

# KIMBERLY FERGUSON-WALTER

Cell: (619) 200-9796, kferguso@cs.umass.edu

## Objective

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Position in **Information Technology** utilizing experience in development, testing, and application of machine learning techniques to automate existing processes and identify system capabilities.

## Summary of Qualifications

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Possess broad understanding of artificial intelligence, reinforcement learning, representation learning, and process modeling; skilled in data collection and statistical analysis. Exhibit high proficiency in programming and simulation with C++, Java, and Matlab. Adept at identifying improvements to machine learning methods in order to resolve complex technical issues. Possess strong reporting and communication abilities; work effectively independently and in collaborative environments.

## Work Experience

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### JUNIOR RESEARCH SCIENTIST

**Smart Information Flow Technologies (SIFT), Minneapolis, MN**

**2008-Present**

Responsible for preparing proposals and implementing projects for Small Business Innovation Research (SBIR) as well as other funding programs with an emphasis on human computer interaction and display usability.

Current projects include:

- Multi-Modal Advisor for Interface Design (MAID), SBIR funded by NASA - Responsible for design, implementation, and testing using Adaptive Information Management techniques to assist in the design and evaluation of safety-critical procedural displays.
- Deep Green, DARPA program - Responsible for design and implementation of a user interface that will give military commanders improved planning and forecasting capabilities by illustrating alternate plans and possible "futures"; currently pursuing automatic option generation using genetic algorithms.

## Education

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**UNIVERSITY OF MASSACHUSETTS, Amherst, MA**

**Currently Pursuing**

Doctor of Philosophy Candidate, Department of Computer Science

**UNIVERSITY OF MASSACHUSETTS, Amherst, MA**

**2008**

Master of Science in Computer Science

- Thesis: *Improving Intelligent Tutoring Systems: Using Expectation Maximization To Learn Student Skill Levels*

**UNIVERSITY OF CALIFORNIA-IRVINE, Irvine, CA**

**2003**

Bachelor of Science in Information and Computer Science, specialization in Artificial Intelligence

- Honors Thesis: *Discovery of Transcription Factor Binding Sites in Yeast by Computational Analysis*
- Graduated *Cum Laude*

## Selected Graduate Courses

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- Machine Learning I/II
- Reasoning Under Uncertainty
- Reinforcement Learning
- Advanced Algorithms
- Advanced Software Engineering
- Computation Study of Consciousness

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## Research Experience

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### UNIVERSITY OF MASSACHUSETTS, Amherst, MA

2004-Present

Research Assistant, Autonomous Learning Laboratory (ALL), 2005-Present

- Researching proto-value functions, representation and transfer learning in context of reinforcement learning.

Research Assistant, Research on Learning and Education (ROLE), 2005-2007

- Investigated machine learning and reinforcement learning in intelligent tutoring systems.

Research Assistant, Laboratory for Advanced Software Engineering Research (LASER), 2004-2005

- Conducted process modeling and error detection of Baystate Hospital Emergency Room.

### UNIVERSITY OF CALIFORNIA - IRVINE, Irvine, CA

2002-2003

Research Assistant, Bioinformatics Research

- Completed bioinformatics and machine learning honors research and thesis.

## Honors & Awards

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### Honors Societies

- **Phi Beta Kappa Honors Society**, Mu, CA, 2003.
- **Golden Key International Honor Society**, 2002.

### Awards and Scholarships

- **Computing Research Association's Outstanding Undergraduate Award**, Honorable Mention, 2003.
- **Bruce Wade Memorial Service Scholarship**, Recipient, University of California - Irvine, 2002.
- **Harvey Mudd College Merit Scholarship**, Recipient, 1999.

## Teaching Experience

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### UNIVERSITY OF MASSACHUSETTS, Amherst, MA

2007

Instructed Computer Science 123, Introduction to Java II.

### GIRLS INCORPORATED, Costa Mesa, CA

2003, 2004

Served as Science Camp instructor; presented educational workshops to underprivileged girls.

## Professional Service

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- Women in Machine Learning Workshop Reviewer, San Diego, CA, 2006.
- Computer Science Women's Group Organizer, University of Massachusetts, Amherst, MA, 2005.
- Computing Research Association (CRA/CRAW), Women's Graduate Cohort Program, San Francisco, CA, 2005.

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### Publications

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- Sridhar Mahadevan, Sarah Ostentoski, Jeff Johns, **Kimberly Ferguson**, Chang Wang. *Learning to Plan using Harmonic Analysis of Diffusion Models*. Proceedings of International Conference on Automated Planning and Scheduling (ICAPS), Providence, RI, 2007.
- Ivon Arroyo, **Kimberly Ferguson**, Jeff Johns, Toby Dragon, Hasmik Meheranian, Don Fisher, Andrew G. Barto, Sridhar Mahadevan, Beverly P. Woolf. *Remediating disengagement with non-invasive interventions*. Proceedings of 13<sup>th</sup> International Conference on Artificial Intelligence in Education (AIED), Marina Del Rey, CA, 2007.
- Sridhar Mahadevan, Mauro Maggioni, **Kimberly Ferguson**, Sarah Osentoski. *Learning Representation and Control in Continuous Markov Decision Processes*. Proceedings of 21<sup>st</sup> National Conference on Artificial Intelligence (AAAI), Boston, MA, 2006.
- **Kimberly Ferguson**, Ivon Arroyo, Sridhar Mahadevan, Beverly P. Woolf, Andrew G. Barto. *Improving Intelligent Tutoring Systems: Using EM to Learn Student Skill Levels*. Proceedings of 8<sup>th</sup> International Conference on Intelligent Tutoring Systems (ITS), Jhongli, Taiwan, 2006. Lecture notes featured in *Computer Science*, No. 4053: 453-462, 2006.
- **Kimberly Ferguson** and Sridhar Mahadevan, *Proto-Transfer Learning in Markov Decision Processes using Spectral Methods*. Proceedings of ICML-06 Workshop on Structural Knowledge Transfer for Machine Learning, Pittsburgh, PA, 2006.
- **Kimberly Ferguson**, *Improving Intelligent Tutoring Systems: Using Expectation Maximization To Learn About Student Skill Levels*. University of Massachusetts Department of Computer Science Technical Report *UM-CS-2006-09*, 2006.