

# WALEED MELEIS

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## ACADEMIC POSITIONS

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**Northeastern University** September 2016-Present  
Associate Chair, Department of Electrical and Computer Engineering

**Northeastern University** July 2012-Present  
Associate Professor, Department of Electrical and Computer Engineering

**Northeastern University** September 1996-June 2002  
Assistant Professor, Department of Electrical and Computer Engineering

## EDUCATION

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**University of Michigan** June 1996  
Ph.D., Computer Science and Engineering

**University of Michigan** December 1993  
M.S., Computer Science and Engineering

**Princeton University** June 1990  
B.S.E., Electrical Engineering

## HONORS

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Fostering Engineering Innovation in Education Award 2016

Black Engineering Student Society Professor Appreciation Award 2015

Favorite Professor selection by Senior Yearbook 2013

Invited to represent NU at NAE Frontiers of Engineering Education Symposium 2012

Favorite Professor selection by Senior Yearbook 2012

Outstanding Teachers of the College of Engineering 2011

Eta Kappa Nu Professor of the Year Award 2010

Martin W. Essigmann Outstanding Teaching Award 2008

Center for Innovative Course Design Teaching Award 2004

Martin W. Essigmann Outstanding Teaching Award 2003

## JOURNAL PUBLICATIONS

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1. W. Li, F. Zhou, K. Chowdhury, and W. Meleis, *QTCP: Adaptive Congestion Control with Reinforcement Learning*, in *IEEE Transactions on Network Science and Engineering*.
2. D. Levac, H. Dumas, and W. Meleis, "Development and preliminary usability evaluation of a tablet-based interactive movement tool for pediatric rehabilitation," in *JMIR Rehabilitation Assistive Technologies* 2018;5(2):e1030.
3. J. Radford, A. Pilny, A. Reichelmann, B. Keegan, B. Welles, J. Hoye, K. Ognyanova, W. Meleis, D. Lazer, "Volunteer Science: An Online Laboratory for Experiments in Social Psychology", *Social Psychology Quarterly*, Volume 79 issue 4, Dec 2016, pages 376-396.

4. L. Hayward, S. Ventura, M. Mahanna, and W. Meleis, "Inter-professional Collaboration between Physical Therapy, Speech Language Pathology and Engineering Faculty and Students to Address Global Pediatric Rehabilitation Needs: A Case Report", *Journal of Physical Therapy Education*, Vol. 30, No. 4, Oct 2016.
5. L. Sallaway, S. Magee, J. Shi, F. Quivira, K. Tgavalekos, D. Brooks, S. Muftu, W. Meleis, R. Moore, D. Kopans, K-T. Wan, "Detecting Solid Masses in Phantom Breast Using Mechanical Indentation", *Experimental Mechanics*, Vol. 54, Number 6, 2014, pp. 935-942.
