Curriculum Vitae

Kurt D. Krebsbach

Department of Mathematics
Lawrence University
Appleton, Wisconsin
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CURRENT POSITION

Associate Professor of Computer Science, 2002–present
Lawrence University, Appleton, Wisconsin. Tenure granted 2007.

EDUCATION

University of Minnesota, Minneapolis, MN, 1985–1993
> **Ph.D.**, Computer Science, July, 1993
> **M.S.**, Computer Science, July, 1988
> Advisor: Dr. Maria Gini (Computer Science)
> Secondary emphasis in Cognitive Science
> Selected Course List:
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>> Artificial Intelligence I & II, AI Programming Techniques, Topics in AI: Expert Systems, Topics in AI: Robotics, Topics in AI: Planning Systems, Principles of Database Systems, Automata Theory, Formal Language Theory, Theories of Learning and Cognition, Psychology of Language.

Lawrence University, Appleton, WI, 1981–1985
> **B.A.**, Mathematics-Computer Science and Music, June, 1985
> First Lawrence Mathematics-Computer Science graduate (major approved in 1984)
> *summa cum laude* in thesis
> *magna cum laude* in course
> Phi Beta Kappa

DISSERTATION

Title: **Rational Sensing for an AI Planner: A Cost-Based Approach**
Keywords: Artificial Intelligence, Automated Planning, Decision Theory, Sensors
Date: June, 1993
Abstract:

> This dissertation work involves applying decision theoretical techniques and analysis to the general problem of task planning with sensors. In particular, I provide experimental data and theoretical analyses of several planning domains (involving both reversible and irreversible actions), and suggest a method for using the results to improve a planner's performance from both success-based and cost-based perspectives. Finally, since exhaustive techniques become intractable for even a modest degree of environmental uncertainty, I suggest ways to make the comparison of potential solutions computationally feasible.

JOURNAL ARTICLES

Kurt D. Krebsbach,
Deliberation Scheduling using GSMDPs in Stochastic Asynchronous Domains, International Journal of Approximate Reasoning, vol 50, number 9, pp. 1347-1359, November, 2009.

Robert P. Goldman, David J. Musliner, and Kurt D. Krebsbach,
Managing Online Self-Adaptation in Real-Time Environments, Springer-Verlag Lecture Notes on Computer Science, LNCS 2614, pp. 6-23, 2003.

David J. Musliner, Robert P. Goldman, Michael J. Pelican, and Kurt D. Krebsbach,
Self-Adaptive Software for Hard Real-Time Environments, IEEE Intelligent Systems, vol 14, number 4, pp. 23-29, July/August, 1999.

PEER-REVIEWED COMPUTER SCIENCE EDUCATION PAPERS

Kurt D. Krebsbach,
Computer Science: Not about Computers, Not Science, Proceedings of the 2015 International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS 2015), CSREA Press 2015, Las Vegas, Nevada, July 27-30, 2015.

PEER-REVIEWED COMPUTER SCIENCE CONFERENCE PAPERS

Colin M. Potts[1], Kurt D. Krebsbach, Jordan T. Thayer, and David J. Musliner,
Improving Trust Estimates in Planning Domains with Rare Failure Events, Proceedings of the AAAI Spring Symposium on Trust and Autonomous Systems, Stanford University, Palo Alto, CA, March 25-27, 2013.

Sam J. Estrem[1] and Kurt D. Krebsbach,
AIRS: Anytime Iterative Refinement of a Solution, Proceedings of the Twenty-Fifth International Florida Artificial Intelligence Research Society Conference (FLAIRS-25), Marco Island, FL, May 23-25, 2012.

Colin M. Potts[1] and Kurt D. Krebsbach,
Iterative-Expansion A*, Proceedings of the Twenty-Fifth International Florida Artificial Intelligence Research Society Conference (FLAIRS-25), Marco Island, FL, May 23-25, 2012.

D. Musliner, M. Pelican, R. Goldman, K. Krebsbach, and E. Durfee,
The Evolution of CIRCA, a Theory-Based AI Architecture with Real-Time Performance Guarantees, Proceedings of the AAAI Spring Symposium on Architectures for Intelligent Theory-Based Agents, Stanford University, Palo Alto, CA, March 26-28, 2008.

Benjamin H. Willard[1] and Kurt D. Krebsbach,
Map-Making with a Four-Legged Mobile Robot, Proceedings of the AAAI Spring Symposium on Robots and Robot Venues: Resources for AI Education, Stanford University, Palo Alto, CA, March 26-28, 2007.

Kurt D. Krebsbach,
Stochastic Deliberation Scheduling using GSMDPs, Proceedings of the Nineteenth International Florida Artificial Intelligence Research Society Conference (FLAIRS-19), Special Track on Uncertain Reasoning, Melbourne Beach, FL, May 11-13, 2006.

