

Christopher W. Geib

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Citizenship: U.S.A

Metrics as of July 12th, 2024
h-index = 33
i10-index = 57
Citations = 4222

EDUCATION

Ph.D., University of Pennsylvania, Philadelphia, PA, May 1995
Department of Computer and Information Science

M.S.E., University of Pennsylvania, Philadelphia, PA, May 1991
Department of Computer and Information Science

B.S., Union College, Schenectady, NY, June 1989
Department of Computer Science (*Cum Laude, Departmental Honors, Member Upsilon Phi Epsilon*)

STATEMENT

My research addresses questions about unified representations for decision making and reasoning about actions and language. My research contributions address multiple related disciplines including plan recognition, planning, scheduling, constraint based reasoning, and probabilistic reasoning. My currently research projects address probabilistic intent recognition and planning based on grammatical formalisms. I have grounded this work in multiple application domains including computer theory of mind, discourse processing, computer network security, assistive systems, human computer and human robot interaction.

EXPERIENCE

Charles River Analytics, Principal Scientist,
06/2024 - present.

Smart Information Flow Technologies (SIFT), Fellow,
02/2022 - 05/2024.

Smart Information Flow Technologies (SIFT), Principal Researcher,
08/2017 - 02/2022.

Drexel University, Associate Professor, Department of Computer Science,
04/2013 – 07/2017.

University of Edinburgh, Research Fellow, School of Informatics (25% time),
10/2013 – 01/2016. (Funded under EU FP7 Xperience project.)

University of Edinburgh, Research Fellow, School of Informatics,
05/2006 – 03/2013. (Funded under EU FP7 PACO-PLUS and Xperience projects.)

Karlsruhe Institute of Technology, Visiting Faculty, Institute for Anthropomatics,
11/2010 – 01/2011.

Honeywell Technology Center, Principal Research Scientist,
05/1997 – 04/2006

University of British Columbia, Post-Doctoral Fellow,
01/1995 - 05/1997

University of Pennsylvania, Graduate Research Fellow,
09/1991 - 01/1995.

SPONSORED RESEARCH

Total Sponsored Research: > \$6M in the last five years.

Principal Investigator, DARPA ASIST program – 2019 (\$5M / 4 years)
Principal Investigator, AFRL Phase 1 STTR LEMMING – 2021 (\$155K / 5 months)
Principal Investigator, DARPA COMPASS program – 2019 (\$742K / 2 years)
Principal Investigator, NSF Eager grant – 2016 (\$70K/1year)
Co-Principal Investigator, EU XPERIENCE project (EC-FP7-ICT) – 2011(GBP 1.6M / 5 years)
Co-Principal Investigator, DARPA STRATUS project (BAA 11-55) – 2011 (\$300K / 4 years)
Co-Principal Investigator, DARPA POIROT project (BAA 05-43) – 2006 (\$180K / 3 years)
Principal Investigator, DARPA CORTEX project (BAA 03-44) - 2003 (\$800K / 12 months)
Principal Investigator, ARDA MOLE program - 2003 (\$750K /12 months)
Principal Investigator, DARPA SKEPTICAL SYSTEMS seedling - 2002 (\$300K / 6 months)
Principal Investigator, DARPA DASDA project (BAA 00-20) - 2000 (\$1M / 4 years)
Principle Investigator, Temporal Evidence Aggregation, Honeywell Grant - 1998 (\$40K /1 year)
Matching funds from NIST Abnormal Situation Management Consortium
Co-Principal Investigator, DARPA Force Multipliers for Urban Area Operations program- 2005
Co-Principal Investigator, DARPA ULTRALOG program - 2000
Co-Principal Investigator, NIST Ilsa program - 2000
Co-Principal Investigator, DARPA Evolutionary Design of Complex Systems Project - 1999

