

CONTACT INFORMATION	Information Technology/Engineering 370 Department of Mathematics and Statistics University of Maryland Baltimore County Baltimore, MD 21250 USA	<i>E-mail:</i> zb1@umbc.edu <a href="http://www.math.umbc.edu/~zb1">http://www.math.umbc.edu/~zb1</a>
RESEARCH INTERESTS	Machine learning, Statistical signal processing, Big data, Numerical optimization.	
EDUCATION	<b>University of Maryland Baltimore County</b> , Baltimore, Maryland USA	
	Ph.D. Candidate, Applied Mathematics, (expected graduation date: May 2017)	
	- Dissertation Topic: “Development of ICA and IVA Algorithms with Application to Medical Image Analysis”	
	- Advisor: Dr. Tülay Adalı	
	M.S., Applied Mathematics, January 2013	
	<b>Rochester Institute of Technology</b> , Rochester, New York USA	
	M.S., Applied and Computational Mathematics, August 2011	
	- Master Thesis: “Distance Metric Learning for Medical Image Registration”	
	- Advisor: Dr. Nathan Cahill	
	<b>University of Patras</b> , Patras, Greece	
	B.S., Mathematics, September 2008	
	- Degree Thesis: “Matrix Groups and Topology”	
	- Advisor: Dr. Andreas Arvanitoyeorgos	
RESEARCH EXPERIENCE	<b>Machine Learning for Signal Processing Laboratory (MLSP-Lab)</b> , University of Maryland Baltimore County, Baltimore, Maryland USA	
	<i>Research Assistant</i>	<b>October 2013 - Present</b>
	Development of blind source separation algorithms and study of their application to functional magnetic resonance imaging (fMRI) data.	
	- Involvement in successful research grants.	
	- Team leader for multiple collaborative research projects.	
	<b>Advanced Document Imaging (ADI) LLC</b> , Rochester, New York USA	
	<i>Research Assistant</i>	<b>November 2010 - March, 2011</b>
	Development of text segmentation algorithms for the separation between text and images in a given document.	
	- Self-directed literature search and research associated with automated form parsing.	
	- Documenting state-of-the art approaches and identification of research areas most likely to yield highest dividends.	
	- Close interaction with company research staff.	
ACADEMIC EXPERIENCE	<b>University of Maryland Baltimore County</b> , Baltimore, Maryland USA	
	<i>Guest Lecturer</i>	<b>September 2015 - Present</b>
	Discussed various topics in probability theory and numerical optimization for machine learning for graduate level courses.	
	- ENEE 620, Probability and Random Processes, Fall 2015.	
	- ENEE 712, Special Topics in Signal Processing, Spring 2016.	

- ENEE 620, Probability and Random Processes, Fall 2016.

*Instructor*

**May 2012 - July 2016**

Create class curriculum and syllabus that is appropriate for class being taught. Provide students with the necessary resources and materials to help them understand the course content. Ensure students are assisted in developing personally and professionally.

- MATH 150, Precalculus, Summer 2012.
- MATH 151, Calculus I, Summer 2013.
- MATH 151, Calculus I, Summer 2014.
- MATH 150, Precalculus, Summer 2015.
- MATH 155, Applied Calculus, Summer 2016.

*Math Teaching Assistant*

**August 2011 - May 2016**

Head teaching assistant. Duties included mini lectures and worksheet preparation, shared administrative responsibilities with faculty instructor, fielding of all student inquiries, provide assistance with calculus-related questions, and grade weekly quizzes for over 100 students.

Courses: Precalculus, Applied Calculus, Calculus I, II.

*Math Gym Coach*

**August 2013 - May 2015**

Participating in an active learning environment, engaging students in manipulating knowledge. Additional duties included office hours and grading problems for various levels of courses.

Courses: Precalculus, Applied Calculus, Calculus and Analytic Geometry I,II, and Multivariate Calculus.

*Orientation Advisor*

**June - August 2014**

Provide assistance in the overall provision of academic advising and registration assistance to the entirety of UMBC's entering undergraduate population.

**Rochester Institute of Technology, Rochester, New York USA**

*Math Teaching Assistant*

**August 2009 - May 2011**

Provide assistance with calculus-related questions and grade homework problems for over 30 students.