Kurt D. Krebsbach,
Other Agents' Actions as Asynchronous Events, Proceedings of the AAAI Spring Symposium on Distributed Plan and Schedule Management, Stanford University, Palo Alto, CA, March 27-29, 2006.

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[1]Denotes Lawrence undergraduate author.

Kurt D. Krebsbach and David J. Musliner,
Projection and Reaction for Decision Support in Refineries: Combining Multiple Theories, Proceedings of the AAAI Spring Symposium on Challenges to Decision Support in a Changing World, Stanford University, Palo Alto, CA, March 21-23, 2005.

David J. Musliner, Robert P. Goldman, and Kurt D. Krebsbach,
Deliberation Scheduling for Planning in Real-Time, Proceedings of the AAAI Spring Symposium on Metacognition in Computation, Stanford University, Palo Alto, CA, March 21-23, 2005.

David J. Musliner, Robert P. Goldman, and Kurt D. Krebsbach,
Deliberation Scheduling Strategies for Adaptive Mission Planning in Real-Time Environments, Proceedings of the International Workshop of Self-Adaptive Software 2003 (IWSAS '03), Rosslyn, VA, June 9-11, 2003.

Kurt D. Krebsbach and David J. Musliner,
Plant + Control System + Human: Three's a Crowd Proceedings of the AAAI Spring Symposium on Human Interaction with Autonomous Systems in Complex Environments, Stanford University, Palo Alto, CA, March 24-26, 2003.

David J. Musliner, Michael J.S. Pelican, and Kurt D. Krebsbach,
Building Coordinated Real-Time Control Plans, Proceedings of the Third International NASA Workshop on Planning and Scheduling for Space, Houston, TX, October 27-29, 2002.

Kurt D. Krebsbach,
Coordinated Deliberation Management in Multi-Agent CIRCA, Proceedings of the AAAI Spring Symposium on Collaborative Learning Agents, Palo Alto, CA, March 2002.

Robert P. Goldman and David J. Musliner and Kurt D. Krebsbach,
Managing Online Self-Adaptation in Real-Time Environments, Proceedings of the Second International Workshop on Self Adaptive Software, Balatonfured, Hungary, May, 2001.

Kurt D. Krebsbach and David J. Musliner,
You Sense, I'll Act: Coordinated Preemption in Multi-Agent CIRCA Proceedings of the AAAI Fall Symposium on Negotiation Methods for Autonomous Cooperative Systems, North Falmouth, MA, November, 2001.

David J. Musliner and Kurt D. Krebsbach,
Multi-Agent Mission Coordination via Negotiation, Proceedings of the AAAI Fall Symposium on Negotiation Methods for Autonomous Cooperative Systems, North Falmouth, MA, November, 2001.

David J. Musliner and Kurt D. Krebsbach,
Adjustable Autonomy in Procedural Control for Refineries, Proceedings of the AAAI Spring Symposium on Adjustable Autonomy, Palo Alto, CA, March 1999.

David J. Musliner and Kurt D. Krebsbach,
Applying a Procedural and Reactive Approach to Abnormal Situations in Refinery Control, Intelligent Systems Track, Foundations of Computer-Aided Process Operations (FOCAPO '98), Snowbird, UT, July 1998.

D. Musliner, K. Krebsbach, M. Pelican, R. Goldman, and M. Boddy,
Issues in Distributed Planning for Real-Time Control, Proceedings of the AAAI Fall Symposium on Distributed Continual Planning, Orlando, FL, October 1998.

Robert P. Goldman, David J. Musliner, Mark S. Boddy, and Kurt D. Krebsbach,
Abstraction for Real-Time Intelligent Control, Proceedings of the Symposium on Abstraction, Reformulation and Approximation (SARA '98), Pacific Grove, CA, May, 1998.

Robert P. Goldman, David J. Musliner, Kurt D. Krebsbach, and Mark S. Boddy,
Dynamic Abstraction Planning, Proceedings of AAAI '97, Providence, Rhode Island, July 1997.

Kurt D. Krebsbach and David J. Musliner,
A Refinery Immobot for Abnormal Situation Management, Proceedings of the AAAI '97 Workshop on Robots, Softbots, and Immobots: Theories of Action, Planning, and Control, Providence, Rhode Island, July 1997.

Robert P. Goldman, David J. Musliner, Mark S. Boddy, and Kurt D. Krebsbach,
The CIRCA Model of Planning and Execution, Proceedings of the AAAI '97 Workshop on Robots, Softbots, and Immobots: Theories of Action, Planning, and Control, July 1997.

