washington County Public Library
Marietta, OH
June 2006 - July 2006
Responsibilities: Redesign web site for the library, assist the staff with daily library functions

Skills

Software: Microsoft Access, Excel, PowerPoint, and Word; Visual Studio; Dr. Java; Eclipse.

Languages: C, C++, Java, HTML, PHP, LaTeX, MySQL.

References

Camille Hayhurst
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