Curriculum Vitae

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Present Position

Head, Adaptive Systems Section
Head, Intelligent Decision Aids Group
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Education

Ph.D. in Computer Science (November, 1990)
- Department of Information and Computer Science
- University of California, Irvine
- Dissertation: *A framework for instance-based learning algorithms: Mathematical, empirical, and psychological evaluations*
- Advisor: Professor Dennis Kibler

M.S. in Computer Science (December, 1985)
- Department of Computer and Information Science
- Syracuse University

B.S. in Computer Science (May, 1983)
with Honors, Magna Cum Laude, Syracuse University Scholar
- Department of Computer and Information Science, Syracuse University
- Undergraduate Thesis: *Logic Programming Methodology*
- Advisor: Professor J. Alan Robinson

Research Interests

Case-based reasoning
- Conversational case-based reasoning, recommender systems
- Knowledge-intensive reasoning
- Textual case-based reasoning

Intelligent agents
- Mixed-initiative planning and reasoning
- Artificial intelligence and games
- Intelligent decision aids

Machine learning
- Lazy learning algorithms, instance-based learning
- Statistical relational learning, collective inference, inductive logic programming
- Transfer learning, reinforcement learning

Knowledge management: Intelligent lessons learned systems
Natural language understanding: Generative lexicon theory
Cognitive architectures

Research and Service Activities Summary

After studying logic and functional programming languages while obtaining my M.S. in Computer Science at Syracuse University, I pursued my PhD at the University of California, Irvine. My focus was on the machine learning (ML) subtopic of instance-based learning, a subject that I helped to popularize that is frequently discussed in ML and artificial intelligence textbooks. My dissertation included three types of evaluations: computational learning theory for assessing the types of concepts that can be *PAC*-learned in polynomial time, empirical evaluations on data sets obtained from diverse sources for studying classification and regression tasks, and the evaluation of algorithmic behavior for fitting subject data in studies concerning cognitive psychology. This lead to my long-time participation with the *Machine Learning* journal, where I have served as an Editorial Board member and Action Editor. During my PhD candidacy, I also established the UCI Repository of ML Databases, which is one of the most successful such repositories in the area of artificial intelligence, having now been cited in well over 4000 publications.

During my three post-doctoral appointments, I first studied with Stephen Muggleton while at the Turing Institute in Glasgow, funded as an SERC Fellow through the help of Donald Michie, who lead the institute at that time. During this time I began publishing on the topic of inductive logic programming, which I would have pursued further if I had the support of NRL, but at that time NRL's focus was on the transition of more mature technologies. My second post-doctoral appointment, with The Johns Hopkins University, permitted me to work with Steven Salzberg and Simon Kasif on topics concerning memory-based reasoning algorithms and systematic analyses for identifying the data set characteristics that permit a supervised learning algorithm to perform well. Finally, as an NSERC Fellow at the University of Ottawa, I worked closely with their ML and case-based reasoning (CBR) groups, which lead to additional contributions on both subjects (e.g., inductive logic programming).

I began working at NRL in 1993, where I soon began to take leadership positions in the CBR field, chairing a workshop at AAAI in 1994, giving several keynote talks on the subject at various conferences, co-chairing the international conference in 2001, and organizing several other meetings related to CBR. The initial culmination of my efforts was serving as guest editor for a quintuple special issue in *Artificial Intelligence Review* titled *Lazy Learning*, which focuses on the comparative utility of ML techniques that postpone eager compilation (induction of abstractions) from their given data. This introduced me to related work in several fields, which I described in my Keynote presentation, titled *The Omnipresence of Case-Based Reasoning in Science and Application*, at the 1997 SGES International Conference on Knowledge Based Systems and Applied Artificial Intelligence held at the University of Cambridge. I have also hosted a few highly-used www sites for machine learning and CBR researchers/practitioners.

A primary focus has been on a variant methodology, known as *Conversational CBR*, which models an incremental problem elicitation process. This technology has had tremendous commercial success for customer support and related applications. I've organized workshops related to this topic on mixed-initiative reasoning, and co-edited the only special journal issue on this topic (2001, *Applied Intelligence*). In 2005, I co-edited the most recent large-scale survey on CBR, which consisted of 20 short review-styled articles (involving 40+ authors) in a special issue of *Knowledge Engineering Review*, including one that I co-authored on conversational CBR. I served as the external dissertation committee member of the most recent dissertation on this topic area in 2006 (Mingyang Gu).

I have given keynote presentations at the 1998 European Workshop on CBR (on lazy learning algorithms) and the 2007 International Conference on CBR (on a formal analysis of the research methodologies used by the CBR R&D community). More recently, I am leading an international task force producing proposals for the creation of a journal related to CBR, and am beginning to

lead efforts to organize a comprehensive Wiki on this topic, involving an international group of editors.