David J. Musliner, Mark S. Boddy, Kurt D. Krebsbach, and Robert P. Goldman,
The Link Between Distributed Planning and Abstraction, Proceedings of the 1997 AAAI Fall Symposium on Model-Directed Autonomous Systems, October, 1997.

Mark S. Boddy and Kurt D. Krebsbach,
Hybrid Reasoning for Complex Systems, Proceedings of the AAAI Fall Symposium on Model-Directed Autonomous Systems, Cambridge, MA, October, 1997.

David J. Musliner and Kurt D. Krebsbach,
Planning for Murphy's Law: Uncertainty in CIRCA, Proceedings of AAAI Spring Symposium on Planning with Incomplete Information for Robot Problems, Palo Alto, CA, March 1996.

Edward Sobiesk, Kurt Krebsbach, and Maria Gini,
Over-Constrained Scheduling Using Dynamic Programming, Proceedings of the Artificial Intelligence and Manufacturing Research Planning Workshop, Albuquerque, NM, pp. 195-201, June 24-26, 1996.

Kurt Krebsbach and Maria Gini,
Dynamic Sensor Policies, Proceedings of the AAAI Spring Symposium on Detecting and Resolving Errors in Manufacturing Systems, pp. 74-80, Stanford University, Palo Alto, CA, March 25-27, 1994.

Kurt Krebsbach, Duane Olawsky, and Maria Gini,
Sensing and Deferral in Planning: Empirical Results, Proceedings of the AAAI Spring Symposium on Selective Perception, Stanford University, Palo Alto, CA, March 25-27, 1992.

Kurt Krebsbach, Duane Olawsky, and Maria Gini,
An Empirical Study of Sensing and Defaulting in Planning, Artificial Intelligence Planning Systems: Proceedings of the First International Conference (AIPS-92), College Park, Maryland, June, 1992, Morgan Kaufmann Publishers, San Mateo, CA.

PERIODICAL ARTICLES

Kurt Krebsbach,
From Programmer to Computer Scientist, Lawrence Today (Alumni Magazine), Lawrence University Office of Communications, Summer, 2012.

UNDERGRADUATE-LEVEL CONFERENCE PAPERS

Undergraduate poster presentations are not included.

Colin M. Potts[1] and Kurt D. Krebsbach,
Iterative-Expansion A*, Proceedings of the 45th Annual Midwest Instruction and Computing Symposium (MICS-2012), Cedar Falls, IA, April 13-14, 2012.

Sam J. Estrem[1] and Kurt D. Krebsbach,
Anytime Iterative Refinement of a Solution, Proceedings of the 45th Annual Midwest Instruction and Computing Symposium (MICS-2012), Cedar Falls, IA, April 13-14, 2012.

Duncan McKee[1] and Kurt Krebsbach,
A Learning Natural Language Parser, Proceedings of the Midwest Instruction in Computing Symposium (MICS-2008), University of Wisconsin-Lacrosse, Lacrosse, WI, April 11-12, 2008.

TECHNICAL REPORTS AND POSTERS

Kurt D. Krebsbach and David J. Musliner,
A Procedural Approach to Abnormal Situation Management in Refineries,Chemical Engineers Annual Meeting (AICHE '98), Technical Poster session, Miami Beach, FL, November 1998.

Kurt D. Krebsbach, David J. Musliner, Kyle S. Nelson, and Robin R. Penner,
SARA: The Search and Rescue Associate, Honeywell Technology Center (HTC), 1997.

David J. Musliner, Robert P. Goldman, Mark S. Boddy, and Kurt D. Krebsbach,
Distributed CIRCA: Guaranteeing Coordinated Behavior in Distributed Real-Time Domains., Technical Report SST-R97-030, HTC, October, 1997.

David J. Musliner and Kurt D. Krebsbach,
1995 IR&D Report: Planning for Intelligent Real-Time Control, HTC, 1995.

Duane Olawsky, Kurt Krebsbach, and Maria Gini,
An Analysis of Sensor-Based Task Planning (version 2.0), Technical Report 95-051, University of Minnesota Department of Computer Science, Mpls, MN, July, 1995.

Kurt Krebsbach,
Rational Sensing for an AI Planner: A Cost-Based Approach, Ph.D. Dissertation, Department of Computer Science, University of Minnesota, June, 1993.

Duane Olawsky, Kurt Krebsbach, and Maria Gini,
An Analysis of Sensor-Based Task Planning, Technical Report 93-43, University of Minnesota Department of Computer Science, Mpls, MN, June, 1993.

Kurt Krebsbach, Duane Olawsky, and Maria Gini,
Deferring Task Planning in the Tool Box World: Empirical Results, Technical Report TR 91-60, University of Minnesota Department of Computer Science, Mpls, MN, December, 1991.