Courses: Project Based Calculus I, II, III, Calculus A.

*Math Grader*

**March 2011 - May 2011**

Grade homework problems for over 30 students.

Courses: Calculus with Foundations II, Engineering Mathematics.

**University of Patras, Patras, Greece**

*High School Math Tutor*

**October 2004 - May 2009**

Responsible for tutoring high school students in various mathematics courses and responsible for preparing them for the Panhellenic Examinations in Greece.

Courses: Mathematics (Calculus), Euclidean Geometry, Analytic Geometry, Algebra, Trigonometry.

**PUBLICATIONS**

**Z. Boukouvalas**, Y. Levin-Schwartz, V. D. Calhoun, and T. Adali, "Sparsity and Independence: Balancing of two Objectives in Optimization for Source Separation," *Elsevier, Journal of the Franklin Institute (JFI), Engineering and Applied Mathematics*. (In review)

**Z. Boukouvalas**, Y. Levin-Schwartz, and T. Adali, "Enhancing ICA performance by exploiting sparsity: Application to fMRI Analysis." *IEEE Int. Conf. Acoust., Speech, Signal Processing (ICASSP)*, New Orleans, USA, March 2017. (Accepted)

S. Bhinge, Q. Long, Y. Levin-Schwartz, **Z. Boukouvalas**, and T. Adali, “Non-orthogonal constrained independent vector analysis: Application to data fusion.” *Proc. IEEE Int. Conf. Acoust., Speech, Signal Processing (ICASSP)*, New Orleans, USA, March 2017. (Accepted)

**Z. Boukouvalas**, R. Mowakeaa, G.-S. Fu, and T. Adali, “Independent Component Analysis by Entropy Maximization with Kernels,” *IEEE Trans. on Neural Networks and Learning Systems*. (In review)

R. Mowakeaa, **Z. Boukouvalas**, and T. Adali, “On the Characterization, Generalization, and Efficient Estimation of the Complex Multivariate Generalized Gaussian Distribution,” in *Proc. IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM)*, Rio de Janeiro, Brazil, July 2016, pp. 1–5.

S. Bhinge, **Z. Boukouvalas**, Y. Levin-Schwartz, and T. Adali, “IVA for Abandoned Object Detection: Exploiting Dependence Across Color Channels,” in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Processing (ICASSP)*, Shanghai, China, March 2016, pp. 2494–2498.

**Z. Boukouvalas**, S. Said, L. Bombrun, Y. Berthoumieu and T. Adali, “A New Riemannian Averaged Fixed-Point Algorithm for MGGD Parameter Estimation,” *IEEE Signal Proc. Letts.*, vol. 22, no. 12, pp. 2314–2318, Dec. 2015.

G.-S. Fu, **Z. Boukouvalas**, and T. Adali, “Density estimation by entropy maximization with kernels,” in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Processing (ICASSP)*, Brisbane, Australia, April 2015, pp. 1896–1900.

**Z. Boukouvalas**, G.-S. Fu, and T. Adali, “An Efficient Multivariate Generalized Gaussian Distribution Estimator: Application to IVA,” in *Proc. Conf. on Info. Sciences and Systems (CISS)*, Baltimore, MD, March 2015, pp. 1–4.

**Z. Boukouvalas**, A. Arvanitoyeorgos, “A coordinate system for the three-sphere in the Euclidean four space,” *Mathematical Review of the Greek Mathematical Society*, (2006) 65.

SEMINAR  
TALKS

*A New Riemannian Averaged Fixed-Point Algorithm for MGGD Parameter Estimation: Application to IVA*, UMBC Graduate Student Seminar, Baltimore MD, March 2016.

*Multivariate Generalized Gaussian Distribution Estimation Algorithms for Independent Vector Analysis*, UMBC Graduate Student Seminar, Baltimore MD, March 2015.

*An Efficient Multivariate Generalized Gaussian Distribution Estimator: Application to IVA*, Conference on Information Sciences and Systems (CISS), Johns Hopkins University, Baltimore MD, March 2015.

*Introduction to Independent Component Analysis*, UMBC Graduate Student Seminar, Baltimore MD, April 2014.

*Image Deblurring, Spectra and Filtering*, UMBC Graduate Student Seminar, Baltimore MD, April 2013.