In recent years, my interests have included the study of intelligent agents in the context of challenging simulation tasks, including as components for game AI components. During this time, I organized workshops on this topic at the International Joint Conference on Artificial Intelligence (IJCAI) and the International Case-Based Reasoning Conference (ICCBR), received the ICCBR-05 Best Paper award for our work on this subject, served as the external dissertation committee member for the pre-eminent student on this topic (Pieter Spronck), participated in several AI & games conferences, and have led the development of TIELT (Testbed for Evaluating Learning Techniques), which, as the leader of the large evaluation team for the DARPA/IPTO Transfer Learning program, my team has used to evaluate state-of-the-art technologies on transfer learning on tasks defined using complex gaming simulations. During this time I have created and served as the technical point-of-contact for grants with 10 institutions including evaluation team collaborators and technology developers for DARPA's Transfer Learning program. I have given invited presentations on this work at several universities and workshops, and also as part of publication presentations at several conference venues.

I have lead the Intelligent Decision Aids Group at NRL since 1997, and have served as the Principal Investigator or co-PI for 27 projects that have been funded by a variety of organizations (e.g., DARPA, DHS, NASA, NRL, ONR, OSD) for a total of $11.8M. Some of these projects have been at the basic research level, while others had a more applied character, and a few resulted in transitions as directed by our sponsor's needs. In 2007, I was elevated to the post of leading a new section within our AI center named *Adaptive Systems*, which includes, in addition to my group, others focusing on Natural Computing and Computer Vision. At NRL, I am in a soft money position, requiring me to obtain funding for my salary in addition to the salaries of my colleagues. This requires an enormous amount of time, and poses a challenge for time that could otherwise be spent on research and publication pursuits. However, I have been fortunate to host the long-term visits and/or employment of several post-doctoral researchers, visiting professors, and others since 1994, including many senior members of the CBR community:

Dr. Karl Branting (BAE systems, formally Assoc. Prof. with U. Wyoming, USA)
Assoc. Prof. Francesco Ricci (U. of Bozen-Bolzano, Italy)
Assoc. Prof. Héctor Muñoz-Avila (Lehigh U., USA)
Assoc. Prof. Rosina Weber (Drexel U., USA)
Dr. Kalyan Moy Gupta (Knexus Corp.)
Dr. J. William Murdock (IBM)
Dr. Bruce McLaren (DFKI, Saarbrücken, Germany, and Carnegie Mellon U., USA)
Asst. Prof. Joshua Summers (Clemson U.)
Prof. Sankar Pal (Indian Statistical Institute, Kolkata, India)
Dr. Fenstermacher (Bridgewater Associates, formally Asst. Prof. with U. Arizona)
Asst. Prof. Luke McDowell (US Naval Academy, USA)

I have collaborated on projects and/or publications with each of these distinguished researchers, along with several PhD candidates and undergraduate students. In total, I have served as an external dissertation committee member for 10 PhDs, and served as a mentor for the past two AAAI Doctoral Consortiums.

Finally, I was elected as a *Councilor* for the Association for the Advancement of Artificial Intelligence (AAAI), the preeminent professional organization in North America focusing on artificial intelligence. The duration of this Executive Board position is from 2006-2009. Recently, I had the distinct pleasure of co-chairing and co-formulating the inaugural AI Video Competition at AAAI-07 with Stanford University Professor Sebastian Thrun, renowned for, among other contributions, his success in leading the winning team in the DARPA Grand Challenge for Autonomous Vehicles. The focus of this video competition is to produce videos that draw the

attention of prospective students into the field of artificial intelligence, where the videos are assessed for their relevance, entertainment value, and research excellence in artificial intelligence. In this capacity, and after conceiving and announcing this competition with very little time prior to the July 2007 conference, we received significant sponsorship (from Microsoft Research & Yahoo! Research), submissions (30), and support from AAAI and the large Program Committee that we formed. This culminated in an Oscars-like multi-media awards ceremony complete with substantial trophies (in six categories), acceptance speeches, and a large attendance at AAAI-07. We believe that this event will serve as a predecessor for similar events at many AI conferences, provide an exciting niche for communicating one's research and development efforts, and we have accepted an invitation to conduct this competition again for the 2008 conference. (For more information, see http://aivideo.org.)