FACULTY APPOINTMENTS, SCHOLARSHIPS, and FELLOWSHIPS

Chair, Mathematics Department, Lawrence University (2013-14 and 2009-10)

Faculty Representative, University Curriculum Committee, Lawrence University (2013-2015)

Chair, Cognitive Science Program, Lawrence University (2010-2012)

London Centre Visiting Faculty Appointment, Lawrence University, 2010
Named the 2010 visiting faculty member to teach at the Lawrence University London Centre alongside permanent London-based faculty members. The appointment is competitive, and is awarded to a single Lawrence faculty member per academic year. The program is coordinated with the Foundation for International Education (FIE).

EuMI Research Scholar, University of Edinburgh, Scotland (2007-2009)
Masters of Informatics (EuMI) Scholar for the School of Informatics at the University of Edinburgh, Scotland. As part of the EuMI postgraduate degree which is financially supported by the European Commission's ERASMUS MUNDUS initiative, EuMI offers a limited number of stipends for high-profile non-EU scholars to visit European institutions for a total of up to three months. The scholarship supported sabbatical research in Edinburgh in the spring and summer of 2009, and enabled the presentation of my research at participating EuMI partner RWTH University Aachen, Germany.

SCHOLARLY ORGANIZATIONS

Association for the Advancement of Artificial Intelligence (AAAI), lifetime member since 1987.

Phi Beta Kappa, President (2006-2007), Vice President (2005-2006), and member (elected 1985) of the $\Gamma\Delta$ Chapter of Wisconsin.

INVITED TALKS

Invited talks are not associated with a particular conference or job.

Deliberation Scheduling using GSMDPs in Stochastic Asynchronous Domains,
Invited EuMI Scholar Research Talk, Knowledge-Based Systems Group, RWTH - Aachen University, Aachen, Germany, June, 2009.

Artificial Intelligence: Oxymoron or New Frontier?,
Lunch at Lawrence Lecture Series, Lawrence University, March, 2007.

Planning to Plan: Deliberation Scheduling Using GSMDPs,
Science Hall Colloquium Series, Lawrence University, April 2006.

Adjustable Autonomy in Procedural Control for Refineries,
AI Seminar Series, Computer Science Dept., University of Wisconsin, Madison, February, 2001.

The Thinking Machine: How to Think Straight about AI,
Science Hall Colloquium Series, Lawrence University, April, 1996.

Current Issues in Planning Research,
NSF-sponsored UGAI Workshop, Temple University, June, 1994.

Task Planning With Sensors,
Pennsylvania Area Computer and Information Science Educators (PACISE) Spring Conference, Slippery Rock University, March, 1994.

PROFESSIONAL SERVICE

Referee and Program Committee Member International Joint Conference on Artificial Intelligence (IJCAI 2011), Barcelona, Spain, July 16-22, 2011.

Referee and Program Committee Member Florida Artificial Intelligence Research Society Annual Conference (FLAIRS '07), Key West, FL, May 7-9, 2007.

Referee, International Joint Conference on Artificial Intelligence, Edinburgh, Scotland, UK, July 30-August 5, 2005.

Referee, International Conference on Robotics and Automation, Washington D.C., May 11-15, 2002.

Referee, Hawaii International Conference on System Sciences, Emerging Paradigms for Intelligent Systems track, HICSS-31, Kohala Coast, Hawaii, January 6-9, 1998.

Referee, Hawaii International Conference on System Sciences, Emerging Paradigms for Intelligent Systems track, HICSS-28, University of Hawaii, January 3-6, 1995.

UNDERGRADUATE RESEARCH GRANTS

All grants proposed on behalf of students and supervised by Kurt Krebsbach.

Senior Experience Mellon Research Grant, Summer, 2015
This grant provided funds for **Eddie Elizondo Rueda** to attend the two-week Machine Learning Summer School at the University of Kyoto, Japan in August, 2015. Award: $2,967.

Women in Computing Conference Mellon Grant, Winter, 2015
This Mellon grant allowed me to take three CS majors—**Rachel Feltes, Liza Girsova, and Sophia Wang**—to attend MinneWIC, a regional two-day conference at the University of Minnesota. We added a day to the trip during which I introduced them to colleagues at two Minneapolis research companies and an AI lab at the university. The students benefitted from the opportunity to network with industrial and academic professionals, and are hoping to establish a "women in computing" student organization at Lawrence. Award: $1,468

Summer Research Grant, Summer, 2014
Lawrence University provided this award to fund **Eddie Elizondo Rueda** to engage in summer research projects involving three machine learning algorithms for analyzing student retention data in cooperation with the Office of Research Administration. Award: $3500.

