

NICHOLAS MISIUNAS

Graduate Research Assistant

Center for Advanced Computation and Telecommunications

University of Massachusetts Lowell

(978) 259 5702

A. EDUCATION

B.S., Electrical Engineering, Purdue University. Minor: Philosophy May 2009

M.S., Electrical Engineering, Univ. of Mass. Lowell May 2013

Thesis: Spectrum Sharing Policies with Adjacent Channel Constraints

GPA: 3.925

Ph.D. Candidate, Electrical Engineering, Univ. of Mass. Lowell 2013-*

Thesis Topic: Non-Uniformly Spaced Linear and Planar Antenna Array Synthesis

GPA: 4.000

B. RESEARCH EXPERIENCE

University of Massachusetts Lowell

Center for Advanced Computation and Telecommunications (CACT)

2016:

- Performance of randomly spaced arrays is analyzed from both an analytic and computational perspective. A metaheuristic algorithm, the firefly algorithm, is utilized to generate conditional probability distributions of inter-element spacings that generate desired directivity patterns [E.2].

2015:

- Analyzed the performance of randomly spaced elements in linear and planar antenna arrays and improved run time of computational models through parallelization. Developed a parallel algorithm for optimizing the element positions based on the metaheuristic firefly algorithm, implemented on an M2090 via CUDA. The compute bound model is addressed by unrolling the multidimensional arrays and abstracting threading over array elements [E.1].

- Identified predictors of student success from an education dataset of university students using bayesian networks and factorial analysis of mixed data. The dataset contained various features such as demographic, financial, and academic performance variables. Published in INFORMS Workshop on Data Mining and Analytics [E.4].

2014:

- Investigated application of the firefly algorithm for non-uniformly spaced arrays to identify spatial clustering for exploiting arrays with continuous distributions of radiating elements. Speedup is performed through parallelization using OpenMP on a multi-cored CPU. Published in ASEE Zone 1 Conference [E.5].

- Enhanced prediction of organ recipient functional status from a large dataset of lung transplants via reduction of training sample size. The sample size reduction was done through data envelopment analysis and the prediction was performed via artificial neural networks. Published in Omega Journal [E.3].

2012-2013:

- Analysis of radio spectrum sharing and impact of allocation methods for opportunistic users. Impact of additional excess channels and a priority scheme were also investigated. Published in International Conference on Software, Telecommunications, and Computer Networks [E.6].

2011:

- Conducted experiments on a software defined radio using a Pentek 7741 transceiver to transmit and receive a wideband RF signal and perform signal detection upon narrowband signals obtained through quadrature mirror filtering. Performance of energy and autocorrelation based spectrum detection was compared. Published in 23rd International Teletraffic Conference [E.7].

C. TEACHING EXPERIENCE

University of Massachusetts Lowell

Networks: Principles, Protocols, and Design. EECE 4830/5840 Spring 2016

- Assist students in learning Python programming and application to sockets and simulation of queues in networks.

Electromagnetics II. EECE 3600 Fall 2015

- Graded quizzes, proctored exams, and assisted students in development of a MATLAB project for animation of electric and magnetic fields.

Signals and Systems. EECE 3620 Summer 2015

- Graded homework and assisted students on concepts of Laplace and Fourier transforms.

Electromagnetics I/II. EECE 3600/4610 Fall 2014, Spring 2015

- Graded quizzes, proctored exams, assisted students with concepts in electric and magnetic fields and the MATLAB project for animation.

Computational Data Modeling. 16.711/712 Fall 2013, Spring 2014

- Assist students with development of R programs for performing various classification problems such as maximum likelihood estimation, hidden markov model estimation, particle filtering, and others related to specific fields such as biology and control.

- Graded quizzes, proctored exams, and assisted students with comprehension of convolution and Laplace and Fourier transforms.

D. FELLOWSHIP EXPERIENCE

National Science Foundation GK-12 Fellowship

2011-2013

- Worked with teacher Anne Chay at Lawrence Performing and Fine Arts High School to integrate research topics into classroom curriculum in Algebra and Pre-Calculus through weekly lesson plans and in-class presentations and activities.
- Developed ability to communicate complex topics both from research and in science and mathematics effectively to the students.
- Motivated students to pursue interests in STEM through personal engagement and participation during weekly visits to the classroom.
- Key activities included bringing MATLAB to the classroom, activities for students to engage in programming, relating their current mathematics problems to applications, and engagement with individual students through weekly feedback from written diaries.