Employment

(July 1993-present) Computer Scientist, Naval Research Laboratory's Navy Center for Applied Research in Artificial Intelligence

- 1993-1997: Member, Machine Learning Section
- 1997-present: Head, Intelligent Decision Aids Group
- 2007-present: Head, Adaptive Systems Section

(October 1992-June 1993) International Postdoctoral NSERC Fellowship completed at the Department of Computer Science, University of Ottawa, Canada. Worked closely with Prof. Rob Holte, Prof. Stan Matwin, Peter Clark, and several others (Supervisor: Prof. Rob Holte)

(June 1991-October 1992) Postdoctoral Fellowship with the Eisenhower Research Center, Applied Physics Laboratory, The Johns Hopkins University of Laurel, MD; Simultaneously, a Visiting Scholar with the Department of Computer Science in Baltimore, MD; Worked closely with Prof. Steven Salzberg (Supervisor: Dr. Vincent Sigillito)

(December 1990-June 1991) Academic Visitor with the Turing Institute (Strathclyde University) in Glasgow, Scotland; Supported by a Science and Engineering Research Council Fellowship; Worked closely with Peter Clark, Prof. Steve Muggleton, and several others (Supervisor: Dr. Donald Michie)

Funding Awards: **Project Principal Investigator or Co-Investigator**

1. *Automated Image Understanding for Maritime Threat Analysis* (ONR Command, Control, & Combat Systems; FY07-FY10; $65.5K+): Co-PI for Code 5515 (PI: F. Pipitone): Developing decision support infrastructure and case-based reasoning tools for classifying vessel behaviors as threats/non-threats in a maritime domain awareness context
2. *AI Support for an Information-Centric Standardized Data Reference System* (CDM Inc.; FY06-FY07; $65K): Developed case-based reasoning techniques for the IMT system developed by CDM for USTRANSCOM for identifying mappings of data references across legacy systems
3. *Coping with Information Overload* (NRL Information Technology; FY05-FY08; $272K+): Co-PI for Code 5512 (PI: E. Marsh), researching/developing language understanding techniques for prioritizing transcribed audio traffic received at an Aegis Combat Information Center
4. *Advanced Techniques for Net-Centric Warfare* (NRL, Battlespace Awareness; FY05-FY08; $330K+): Co-PI for Code 7400 (PI: R. Ladner), researched and developed case-based

classification techniques for identifying the relevance of meteorological and oceanographic web services for the Automated MetOc Broker

5. *Evaluation Frameworks for Transfer Learning* (DARPA/IPTO Transfer Learning; FY05-FY08; $3694.3K+): Leading large North American team for evaluating intelligent (transfer learning) agents developed by the technology development teams in the TL program. Partners include Stanford University, U. Southern California, Lehigh U., U. Maastricht, Mad Doc Software, among others. Technology teams include machine learning professors from such universities as Stanford, MIT, Oregon State, U. Michigan, Northwestern, U. Texas, and others.
6. *Intelligent Crisis Action Planning Assistant* (ONR Command, Control, & Combat Systems; FY04; $175K): Research and development of an intelligent agent prototype for comparing actual military tracks/actions with predictions extracted from text documents, for purposes of flagging replanning efforts
7. *Automatic Hypothesis Testing* (DHS Insight; FY04-FY05; $604K): Developed a mature version of the AHEAD program, based on previous research funded by DARPA/IPTO's EELD program.
8. *Real-World Learning* (DARPA/IPTO seedling; FY04-FY05; $1680.8K): Developed TIELT (Testbed for Integrating and Evaluating Learning Techniques) for use with a broad class of intelligent agents and simulation tasks. Created and managed 10 subcontracts with academic, nonprofit, and industry partners (e.g., U. Michigan, ISLE, Lehigh U., Mad Doc Software) to collaboratively develop TIELT.
9. *Rapid, Enduring, and Embedded Learning* (DARPA/IPTO seedling; FY03; $67.5K): Organized workshop related to new topics in machine learning for cognitive systems, performed initial research leading to the development of the TIELT testbed for evaluating intelligent agents in simulation tasks
10. *Case-Based Reasoning for the Next Generation Synthetic Force* (ONR Affordable Human Behavior Modeling program, FY03-FY05, unfunded); Assisted SAIC/Orlando with developing a CBR capability to improve the process of building composite behaviors for wargaming simulators
11. *Analogical Hypothesis Elaborator for Activity Detection* (DARPA Evidence Extraction and Link Discovery & intelligence community support in FY04, FY02-04; $535K): Developed AHEAD, which generates formal pro/con arguments for a given terrorist activity hypothesis
12. *Rapid Analytical Wargaming* (DARPA/IPTO seedling; FY02-FY03; $100K): Provided consultation and guidance on the development of a 2-stage COA prediction process
13. *Plan Deconfliction, Repair, and Authoring for the Expeditionary Decision Support System* (ONR Accelerated Amphibious Planning, FY01-FY05; $561K): Developed modules for support of SAIC's Expeditionary Warfare Decision Support System
14. *Intelligent Planning for Wargaming Systems* (ONR, Intelligent Systems, FY01; $90K): Research and development of a plan critiquing tool for the JICM wargaming simulator
15. *Task Decomposition for Driver Modeling* (DARPA Mobile Adaptive Robotics Systems, FY01-FY02-FY04; $228.6K): Assisted with defining a 4D/RCS control architecture for human driving behaviors
16. *Language Understanding for Interactive Knowledge Management* (NRL, Information Technology Division, FY01-04; $1030K): Textual data mining approach for lesson document restructuring and efficient retrieval
17. *Reducing JICM Planning Time Through Iterative Plan Authoring* (OSD/PA&E, FY01; $127K): Developed a GIS plan authoring component for IPATS to reduce time required to created JICM planning scenarios

