

Jordan T Thayer
Research Scientist & Developer

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Research Interests

Heuristic search, automated planning and scheduling, formal verification

Education

PhD in Artificial Intelligence University of New Hampshire 2006 - 2012
Thesis: Heuristic Search Under Time and Quality Bounds
Advisor: Wheeler Ruml

B.S. in Computer Science Rose-Hulman Institute of Technology 2002-2006

Professional Experience

AI Practice Strategist

SEP

2019 - Present

Built a software product consultancy's AI practice from the ground up. Responsibilities include:

- Technical sales, explaining cost/benefit of applying AI for business needs
- Hiring other AI Experts
- Teaching AI techniques to fellow engineers
- Public speaking (workshops, technical talks, outreach)
- Technical leadership and individual contributor for AI-enhanced systems in many industries
 - Automated board edging in lumber mills (computer vision, heuristic search)
 - Scoring of pre-interview screening tests (NLP, static analysis, LLMs)
 - Planning municipal road network maintenance (machine learning, heuristic search)
 - Predictive maintenance of turbine engines (machine learning)

Staff Scientist

Codiscope, Synopsys

2017 - 2018

One of two scientists for a static analysis and cybersecurity training startup. Combined expert systems, cloud computing, and static analysis to provide better user experiences for code checking as part of a CI/CD pipeline. Transferred techniques to Coverity post-acquisition by Synopsys.

Senior Member Technical Staff
2015 - 2017

Charles-Stark Draper Laboratory

Wrote and fulfilled grants. Notable projects included analysis of java byte code to identify timing attacks, and validating the manufacturability of microfluidics devices using computational geometry.

Researcher
2012 - 2015

Smart Information Flow Technologies

Wrote and fulfilled grants. My work was split between the probabilistic verification and synthesis of controllers for industrial and aerospace applications, and various cyber security research efforts. Notable projects include mission resilient computing under kinetic threats, automated program repair for java, and an entrant in DARPA's Cyber Grand Challenge.

Research Assistant
July 2007 – May 2012

University of New Hampshire

Researcher in heuristic search.

Visiting Researcher *Ben-Gurion University of the Negev, Israel*
November 2011 – December 2011

Worked with Roni Stern and Ariel Felner on Bounded Cost Search, a new problem setting for heuristic search. Resulted in accepted ICAPS-12 paper.

Visiting Researcher *Albert-Ludwigs-Universitaet Freiburg Germany*
June 2011 – August 2011

Worked with Malte Helmert on integrating my state-of-the-art bounded suboptimal search algorithms into the state-of-the-art Fast Downward planning system.

Software Engineer
August 2004 – May 2005

Rose-Hulman Ventures

Developer for OBTech, a company which made medical transcription software targeted for obstetricians and gynecologists. In charge of synchronization between desktop and PDA version of software, backup and security of patient data.

Refereed Conference Publications

Kuter, U., Burstein, M., Benton, J., Bryce, D., Thayer, J., & McCoy, S. (2015, January). HACKAR: helpful advice for code knowledge and attack resilience. In Proceedings of the AAAI Conference on Artificial Intelligence (Vol. 29, No. 2, pp. 3987-3992).

Thayer, J. T., Burstein, M., Goldman, R. P., Kuter, U., Robertson, P., & Laddaga, R. (2013, September). Comparing strategic and tactical responses to cyber threats. In 2013 IEEE 7th international conference on self-adaptation and self-organizing systems workshops (pp. 35-40). IEEE.

Richard Anthony Valenzano, Shahab Jabbari Arfaee, Jordan Thayer, Roni Stern, Nathan R. Sturtevant, "Using Alternative Suboptimality Bounds in Heuristic Search" *Proceedings of the Twenty-third International Conference on Automated Planning and Scheduling (ICAPS-13)* 2013.

Jordan T. Thayer, Roni Stern, Ariel Felner, Wheeler Ruml, "Faster Bounded-Cost Search Using Inadmissible Estimates" *Proceedings of the Twenty-Second International Conference on Automated Planning and Scheduling (ICAPS-12)* 2012.