Eloise Frick Cherven Fund Research Grant, Summer, 2014
This grant provided travel funds to support **Eddie Elizondo Rueda** to attend the 31st International Conference on Machine Learning (ICML 2014) in Beijing, China. This is a fabulous opportunity for Eddie to participate in workshops and tutorials in areas relevant to his ongoing research with me, including Bayesian learning, deep learning, and text mining. Award: $2,100.

Senior Experience Mellon Research Grant, 2012-2013
A Mellon Grant provided travel funds to support summer research student **Colin Potts** to present our co-authored paper at the AAAI Spring Symposium on Trust and Autonomous Systems, Stanford University, Palo Alto, CA, March 25-27, 2013. Award: $1600.

Women in Computing Conference Travel Grant, Winter, 2012
The Provost's office provided this grant to allow sophomore computer science students **Ciao-Yu Tuan** and **Natalie Wolf** to attend MinneWIC, a regional two-day conference to encourage women in computing, held at the University of Minnesota, and co-hosted by my Ph.D. advisor, Dr. Maria Gini. Award: $260 plus transportation.

Summer Research Grant, Summer, 2012

Lawrence University provided this award to fund **Colin Potts** to engage in summer research projects involving parallel search algorithms and new techniques for planning in probabilistic domains. Award: $3500.

Senior Experience Mellon Research Grant, 2011-2012

A Mellon Grant provided travel funds to purchase computer equipment and to support two summer research students, **Sam Estrem** and **Colin Potts** to each present their accepted research papers at MICS-2012 (Iowa) and FLAIRS-25 (Florida). Award: $3700.

Summer Research Grant, Summer, 2011

Lawrence University provided this award to fund two summer research students, **Sam Estrem** and **Colin Potts**, to assist in summer research projects involving developing and evaluating new hybrid search algorithms to support modern planning systems. Award: $7500.

Summer Research Grant, Summer, 2010

Lawrence University provided this award to fund a summer research student, **Sam Estrem**, to assist in several summer research projects involving evaluating search algorithms and heuristics for the most current planning systems. Award: $3500.

Enhancing Academic Distinctiveness Grant: MICS Conference, Spring, 2008

This grant supported seniors **Duncan McKee** and **Stephen Marquis** to present papers at the Midwest Instruction in Computing Symposium (MICS-2008), held at the University of Wisconsin-Lacrosse, April 11-12, 2008. Duncan and Stephen also placed 2nd of 42 teams in the programming competition to claim a $300 prize—particularly impressive for two undergraduates competing against teams of three, some of which included graduate students.

Scholarly Distinctiveness Grant: Mobile Robotics, Summer, 2006

Ben Willard and I received this support for Mobile Robot Control that began in January 2006 and culminated in a year-long independent study project and a joint paper published and presented in the 2007 AAAI Spring Symposium at Stanford University. The grant provided for one Sony AIBO robot, a laptop for programming and control, and a stipend to allow Ben to work full-time on this project throughout the summer of 2006. Award: $9000.

Summer Research Grant, Summer, 2003

Lawrence University provided this stipend for **Nabeeha Mohammed** to assist in summer research projects in the area of heuristic search and automated planning. This work resulted in Nabeeha presenting *"Artificial Intelligence: Search and Graphplan,"* at the The PEW Midstates Undergraduate Research Symposium, University of Chicago, November 14-16, 2003. Award: $3000.

OTHER ACADEMIC GRANTS

Conference Grant, May, 2012

I received a travel grant of $1300 to defray costs to attend FLAIRS-25 – the twenty-fifth anniversary of FLAIRS – at which two of my students presented our co-authored papers.

Conference Grant, July, 2011

I received a travel grant of $1000 to defray costs to attend AAAI in San Francisco.

Conference Grant, May, 2010

I received a travel grant of $1300 to defray costs to attend the International Conference on Automated Planning and Scheduling Systems, held in Toronto, Ontario.

Conference Grant, March, 2008

Lawrence provided funds to attend the AAAI Spring Symposium entitled *Architectures for Intelligent Theory-Based Agents* in which I co-authored *The Evolution of CIRCA, a Theory-Based*

AI Architecture with Real-Time Performance Guarantees. Due to unforeseen circumstances, the grant was instead used to attend the AAAI conference in Chicago, July, 2008.

Conference Grant, March, 2007

Lawrence University provided support to attend the AAAI Spring Symposium workshop entitled *Robots and Robot Venues: Resources for AI Education* at Stanford in which I co-authored the paper *Map-Making with a Four-Legged Mobile Robot.*

Conference Grant, May, 2006

Lawrence University provided travel funds to the FLAIRS '06 conference to present the paper, *Stochastic Deliberation Scheduling Using GSMDPs*, for the Special Track in Uncertain Reasoning.