PROFESSIONAL SERVICE

Co-Chair, Association for the Advancement of AI (AAAI) Symposium Series 2016 - present, responsible for organizing the AAAI annual Spring and Fall Symposium series.
Senior Program Committee, International Joint Conference on AI (IJCAI) 2011, 2016, 2017
Program Committee, IJCAI 2007, 2009
Senior Program Committee, AAAI 2013, 2015 - 2017
Program Committee, AAAI 2005, 2014
Program Committee, Conference on Innovative Applications of AI (IAAI) 2009 - 2015
Co-Chair, AAAI Plan, Activity, and Intent Recognition workshop (PAIR) 2007, 2009 - 2011, 2013, 2017
Co-Chair, AAAI Modeling Others from Observations workshop (MOO) 2005, 2006
Program Committee, AAAI Multi-agent Interaction Without Prior Coordination workshop 2014 - 2016
Program Committee Annual German Conference of Artificial Intelligence (KI) 2011 - 2015
Program committee 15th IEEE RAS Humanoids Conference 2014
Associate Editor, 20th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN) 2011
Reviewer, IEEE Transactions on Robotics (T-RO) 2011, 2012, 2015
Organizing Committee, Schloss Dagstuhl Seminar on Plan Recognition 2011
Co-Chair, AAAI Intelligent Security workshop (SecArt) 2010
Program Committee, FLAIRS 2002
Chair, AAAI Decision Theoretic Planning and Abstraction workshop 1997

TEACHING

Associate Professor, Drexel University 2013 - 2017:

Distributed Network Security (INFO-336), Foundations of Software (INFO-108), Artificial Intelligence (CS-380), Introduction to Artificial Intelligence (CS-510), Advanced Artificial Intelligence (CS-610).

Lecturer, Analysis of Algorithms, University of British Columbia, Spring 1997.

Lecturer, Functional and Logic programming, University of British Columbia, Fall 1995.

Lecturer, Intelligent Systems, University of British Columbia, Spring 1995 and Spring 1996.

Instructor, Introduction to programming, University of Pennsylvania, two summer sessions 1991.

Instructor, Introduction to programming, University of Pennsylvania, Fall 1990 and Spring 1991.

POST GRADUATE SUPERVISION

Past Phd committees:

Pavan Kantheraju, Drexel University, Department of Computer Science, 2021

Alberto Uriarte, Drexel University, Department of Computer Science, 2017

Linge Bai, Drexel University, Department of Computer Science, 2014

Past MS committees:

Felicia Tucker: Drexel University, Westphal College of Media Arts & Design, 2016

Jianyu Wang: Drexel University, Department of Computer Science, 2015.

Christopher Swetenham, Msc. University of Edinburgh, School of Informatics, 2012.

Michael Bano, MSc. University of Edinburgh, School of Informatics, 2011.

INVITED TALKS

IHMC, Research Seminar, 2023

OpenStream LLC, Research Seminar, 2023

VoiceBox Technologies Inc, Research Seminar, 2016

Jozef Stefan Institute, Keynote Speaker, Information Society Conference, 2011

Schloss Dagstuhl Leibniz-Zentrum für Informatik, Seminar on Plan Recognition, 2011

University of Aberdeen, Department of Computing Sciences, 2011

Karlsruhe Institute of Technology, Institute for Anthropomatics, 2010

DFKI, Language Technology lab, Talking Robots Group, 2010

University of Strathclyde, Department of Computer Science, 2009

Rutgers University, Department of Computer Science, 2009

Drexel University, Department of Computer Science, 2009

PUBLICATIONS AND PRESENTATIONS

Refereed Conference Papers

1. **Geib, C.**, George, D., Khalid, B., Magnotti, R., Stone, M., Kantharaju, P., "An Integrated Architecture for Common Ground in Collaboration", Proceedings of the 2022 Advances in Cognitive Systems Conference (ACS), 2022.
2. **Geib, C.**, Rye, J., Sarathay, V., "Portals and Spaces: An Egocentric Knowledge Representation for Reasoning about Actions and its Implementation", Proceedings of the 2022 Advances in Cognitive Systems Conference (ACS), 2022.
3. Kantharaju, P., **Geib, C.**, Ontanon, S., "Scaling up CCG-based plan recognition via Monte-Carlo tree search", Proceedings of the 2019 IEEE Conference on Games, 2019.

