Gregory Gelfond

Curriculum Vitae

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Areas of Specialization

Artificial Intelligence, Knowledge Representation, Answer Set Programming, Programming Languages and Methodology, Multi-Agent Systems

Education

May 2018	**PhD in Computer Science**, *Arizona State University*
thesis	*Representing and Reasoning about Dynamic Multi-Agent Domains: An Action Language Approach*
chair	Dr. Chitta Baral
committee	Dr. Subbarao Kambhampati, Dr. Joohyung Lee, Dr. Larry Moss, Dr. Tran Cao Son
2007	**MS in Computer Science**, *Texas Tech University*
thesis	*A Declarative Framework for Modeling Multi-Agent Systems*
chair	Dr. Richard Watson
committee	Dr. Daniel Cooke, Dr. Nelson Rushton, Dr. John Borelli
2003	**BS in Computer Science**, *Texas Tech University*

Publications and Patents

2023   David Ferrucci, Nelson Rushton, Andrew Beck, Greg Burnham, David Nachman, Marcello Balduccini, Clifton McFate, and Gregory Gelfond. "Machine-Learning Assisted Natural Language Programming System". Patent US-2023/0305822-A1.

Gregory Gelfond, Marcello Balduccini, David Ferrucci, Aditya Kalyanpur, and Adam Lally. "Machines as Thought Partners: Reflections on 50 Years of Prolog". In: *Prolog - The Next 50 Years*. Edited by David S. Warren, Veronica Dahl, Thomas Eiter, Manuel Hermenegildo, Robert Kowalski, and Francesca Rossi. LNCS 13900. Springer.

2022   Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "An Action Language for Multi-Agent Domains". In: *Artificial Intelligence* 302, page 103601. ISSN: 0004-3702.

2018   Gregory Gelfond. "Representing and Reasoning about Dynamic Multi-Agent Domains: An Action Language Approach". PhD thesis. Arizona State University.

2015   Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "An Action Language for Multi-Agent Domains: Foundations". In: *CoRR* abs/1511.01960.

Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "Exploring the KD45n property of a Kripke model after the execution of an action sequence." In: *In Proceedings of the Twenty-Ninth AAAI Conference on Artificial Intelligence*. AAAI '15.

Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "Multi-Agent Action Modeling through Action Sequences and Perspective Fluents." In: *Proceedings of the AAAI Spring Symposium on Common Sense Reasoning 2015*. AAAI '15.

2014   Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "Finitary S5-Theories". In: *Logics in Artificial Intelligence*. Edited by Eduardo Fermé and João Leite. Volume 8761. Lecture Notes in Computer Science. Springer International Publishing, pages 239–252.

2013   Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "Reasoning about the Beliefs of Agents in Multi-Agent Domains in the Presence of State Constraints: The Action Language mAL". In: *Computational Logic in Multi-Agent Systems*. Edited by João Leite, Tran Cao Son, Paolo Torroni, Leon Torre, and Stefan Woltran. Volume 8143. Lecture Notes in Computer Science. Springer Berlin Heidelberg, pages 290–306.

2012   Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "An Action Language for Reasoning about Beliefs in Multi-Agent Domains". In: *Proceedings of the 14th International Workshop on Non-Monotonic Reasoning*.

Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "Answer Set Programming and Planning with Knowledge and World-Altering Actions in Multiple Agent Domains". In: *Correct Reasoning*. Edited by Esra Erdem, Joohyung Lee, Yuliya Lierler, and David Pearce. Volume 7265. Lecture Notes in Computer Science. Springer Berlin Heidelberg, pages 509–526.

2011   Chitta Baral and Gregory Gelfond. "On Representing Actions in Multi-Agent Domains". In: *Proceedings of the Symposium on Constructive Mathematics*. Edited by Marcello Balduccini and Tran Cao Son. Springer, pages 213–232.

2010   Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "Logic Programming for Finding Models in the Logics of Knowledge and its Applications: A Case Study". In: *Theory and Practice of Logic Programming* 10.4-6, pages 675–690.

Chitta Baral, Gregory Gelfond, Enrico Pontelli, and Tran Cao Son. "Using Answer Set Programming to Model Multi-Agent Scenarios Involving Agents' Knowledge About Other's Knowledge". In: *Proceedings of the 9th International Conference on Autonomous Agents and Multiagent Systems*. AAMAS '10, pages 259–266.

2007   Gregory Gelfond. "A Declarative Framework for Modeling Multi-Agent Systems". Master's thesis. Texas Tech University.

Gregory Gelfond and Richard Watson. "Modeling Cooperative Multi-Agent Systems". In: *Proceedings of the 4th International Workshop on Answer Set Programming*. ASP '07.