6. M. Fayyazi, D. Kaeli and W. Meleis, "An adjustable linear-time parallel algorithm for maximum weight bipartite matching", *Information Processing Letters*, Vol. 97, No. 5, March 2006, pp. 186-190.
7. Z. Navabi, W. Meleis, and F. Lombardi, "Using Data Compression in Automatic Test Equipment for System-on-Chip Testing", F. Karimi, *IEEE Transactions on Instrumentation and Measurement*, Vol. 53, No. 2, April 2004, pp. 308-317.
8. W. Meleis, I. Baev, and S. Abraham, "Backtracking-based Instruction Scheduling" *International Journal of Parallel Programming*, Vol. 30, December 2002, pp. 397-418.
9. M. El-Shenawee, C. Rappaport, D. Jiang, and W. Meleis, "Electromagnetics Computations Using the MPI Parallel Implementation of the Steepest Descent Fast Multipole Method (SDFMM)", *Applied Computational Electromagnetics Society Journal*, Vol. 17, 2002, pp. 112-122.
10. I. Baev, W. Meleis, and A. Eichenberger, "Lower Bounds on Precedence-Constrained Scheduling for Parallel Processors", *Information Processing Letters*, Vol. 83, No. 1, July 2002, pp. 27-32.
11. M. Ashouei, D. Jiang, W. Meleis, D. Kaeli, M. El-Shenawee, E. Mizan, Y. Wang and C. Rappaport, "Profile-based Characterization and Tuning for Subsurface Sensing and Imaging Applications", *International Journal of SIMULATION: Systems, Science and Technology*, Vol. 3, No. 1-2, June 2002, pp. 40-55.
12. I. Baev, W. Meleis, and A. Eichenberger, "An Experimental Study of Algorithms for Weighted Completion Time Scheduling", *Algorithmica*, Vol. 33, No. 1, May 2002, pp. 34-51.
13. D. Jiang, W. Meleis, M. El-Shenawee, E. Mizan, M. Ashouei, and C. Rappaport, "Parallel Implementation of the Steepest Descent Fast Multipole Method (SDFMM) On a Beowulf Cluster for Subsurface Sensing Applications", *IEEE Microwave and Guided Wave Letters*, Vol. 12, No. 1, January 2002, pp. 24-26.
14. W. Meleis, A. Eichenberger, and I. Baev, "Scheduling Superblocks with Bound-based Branch Tradeoffs", *IEEE Transactions on Computers*, Vol. 50, No. 8, August 2001, pp. 784 – 797.
15. W. Meleis, "Dual-Issue Scheduling for Binary Trees with Spills and Pipelined Loads", *SIAM Journal on Computing*, Vol. 30, No. 6, 2001, pp. 1921–1941.
16. J. Kalamatianos, A. Khalafi D. Kaeli, and W. Meleis, "Analysis of Temporal-Based Program Behavior for Improved Instruction Cache Performance", *IEEE Transactions on Computers*, Vol. 48, No. 2, February 1999, pp. 168–175.
17. A. Hooshang Hashemi, J. Kalamatianos, D. Kaeli, A. Khalafi, W. Meleis, and B. Calder, "Program Mapping Using Estimated Program Behavior", *DEC Technical Journal, Special Issue on Programming Languages and Tools*, 1999 (accepted).
18. M. Leeser, W. Meleis, M. Vai, S. Chiricescu, W. Xu, and P. Zavracky, "Rothko: A Three Dimensional FPGA", *IEEE Design and Test of Computers*, Vol. 15, No. 1, January–March, 1998, pp. 16–23.