4. Kantharaju, P., Ontanon, S., **Geib, C.**, “ μ CCG, a CCG-based Game-Playing Agent for μ RTS”, Proceedings of the 2018 IEEE Conference on Computational Intelligence and Games (CIG 2018), 2018.
5. **Geib, C.**, Kantharaju, P., “Learning Combinatory Categorical Grammars for Plan Recognition”, Proceedings of the 2018 AAAI Conference on Artificial Intelligence, 2018.
6. **Geib, C.**, Weerasinghe, J., Matskevich, S., Kantharaju, P., Petrick, R., and Craenen, B., Building Helpful Virtual Agents Using Plan Recognition and Planning, Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE) 2016, pp. 162-168, 2016.
7. **Geib, C.**, Lexicalized Reasoning, Proceeding of the Third Annual Conference on Advances in Cognitive Systems (ACS) 2015, May 2015.
8. **Geib, C.**, and Goldman, R., Recognizing Plans with Loops Represented in a Lexicalized Grammar, Proceeding of the Twenty-Fifth AAAI Conference on Artificial Intelligence (AAAI) 2011, pp. 958-963, 2011. (Acceptance rate 25%)
9. **Geib, C.**, Delaying Commitment in Probabilistic Plan Recognition Using Combinatory Categorical Grammars, Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI) 2009, pp. 1702-1707, 2009. (Acceptance rate 24%)
10. **Geib, C.**, Maraist, J., and Goldman, R., *A New Probabilistic Plan Recognition Algorithm Based on String Rewriting*, Proceedings of the International Conference on Automated Planning and Scheduling (ICAPS) 2008, pp. 81-89, 2008. (Acceptance rate 33%)
11. Kraft, D., Baseski, E., M. Popovic, M., Batog, A., Kjær-Nielsen, A., Krüger, N., Petrick, R., **Geib, C.**, Pugeault, N., Steedman, M., Asfour, T., Dillmann, R., Kalkan, S., Wörgötter, F., Hommel, B., Detry, R., and Piater, J., *Exploration and Planning in a Three-Level Cognitive Architecture*, Proceedings of the International Conference on Cognitive Systems (CogSys) 2008, pp. 71-78, 2008.
12. **Geib, C.** and Steedman, M. *On Natural Language Processing and Plan Recognition*, Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI) 2007, pp. 1612-1617, 2007. (Acceptance rate 15%)
13. **Geib, C.** *Assessing the Complexity of Plan Recognition*, Proceedings of American Association of Artificial Intelligence (AAAI) 2004, pp. 507-512, 2004. (Acceptance rate 26%)
14. Haigh, K., Kiff, L., Myers, J., Guralnik, V., **Geib, C.**, Phelps, J., Wagner, T., *The Independent LifeStyle Assistant (I.L.S.A.): AI Lessons Learned*, Proceedings of IAAI 2004, pp. 852-857, 2004.
15. **Geib, C.**, Goldman, R., *Recognizing Plan/Goal Abandonment*, Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI) 2003, pp. 1515-1517, 2003. (Acceptance rate 20%)
16. **Geib, C.**, Goldman, R., *Requirements for Plan Recognition in Network Security Systems*, (Extended abstract presented at) the Recent Advances in Intrusion Detection (RAID) Conference 2002.
17. Haigh, K., Phelps, J., **Geib, C.**, *An Open Agent Architecture for Assisting Elder Independence*, Proceedings of AAMAS 2002, pp. 578-586, 2002. (Acceptance rate 26%)
18. **Geib, C.**, Goldman, R., *Plan Recognition for Hostile Agents*, Proceedings of FLAIRS 2001, pp. 580-584, 2001.
19. Goldman, R., Heimerdinger, W., Harp, S., **Geib, C.**, Thomas, Vic., Carter, R., *Information Modeling for Intrusion Report Aggregation*, Proceedings of DISCEX II, pp. 329-342, 2001.
20. **Geib, C.**, Goldman, R., *Plan Recognition in Intrusion Detection Systems*, Proceedings of DISCEX II, pp. 46-55, 2001.