18. *Interactive Plan Authoring Tool Suite* (ONR, Command, Control, & Combat Systems, FY01; $400K) Developed IPATS, integrated it with a variety of knowledge sources, GUIs, and inferencing tools (e.g., SHOP)
19. *Inferencing in Support of Active Templates* (DARPA Active Templates, FY00-03, $446.5K): Extended IPATS (Integrated Plan Authoring Tool Suite) and integrated it with SOFTools
20. *Managing Lessons Learned for Problem Reporting and Corrective Action Systems* (NASA Design For Safety, FY00; $25K): Created Lesson Editor and related tools for the PostDoc document management system
21. *Interactive Affordability Prediction Modeling* (ONR 6.2, Affordability Modeling, FY99-01, $100K): Developed AMPA, an affordability model analysis and prediction tool based on NaCoDAE
22. *Case-Based Plan Authoring for Interactive Decision Support* (ONR 6.2, Command, Contol, & Combat Systems, FY99-FY00, $320K): Developed HICAP, a conversational case-based plan authoring tool, as a module for the SSC-SD IDS project (POC: M. Gherrity)
23. *Active Knowledge Management for Intelligent Decision Support* (ONR 6.2, Command, Control, & Combat Systems, FY99-FY00, $100K): Developed and integrated a proactive lessons learned retrieval tool with HICAP, a plan authoring system; demonstrated for non-combatant evacuations
24. *ACOA Transition* (ONR 6.2, Command, Control, & Combat Systems; FY99-FY00; $350K): Transitioned components of the HICAP and IPATS planning tools for use with the DISA AOCA program
25. MURI Collaboration w/ Stanford University (POC: P. Langley) on *Intelligent Adaptive Agents* (ONR, M. Shneier, AI, FY98-FY00, $25K): Evaluated HICAP using ModSAF simulations; integrated and demonstrated case-based planning and scheduling software with Stanford personnel.
26. *Practical Advances in Case-Based Reasoning* (ONR 6.2, Command & Control, FY96-FY98; $400K): Developed NaCoDAE, a conversational CBR tool for use in interactive decision aids.
27. *Conversational Case-Based Reasoning Research* (Inference Corporation, Cooperative Research and Development Agreement, FY97-FY99; $50K): Developed and tested potential additions to Inferences CBR products in the context of NaCoDAE.

Publications

Journal Articles

1. Ponsen, M., Spronck, P., Munoz-Avila, H., & Aha, D.W. (2007). Knowledge acquisition for adaptive game AI. To appear in *Science of Computer Programming*.
2. Ponsen, M.S.V., Spronck, P., Munoz-Avila, H., & Aha, D.W. (2006). Automatically generating game tactics through evolutionary learning. *AI Magazine*, **27**(3), 75-84.
3. Aha, D.W., Molineaux, M., & Ponsen, M. (2006). Learning to win: Case-based plan selection in a real-time strategy game. *Kunstliche Intelligenz*, **v1**/06, 39-44.
4. Aha, D.W., Marling, C., & Watson, I. (2005). Case-based reasoning commentaries: Introduction. *Knowledge Engineering Review*, **20**(3), 201-202.
5. Aha, D.W., McSherry, D., & Yang, Q. (2005). Advances in conversational case-based reasoning. *Knowledge Engineering Review*, **20**(3), 247-254.
6. Ilghami, O., Nau, D., Muñoz-Avila, H., & Aha, D.W. (2005). Learning preconditions for planning from plan traces and HTN structure. *Computational Intelligence*, **21**(4), 388-413.