#### CONFERENCE AND WORKSHOP PUBLICATIONS

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19. W. Li and W. Meleis, "Similarity-Aware Kanerva Coding for On-Line Reinforcement Learning," in *International Symposium of Intelligent Unmanned Systems on Artificial Intelligence (SIUSAI)*, Las Vegas, August 2018.
20. W. Li and W. Meleis, "Adaptive Adjacency Kanerva Coding for Memory-Constrained Reinforcement Learning," in *International Conference on Machine Learning and Data Mining in Pattern Recognition (MLDM)*, Springer, New York, July 2018.

21. W. Li, F. Zhou, W. Meleis and K. Chowdhury, "Dynamic Generalization Kanerva Coding in Reinforcement Learning for TCP Congestion Control Design," *Proceedings of the 16th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Sao Paulo, Brazil, 2017.
22. W. Li, F. Zhou, W. Meleis, and K. Chowdhury, "Learning-Based and Data-Driven TCP Design for Memory-Constrained IoT," in *International Conference on Distributed Computing in Sensor Systems*, Washington D.C., May, 2016.
23. S. Guler, M. Dannhauer, B. Erem, R. Macleod, D. Tucker, S. Turovets P. Luu, W. Meleis, and D Brooks, "Optimizing Stimulus Patterns for Dense Array TDCS with Fewer Sources than Electrodes Using a Branch and Bound Algorithm," in *International Symposium on Biomedical Imaging (ISBI'16)*, Prague, Czech Republic, April 13-16, 2016.
24. C. Wu, W. Li and W. Meleis, "Rough Sets-based Prototype Optimization in Kanerva-based Function Approximation", in *IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT)*, 2015.
25. D. Lazer, W. Meleis, B. Foucault Wells, C. Riedl, J. Radford, B. Keegan, K. Ognyanova, S. Wojcik, J. Hoyer and C. Karbeyaz, "Performing Massively Open Online Social Experiments with Volunteer Science," *Workshop on Crowdsourcing and Online Behavioral Experiments (COBE)* at the ACM Conference on Economics and Computation, 2015.
26. B. Keegan, K. Ognyanova, B. Welles, C. Riedl, C. Karbeyaz, W. Meleis, David Lazer, J. Radford and J. Hoyer, "Conducting Massively-Open Online Social Experiments with Volunteer Science," *Citizen + X: Volunteer-Based Crowdsourcing in Science, Public Health, and Government*, papers from the Human Computation Workshop (HCOMP), pp. 19-20, 2014.
27. J. Tai, J. Zhang, J. Li, W. Meleis, N. Mi, ArA: Adaptive "Resource Allocation for Clouds under Bursty Workloads," in *Proceedings of the IEEE International Performance Computing and Communications Conference (IPCCC)*, Orlando, Florida, 2011, pp. 1-8.
28. K. Chowdhury, R. Doost-Mohammady, W. Meleis, M. Di Felice, L. Bononi, "Cooperation and Communication in Cognitive Radio Networks based on TV Spectrum Experiments," in *Proceedings of IEEE International Symposium on a World of Wireless Mobile and Multimedia Networks (WoWMoM)*, Lucca, Italy, 2011, pp. 1-9.
29. J. Zhang, N. Mi, J. Tai and W. Meleis, "Decentralized Scheduling of Bursty Workload On Computing Grids," in *Proceedings of IEEE International Conference on Communications (ICC)*, Kyoto, Japan, 2011.
30. M. Di Felice, K. Chowdhury, C. Wu, L. Bononi, and W. Meleis, "Learning-based Spectrum Selection in Cognitive Radio Ad Hoc Networks," in *Proceedings of the Eight International Conference on Wired/Wireless Internet Communications (WWIC)*, Invited paper, Lulea, Sweden, 2010.
31. C. Wu, K. Chowdhury, M. Di Felice, and W. Meleis, "Spectrum Management of Cognitive Radio Using Multi-agent Reinforcement Learning," in *Proceedings of the 9th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Toronto, Canada, 2010.
32. M. Di Felice, K. Chowdhury, W. Meleis, and L. Bononi, "To Sense or To Transmit: A Learning-based Spectrum Management Scheme for Cognitive RadioMesh Networks", *Fifth IEEE Workshop on Wireless Mesh Networks (WiMesh)*, held in conjunction with IEEE SECON, Boston, Massachusetts, 2010
33. J. Zhang and W. Meleis, "Adaptive Grid Computing for MPI Applications," in *Proceedings of the IASTED International Conference on Parallel and Distributed Computing and Systems*, Cambridge, MA, 2009.
34. C. Wu and W. Meleis, "Function Approximation Using Tile and Kanerva Coding For Multi-Agent Systems," in *Workshop on Adaptive Learning Agents (ALA)*, held in conjunction with the 8th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), Budapest, Hungary, 2009.
35. C. Wu and W. Meleis, "Adaptive Fuzzy Function Approximation for Multi-Agent Reinforcement Learning," in *Proceedings of IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT)*, Milan, Italy, 2009.
36. C. Wu and W. Meleis, "Fuzzy Kanerva-based Function Approximation for Reinforcement Learning," in *Proceedings of the 8th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Budapest, Hungary, 2009.