21. Goldman, R., **Geib, C.**, Miller, C., *A New Model of Plan Recognition*, Proceedings of the Fifteenth Uncertainty in Artificial Intelligence Conference (UAI 1999), 245-254. (Acceptance rate 51%)
22. Boutilier, C., Brafman, R., **Geib, C.**, Structured Reachability Analysis for Markov Decision Processes, Proceedings of the Fourteenth Uncertainty in Artificial Intelligence Conference (UAI 1998), pp. 24-32, 1998.
23. Boutilier, C., Brafman, R., **Geib, C.**, *Prioritized Goal Decomposition of Markov Decision Processes: Toward a Synthesis of Classical and Decision Theoretic Planning*, Proceedings of the International Joint Conference on Artificial Intelligence 1997, pp. 1156-1162, 1997 . (Acceptance rate 24%)
24. Moore, M., **Geib, C.**, Reich, B., *Planning for Reactive behaviors in Hide and Seek*, Proceedings of the Fifth Conference on Computer Generated Forces and Behavioral Representation, 1995.
25. Badler, N., Webber, B., Becket, W., **Geib, C.**, Moore, M., Pelachaud, C., Reich, B., Stone, M., *Planning and Parallel Transition Networks: Animation's New Frontier* Proceedings of Pacific Graphics '95, Seoul, Korea, 1995.
26. **Geib, C.** *The Intentional Planning System: ItPlanS*, Proceedings of the Artificial Intelligence in Planning Systems Conference (AIPS) 1994, pp. 55-60, 1994.

Journal Articles

1. **Geib, C.**, Lexicalized Reasoning about Actions, *Advances in Cognitive Systems (ACS)* vol. 4, pp. 187-206, 2016.
2. Woergoetter, F., **Geib, C.**, Tamosiunaite, M., Aksoy, E., Piater, J., Xiong, H., Ude, A., Nemeč, B., Kraft, D., Krueger, N., Wachter, M., Asfour, T., *Structural Bootstrapping - A Novel, Generative Mechanism for Faster and More Efficient Acquisition of Action-knowledge*, *IEEE-Transactions on Autonomous Mental Development*, 7(2):1-1, May 2015.
3. Krüger, N., **Geib, C.**, Piater, J., Petrick, R., Steedman, M., Wörgötter, F., Ude, A., Asfour, T., Kraft, D., Omrčen, D., Agostini, A., Dillmann, R., *Object-Action Complexes: Grounded Abstractions of Sensory-motor Processes*, *Robotics and Autonomous Systems*, Vol. 59(10), pp. 740-757, 2011.
4. **Geib, C.**, Goldman, R., *A Probabilistic Plan Recognition Algorithm Based on Plan Tree Grammars*, *Artificial Intelligence*, Vol. 173(11), pp. 1101-1132, 2009.
5. Krueger, V., Kragic, D., Ude, A., **Geib, C.**, *The Meaning of Action: a review on action recognition and mapping*, *Advanced Robotics*, Vol. 21, (13), pp. 1473-1501, 2007.
6. Webber, B., Badler, N., DiEugenio, B., **Geib, C.**, Levison, L., Moore, M., *Instructions, Intentions and Expectations*, *Artificial Intelligence special issue on Computational Research on Interaction and Agency*, Agre, P. and Rosenschein, S. (eds), Vol. 73(1-2), pp. 253-269, 1995.