Jordan T. Thayer, Wheeler Ruml, "Bounded Suboptimal Search: A Direct Approach Using Inadmissible Estimates" *Proceedings of the Twenty-Second International Joint Conference on Artificial Intelligence (IJCAI-11)* 2011, pages 674-679.

A preliminary version appeared as UNH Technical Report 10-01.

Jordan T. Thayer, Austin Dionne, Wheeler Ruml, "Learning Inadmissible Heuristics During Search" *Proceedings of the Nineteenth International Conference on Automated Planning and Scheduling (ICAPS-11)* 2011, pages 250-257. Selected for plenary presentation.

Silvia Richter, Jordan T. Thayer, Wheeler Ruml, "The Joy of Forgetting: Faster Anytime Search via Restarting" *Proceedings of the Eighteenth International Conference on Automated Planning and Scheduling (ICAPS-10)* 2010, pages 137-144.

Preliminary version appeared in *Proceedings of the Second International Symposium on Combinatorial Search (SoCS-09)*.

Jordan T. Thayer, Wheeler Ruml, "Using Distance Estimates in Heuristic Search" *Proceedings of the Seventeenth International Conference on Automated Planning and Scheduling (ICAPS-09)* 2009, pages 382-385.

Jordan T. Thayer, Wheeler Ruml, "Faster than Weighted A*: An Optimistic Approach to Bounded Suboptimal Search," *Proceedings of the Sixteenth International Conference on Automated Planning and Scheduling (ICAPS-08)* 2008, pages 355-362.

Refereed Symposia Publications

Jordan T. Thayer, Mark Burstein, Robert P. Goldman, Ugur Kuter, Paul Robertson, Robert Laddaga, "Comparing Strategic and Tactical Responses to Cyber Threats" *Proceedings of the Second Annual Workshop on Adaptive Host and Network Security* 2013.

Jordan T. Thayer, J. Benton, Malte Helmert “Better Parameter-free Anytime Search by Minimizing Time Between Solutions” *Proceedings of the Fifth International Symposium on Combinatorial Search (SoCS-12)* 2012.

Jordan T. Thayer, Roni Stern, Levi Lellis “Are We There Yet? – Estimating Search Progress” *Proceedings of the Fifth International Symposium on Combinatorial Search (SoCS-12)* 2012.

Austin Dionne, Jordan T. Thayer, Wheeler Ruml “Deadline-Aware Search Using On-line Measures of Behavior” *Proceedings of the Fourth International Symposium on Combinatorial Search (SoCS-11)* 2011.

Jordan T. Thayer, Wheeler Ruml “Finding Acceptable Solutions Faster Using Inadmissible Information” *Proceedings of the Third International Symposium on Combinatorial Search (SoCS-10)* 2010.

Jordan T. Thayer, Wheeler Ruml “Anytime Heuristic Search: Frameworks and Algorithms” *Proceedings of the Third International Symposium on Combinatorial Search (SoCS-10)* 2010.

Chris Wilt, Jordan T. Thayer, Wheeler Ruml “A Comparison of Greedy Search Algorithms” *Proceedings of the Third International Symposium on Combinatorial Search (SoCS-10)* 2010.

Jordan T. Thayer, Wheeler Ruml, Jeff Kreis “Using Distance Estimates in Heuristic Search: A Re-evaluation” *Proceedings of the Second International Symposium on Combinatorial Search (SoCS-09)* 2009.

Jordan T. Thayer, Wheeler Ruml, Ephrat Bitton, “Fast and Loose in Bounded Suboptimal Heuristic Search” *Proceedings of the First International Symposium on Search Techniques in Artificial Intelligence and Robotics (STAIR-08)*, pp. 120–126, 2008.

Also presented at the North East Student Colloquium on Artificial Intelligence, 2008.