Conference Grant, March, 2006

Lawrence University provided reimbursement for travel to the AAAI Spring Symposium Series to present the paper, *Other Agents' Actions as Asynchronous Events*, for the workshop entitled "Distributed Plan and Schedule Management" I was also asked to serve with two other speakers on a 90-minute panel on the topic of "Meta-Level Reasoning."

Conference Grant, March, 2005

Lawrence University provided reimbursement for travel to the AAAI Spring Symposium Series to present the paper, *Projection and Reaction for Decision Support in Refineries: Combining Multiple Theories*, for the workshop entitled "Challenges to Decision Support in a Changing World." I was also asked to serve with three other speakers on a 90-minute panel entitled: "Challenges Posed by the Changing World"

Conference Grant, March, 2003

Lawrence University provided reimbursement for travel to the AAAI Spring Symposium Series to present the paper, *"Plant + Control System + Human: Three's a Crowd"*, for the workshop entitled "Human Interaction with Autonomous Systems in Complex Environments."

PEW Faculty Development Workshop Grant, November, 2002

This workshop, entitled *Computer Science in the Next Decade,* was held at Hope College in Holland, MI, and addressed hiring and retaining faculty at undergraduate institutions, designing the introductory CS sequence, and attracting women and minorities to computer science.

Pennsylvania SSHE Professional Development Grant, summer, 1994

My proposal, *Computer Lab Development for the Artificial Intelligence Course*, was one of 83 funded by SSHE (of 239 proposals), and provided $4200 for software and a small summer stipend.

Pennsylvania SSHE Joint Student-Faculty Research Grant, summer, 1995

This student-faculty research proposal was submitted in the Joint Student-Faculty Research category and was entitled *Designing Softbots: Intelligent Software Robots for Automated Maintenance of Computer Networks.* It involved a junior undergraduate with an excellent background in networks but who is new to AI problem-solving techniques. Funding level: $6009.

NFS-sponsored Workshop: *Teaching an Undergraduate Course in Artificial Intelligence Given Limited Resources*, Temple University, June, 1994.

This NSF-sponsored week-long workshop invited 20 undergraduate educators to join five organizers (from Temple, Drexel, and Villanova) to seek innovative yet realistic ways to teach a first course in AI. The participants also met for two "reflection days" in the fall and spring, and an active repository of free AI course materials developed by members was made available online.

TEACHING EXPERIENCE

Associate Professor of Computer Science 2002-present
Department of Mathematics, **Lawrence University**, Appleton, Wisconsin.

All courses taught many times except where noted:

Artificial Intelligence, Programming Languages, Data Structures, Systems Analysis and Design, Introduction to Computer Science (Java), Exploring Computer Science, Computer Science Senior Seminar, Freshman Studies, Advanced Topics in Computing (2008), WWII Codebreaking - London Centre (2010) and Appleton Campus (2012, 2014), Computer Organization and Architecture (2014)

Adjunct Professor 1996
Department of Computer Science, **University of Minnesota**, Minneapolis, MN.

Artificial Intelligence (F96)

Assistant Professor 1993-1995
Department of Math and Computer Science, **Shippensburg University** of Pennsylvania.

Programming Languages (F94)

Artificial Intelligence (S95)

Database Systems (F93, graduate and undergraduate)

Structured Computer Programming (F94, S95)

Computer Science for Liberal Studies (F93, S94)

Introduction to Algebra (S94)

Systems Development Projects (S94, S95, graduate)

Lecturing Teaching Assistant 1990-1993
Computer Science Department, **University of Minnesota**, Minneapolis, MN.

A FORTRAN Introduction to Programming (F90, Su91 (2), W92, S92, Su92, F92)

Introduction to Pascal Programming (W93, S93)

Teaching Assistant 1986-1992
Computer Science Department, **University of Minnesota**, Minneapolis, MN.

Artificial Intelligence I (F87, W88, W90, F91)

AI Programming Techniques (S87, S88, S89, W90)

AI Topics: Robotics (S90)

Automata Theory (S91)

Fundamentals of Algorithms and Languages I (F86)

Fundamentals of Algorithms and Languages II (W87)

A FORTRAN Introduction to Computer Programming (S91, Sum91, W92)

SELECTED INDEPENDENT PROJECTS SUPERVISED

Ensemble Learning for Student Retention Prediction, Eddie Elizondo Rueda, 2014
Eddie designed and implemented a supervised machine learning approach for predicting university student retention from one academic year to the next. The approach incorporates three distinct algorithms: logistical regression, neural networks, and random forests. Because the combined algorithms target different predictive factors, the ensemble is robust to weaknesses inherent in any single approach, and demonstrates impressive student-by-student prediction accuracy, outperforming the individual algorithms in isolation.

Travel Scheduler, Chiao Yu Tuan, Fall, Winter 2014
Chiao Yu developed a large software system involving three new algorithms that she designed: an algorithm for pairing activities with time blocks, a clustering algorithm for associating activity/time-block pairs with contiguous blocks of time, and a scheduler for assigning the activities to specific intervals of time within the assigned time block.

