

# RONALD W. ALFORD

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## PROFILE

I am a researcher at MITRE investigating semi-autonomous operation for unmanned vehicles and the foundations of automated planning with procedural knowledge.

## EDUCATION

2014    PhD. in Computer Science —  
University of Maryland, College Park  
Thesis: "Search Complexities for HTN Planning." Advisor: Dana Nau

2005    Bachelor of Science in Mathematics —  
University of Maryland, College Park

2002    Bachelor of Science in Computer Science —  
University of Maryland, College Park

## RESEARCH APPOINTMENTS

2016–Present    Senior Autonomous Systems Engineer —  
The MITRE Corporation, McLean, VA

2014–2016        Postdoctoral Research Fellow —  
Adaptive System, U.S. Naval Research Laboratory, Washington, DC

2002–2007        Faculty Research Assistant —  
Department of Computer Science, University of Maryland, College Park

## JOURNAL ARTICLES

- [1] Ron Alford, Ugur Kuter, Dana Nau, and Robert P. Goldman. Plan aggregation for strong cyclic planning in nondeterministic domains. In: *Artificial Intelligence* 216 (2014), pp. 206–232.
- [2] ZD Myers et al. Cosmic ray 1h and 2h spectra from BESS 98. In: *Advances in Space Research* 35.1 (2005), pp. 151–155.

PEER-REVIEWED CONFERENCE PUBLICATIONS

- [3] Vikas Shivashankar, Ron Alford, and David W. Aha. Incorporating domain-independent planning heuristics in hierarchical planning. In: *Proceedings of the 31<sup>st</sup> AAAI Conference on Artificial Intelligence (AAAI-17)*. AAAI Press. 2017.
- [4] Vikas Shivashankar, Ron Alford, Mark Roberts, and David W. Aha. Cost-optimal algorithms for planning with procedural control knowledge. In: *Proceedings of the 22<sup>nd</sup> European Conference on Artificial Intelligence (ECAI)*. IEEE. 2016.
- [5] Ron Alford, Vikas Shivashankar, Mark Roberts, Jeremy Frank, and David W. Aha. Hierarchical planning: relating task and goal decomposition with task sharing. In: *Proceedings of the 25<sup>th</sup> International Joint Conference on Artificial Intelligence (IJCAI)*. AAAI Press. 2016, pp. 3022–3029.
- [6] Mark Roberts, Vikas Shivashankar, Ron Alford, Michael Leece, Shubham Gupta, and David W. Aha. Goal reasoning, planning, and acting with ActorSim, the actor simulator. In: *Proceedings of the 4<sup>th</sup> Annual Conference on Advances in Cognitive Systems*. Cognitive Systems Foundation. 2016.
- [7] Ron Alford, Gregor Behnke, Daniel Höller, Pascal Bercher, Susanne Biundo, and David W. Aha. Bound to plan: exploiting classical heuristics via automatic translations of tail-recursive HTN problems. In: *Proceedings of the 26<sup>th</sup> International Conference on Automated Planning and Scheduling (ICAPS)*. AAAI Press. 2016, pp. 20–28.
- [8] Hayley Borck, Justin Karneeb, Michael W. Floyd, Ron Alford, and David W. Aha. Case-based policy and goal recognition. In: *Proceedings of the 23<sup>rd</sup> International Conference on Case-Based Reasoning (ICCBR)*. Springer. 2015, pp. 30–43.
- [9] Ron Alford, Pascal Bercher, and David W. Aha. Tight bounds for HTN planning with task insertion. In: *Proceedings of the 24<sup>th</sup> International Joint Conference on Artificial Intelligence (IJCAI)*. AAAI Press. 2015, pp. 1502–1508.
- [10] Ron Alford, Pascal Bercher, and David W. Aha. Tight bounds for HTN planning. In: *Proceedings of the 25<sup>th</sup> International Conference on Automated Planning and Scheduling (ICAPS)*. AAAI Press. 2015, pp. 7–15.
- [11] Ron Alford, Hayley Borck, Justin Karneeb, and David W. Aha. Active behavior recognition in beyond visual range air combat. In: *Proceedings of the 3<sup>rd</sup> Annual Conference on Advances in Cognitive Systems (ACS)*. Cognitive Systems Foundation. Atlanta, GA, USA, 2015.