Edited Volumes

1. Sukthankar, G., Goldman, R., **Geib, C.**, Pynadath, D., and Bui, H., (editors), Plan, Activity, and Intent Recognition, Elsevier, 2014.
2. **Geib, C.**, Agrawal, V., Sukthankar, G., Shastri, L., and Bui, H., (editors), AI Magazine Special Issue on Architectures for Activity Recognition, Vol. 36, Number 2, 2015.

Magazine Articles

1. **Geib, C.**, Agrawal, V., Sukthankar, G., Shastri, L., and Bui, H., *Architectures for Activity Recognition and Context-Aware Computing*, AI Magazine Special Issue on Architectures for Activity Recognition, Vol. 36, Number 2, pp. 3-9, 2015.
2. **Geib, C.**, C. Swetenham, *Parallelizing Plan recognition*, AI Magazine Special Issue on Architectures for Activity Recognition, Vol. 36, Number 2, pp. 22-32, 2015.

Books

1. Mirsky, R., Keren, S., **Geib, C.**, Introduction to Symbolic Plan and Goal Recognition, Synthesis Lectures on Artificial Intelligence and Machine Learning #47, Morgan & Claypool, 2021.

Book Chapters

1. Sukthankar, G., Goldman, R., **Geib, C.**, Pynadath, D., and Bui, H., *Introduction, Plan, Activity, and Intent Recognition*, Elsevier, 2014.
2. **Geib, C.**, *Plan Recognition* in A. Kott and W. McEneaney (eds.), Adversarial Reasoning: Computational Approaches to Reading the Opponents Mind, pp. 77-100, Chapman & Hall/CRC, 2006.
3. Webber, B., Badler, N., Baldwin, F.B., Becket, W., DiEugenio, B., **Geib, C.**, Jung, M., Levison, L., Moore, M., White, M., *Doing What You're Told: Following Task Instructions in Changing, but Hospitable Environments*, in Y. Wilks and N. Okada (eds.), Computer Language and Vision across the Pacific. Ablex Publishing, 1996.
4. Badler, N., Webber, B., Becket, W., **Geib, C.**, Moore, M., Pelachaud, C., Reich, B., Stone, M., *Planning for Animation*, in N. Magnenat-Thalmann and D. Thalmann (eds.), Interactive Computer Animation, pp. 235-262, Prentice Hall Publishing, 1996.

Refereed Workshop Papers

1. **Geib, C.**, Weerasinghe, J., *Planning Using Combinatory Categorical Grammars*, Proceedings of the 3rd ICAPS Workshop on Hierarchical Planning (HPLAN 2020) 2020.
2. **Geib, C.**, *Partial Observability in Grammar Based Plan Recognition*, Workshops at the Thirty-First AAAI Conference on Artificial Intelligence, 2017.
3. **Geib, C.**, Craenen, B., and Petrick, R., *Combining Plan Recognition, Goal Reasoning, and Planning for Cooperative Task Behaviour*, IJCAI 2016 Workshop on Goal Reasoning, July 2016.
4. **Geib, C.**, Craenen, B., and Petrick, R., *Generating Collaborative Behaviour through Plan Recognition and Planning*, Proceedings for the ICAPS-16 Workshop on Distributed and Multi-Agent Planning (DMAP), June 2016.
5. **Geib, C.** and Craenen, B., and Petrick, R., *I Can Help! Cooperative Task Behaviour Through Plan Recognition and Planning*, Workshop of the UK Planning and Scheduling Special Interest Group (PLANSIG-2015), February 2016
6. Geib, C. and Swetenham, C., *Parallelizing Plan Recognition*, Proceedings of the AAAI 2013 Workshop on Plan Activity and Intent Recognition, July 2013.
7. Geib, C., *Fixing a Hole in Lexicalized Plan Recognition*, Proceedings of the AAAI 2011 Workshop on Plan Activity and Intent Recognition, July 2011.
8. Geib, C. and Goldman, R., *Handling Looping and Optional Actions in YAPPR*, Proceedings of the AAAI 2010 Workshop on Plan Activity and Intent Recognition, July 2010.