7. Weber, R.O., & Aha, D.W. (2003). Intelligent delivery of military lessons learned. *Decision Support* Systems, **34**, 287-304.
8. Marling, C., Sqalli, M., Rissland, E., Muñoz-Avila, H., & Aha, D.W. (2002). Case-based reasoning integrations. *AI Magazine*, **23**(1), 69-86.
9. Aha, D.W., Breslow, L.A., & Muñoz-Avila, H. (2001). Conversational case-based reasoning. *Applied Intelligence*, **14**, 9-32.
10. Aha, D.W., & Muñoz-Avila, H. (2001). Editorial for the Special Issue on Interactive Case-Based Reasoning. *Applied Intelligence*, **14**, 7-8.
11. Bazell, D., & Aha, D.W. (2001). Ensembles of classifiers for morphological galaxy classification. *Astrophysical Journal*, **548**, 219-223.
12. Weber, R., Aha, D.W., & Becerra-Fernandez, I. (2001). Intelligent lessons learned systems. *Expert Systems with Applications*, **20**, 17-34.
13. Aha, D.W., Becerra-Fernandez, I., Maurer, F., & Muñoz-Avila, H. (2000). Reports on the AAAI 1999 workshop program: Exploring synergies of knowledge management and case-based reasoning. *AI Magazine*, **21**(1), 98.
14. Muñoz-Avila, H., Hendler, J., & Aha, D.W. (1999). Conversational case-based planning. *Review of Applied Expert Systems*, **5**, 163-174.
15. Kasif, S., Salzberg, S., Waltz, D., Rachlin, J., & Aha, D.W. (1998). A probabilistic framework for memory-based reasoning. *Artificial Intelligence*, **104**(1-2), 297-312.
16. Aha, D.W. (1998). The Omnipresence of Case-Based Reasoning in Science and Application. *Knowledge-Based Systems*, **11**(5-6), 261-273.
17. Aha, D.W., & Wettschereck, D. (1997). MLnet ECML'97 workshop: Case-based learning: Beyond classification of feature vectors. *MLnet News*, **5**:1, 8-11.
18. Aha, D. W., & Bankert, R. (1997). Cloud classification using error-correcting output codes. *Artificial Intelligence Applications: Natural Resources, Agriculture, and Environmental Science*, **11**:1, 13-28.
19. Aha, D.W. (1997). Editorial on Lazy Learning. Artificial Intelligence Review, 11, 7-10.
20. Wettschereck, D., Aha, D.W., & Mohri, T. (1997). A review and comparative evaluation of feature weighting methods for lazy learning algorithms. *Artificial Intelligence Review*, **11**, 273-314.
21. Aha, D. W., & Ram, A. (1996). Summary of the 1995 AAAI Fall Symposium on Adaptation of Knowledge for Reuse. *AI Magazine*, **17**(1), 83-84.
22. Breslow, L. A., & Aha, D.W. (1997). Simplifying decision trees: A survey. *Knowledge Engineering Review*, **12**, 1-40.
23. Aha, D.W. (1996). AAAI-94 Workshop Report: Case-Based Reasoning. *AI Magazine*, **17**, 92.
24. Bankert, R. L., & Aha, D.W. (1996). Improvement to a neural network cloud classifier. *Journal of Applied Meteorology*, **35**, 2036-2039.
25. Aha, D.W. (1992). Tolerating Noisy, Irrelevant, and Novel Attributes in Instance-Based Learning Algorithms. *International Journal of Man-Machine Studies*, **36**, 267-287.
26. Aha, D.W., Kibler, D., & Albert, M.K. (1991). Instance-based learning algorithms. *Machine Learning*, **6**, 37-66.
27. Kibler, D., Aha, D.W., & Albert, M.K. (1989). Instance-based prediction of real-valued attributes. *Computational Intelligence*, **5**, 51-57.

Conference and Workshop Papers

1. Gupta K.M., & Aha D.W. (2007). Conversation for textual case-based reasoning. In D. Wilson, & D. Khemani (Eds.) Textual Case-Based Reasoning: Beyond Retrieval: Papers from the ICCBR-07 Workshop (Technical Report). Belfast, Northern Ireland.

