

Nicholas Ruozzi

Computer Science Department
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Research Area

I am broadly interested in graphical models, combinatorial optimization, and inference. Currently, I am working on iterative message passing and approximate inference with a focus on applications in statistical physics and machine learning.

Education

- 2011 **Ph.D. in Computer Science, Yale University**
Advisor: Sekhar Tatikonda
Committee: Devavrat Shah, Dan Spielman, Steve Zucker, Sujay Sanghavi
- 2010 **M.A. in Computer Science, Yale University**
- 2010 **M.S. in Computer Science, Yale University**
- 2006 **B.S. in Computer Science, Cornell University**
Specialization in applied mathematics
Graduated magna cum laude

Employment

Asst. Professor of Computer Science, University of Texas at Dallas
Richardson, TX
January, 2015 - Present

Postdoctoral Scientist and Adjunct Asst. Professor, Columbia University
New York, NY
Fall, 2013 - December, 2014
Supervisor: Tony Jebara

Postdoctoral Researcher, Ecole Polytechnique Fédérale de Lausanne
Lausanne, Switzerland
Fall, 2011 - Fall, 2013
Supervisor: Rüdiger Urbanke

Research Assistant, Yale University

New Haven, CT

Fall, 2007 - Fall, 2011

Advisor: Sekhar Tatikonda

Course Instructor, Center for Talented Youth

Loudonville, NY

Summer, 2006

Undergraduate Research Award, Cornell University

Ithaca, NY

Summer, 2005

Advisor: Dexter Kozen

Software Developer, ANSYS, Inc.

Canonsburg, PA

Summer, 2004

Publications

Journal Papers

Nicholas Ruoizzi and Sekhar Tatikonda. Message-passing algorithms for quadratic minimization. *Journal of Machine Learning Research*, 14:2287–2314, 2013

N. Ruoizzi and S. Tatikonda. Message-passing algorithms: Reparameterizations and splittings. *IEEE Transactions on Information Theory*, 59(9):5860–5881, Sept. 2013

D. Kozen and N. Ruoizzi. Applications of metric coinduction. *Logical Methods in Computer Science*, 5(3), 2009

Conference Papers

N. Ruoizzi and T. Jebara. Making pairwise binary graphical models attractive. In *Advances in Neural Information Processing Systems (NIPS)*, Montreal, Canada, 2014

N. Ruoizzi. Beyond log-supermodularity: lower bounds and the Bethe partition function. In *Uncertainty in Artificial Intelligence (UAI)*, Bellevue, WA, USA, July 2013

N. Ruoizzi. The Bethe partition function of log-supermodular graphical models. In *Advances in Neural Information Processing Systems (NIPS)*, Lake Tahoe, NV, Dec. 2012

N. Ruoizzi. Convergent message-passing algorithms in the presence of erasures. In *Communication, Control, and Computing. 50th Annual Allerton Conference on*, Allerton, IL, Oct. 2012

N. Ruoizzi and S. Tatikonda. Convergent and correct message passing schemes for optimization problems over graphical models. In *Proceedings of the Twenty-Sixth Conference Annual Conference on Uncertainty in Artificial Intelligence (UAI-10)*, page 500, Corvallis, Oregon, 2010. AUAI Press

N. Ruoizzi and S. Tatikonda. Unconstrained minimization of quadratic functions via min-sum. In *44th Annual Conference on Information Sciences and Systems (CISS)*, Princeton, NJ, March 2010

N. Ruoizzi, J. Thaler, and S. Tatikonda. Graph covers and quadratic minimization. In *Communication, Control, and Computing. 47th Annual Allerton Conference on*, pages 1590–1596, Allerton, IL, Oct. 2009

N. Ruoizzi and S. Tatikonda. s-t paths using the min-sum algorithm. In *Communication, Control, and Computing, Forty-Sixth Annual Allerton Conference on*, Allerton, IL, Oct. 2008

D. Kozen and N. Ruoizzi. Applications of metric coinduction. In T. Mossakowski et al., editor, *Proc. 2nd Conf. Algebra and Coalgebra in Computer Science (CALCO 2007)*, volume 4624 of *Lecture Notes in Computer Science*, pages 327–341. Springer, August 2007

Theses

Nicholas Ruoizzi. *Message-Passing Algorithms for Optimization*. Yale University, Aug. 2011

Invited Talks

Continuous MAP Inference. INFORMS, August 2015.

Reweighted message passing: the good, the bad, and the ugly. Texas A&M, December 2012.

Log-supermodular functions and counting problems. Yale University, October 2012.

N. Ruozzi and S. Tatikonda. Fixing max-product: A unified look at message-passing algorithms. In *Communication, Control, and Computing. 47th Annual Allerton Conference on*, Allerton, IL, Sept. 2010

Convergent message-passing algorithms. Los Alamos National Lab, June 2010.

Teaching Experience

Columbia University (New York, NY)

Course instructor, CSOR W4246, Algorithms for Data Science (Fall 2013)

EPFL (Lausanne, Switzerland)

Guest lecturer, Convex Optimization & Linear Programming (Spring 2012)

Organized the Reading Group on Graphical Models (2012)

Advised a Masters research project (2012)

Advised a summer research student (2012)

Yale University (New Haven, CT)

Advised an undergraduate senior thesis (2010)

Teaching fellow, CPSC 425, Theory of Distributed Systems (Spring 2010)

Teaching fellow, OPRS 237, Stochastic Models and Decision Making (Fall 2010)

Teaching fellow, CPSC 469, Randomized Algorithms (Spring 2009)

Teaching fellow, AMTH 605, Networks Algorithms and Applications (Fall 2009)

Teaching fellow, CPSC 365, Design and Analysis of Algorithms (Spring 2008)

Teaching fellow, CPSC 468, Computational Complexity (Fall 2008)

Teaching fellow, CPSC 468, Computational Complexity (Fall 2007)

Cornell University (Ithaca, NY)

Teaching assistant, CS 211, Data Structures and Algorithms (2004 - 2006)

Teaching assistant, CS 99, Introduction to Programming (Summer 2005)

Course consultant, CS 211, Data Structures and Algorithms (2002 - 2004)

Service

Committee member of the Foundations of Data Science Center, part of the Institute for Data Sciences and Engineering at Columbia University

Program committee member AAAI (2015), ISIT (2016)

Reviewer for Neural Computation (2013-2014), ICML (2014-2015), NIPS (2013-2015), Journal of Machine Learning Research (2013), NETSTAT (2013), IEEE International Symposium on Information Theory (2013), European Symposium on Algorithms (2012), IEEE Transactions on Information Theory (2012, 2015), Designs, Codes and Cryptography (2012)

Board member of the Association of Computer Science Undergraduates, Cornell University's student chapter of the ACM (2004 - 2006)

Awards and Honors

Honorable mention for NSF Graduate Research Fellowship Program (2008)

Honorable mention for NSF Graduate Research Fellowship Program (2006)