37. C. Wu and W. Meleis, "Optimized Kanerva-based Function Approximation for Multi-Agent Systems," in *Proceedings of the 7th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Estoril, Portugal, 2008.
38. J. Zhang, W. Meleis, D. Kaeli and T. Wu, "Acceleration of Maximum Likelihood Estimation for Tomosynthesis Mamography", in *The 12th International Conference on Parallel and Distributed Systems*, pp. 291-299, Minneapolis, MN, 2006.
39. T. Wu, R. Moore, J. Zhang, E. Rafferty, D. Kopans, W. Meleis and D. Kaeli, "Digital tomosynthesis mammography using a parallel maximum likelihood reconstruction method", in *Proceedings of SPIE: Medical Imaging*, pp. 1-4, San Diego CA, 2004.
40. M. Fayyazi, D. Kaeli and W. Meleis, "A Polylogarithmic Time Parallel Maximum Weight Bipartite Matching Algorithm for Scheduling in Input-Queued Switches," in *Proceedings of International Parallel and Distributed Processing Symposium (IPDPS)*, (IPDPS), Santa Fe NM, 2004.
41. H. Quinn, L. King, M. Leeser, and W. Meleis, "Runtime Assignment of Reconfigurable Hardware Components for Image Processing Pipelines," in *Proceedings of the IEEE Symposium on FPGAs for Custom Computing Machines*, Napa CA, 2003, p. 173.
42. F. Karimi, W. Meleis, Z. Navabi, and F. Lombardi, "Data Compression for System-On-Chip Testing using ATE," in *Proceedings of the 17th IEEE Intl. Symposium on Defect and Fault Tolerance in VLSI Systems*, Vancouver, Canada, 2002, pp. 166-174.
43. A. Eichenberger, W. Meleis, and S. Maradani, "An Integrated Approach to Accelerate Data and Predicate Computations in Hyperblocks," in *Proceedings of the 33rd Annual IEEE/ACM International Conference on Microarchitecture*, Monterey CA, Dec. 2000, pp. 101-111, Acceptance rate: 28%.
44. S. Abraham, W. Meleis, and I. Baev, "Efficient backtracking instructionschedulers," in *Proceedings of the IEEE/ACM International Conference on Parallel Architectures and Compilation Techniques*, Philadelphia, PA, 2000, pp. 301-308, Acceptance rate: 21% (full papers).
45. I. Baev, W. Meleis and A. Eichenberger, "Lower Bounds on Precedence-constrained Scheduling for Parallel Processors," in *Proceedings of the IEEE International Conference on Parallel Processing*, Toronto, Canada, 2000, pp. 549-553, Acceptance rate: 39%.
46. A. Eichenberger and W. Meleis, "Balance Scheduling: Weighing Branch Tradeoffs in Superblocks," in *Proceedings of the 32nd Annual IEEE/ACM International Conference on Microarchitecture*, Haifa, Israel, November 1999, pp. 272-283, Acceptance rate: 21%.
47. W. Meleis and E. Davidson, "Dual-Issue Scheduling With Spills for Binary Trees," in *Proceedings of the ACM/SIAM Symposium on Discrete Algorithms*, Baltimore, Maryland, January 1999, pp. 678-686, Acceptance rate: 28% (full papers).
48. I. Baev, W. Meleis, and A. Eichenberger, "Algorithms for Total Weighted Completion Time Scheduling," in *Proceedings of the ACM/SIAM Symposium on Discrete Algorithms*, Baltimore, Maryland, pp. 852-853, January 1999, 74 short papers accepted, 337 papers submitted.
49. J. Casmira, J. Fraser, D. Kaeli, and W. Meleis, "Operating System Impact on Trace-Driven Simulation," in *Proceedings of the 31st Annual Simulation Symposium*, April 1998, pp. 183-192.
50. S. Sair, D. Kaeli, and W. Meleis, "A Study of Loop Unrolling for VLIW-Based DSP Processors," in *Proceedings of the IEEE Workshop on Signal Processing Systems*, 1998, pp. 519 - 527.
51. J. Kalamatianos, A. Khalafi, D. Kaeli, and W. Meleis, "Memory Performance Tuning Using Graph-based Analysis," in *Proceedings of the Workshop on Pre-Hardware Performance Analysis Techniques*, June 1998.
52. I. Baev and W. Meleis, "Total Weighted Completion Time Scheduling for Superblocks", *SIAM Conference on Discrete Mathematics*, January 1998.
53. W. Meleis, M. Leeser, P. Zavracky and M. Vai, "Architectural Design of a Three Dimensional FPGA," in *Proceedings of the 17th Conference on Advanced Research in VLSI*, 1997, pp. 256 - 268.

54. W. Meleis and E. Davidson, "Optimal Local Register Allocation for a Multiple-Issue Machine," in *Proceedings of the ACM International Conference on Supercomputing*, pp 107–116, July 1994. Acceptance rate: 39%.