- [12] Hayley Borck, Justin Karneeb, Ron Alford, and David W. Aha. Case-based behavior recognition in beyond visual range air combat. In: *Proceedings of the 28<sup>th</sup> International Florida Artificial Intelligence Research Society Conference (FLAIRS)*. AAAI Press. 2015, pp. 379–384.
- [13] Ron Alford, Vikas Shivashankar, Ugur Kuter, and Dana S. Nau. On the feasibility of planning graph style heuristics for HTN planning. In: *Proceedings of the 24<sup>th</sup> International Conference on Automated Planning and Scheduling (ICAPS)*. AAAI Press. 2014, pp. 2–10.
- [14] Vikas Shivashankar, Ron Alford, Ugur Kuter, and Dana Nau. The GoDeL planning system: a more perfect union of domain-independent and hierarchical planning. In: *Proceedings of the 23<sup>rd</sup> International Joint Conference on Artificial Intelligence (IJCAI)*. AAAI Press. 2013, pp. 2380–2386.
- [15] Ron Alford, Vikas Shivashankar, Ugur Kuter, and Dana S Nau. HTN problem spaces: structure, algorithms, termination. In: *Proceedings of the 5<sup>th</sup> Annual Symposium on Combinatorial Search (SoCS)*. AAAI Press, 2012, pp. 2–9.
- [16] Vikas Shivashankar, Ugur Kuter, Dana Nau, and Ron Alford. A hierarchical goal-based formalism and algorithm for single-agent planning. In: *Proceedings of the 11<sup>th</sup> International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. Vol. 2. International Foundation for Autonomous Agents and Multiagent Systems. 2012, pp. 981–988.
- [17] Ron Alford, Ugur Kuter, and Dana S Nau. Translating HTNs to PDDL: a small amount of domain knowledge can go a long way. In: *Proceedings of the 21<sup>st</sup> International Joint Conference on Artificial Intelligence (IJCAI)*. AAAI Press, 2009, pp. 1629–1634.
- [18] Ron Alford, Ugur Kuter, Dana Nau, Elnatan Reisner, and Robert Goldman. Maintaining focus: overcoming attention deficit disorder in contingent planning. In: *Proceedings of the 22<sup>nd</sup> International Florida Artificial Intelligence Research Society Conference (FLAIRS)*. AAAI Press, 2009, pp. 177–182.
- [19] O Ganel et al. Cosmic ray energetics and mass (CREAM): calibrating a cosmic ray calorimeter. In: *Proceedings of the 10<sup>th</sup> International Conference on Calorimetry in High Energy Physics*. 2002, pp. 133–138.
- [20] O Ganel et al. Cosmic ray energetics and mass: configuration and progress on construction and testing. In: *Proceedings of the 27<sup>th</sup> International Cosmic Ray Conference*. Vol. 6. 2001, p. 2163.
- [21] JZ Wang et al. Space based calorimeters: heavy ion simulations. In: *Proceedings of the 27<sup>th</sup> International Cosmic Ray Conference*. Vol. 4. 2001, p. 1445.

- [22] JZ Wang et al. Isotopic measurements of cosmic-ray hydrogen and helium during the 1997 solar minimum. In: *Proceedings of the 27<sup>th</sup> International Cosmic Ray Conference*. Vol. 5. 2001, p. 1671.

REFEREED WORKSHOP PAPERS AND ABSTRACTS

- [23] Doug Miller, Ron Alford, Andy Applebaum, Henry Foster, Caleb Little, and Blake Strom. Automated adversary emulation: a case for planning and acting with unknowns. In: *2<sup>nd</sup> ICAPS Workshop on Integrated Planning, Acting, and Execution (IntEx) at ICAPS-2018*. AAAI Press. 2018, pp. 1–9.
- [24] Vikas Shivashankar, Ron Alford, Mark Roberts, and David W. Aha. Cost-optimal algorithms for hierarchical goal network planning: a preliminary report. In: *ICAPS Workshop on Heuristics and Search for Domain-Independent Planning (HSDIP)*. 2016, pp. 102–110.
- [25] Mark Roberts, Ron Alford, Vikas Shivashankar, Michael Leece, Shubham Gupta, and David W. Aha. ACTORSIM: a toolkit for studying goal reasoning, planning, and acting. In: *ICAPS Workshop on Planning and Robotics (PlanRob)*. 2016, pp. 184–194.
- [26] Ronald Alford. Search complexities for HTN planning. In: *Künstliche Intelligenz (KI)* 30.1 (2015). Thesis abstract, pp. 99–100.
- [27] Ron Alford, Pascal Bercher, and David W. Aha. Tight bounds for HTN planning with task insertion. In: *Proceedings of the 8<sup>th</sup> Annual Symposium on Combinatorial Search (SoCS)*. Extended abstract. AAAI Press. 2015, pp. 221–222.
- [28] Mark Roberts, Swaroop Vattam, Ronald Alford, Bryan Auslander, Tom Apker, Benjamin Johnson, and David W. Aha. Goal reasoning to coordinate robotic teams for disaster relief. In: *Proceedings of the 3<sup>rd</sup> Workshop on Planning and Robotics (PlanRob)*. 2015.
- [29] Hayley Borck, Justin Karneeb, Ron Alford, and David W. Aha. Case-based behavior recognition to facilitate planning in unmanned air vehicles. In: *Case-based Agents: Papers from the ICCBR Workshop*. University College Cork: Cork, Ireland, 2014.
- [30] Mark Roberts, Swaroop Vattam, Ronald Alford, Bryan Auslander, Justin Karneeb, Matthew Molineaux, Tom Apker, James McMahan, and David W. Aha. Iterative goal refinement for robotics. In: *Planning and Robotics: Papers from the ICAPS Workshop*. 2014.
- [31] Vikas Shivashankar, Ron Alford, Ugur Kuter, and Dana S. Nau. Hierarchical goal networks and goal-driven autonomy: going where AI planning meets goal reasoning. In: *Goal Reasoning: Papers from the ACS Workshop*. 2013, pp. 95–110.

