Andrew E. Gelfand

CONTACT INFORMATION

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PERSONAL

I am a PhD candidate in Rina Dechter's Automated Reasoning in Artificial Intelligence group and Max Welling's Statistical Computation, Information, Vision and Inference (SCIVI) Lab. Prior to attending UC Irvine, I received a master's degree in operations research at George Washington University, where I worked with Tom Mazzuchi on Bayesian inference in time-varying failure processes for software reliability.

RESEARCH INTERESTS

I work in the area of artificial intelligence and machine learning. My focus is on developing methods to efficiently learn from data using graphical models - a modeling formalism that provides structure to probability distributions over large, complex systems. I am interested in developing methods to efficiently and accurately perform approximate inference in probabilistic graphical models, particularly in message passing algorithms based on variational methods.

EDUCATION

University of California, Irvine, Irvine, CA USA

Ph.D. Candidate, Computer Science, September 2009-Present

- Advisors: Rina Dechter, Max Welling
- Area of Study: Learning & Inference in Probabilistic Graphical Models

The George Washington University, Washington, DC USA

M.S., School of Engineering and Applied Science, June 2009

- Advisor: Professor Thomas A. Mazzuchi
- Area of Study: Operations Research

Tufts University, Medford, MA USA

B.S., Electrical and Computer Engineering, June 2004

- *Magna cum Laude*

PUBLICATIONS

Chen, Y., A.E. Gelfand and M. Welling "Herding for Structured Prediction." To appear in *Advanced Structured Prediction.* Eds. Sebastian Nowozin, Peter V. Gehler, Jeremy Jancsary and Christoph Lampert. MIT Press.

Chertkov, M., A.E. Gelfand and J. Shin. "Loop Calculus and Bootstrap-Belief Propagation for Perfect Matchings on Arbitrary Graphs." Proceedings of the International Meeting on Inference, Computation, and Spin Glasses 2013.

Gelfand, A.E., J. Shin and M. Chertkov "Belief Propagation for Linear Programming." ISIT 2013.

Gelfand, A.E. and M. Welling. "Generalized Belief Propagation on Tree Robust Structured Region Graphs." UAI 2012.

Welling, M., A.E. Gelfand and A. Ihler. "A Cluster-Cumulant Expansion at the Fixed Points of Belief Propagation." UAI 2012.

Chen, Y., A.E. Gelfand, C. Fowlkes and M. Welling. "Integrating Local Classifiers through Nonlinear Dynamics on Label Graphs with an Application to Image Segmentation." ICCV 2011.

Gelfand, A.E., K. Kask and R. Dechter. "Stopping Rules for Randomized Greedy Triangulation Schemes." AAAI 2011.

Kask, K., A.E. Gelfand, L. Otten and R. Dechter. "Pushing the Power of Stochastic Greedy Ordering Schemes for Inference in Graphical Models." AAAI 2011.

Gelfand, A.E., L. Van Der Maaten, Y. Chen, and M. Welling. "On Herding and the Perceptron Cycling Theorem." NIPS 2010.

Kask, K., R. Dechter and A.E. Gelfand. "BEEM: Bucket Elimination with External Memory." UAI 2010.

Gelfand, A.E., C. Smith, M. Colony and C. Bowman. "Performance Evaluation of Decentralized Estimation Systems with Uncertain Communication." FUSION 2009.

Professional Experience

Yahoo! Labs, Sunnyvale, CA USA

Summer Intern **June 2013 to October 2013**

- Developed an approach for constructing rich profiles of individual user interests based on their interactions with the Yahoo content (article) stream.
- Submitted an approach for estimating article read time that was a top 4 finalist in the ALBERT program - a Yahoo Labs-wide competition for innovative ideas.

Los Alamos National Lab, Los Alamos, NM USA

Summer Intern & Visiting Student **June 2012 to present**

- Am a visiting scholar at the Center for Non-Linear Studies at Los Alamos National Lab, where I work with Dr. Misha Chertkov on the development of novel generalized belief propagation algorithms that leverage tractable structures.

Decisive Analytics Corporation, Arlington, VA USA

Research Scientist **May 2006 to September 2009**

- Led an Army funded effort exploring the effect of architectural choice, information sharing policy choice and non-deterministic communication effects on local and global consistency in distributed estimation systems (e.g., a sensor network).
- Led an Army funded effort that developed a solution to the simultaneous localization and mapping (SLAM) problem on a robotic platform with an EO video camera and scanning laser. Involved the development of a competitive expectation maximization (EM) algorithm to extract features from the laser and camera.

Raytheon Missile Systems, Tucson, AZ USA

Embedded Software Engineer **June 2004 to May 2006**

- Collaborated in the design, implementation and unit testing of a computer subcomponent for handling communications between an external GPS card and the main processor of the Joint Stand-Off Weapon (JSOW) missile.
- Spearheaded the integration and testing of the aforementioned sub component with the existing system on multiple hardware configurations, including an Intel 486/586 with a custom ASIC and a Pentium with an FPGA.

Service	Organizer of the UCI Machine Learning Reading Group, 2011-present. Organizer of AI/ML weekly seminar series, UCI Center for Machine Learning, 2010-2011. Teaching assistant for Intro to AI course in Fall 2011 and Winter 2012.
Reviewing	Conference on Artificial Intelligence (AAAI) International Conference on Machine Learning (ICML) Conference on Neural Information Processing Systems (NIPS) Conference on Uncertainty in Artifcial Intelligence (UAI)
Miscellaneous	Licensed private pilot (not current).