2. McSherry, D., & Aha, D.W. (2007). Mixed-initiative relaxation of constraints in critiquing dialogues. In Proceedings of the Seventh International Conference on Case-Based Reasoning. Belfast, Northern Ireland: Springer.
3. McDowell, L.K., Gupta, K.M., & Aha, D.W. (2007). Cautious inference in collective classification. In Proceedings of the Twenty-Second National Conference on Artificial Intelligence. Vancouver (BC), Canada: AAAI Press.
4. McDowell, L.K., Gupta, K.M., & Aha, D.W. (2007). Case-based collective classification. In Proceedings of the Twentieth InternationalFLAIRS Conference. Key West, FL: AAAI Press.
5. McSherry, D., & Aha, D.W. (2007). The ins and outs of critiquing. In Proceedings of the Twentieth International Joint Conference on Artificial Intelligence. Hyderabad, India: Professional Book Center.
6. McSherry, D., & Aha, D.W. (2007). Avoiding long and fruitless dialogues in critiquing. In Proceedings of the Twenty-sixth SGAI International Conference on Innovative Techniques and Applications of Artificial Intelligence Cambridge, England: Springer.
7. Gupta K.M., Aha D.W., & Moore P.G. (2006). Rough set feature selection algorithms for textual case-based classification. Proceedings of the Eighth European Conference on Case-Based Reasoning (pp. 166-181). Ölündeniz, Turkey: Springer. (Nominee: Best Paper Award)
8. Aha, D.W., Molineaux, M., & Moore, P. (2006). A testbed for evaluating AI research systems in commercial games. Proceedings of the Second Conference on Artificial Intelligence and Interactive Digital Entertainment (pp. 137-138). Marina del Rey, CA: AAAI Press.
9. Ladner R., Warner, E., Petry, F., Gupta K.M., Moore P.G., Aha D.W., & Shaw, K. (2006). Case-based classification alternatives to ontologies for automated web service discovery and integration. Proceedings of the Defense & Security Symposium. Orlando, FL: International Society for Optical Engineering.
10. Aha, D.W., & Christman, J. (2006). Enabling and testing autonomouslearning behaviors in models of computer-generated forces. Proceedings of the Spring Simulation Interoperability Workshop. Huntsville, AL: Simulation Interoperability Standards Organization.
11. Gupta, K.M., Aha, D.W., & Moore, P. (2005). Rough set feature selection methods for case-based categorization of text documents. First International Conference on Pattern Recognition and Machine Intelligence (pp. 792-798). Kolkata, India: Springer.
12. Aha, D.W., Molineaux, M., & Ponsen, M. (2005). Learning to win: Case-based plan selection in a real-time strategy game. Proceedings of the Sixth International Conference on Case-Based Reasoning (pp. 5-20). Chicago, IL: Springer. (Winner: ICCBR'05 Best Paper Award, 2005 NRL Alan Berman Publication Award)
13. Needels, K., Molineaux, M., & Aha, D.W. (2005). Evaluating case-based systems in virtual games. In D.W. Aha & D.C. Wilson (Eds.) Computer Gaming and Simulation Environments: Proceedings of the ICCBR'05 Workshop (Technical Report). Chicago, IL.
14. Molineaux, M., Aha, D.W., & Ponsen, M.J.V. (2005). Defeating novel opponents in a real-time strategy game. In D.W. Aha, H. Muñoz-Avila, & M. van Lent (Eds.) Reasoning, Representation, and Learning in Computer Games: Papers from the IJCAI Workshop (Technical Report AIC-05-127). Washington, DC: Naval Research Laboratory, Navy Center for Applied Research in Artificial Intelligence.
15. Ponsen, M.J.V., Lee-Urban, S., Muñoz-Avila, H., Aha, D.W., & Molineaux, M. (2005). Stratagus: An open-source game engine for research in real-time strategy games. In D.W. Aha, H. Muñoz-Avila, & M. van Lent (Eds.) Reasoning Representation, and Learning in Computer Games: Papers from the IJCAI Workshop (Technical Report AIC-