TECHNICAL REPORTS

- [32] Caitlin A. Whitter, Ronald Alford, David W. Aha, and Justin Karneeb. Programming a human interaction access point for a virtual air combat simulation environment. Tech. rep. AIC-015-188. Washington, DC: U.S. Naval Research Laboratory, Navy Center for Applied Research on Artificial Intelligence, 2015.

TALKS

- Intelligent automation for cyber training and evaluation. NDIA Cyber-Augmented Operations Division Fall Conference, McClean, VA. Nov. 2018.
- Progress on planning with procedural knowledge. The MITRE Corporation, McClean, VA. Dec. 2015.
- Progress on planning with procedural knowledge. NASA Ames, Mountain View, CA. Oct. 2015.
- Progress on planning with procedural knowledge. Ulm University, Ulm, Germany. June 2015.
- Automated planning in the context of intelligent agents. U.S. Naval Research Laboratory, Washington, DC. July 2014.
- Current directions in HTN planning. U.S. Naval Research Laboratory, Washington, DC. May 2014.
- Goal reasoning: interactions with planning. Goal Reasoning Summit at the U.S. Naval Research Laboratory, Washington, DC. Apr. 2014.
- MINDSWAP - Maryland information and network dynamics lab semantic web agents project. With Daniel Krech in the Workshop on Semantic Interoperability at the Open University, Milton Keynes, UK. Feb. 2005.

TEACHING

- 2018 Student research mentor; The MITRE Corporation, McLean, VA  
Guided a high school student through building and testing a low-cost robot for evaluating 3D SLAM techniques
- 2017 Student researcher mentor, The MITRE Corporation, McLean, VA  
Guided a high school student through the creation of an object inspection routine for EOD-like robots
- 2015 Summer intern mentor, U.S. Naval Research Laboratory, Washington, DC  
Led two undergraduates and one high school student on summer projects

2011 Teaching assistant, University of Maryland, College Park.  
Graduate course on automated planning

2010 Guest instructor at Poolesville High School, Maryland.  
Designed and led curriculum for introductory topics on computer networking and game theory

#### SERVICE

2019 Organizing Committee for the 2<sup>nd</sup> International Workshop on Hierarchical Planning at ICAPS-19

2018 Reviewer for the ACM Transactions on Intelligent Systems and Technology

2018 Program Committee for the 33<sup>rd</sup> AAI Conference on Artificial Intelligence (AAAI-19)

2018 Organizing Committee for the 1<sup>st</sup> International Workshop on Hierarchical Planning at ICAPS-18

2018 Program Committee for the Integrated Planning, Acting and Execution (IntEx) ICAPS-18 Workshop

2018 Program Committee for the 28<sup>th</sup> International Conference on Automated Planning and Scheduling (ICAPS-18)

2017 Program Committee for the 32<sup>nd</sup> AAI Conference on Artificial Intelligence (AAAI-18)

2017 Program Committee for the Integrated Execution of Planning and Acting ICAPS-17 Workshop (IntEx)

2017 Program Committee for the 26<sup>th</sup> International Joint Conference on Artificial Intelligence (IJCAI-17)

2017 Reviewer for the Annals of Mathematics and Artificial Intelligence

2017 Publicity co-chair and program committee for the 27<sup>th</sup> International Conference on Automated Planning and Scheduling (ICAPS-17)

2016 Grant panelist for NASA

2016 Program Committee for the 25<sup>th</sup> International Joint Conference on Artificial Intelligence (IJCAI-16)

2016 Program Committee for the 4<sup>th</sup> Workshop on Goal Reasoning at IJCAI-2016

2016 Reviewer for the Annals of Mathematics and Artificial Intelligence

- 2015 Organizing Committee for the 7<sup>th</sup> Workshop on Heuristics and Search for Domain Independent Planning (HSDIP)
- 2015 Organizing Committee for Workshop on Goal Reasoning at the 3<sup>rd</sup> Annual Conference on Advances in Cognitive Systems
- 2015 Grant panelist for the National Science Foundation
- 2015 Reviewer for the Annals of Mathematics and Artificial Intelligence
- 2014 Judge for NRL's SEAP summer student presentations
- 2014 Doctoral Consortium mentor at ICAPS
- 2013 Organized the PhD. Presentation Group for PhD. candidates at the University of Maryland

#### NON-ACADEMIC EMPLOYMENT

- 2002–2014 Linux Consultant — SC&A
- 2007–2009 Summer, Winter Intern — Clark-Parsia
- 2001–2007 Network Engineer — CruiseEmail

#### COMPUTER SKILLS

- Languages* Java, Haskell, Python, C, Javascript, C++
- Standards* XML, RDF, OWL, HTML, CSS, PDDL