Machine Learning for Language Translation, The Gia Hoang, Winter, 2014
The Gia built a program designed to learn to translate noun phrases between English and Japanese with a small vocabulary and minimal marked data.

Machine Learning for Social Networks, Eddie Elizondo Rueda, Winter, Spring 2014
Eddie worked on understanding how to use both supervised and unsupervised learning algorithms for analysis of New York Times Twitter data. He combined this with knowledge gained in Adam Loy's "R" tutorial to demonstrate impressive initial results.

Machine Learning, Chiao Yu Tuan, Spring, 2014
Chiao Yu independently studied and demonstrated machine learning algorithms to better understand big data applications in anticipation of her job at LinkedIn.

Garden Systems Automation, Eric Garasky, Spring, 2014
Eric extended his CMSC 435 project to assist the Riverview Gardens team with tasks such as controlling sprinkler systems based on moisture sensors positioned throughout the grounds.

Iterative Statistical Verification of Probabilistic Plans, Colin Potts, 2012-2013
Colin developed systematic graph expansion techniques to allow importance sampling to more efficiently and accurately compute probabilities for safety bounds for a probabilistic, verification-based, task planner. This work led to a co-authored paper for a conference at Stanford, and an Honors Thesis I supervised that earned Colin *summa cum laude* honors at graduation.

AIRS: Anytime Iterative Refinement of a Solution, Sam Estrem, 2010-2012
Sam developed new heuristic repair techniques for inexpensively improving fast but low-quality solutions for state-space search problems. These techniques scale well and are ideally-suited for producing the best possible solution given an unknown and variable amount of time in which to produce it. This work resulted in papers at FLAIRS-25 and MICS-2012.

Iterative-Expansion A*, Colin Potts, 2010-2012
Colin developed a new algorithm, Iterative-Expansion A* (IEA*), and tested both sequential and parallelized implementations of it against classical heuristic search algorithms (e.g., IDA*). These techniques show promising results on both 8- and 12-processor machines obtained specifically for this study. This work resulted in a published paper at FLAIRS-25 and earned the Best Undergraduate Paper Award at MICS-2012.

Online Pricing, Gennady Malyshev, Fall, 2009
Gennady developed and evaluated algorithms for assigning values to user-originated information in a video game (Vendetta Online) to encourage gathering, storing, and trading of that information among players.

Line-Runner Robot, Matt Hoh, Fall, 2008
Matt constructed the hardware and wrote the software enabling a robot to complete a course – from a fixed starting point to a fixed endpoint – by following a line drawn on a poster board while removing four obstacles placed in its way along the path.

A Learning Natural Language Parser, Duncan McKee, Fall, 2007
Duncan developed a learning algorithm to parse English sentences into their X-bar parse trees. He expanded the model to learn to disambiguate parses over time via feedback from a user as to which parse was intended in each earlier case. This work was accepted and presented at the MICS conference.

Genetic Evolution of Game Playing Strategies, Dan Zwell, Fall and Winter, 2007-2008
Over the course of two terms, Dan studied the competence of genetic programming to evolve neural networks in a domain – the game Go-moku – with a large problem space. Two types of neural networks were trained and compared, including one with a fixed structure and another with a self-adaptive structure.

Fitness Evaluations for Genetic Algorithms in Adversarial Games, Kendrick Boyd, 2007
Using tic-tac-toe as a domain, Kendrick pitted random players against a competent (but sub-optimal) player and "bred" future generations of tic-tac-toe players by "mating" pairs of individuals that were deemed the most "fit," (i.e., according to performance against a competent opponent). He showed that over time the population grew more competent to a point and then did not improve any more, offering several reasons for that behavior given his fitness functions.

Map-Making with a Four-Legged Mobile Robot, Ben Willard, 2006-07
Ben investigated methods for enabling a Sony AIBO robot to autonomously map unknown hallway environments. The result was a fully-implemented framework incorporating a sophisticated occupancy grid-based mapper and a state machine-based controller governing the robot's walking behavior and head movement. This work led to a peer-reviewed paper presented at AAAI Spring Symposium.

Treasure-Hunting with a Mobile Robot, Deana Brown, Winter, 2007
Deana used a Lego Mindstorms NXT Robotic Invention Kit to build and program a robot capable of following paths, sensing and interpreting en route, rejecting apparent but false goals, and recognizing actual goals. She overcame many technical problems with the inexpensive robot by diligently and creatively devising alternative solutions.

