

# Brigham Anderson

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## GOALS

My motivation is to push the state of the art of machine learning and data mining through applied research. I specialize in large scale probabilistic models, with a current emphasis on active learning, Bayesian networks, and fast inference.

## EDUCATION

<b>Ph.D. Robotics, School of Computer Science,</b> <i>Carnegie Mellon University. Pittsburgh, PA.</i>	<b>07/99 ~ 07/03</b>
<b>M.S. Organizational Science,</b> <i>Carnegie Mellon University. Pittsburgh, PA.</i>	<b>07/95 ~ 07/99</b>
<b>B.S. Biochemistry, B.S. Biology,</b> <i>University of Washington. Seattle, WA.</i>	<b>07/90 ~ 07/94</b>

## WORK AND RESEARCH

**Entrepreneurial Venture,**  
**Large-Scale Active Personalization** **10/2005 – present**

Prototype development of a Java web service that adaptively interviews users. The system can be used to conversationally extract and model user information.

- Fully Bayesian model of thousands of user attributes
- Efficiently computes optimal interview questions.
- Responsible for all aspects of project: algorithm design and coding

**Postdoctoral Research Fellow,** **Carnegie Mellon University**  
**Biosurveillance Project** **7/2005 – present**

An early-warning system for detecting and diagnosing different outbreak types (anthrax, botulism, influenza, cryptosporidium, etc.) at the city-wide level.

- Many data streams (emergency room visits, over-the-counter sales of various items, webMD usage, etc.)
- Incorporates external effects such as the "weekend-effect" for ER visits.
- Created general-purpose Bayes net and Dynamic Bayes net libraries.
- Responsible for all aspects of project: algorithm design and coding.

**Postdoctoral Research Fellow,** **Carnegie Mellon University**  
**Computer Assistant Project** **4/2004 – 7/2005**

DARPA-funded project to create a learning desktop assistant. Our subsystem tracked the user's state from keyboard, mouse, motion, and sound sensors.

- Real-time sensors, Jabber-based communications, and SQL data storage.
- Project manager: directed three full-time undergraduate programmers
- Research produced the first linear-time all-pairs value of information algorithm, many orders of magnitude faster than the state of the art.

**Graduate Research Assistantship,** **Carnegie Mellon University**  
**Astronomy Survey Project** **1/2002 – 7/2003**

Designed algorithm to process tens of millions of atmospherically-distorted galaxy images to determine the morphology (shape parameters) of each.

- State of the art: 3 minutes per image.
- Our algorithm: about 1 second per image.
- Designed and coded all algorithms.

**Graduate Research Assistantship,  
3M Project**

**Carnegie Mellon University  
7/2001 – 1/2002**

Designed and implemented algorithms that design experiments for noisy and expensive tests. Application area: industrial research facility.

- Developed several novel algorithms used by chemical engineers
- Created Excel plug-in for algorithm
- Consulted on site at 3M Corp.

**Teaching Assistantships  
Computer Science Dept. and Social and Decision Sciences Dept.**

**Carnegie Mellon University  
1996 – 2000**

- Artificial Intelligence
- Experimental Research Methods
- Economic Policy
- Organizational Theory

## COMPUTER SKILLS

- **Programming Languages:** C, Java, Matlab, Perl.
- **OS/Applications:** Linux, Windows, MySQL.

## PAPERS

1. **B. Anderson**, S. Siddiqi, and A. Moore, "Sequence Selection for Active Learning," ICML 2006, *Under Review*
2. **B. Anderson**, A. Moore, "Fast Information Value for Graphical Models," NIPS 2005.
3. **B. Anderson**, A. Moore, "Active Learning for Hidden Markov Models: Objective Functions and Algorithms," ICML 2005.
4. **B. Anderson**, A. Moore, A. Connolly, and B. Nichol, "Eigengalaxies for Fast Galaxy Morphology," KDD 2004.
5. **B. Anderson**, "Nonparametric Optimization and Galactic Morphology," Doctoral Dissertation CMU-RI-TR-03-17, Carnegie Mellon University, Pittsburgh, PA, 2003.
6. **B. Anderson**, A. Moore, and D. Cohn, "A Nonparametric Approach to Noisy and Costly Optimization," ICML 2000.
7. **B. Anderson**, C. Butts, and K. Carley, "The Interaction of Size and Density with Graph Level Indices," Social Networks, 21 (3), 239-267, 1999.
8. **B. Anderson**, A. Moore, "ADtrees for Fast Counting and Fast Learning of Association Rules," KDD 1998.

## PROFESSIONAL ACTIVITIES

Program Committee, Knowledge Discovery and Data Mining Conference 2006.

Reviewer, Knowledge Discovery and Data Mining Conference, 2005.

Reviewer, Journal of Machine Learning Research, 2005.

## REFERENCES

Prof. Andrew Moore, Director of Google Labs, Pittsburgh  
Doctoral Advisor and Postdoctoral Supervisor  
[awm@cs.cmu.edu](mailto:awm@cs.cmu.edu)

Dr. Artur Dubrawski, Carnegie Mellon University  
Director of Auton Lab,  
[awd@cs.cmu.edu](mailto:awd@cs.cmu.edu)

Prof. Matt Mason, Carnegie Mellon University  
Director of Robotics Institute,  
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