E. PUBLICATIONS

1. N. Misiunas, K. Chandra, and C. Thompson, "Parallelization of the Firefly Algorithm for Planar Array Synthesis on GPU," *In preparation, IEEE Transactions on Wireless Communications*.
2. N. Misiunas, J. Au, C. Nguon, K. Chandra, and C. Thompson, "Performance Analysis of Non-Uniformly Spaced Linear Arrays," *To be submitted, IEEE GLOBECOM, April 15, 2016*.
3. N. Misiunas, A. Oztekin, Y. Chen, and K. Chandra, "DEANN: A Healthcare Analytic Methodology of Data Envelopment Analysis and Artificial Neural Networks for the Prediction of Organ Recipient Functional Status," *Omega Journal*, Vol. 58, pp. 45-54, January 2016.
4. N. Misiunas, M. Raspopovic, K. Chandra, and A. Oztekin, "Sensitivity of Predictors in Educational Data: A Bayesian Network Model," *Proceedings of INFORMS Workshop on Data Mining and Analytics*, Philadelphia PA, October 2015.
5. N. Misiunas, C. Thompson, and K. Chandra, "Analysis of Directional Beam Patterns from Firefly Optimization," *American Society of Engineering Education, Zone 1 Conference*, Bridgeport CT, April 2014.
6. N. Misiunas, K. Chandra, and C. Thompson, "Spectrum Sharing with Adjacent Channel Constraints," *22nd International Conference on Software, Telecommunications and Computer Networks*, pp. 11-13, Split Croatia, September 2012.

7. N. Misiunas, P. Gandhi, R. Remany, K. Chandra, and C. Thompson, "Wideband Spectrum Sensing Experiments in Indoor Wireless Channels," *23rd International Teletraffic Congress*, pp. 318-319, San Francisco CA, July 2011.

F. PRESENTATIONS

1. N. Misiunas, C. Nguon, J. Au, K. Chandra, and C. Thompson, "Classification and Optimization of Beam Responses Synthesized from Non-uniformly Spaced Linear Arrays", *Journal of the Acoustical Society of America*, Vol. 139, No. 4, Pt. 2, April 2016.
2. N. Misiunas, K. Chandra, and C. Thompson, "Parallelization of the Firefly Algorithm for Beam Forming from Non-Uniform Spaced Elements in a Planar Antenna." *HPC Day 2016*, University of Massachusetts Dartmouth, 2016.
3. N. Misiunas, J. Au, C. Nguon, K. Chandra, and C. Thompson, "Performance Analysis of Non-Uniformly Spaced Linear Arrays," *18th University of Massachusetts Lowell Research Symposium*, 2016.
4. K. Chandra, C. Thompson, J. Au, N. Misiunas, and C. Nguon, "Performance Analysis of Linear Arrays with Non-Uniformly Spaced Elements," *BAE Systems*, Merrimack NH, January 2016.
5. A. Kalkan-Savoy, N. Misiunas, and C. Minitier, "Evaluation of the Spatial Impulse Response of Planar Ultrasonic Radiators," *Journal of the Acoustical Society of America*, Vol. 137, No. 4, pp. 2294-2294, April 2015.
6. N. Misiunas, K. Chandra, and C. Thompson, "Bayesian network modeling for predicting degree completion rates," *18th University of Massachusetts Lowell Research Symposium*, 2015.
7. N. Misiunas, K. Chandra, and C. Thompson, "Analysis of Directional Beam Patterns from Firefly Optimization," *17th University of Massachusetts Lowell Research Symposium*, 2014.
8. N. Misiunas, K. Chandra, and C. Thompson, "Spectrum Sharing Policies with Adjacent Channel Constraints," *16th University of Massachusetts Lowell Research Symposium*, 2013.
9. P. Gandhi, N. Misiunas, R. Remany, K. Chandra, and C. Thompson. "Wideband Spectrum Sensing Experiments in Indoor Wireless Channels," *James E. West Symposium*, Baltimore MD, October 2012.
10. N. Misiunas, K. Chandra, and C. Thompson, "Spectrum Sharing Models for Cognitive Radio," *NSF GK-12 Annual Meeting*, Washington DC, March 2012.
11. N. Misiunas, K. Chandra, and A. Chay, "Spectrum Sharing Models for Cognitive Radios," *15th University of Massachusetts Lowell Research Symposium*, 2012.
12. N. Misiunas, A. Chay, K. Chandra, and C. Thompson, "Queueing Theory and Frequency Spectrum in the Classroom," *American Society of Engineering Education*, Northeast Section, Lowell MA, April 2012.

13. N. Misiunas, K. Chandra, and C. Thompson, "Investigation of a Multi-Server Queuing Model for Spectrum Sharing and Allocation," *14th University of Massachusetts Lowell Research Symposium*, 2011.

G. COMPUTER SKILLS

Languages & Software: C, FORTRAN, CUDA, R, Python, MATLAB, L^AT_EX
Operating Systems: Unix, Linux.

H. SERVICE

- President of the CACT Club* 2013-2016
- Established club at the start of each academic year.
 - Attended Graduate Student Association meetings.
 - Organized funds for activities performed by club members.

I. AWARDS

- Third place for student poster at HPC Day 2016. 2016
Outstanding Graduate Student Award, University of Massachusetts Lowell. 2016
Third place for student paper/presentation at ASEE Conference. 2014
National Science Foundation GK-12 fellowship: Vibes and Waves in Action. 2011

J. PROFESSIONAL AFFILIATIONS

IEEE student member.