05-127). Washington, DC: Naval Research Laboratory, Navy Center for Applied Research in Artificial Intelligence.
16. Ilghami, O., Nau, D., Muñoz-Avila, H., & Aha, D.W. (2005). Learning approximate conditions for methods in hierarchical plans. Proceedings of the Twenty Second International Conference on Machine Learning. Bonn, Germany: Morgan Kaufmann.
17. Molineaux, M., & Aha, D.W. (2005). TIELT: A testbed for gaming environments. Proceedings of the Sixteenth National Conference on Artificial Intelligence (pp. 1690-1691). Pittsburgh, PA: AAAI Press.
18. Ponsen, M.J.V., Muñoz-Avila, H., Spronck P., & Aha D.W. (2005). Automatically acquiring adaptive real-time strategy game opponents using evolutionary learning. Proceedings of the Seventeenth Conference on Innovative Applications of Artificial Intelligence (pp. 1535-1540). Pittsburgh, PA: AAAI Press.
19. Gupta, K.M., & Aha, D.W. (2005). Interpreting events using generative sublanguage ontologies. Proceedings of the Third Workshop on Generative Approaches to the Lexicon. Geneva, Switzerland: University of Geneva.
20. Gupta, K.M., & Aha, D.W. (2005). Automatic planning using natural language. Proceedings of the Eighteenth International FLAIRS Conference. Miami Beach, FL: AAAI Press.
21. Gupta, K.M., & Aha, D.W. (2004). Heuristic acronym extraction using linguistic features. In Proceedings of the International Conference on NaturalLanguage Processing. Hyderabad, India: International Institute of Information Technology.
22. Gupta, K.M., & Aha, D.W. (2004). RuMoP: A rule-based morphotactic parser. In Proceedings of the International Conference on Natural Language Processing. Hyderabad, India: International Institute of Information Technology.
23. Muñoz-Avila, H., & Aha, D.W. (2004). On the role of explanation for hierarchical case-based planning in real-time strategy games. In P. Gervas & K.M. Gupta (Eds.) Proceedings of the ECCBR 2004 Workshops (Technical Report 142-04). Madrid, Spain: Universidad Complutense Madrid, Departamento di Sistemos Informaticos y Programacion.
24. Gupta, K.M., Aha, D.W., & Moore, P. (2004). Learning feature taxonomies for case indexing. Proceedings of the Seventh European Conference on Case-Based Reasoning (pp. 211-226). Madrid, Spain: Springer.
25. Aha, D.W., & Molineaux, M. (2004). Integrating learning in interactive gaming simulators. In D. Fu & J. Orkin (Eds.) Challenges of Game AI: Proceedings of the AAAI'04 Workshop (Technical Report WS-04-04). San Jose, CA: AAAI Press.
26. Molineaux, M., & Aha, D.W. (2004). Evaluating learning techniques in gaming simulators. In Proceedings of the Behavior Representation in Modeling and Simulation Conference (pp. 395-396). Arlington, VA: SISO.
27. Summers, J.D., McLaren, B.M., & Aha, D.W. (2004). Towards applying case-based reasoning to composable behavior modeling. Proceedings of the Behavior Representation in Modeling and Simulation Conference (pp. 277-284). Arlington, VA: SISO.
28. Gupta, K.M., & Aha, D.W. (2004). Towards acquiring case indexing taxonomies from text. In Proceedings of the Sixteenth International Conference of the Florida Artificial Intelligence Research Society Miami Beach, FL: AAAI Press.
29. Barbera, A., Horst, J., Schlenoff, C., Wallace, E., & Aha, D.W. (2003). Developing world model data specifications as metrics for sensory processing for on-road driving tasks. Measuring the Performance and Intelligence of Systems: Proceedings of the PerMIS Workshop. Gaithersburg, MD: National Institute of Standards and Technology.
30. Gupta, K.M., & Aha, D.W. (2003). A framework for incremental query formulation in mixed-initiative case-based reasoning. In D.W.Aha (Ed.) Mixed-Initiative Case-Based Reasoning: Proceedings of the ICCBR'03 Workshop. Trondheim, Norway: Norweigen

University of Science and Technology, Department of Computer and Information Science.
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- ICML 1996 Workshop: Learning in Context-Sensitive Domains
- IICAI: 2005

- IJCAI
  - Reviewer: 1993; 1995; 1997; 2001; 2005
  - Area Chair in CBR: 2007
- IJCAI Workshops
  - 1995: Industrial Applications of Case-Based Reasoning
  - 2003: Mixed-Initiative Intelligent Systems
- IRIA Workshop: 2002
- IUI 2002
- Mexican AI Conference: 2002; 2004
- New Zealand CBR Workshop: 2003
- PADD 1998
- PReMI (India): 2005; 2007
- SAB Workshop: 2006
- SIMCAT 1997

Branch, Departmental, and University Services

Dissertation Committee Member or Proposal Reviewer

1. Marc Goodman, Brandeis University (1994) (Advisor: David Waltz)
2. Andres Rodriguez, University of Salford (1997) (Advisor: Sunil Vadera)
3. Jenngang Shih, The Graduate School, CUNY (Advisor: Susan Epstein)
4. Mohammed Sqalli, University of New Hampshire (2002) (Advisor: Eugene Freuder)
5. Kai Ming Ting, University of Sydney (1995) (Advisor: J. Ross Quinlan)
6. Len Trigg, University of Hamilton (1998) (Advisor: J. Cleary)
7. Antal van den Bosch, University of Maastricht (1997) (Advisor: Jaap van den Herik)
8. Fabio Sartori, University of Milan-Bicocca (2004) (Advisor: Stephanie Bandini)
9. Pieter Spronck, University of Maastricht (2005) (Advisor: Jaap van den Herik)
10. Mingyang Gu, Norwegian Institute of Science & Technology (2006) (Advisor: Agnar Aamodt)

Developer: UCI Repository of Machine Learning Databases (Maintained 1987-1993)

- This has been referenced in over 4083 publications since its inception (as of July 2007)
- It is by far the most frequently cited repository used in machine learning research