*Medical Image Registration*, UMBC Graduate Student Seminar, Baltimore MD, April 2012.

*Text Segmentation*, RIT Summer Mathematics Institute Teachers’ Workshop, Rochester NY, June 2011.

POSTERS

*IVA for Abandoned Object Detection: Exploiting Dependence Across Color Channels*, Research Presentation, UMBC, Baltimore MD, November 2016.

*Classification Algorithms for Medical Image Registration*, Graduate Research Conference, UMBC, Baltimore MD, February 2013.

*Medical Image Registration using Distance Metric Learning*, RIT Graduate Research Symposium, Rochester NY, July 2011.

SELECTED PROJECTS

*Clustering for Text Mining*, as part of the course Big Data, Nov 2015. Introduction to theory and clustering algorithms. Includes design and implementation of algorithms for text mining applications.

*Image Deblurring, Spectra and Filtering*, (Independent Study) Supervisor Dr. Florian Potra, May 2013. Study of modern techniques for solving realistic large-scale problems in image deblurring. (Use of Matlab)

*Programming Projects in C*, as part of the course Computational Mathematics and C programming, Feb - May 2013. Introduction to theory and computational algorithms in selected topics of interest to mathematicians, engineers and scientists. Includes design and implementation of algorithms as C programs.

*Spline Regression for Phoneme Recognition*, (Independent Study) Supervisor Dr. Nagaraj Neerchal, May 2012. Designed algorithm based on piecewise polynomials and splines to classify spoken phonemes.(Use of Matlab)

*Distance Metric Learning for Medical Image Registration*, (**Master Thesis**) Supervisor Dr. Nathan Cahill, August 2011. Designed classification algorithms based on neighbourhood structure for use in medical image registration. (Use of Matlab)

*The Data Clustering Problem*, as part of the course Methods of Scientific Computing, April 2010. Used of a method (SVD and K-means clustering) in order to recover the best estimate of the original image from its noisy version. (Use of Matlab)

*Matrix Groups and Topology*, (**Degree Thesis**), February 2007. Provided full description of Matrix Groups with their topological properties and their connection with applied math and especially with image science.

PROFESSIONAL SERVICE

*Proposal writing experience:*

Provided technical support for proposal: "A Unified Framework for Flexible Brain Image Analysis"

*Journal and conference paper reviewer:*

- Journal:

Neural Processing Letters (Springer)

Transactions on Signal Processing (IEEE)

Journal of Neuroscience methods (Elsevier)

- Conference:

IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2016, 2017

The Ninth IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM), 2016

Latent Variable Analysis and Signal Separation (LVA/ICA), 2015

IEEE International Workshop on Machine Learning for Signal Processing (MLSP), 2015

HONORS AND AWARDS	Outstanding Graduate Teaching Assistant in the Field of Mathematics, UMBC, 2012.
COMPUTER KNOWLEDGE	Languages: MATLAB, C. Operating Systems: Unix/Linux, Windows.
OTHER QUALIFICATIONS AND SKILLS	Numeracy/Problem Solving: <ul style="list-style-type: none"> <li>- Strong analytical and problem solving skills.</li> </ul> Effective communication <ul style="list-style-type: none"> <li>- Strong presentation skills demonstrated by presentations, assignments and team projects.</li> <li>- Ability to work well in a fast-paced environment.</li> </ul> Languages <ul style="list-style-type: none"> <li>- Greek: Native language.</li> <li>- English: Excellent.</li> <li>- German: First Certificate in German (Grundstufe Deutsch).</li> </ul>
LEADERSHIP AND ORGANIZATION	<p><b>Mathematics and Statistics Graduate Student Association (MSGSA)</b>  <i>President</i>, <b>January 2014 - January 2015.</b>  Preside over the MSGSA meetings, direct the activities of the MSGSA, assure student representation in faculty meetings and serve as the Deans representative for MSGSA.</p> <p><b>Society of Industrial and Applied Mathematics (SIAM)</b>  <i>Vice President</i>, SIAM <b>August 2012 - August 2014.</b>  Prepare meeting agendas, work closely with faculty members to develop discussion topics and organize events.</p> <p><i>Treasurer</i>, SIAM <b>August 2011 - August 2012.</b>  Manage accounts, organize annual budget.</p>