Tutorials & Workshops

“Data Structures Crash Course”

To be given at CodeMash 2025

“Off the Shelf AI”

Given at Beer City Code 2024, CodeMash 2024, and Indy.Code() 2023

“Heuristic Search: The Basics and Beyond”

Given at the Twenty-sixth Conference on Artificial Intelligence (AAAI-12) in Toronto, Canada with Wheeler Ruml, July 2012

“A Survey Of Suboptimal Search Algorithms”

Given at the Twenty-first International Conference on Planning and Scheduling (ICAPS-11) in Freiburg, Germany with Wheeler Ruml, June 2011,
Given again at the Twenty-Second International Conference on Planning and Scheduling (ICAPS-12) in Sao Paulo, Brazil, June 2012

“Using Solution Length Estimates In Heuristic Search”

Given at the Twenty-first International Conference on Planning and Scheduling (ICAPS-11) in Freiburg, Germany with Wheeler Ruml, June 2011

Given again at the Twenty-Second International Conference on Planning and Scheduling (ICAPS-12) in Sao Paulo, Brazil, June 2012

Industry Conference Presentations

“Everything You Wanted to Know But Were Afraid to Ask about AI & Product Discovery”

To be given at: CodeMash 2025

“AI for Lumber Mills: A Case Study”

Given At: Beer City Code 2024, CodeMash 2023, Nebraska.Code() 2022

“AI for Highway Maintenance”

Given At: CodeMash 2024, Indy.Code() 2023, Momentum 2023

[A recording is available at: https://vimeo.com/855443918](https://vimeo.com/855443918)

“How to Get Started with AI: Moving Beyond ChatGPT”

Given at: Momentum 2024, StirTrek 2024

[A recording is available at: https://youtu.be/GbhIXAvDVIQ?si=mXQrQvJcwEoJn3o1](https://youtu.be/GbhIXAvDVIQ?si=mXQrQvJcwEoJn3o1)

“Avoiding False Starts with Artificial Intelligence”

Co-Author & Presenter: Robert Herbig

Given at: Agile Indy 2024, StirTrek 2023

[A recording is available at: https://youtu.be/LAx5Rr8Hkss?si=lvAuClcuCLnBZRnD](https://youtu.be/LAx5Rr8Hkss?si=lvAuClcuCLnBZRnD)

Panels

“Is Your Data Ready for AI”, Indy IT Symposium, 2024.

“Everything Everywhere All at Once: AI, Disruption, Ethics, & Innovation”, IEEE Conference on AI, 2023.

Grants

International Collaboration Supplement 2011

PI: Wheeler Ruml. NSF Robust Intelligence Program, \$18,508.

Wrote initial draft, was heavily involved with editing and submission. Supported research performed in collaboration with Malte Helmert at Albert-Ludwigs-Universitaet Freiburg.

IJCAI Extended Research Visit 2011

Awarded \$7,500 to visit Malte Helmert at Albert-Ludwigs-Universitaet Freiburg as part of a program associated with the IJCAI-11 doctoral consortium.

Volunteer for IJCAI-11 2011

Received complimentary registration for volunteering during IJCAI-11.

ICAPS-10 Doctoral Consortium 2010

Received complimentary registration and a travel grant for attending the doctoral consortium associated with ICAPS-10.

IJCAI-09 Doctoral Consortium 2009

Received complimentary registration and a travel grant for attending the doctoral consortium associated with IJCAI-09.

Teaching Experience

University of New Hampshire

Teaching Assistant

Algorithms Fall 2011

Introduction to Artificial Intelligence Spring 2007 – 2010

Introduction to Computer Science I Fall 2006

Rose-Hulman Institute of Technology

Programming Tutor

Databases Fall 2004

Introduction to Computer Science II Winter 2003

Introduction to Computer Science I Winter 2002

Professional Activities

Organizing

Co-organizer, Fifth International Symposium on Combinatorial Search 2012

Co-organizer, ICAPS workshop on Heuristics and Search

for Domain-Independent Planning 2012 – 2014

Journal Reviewing

Journal of Artificial Intelligence Research 2011-2013

Artificial Intelligence Journal 2012-2013

Conference Reviewing

AAAI Conference on Artificial Intelligence 2012 – 2014

International Joint Conference on Artificial Intelligence 2011, 2013

International Conference on Automated Planning and Scheduling 2012 – 2014, 2022

Learning and Intelligent Optimization Conference 2011

Symposium on Combinatorial Search 2011 – 2014

Conference Reviewing (Auxiliary Reviewer)

International Conference on Autonomous Agents and Multi-Agent Systems 2012

Learning and Intelligent Optimization Conference 2010, 2012

International Symposium on Artificial Intelligence and Mathematics 2010