2005   Chitta Baral, Gregory Gelfond, Michael Gelfond, and Richard Scherl. "Textual Inference by Combining Multiple Logic Programming Paradigms". In: *AAAI'05 Workshop on Inference for Textual Question Answering*. AAAI '05.

Academic & Professional Service

2018   Reviewer for the International Conference on Logic Programming (ICLP 2018)

2018   Reviewer for the Joint Conference on Artificial Intelligence (IJCAI 2018)

2015   Member of the Program Committee for the Workshop on Answer Set Programming and Other Computing Paradigms (ASPOCP 2015)

2014   Member of the Program Committee for the Workshop on Answer Set Programming and Other Computing Paradigms (ASPOCP 2014)

2013   Member of the Program Committee for the Workshop on Answer Set Programming and Other Computing Paradigms (ASPOCP 2013)

2012   Reviewer for the International Conference on Logic Programming (ICLP 2012)

2012   Reviewer for the Fourteenth International Symposium on the Practical Aspects of Declarative Languages (PADL 2012)

2011   Reviewer for the International Conference on Logic Programming (ICLP 2011)

2011   Reviewer for the International Conference on Logic Programming and Nonmonotonic Reasoning (LPNMR 2011)

Organizations & Affiliations

Texas Action Group, Association for Computing Machinery, Upsilon Pi Epsilon, Association for Logic Programming

Positions Held

July 2023–Present   **Researcher**, *Systems Autonomy Group*, University of Dayton Research Institute
Working on advanced natural language understanding and the integration of stochastic and symbolic reasoning systems. Logic programming generalist.

2021–2023   **Researcher**, *Knowledge Representation Group*, Elemental Cognition Inc.
One of the founding members of EC's Knowledge Representation Group. Co-inventor of the Cogent declarative programming language. Duties involved detailed design of the language's syntactic and semantic primitives. Additionally, worked on the design and implementation of the compiler backend, in particular the compiler's target into the native code of EC's reasoning engine. In addition, was one of the key designers of the overall methodology for the use of Cogent for knowledge representation and domain modeling tasks.

2018–2021   **Research Fellow**, *Department of Computer Science*, The University of Nebraska, Omaha
Designed and taught a variety of courses, specializing in: Theory of Computation; Principles of Programming Languages (undergraduate and graduate level); and Data Structures. Helped design and institute an undergraduate concentration in artificial intelligence, and serve as an active member on the undergraduate curriculum committee.

2016–2018   **Visiting Assistant Professor**, *Department of Computer Science*, The University of Nebraska, Omaha

Taught a variety of courses including: Theory of Computation; Principles of Programming Languages (undergraduate and graduate level); Data Structures; Discrete Mathematics; Communication Networks and Introduction to Computer Science II.

2015–2016   **Instructor**, *Department of Computer Science and Software Engineering*, Miami University, Ohio

Taught courses on Object Oriented Programming as well Algorithm Design (to both graduate and undergraduate students).

2012–2015   **Lecturer**, *Department of Computer Science*, Texas Tech University, Lubbock

Designed and taught a variety of courses, specializing in: Principles of Programming I & II; Introduction to Artificial Intelligence; Systems Programming; and Operating Systems.

2009–2012   **Teaching/Research Assistant**, *School of Computing, Informatics, and Decision Systems Engineering*, Arizona State University, Tempe

Graded papers and helped teach courses such as: Principles of Programming with Java; Artificial Intelligence; and Natural Language Processing and Query Answering. Lectured on a number of subjects including: programming principles; knowledge representation; probabilistic reasoning; and declarative programming. Developed a pair of multi-agent action languages for representing and reasoning about the effects of actions in dynamic multi-agent domains. Extended various theoretical frameworks for multi-agent reasoning by bridging the work done within the reasoning about actions and dynamic epistemic logic communities. Worked on a grant in conjunction with SCIL/IARPA on natural language understanding with a focus on extracting information on social structures from both English and Russian text.

2007–2009   **Software Developer**, *Trust and Safety Group*, eBay Inc., Mountain View

Worked on a number of projects involving the integration of machine learning and advanced natural language processing techniques in the interest of fraud detection and prevention. Also did work as a project generalist and troubleshooter, helping develop in-house tools for site activity analysis.

2004–2007   **Teaching/Research Assistant**, *Department of Computer Science*, Texas Tech University, Lubbock

Graded papers and helped lecture for the Object-Oriented Programming in C++ course. Worked on a grant project in conjunction with the United Space Alliance to develop a declarative specification for a mock electrical power system of the International Space Station. Developed a temporal query answering system using a variety of logic and imperative programming techniques. Worked on a proof of concept difference constraint solver.