Robot Planning, Daniel Casner, Winter, 2006
Dan did a superb job of combining AI-style planning (with Sensory Graphplan) with the mid-level Tekkotsu software from Carnegie-Mellon University to control an AIBO robot. Dan's robot was able to identify a pink ball, retrieve it, and deliver it to a specified destination starting with no information about the initial state.

Mobile Robot Cooperation and Navigation, Daniel Casner and Ben Willard, Spring, 2006
Dan and Ben exploited the opportunity of having two AIBO robots at their disposal to implement multi-robot coordination algorithms. The robots use real-time information obtained from the sensors of both robots to communicate wirelessly in order to arrange and execute a rendezvous.

Pattern Recognition, Tatiana Plaxina, Winter, 2005
Tatiana designed and implemented a neural network to recognize alphabetic characters despite corrupted or incomplete input data.

Chess AI: Emulating a Mind, Matt Kruse, Fall, 2004
Matt designed and implemented a system to play chess. One version was designed to play based on AI min-max search techniques while another used a model of his own intuition.

Web-Based System Design, Nabeeha Mohammed, Winter, 2003
Nabeeha analyzed the Lawrence Phonathon paper system for soliciting alumni donations, and designed and implemented a web-based system to streamline many of the functions.

OTHER ACADEMIC HONORS

MEIS Doctoral Fellowship, University of Minnesota, 1985-1986
Sponsored by the Minnesota Microelectronic and Information Sciences Center, and funded by (then) local companies of 3M, Honeywell, Cray Research, Control Data, and Sperry, I received one of five one-year awards of $10,000 (plus tuition) for graduate study in computer science.

Honors Thesis, *summa cum laude*, Lawrence University, 1984-1985
My paper, *Smart Database Management: An Implementation in Lisp, using Knowledge Representation Theory and Artificial Intelligence Programming Techniques,* was one one of only two theses to receive *summa cum laude* distinction at Lawrence University in 1985.

Commencement Introduction, Lawrence Commencement Ceremony, Spring, 1985.
I was honored as the graduating senior chosen to introduce Turing Award winning Professor Donald Knuth of Stanford University as both keynote speaker and recipient of an honorary doctorate from Lawrence University.

Phi Beta Kappa, ΓΔ Chapter of Wisconsin, elected 1985.

Pi Kappa Lambda, music honor society, elected 1985.

Kappa Mu Epsilon, mathematics honor society, elected 1994.

Mortar Board, member, elected 1984.

London Seminar, spring term study abroad, Lawrence University, 1984.

Commencement Address, Berlin High School Commencement, 1981
As one of the two valedictorians, I was honored to be invited to deliver an address at my High School graduation exercises.

National Rotary Scholarship, Berlin High School, 1981
Sponsored by the Berlin Rotary Club, this scholarship is the most generous and prestigious of the scholarships awarded to one college-bound senior each year.

EMPLOYMENT HISTORY

Associate Professor of Computer Science (7/02–present), Lawrence University, Dept. of Mathematics, Appleton, WI.

Principal Research Scientist (5/99–5/02), Honeywell Technology Center, Automated Reasoning Group, Mpls, MN.

Senior Research Scientist (7/95–5/99), Honeywell Technology Center, Automated Reasoning Group, Mpls, MN.

Adjunct Professor (8/96), University of Minnesota, Mpls, MN, Dept. of Computer Science.

Assistant Professor (8/93–5/95), Shippensburg University, Shippensburg, PA, Dept. of Mathematics and Computer Science.

Lecturing Teaching Assistant (8/90–6/93), Computer Science Dept., University of Minnesota.

Teaching Assistant (9/86–6/92), Computer Science Dept., University of Minnesota.

Graduate Student Intern (6/86–8/90), Honeywell Sensor and System Development Center, Mpls, MN. Designed, implemented, and tested natural language (ATOZ) systems, expert systems shells, and other research systems.

Research Assistant (9/89–6/90) for Dr. Maria Gini, Dept. of Computer Science, University of Minnesota. Projects included task planning, robot path planning, sensor integration and robot error recovery.

Research Assistant (9/88–9/89) for Dr. Charles Fletcher, Dept. of Psychology, University of Minnesota. Designed and implemented computer models of several theories of text and discourse understanding to obtain experimental results for publication.

Research Intern (summer 1985), Sperry Corporation (now UNISYS). Interned in the Knowledge-Based Systems group. Wrote AI demonstration software on Lisp machines and presented it at the International Joint Conference for Artificial Intelligence (IJCAI), Los Angeles, CA, 1985.

Staff Programmer/Analyst (summers 1983, 84), Lawrence University. Wrote software used for administrative and educational purposes, and became the second most prolific co-author of COSAP v3, a Conversationally-Oriented Statistical Analysis Package.

Staff Computer Consultant (6/82–3/84), Lawrence University. Computer lab consultant for students enrolled in introductory computer courses.