H E I D I   D I X O N
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P R O F I L E

Research scientist and software engineer with a background in artificial intelligence, search and optimization. Strengths include algorithm design and problem solving.   Looking for a position where I can work on innovative and creative solutions to challenging problems.

E D U C A T I O N

Ph.D.	2004	in Computer and Information Science, University of Oregon
		Thesis: *Automating Pseudo-Boolean Inference within a DPLL Framework*
		Advisor: Matthew L. Ginsberg
B.A.	1993	in Geology, Oberlin College

T E A C H I N G

Adjunct Professor, University of Oregon, Eugene, Oregon — 2013-2014

- Taught *Automata Theory*, a combined graduate and undergraduate class and the graduate level *Algorithms and Complexity* class in the Computer and Information Science Department.

Mathematics Teacher, The Chewonki Foundation, Maine Coast Semester Program — 1996-1997

- Taught high school algebra, calculus and statistics in an environmentally based semester away program for high school juniors.

FLL Lego Robotics Coach — 2013-2017

- Ran two robotics teams, one for 4th and 5th graders and one for middle school kids. Developed robotics curriculum, ran practices and prepared teams for First Lego League competitions.

4th Grade TAG Math Group — 2015

- Ran a TAG math group in my son's 4th grade class as a volunteer.

E X P E R I E N C E

Senior Research Scientist, On Time Systems, Eugene, Oregon — 2004-2012

- Conducted research in search and optimization with a focus in satisfiability testing, planning and large scale scheduling and routing problems. My personal research focused on applying group theory to automated logical proof systems to solve structured constraint satisfaction problems with efficient general purpose methods.
- Familiar with solution methods from the field of Operations Research including linear and integer programming methods.
- Worked for GreenDriver (now Connected Signals at connectedsignals.com) developing a mobile app that provides real-time traffic routing and traffic light predictions for passenger cars using live traffic light data streams. Scientifically investigated in house methods for predicting traffic routes from smart phone GPS data streams generated by moving cars in traffic. Developed code in C++, Python, Objective C and Java on both the server side and client side.
- Worked on the human resources team as the lead code reviewer for incoming interview candidates and as lead interviewer for identifying mathematical and algorithmic problem solving skills.

Research Assistant, Computational Intelligence Research Lab, University of Oregon — 1998-2004

- Conducted research into integrating pseudo-Boolean representations and inference methods into standard satisfiability engines to improve the power of the underlying proof system and improve runtime efficiency.
- Participated in research into search and optimization in the domains of scheduling and routing.

PUBLICATIONS

Journal Articles

- H. E. Dixon, M. L. Ginsberg, D. Hofer, E. M. Luks and A. J. Parkes. Generalizing Boolean Satisfiability III: Implementation. *Journal of Artificial Intelligence Research,* 23:441-531, 2005.

- H. E. Dixon, M. L. Ginsberg, E. M. Luks and A. J. Parkes. Generalizing Boolean Satisfiability II: Theory. *Journal of Artificial Intelligence Research,* 22:481-534, 2004.

- H. E. Dixon, M. L. Ginsberg and A. J. Parkes. Generalizing Boolean Satisfiability I: Background and Survey of Existing Work. *Journal of Artificial Intelligence Research,* 21:193-243, 2004.

- H. E. Dixon and M. L. Ginsberg. Combining Satisfiability Techniques from AI and OR. *The Knowledge Engineering Review*, 15(1):31-45, 2000.

Refereed Conference Proceedings

- J. Apple, P. Chang, A. Clauson, H. E. Dixon, H. Fakhoury, M. L. Ginsberg, E. Keenan, A. Leighton, K. Scavezze and B. Smith. Green Driver: AI in a Microcosm. In *Proceedings of the Twenty-Fifth National Conference on Artificial Intelligence (AAAI-2011),* 2011.

- H. E. Dixon, M. L. Ginsberg, D. K. Hofer, E. M. Luks and A. J. Parkes. Implementing a generalized version of resolution. In *Proceedings of the Nineteenth National Conference on Artificial Intelligence (AAAI-2004),* 2004.

- H. E. Dixon and M. L. Ginsberg. Inference methods for a pseudo-Boolean satisfiability solver. In *Proceedings of the Eighteenth National Conference on Artificial Intelligence (AAAI-2002),* 2002.

INVITED TALKS

- *Satisfiability, Structure and Permutation Groups* at the University of Washington in Seattle Department of Computer Science and Engineering, October 22, 2004.
- *Efficient General-Purpose Problem Solving: Fact or Fiction* at Portland State University Computer Science Colloquium, May 2, 2005.

INTERESTS

swimming, piano, rock climbing and face painting