## PRESENTATIONS

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55. J. Radford, B. Keegan, J. Hoye, C. Karbeyaz, K. Ognyanova, B. Foucault Welles, W. Meleis, D. Lazer, "Conducting Massively Open Online Social Experiments with Volunteer Science," *Intl AAAII Conference on Web and Social Media*, 2015.
56. J. Radford, B. Keegan, K. Ognyanova, B. Welles, J. Hoye, C. Karbeyaz, W. Meleis, David Lazer, "Validating Massively Open Online Social Experiments with Volunteer Science," *Online Experiments: Methods, Opportunities, and Challenges* panel of the Conference of the International Communication Association, 2015.
57. B. Keegan, C. Karbeyaz, B. Foucault Welles, J. Hoye, W. Meleis, and David Lazer, "Information Navigation and Hidden Profile Experiments on the Volunteer Science Web Laboratory", *International Sunbelt Social Network Conference (Sunbelt XXXIV)*, Florida, US, 2014.
58. J. Radford, B. Keegan, K. Ognyanova, B. Welles, J. Hoye, W. Meleis, David Lazer, "Volunteer Science as a Platform for Studying Team Processes and Performance," *Cooperative Team Networks Workshop at the International School and Conference on Network Science (NetSci)*, 2014.
59. J. Radford, B. Keegan, K. Ognyanova, B. Welles, J. Hoye, W. Meleis, David Lazer, "Volunteer Science: A Crowd Sourced Platform for Studying Human Behavior", *MIT Conference on Digital Experimentation (CODE)*, 2014.
60. B. Keegan, C. Karbeyaz, J. Hoye, W. Meleis, D. Lazer, "Volunteer Science: Behavioral Experiments on Networks with Facebook Users," *International Workshop and Conference on Network Science (NetSci)*. Copenhagen, Denmark, 2013.
61. B. Keegan, C. Karbeyaz, J. Hoye, W. Meleis, D. Lazer, "Volunteer Science: Online Behavioral Experiments Using Facebook as a Subject Pool," *International Sunbelt Social Network Conference (Sunbelt XXXIII)*, Hamburg, Germany, 2013.

## TEACHING

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EECE 1381: Introduction to Computer Organization  
 EECE 1382: Digital Logic Design  
 EECE 2540: Fundamentals of Engineering Algorithms  
 EECE 2750: Enabling Engineering  
 EECE 4542: Advanced Engineering Algorithms  
 EECE 4790: Capstone Design 1  
 EECE 4792: Capstone Design 2  
 EECE 7205: Fundamentals of Computer Engineering  
 EECE 7360: Combinatorial Optimization  
 GE 1210: Scientific Revolutions Abroad  
 HONR 3310: Honors Seminar, Fund. Limits on Scientific Knowledge: Chaos, Complexity, and Computability

## FUNDING

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NSF EIA, Research Instrumentation Grant	1998-2000
NSF EIA, Major Research Instrumentation Grant	1999-2000
NSF CCR, Research Grant	1999-2001
NSF EIA, Major Research Instrumentation Grant	2000-2001
NSF CCR, Research Experience for Undergraduates Supplement	2000-2001
NSF CenSSIS, Research Grants	2000-2010
Provost ENHANCE Grant	2007
US Army Research Lab Network Science Collaborative Technology Alliance (NS-CTA)	2013-2014
Noonan Memorial Research Fund	2016-2017

New York Community Trust Grant	2015-2018
Lanes Family Grant	2016
Provost Tier 1 Grant	2018-2019

## ADVISING

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### *Ph.D.*

Wei Li, Function Approximation-based Reinforcement Learning for Large-Scale Problem Domains	2018
Ceyhun Karbeyaz, Optimized Participant Assignment for an Online Experimental Framework	2015
Curtis Watson, Signal Detection and Digital Modulation Classification-Based Spectrum Sensing for Cognitive Radio	2014
Cheng Wu, Novel Function Approximation Techniques for Large-scale Reinforcement Learning	2010
Juemin Zhang, Adaptive Grid Computing	2010
Ivan Baev, Resource Aware Instruction Scheduling	2001

### *M.S.*

Junxiang Chen, Optimal Breast Cancer Screening Policies	2013
Elias Mizan, Performance Analysis and Machine-dependent Compiler Optimizations for the Intel Itanium Processor	2002
Desheng Jiang, Parallel Implementation of the Steepest Descent Fast Multipole Method (SDFMM) On a Beowulf Cluster System	2001
Jason Goldstein, An Architecture and Task Allocation Scheme for a Homogeneous Synchronous Data Flow System	2001

### *B.S.*

James Kirk, Two-sided Matching and the National Residency Match Program	2010
Scott Frasso, Online Framework for Multiagent Simulations	2009
Andrew Li, Algorithm Design and Reinforcement Learning	2008
Geoff Krapf, Building a Beowulf Cluster, and the Effect of Hardware and Software Variation on Benchmarking Results	2003
Eric Anderson	2003
Ebubechukwu Okafor, Estimating the Difficulty of Solving Partitioning Problems	2003
Adaeze Ibeneche, Using Message Passing Interface (MPI) to Parallelize Scientific Applications	2002
Ahmed Kanan, Evaluation of Compiler Algorithms for Explicitly Parallel Instruction Computers	2002