WWW Page Author

Machine Learning/Case-Based Reasoning Home Pages (1995-2003)
Machine Learning Resources Page (1996-2003)
Case-Based Reasoning Resources Page (1996-2003)

NRL, NCARAI Seminar Series Coordinator (1993-1994)

University of California, Irvine

- Graduate Student Rep., Faculty Recruitment Committee (1988-89)
- Graduate Student Rep., Computer Resources Committee (1987-88)

Professional Associations

- AAAI
- ACM

Honors and Fellowships

- 2005 NRL Alan Berman Publication Award

- 2005 International Conference on Case-Based Reasoning Best Paper Award
  - Nominated for three other co-authored papers (ICCBR-99, ECCBR-02, ECCBR-06)
- NRL Accelerated Step Award (several)
- NRL Technology Transfer Award (multiple)
- NRL's Outstanding Performance Rating and Performance Awards (several)
- Canadian NSERC International Post-Doctoral Fellowship, 10/92-6/93
- APL Post-Doctoral Fellowship, 6/91-10/92
- Great Britain SERC Post-Doctoral Fellowship, 12/90-6/91
- UC Irvine Dissertation Fellowship Recipient: Fall, 1989
- Syracuse University Scholar (highest undergraduate academic honor), 1983
- Who's Who in America's Colleges and Universities, 1983
- Texas Instruments Fellowship, 1982-83

(Selected) Keynote Conference, Workshop, and University Invited Talks

- 7/07 (Belfast, Northern Ireland): Keynote talk at the 2007 International Conference on Case-Based Reasoning. Title: *Addressing Perceptions of Case-Based Reasoning*.
- 12/05 (Kolkata, India): Keynote talk at the 2005 Conference on Patter Recognition and Machine Intelligence. Title: *Conversational Case-Based Reasoning*
- 5/05 (Maastricht, The Netherlands): Keynote talk at the Machine Learning for Game AI Workshop. Title: *Learning to Win*
- 3/04 (Pittsburgh, PA): Invited talk at Carnegie Mellon University. Title: *Generative Ontologies for Knowledge Extraction from Text*
- 5/02 (Key West, FL): Keynote Talk for the Special Track in Case-Based Reasoning, FLAIRS'02. Title: *Causal query elaboration in conversational case-based reasoning*
- 5/01 (Orlando, FL): Keynote Talk for the Special Track in Knowledge Management, FLAIRS'01. Title: *How Artificial Intelligence can Benefit Knowledge Management: An Example.*
- 6/00 (New Orleans, LA): Keynote Talk for the International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems. Title: *Interactive*
- *Case-Based Reasoning: Influences, Utility, and Outlook in an Applied World.*
- 4/00 (Oakland, CA): Keynote Talk of the Spring Workshop of the Department of Energy's Society for the Effective Use of Lessons Learned. Title: *Intelligent Lessons Learned Systems*.
- 11/98 (Mexico City, Mexico): Keynote Talk for the Machine Learning Workshop of the Mexican AI Conference. Title: *The Omnipresence of Case-Based Reasoning in Science and Application*.
- 9/98 (Dublin, Ireland): Keynote Technical Talk, Fourth European Workshop on Case-Based Reasoning. Title: Reasoning and Learning: *Exploiting the Lazy-Eager Dimension.*
- 12/97 (Cambridge, UK): Keynote Technical Talk, Seventeenth SGES International Conference on Knowledge Based Systems and Applied Artificial Intelligence. Title: *The Omnipresence of Case-Based Reasoning in Science and Application.*
- 11/96 (Napa, CA): Keynote Speech at the Fall 1996 Inference Corporation User Group Conference. Title: *Assisting Case Authoring with Machine Learning*.
- 11/94 (Biloxi, MS): Artificial Intelligence Research on Environmental Sciences Workshop. Title: *Case-Based Reasoning*.
- 11/93 (Dunedin, New Zealand): First International New-Zealand Two-Stream Conference on Artificial Neural Networks and Expert Systems. University of Otago. Title: *Integrating Machine Learning with Knowledge-Based Systems.*

I have also given invited presentations on my work at several universities (e.g., Essex, Maryland, The Johns Hopkins University, Brigham Young, Wyoming, Robert Gordon, Kaiserslautern, Stanford, Maastricht, Simon Fraser, Hong Kong Polytechnic, Maryland @ Baltimore County, Lehigh, New Mexico, Georgia Tech., Norwegian Institute of Science & Technology, Ottawa, Waikato, Victoria) and USA/other government institutions, and served on panels at several conferences and workshops (e.g., ICCBR-97; AAAI-05 Fall Symposium; ICCBR-05; ICML-06 Workshop on Structural Knowledge Transfer for Machine Learning).

References: Available upon request