9. Geib, C., *Lexical Ambiguity and its Impact on Plan Recognition for Intrusion Detection*, Proceedings of the AAAI 2010 Workshop on Intelligent Security, July 2010.
10. Geib, C., *Toward Using Plan Recognition for Intrusion Detection*, Proceedings of the ICAPS Workshop on Intelligent Security, September 2009.
11. Petrick, R., Kraft, D., Mourão, K., **Geib, C.**, Pugeault, N., Krüger, N., and Steedman, M., *Representation and Integration: Combining Robot Control, High-Level Planning, and Action Learning*, Proceedings of the International Cognitive Robotics Workshop (CogRob 2008) at ECAI 2008.
12. **Geib, C.**, *Using Lexicalized Grammars and Headedness for Approximate Plan Recognition*, Proceedings of the AAAI Workshop on Plan, Activity, and Intent Recognition, July 2007.
13. **Geib, C.**, Mouro, K., Petrick, R., Pugeault, N., Steedman, M., Krueger N., and Worgotter, F., *Object Action Complexes as an Interface for Planning and Robot Control*, Proceedings of the HUMANOIDS-06 Workshop: Toward Cognitive Humanoid Robots, 2006.
14. **Geib, C.**, Harp, S., *Empirical Analysis of a Probabilistic Task Tracking Algorithm*, Autonomous Agents and MultiAgent Systems Workshop on Agent Tracking (MOO-04), 2004.
15. **Geib, C.**, *Problems with Intent Recognition for Elder Care*, Proceedings of AAAI Workshop on Automation as Caregiver., July 2001.
16. Binns, P., **Geib, C.**, Lewis, B., Vestal, S., Ward, J., *Gauging in MetaH for Dynamic Embedded Systems*, Working Conference on Complex and Dynamic Systems Architectures (CDSA), Brisbane, Australia, 2001.
17. **Geib, C.**, Goldman, R., *Partial Observability in Collaborative Task Tracking*, Proceedings of AAAI Fall Symposium on Intent Inference for Collaborative Tasks, 2001.
18. **Geib, C.**, Goldman, R., Musliner, D., *Monte-Carlo Simulation for Automatic Synthesis of Verified Real-time Controllers*, Proceedings of AAAI Spring Symposium on Model-Based Validation of Intelligence, 2001.
19. Moore, M., **Geib, C.**, Reich, B., *Planning and Terrain Reasoning*, AAAI Spring Symposium on Integrated Planning Applications, 1995.
20. **Geib, C.**, Webber, B., *A Consequence of Incorporating Intentions in Means-end Planning*, AAAI Spring Symposium on Foundations of Automatic Planning, 1993.

arXiv Papers

1. Friedman, S., Goldman, R., Freedman, R., Kuter, U., **Geib, C.**, Rye, J., *Provenance-Based Assessment of Plans in Context*, arXiv preprint arXiv:2011.01774, 2020.

PATENTS AND PATENT APPLICATIONS

Geib, C., *Computer Architecture for Plan Recognition*, U.S. Pat. App. No: 18/140,104.
 Friedman, S., Goldman, R., Freedman, R., Kuter, U., **Geib, C.**, Rye, J., *Machine architecture for computerized plan analysis with provenance*, USPN: 11468608.
Geib, C., Goldman, R., *Probabilistic goal recognition system and method incorporating inferred unobserved actions*, USPN: 7146348.
 Harp, S., **Geib, C.**, *Skeptical Systems*, USPN: 7421738.
Geib, C., *Recognition [of] plan/goal abandonment*, U.S. Patent Application 20070150427.
Geib, C., Pelican, M., Phelps, J., *Type variables and/or temporal constraints in plan recognition*, U.S. Patent Application 20070226164.
 VanRiper, R., Musliner, D., **Geib, C.**, *System and method for network security*, USPN: 7774297.