# Gregory Gelfond

*Curriculum Vitae*

*1528 S 169th Ave*
*Omaha, NE 68130*
*(408) 506 1991*
*gregory_gelfond@fastmail.com*
*https://gregory-gelfond.com*
*gregory.gelfond*
*gregory-gelfond*

## Overview

Over two decades of experience in artificial intelligence research and development, with a strong focus on knowledge representation, answer-set programming, and natural language understanding. Proven track record in designing and implementing hybrid AI systems that combine symbolic reasoning with natural language understanding and machine learning techniques.

## Current Position

**Senior AI Research Software Engineer**, *Autonomous Systems Group*, University of Dayton Research Institute

Working on advanced modeling projects for a number of high stakes application domains, involving the integration of symbolic reasoning (specifically answer-set programming) with natural language understanding and generative AI models.

## Areas of Specialization

Knowledge Representation, Answer-Set Programming, Natural Language Understanding, Artificial Intelligence, Neuro-Symbolic AI, Hybrid AI Systems, Programming Languages and Methodology

## 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* |

## Positions Held

2024–2025 **Research Scientist**, *Noeon Research*, Tokyo

Worked on the integration of answer-set prolog with a novel, category-theory based compute platform architecture.

2023-2024 **Researcher**, *Autonomous Systems Group*, University of Dayton Research Institute

Worked on advanced modeling projects for a number of high stakes application domains, involving the integration of symbolic reasoning (specifically answer-set programming) with natural language understanding.

2021–2023 **Researcher**, *Knowledge Representation Group*, Elemental Cognition Inc.

One of the founding members of EC's Knowledge Representation Group. Co-inventor of one of EC's technology pillars - *the Cogent declarative programming language.* Duties involved designing the syntax and semantics of Cogent in addition to the compiler backend. Key contributor to Cogent's knowledge representation methodology.

2018–2021 **Research Fellow**, *Department of Computer Science*, The University of Nebraska

Taught a number of courses, specializing in: Theory of Computation; Principles of Programming Languages (both undergraduate and graduate); and Data Structures. Designed and helped institute a new undergraduate concentration in artificial intelligence, and served on the undergraduate curriculum committee.

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

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

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

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

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

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

Developed a pair of *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.

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

Worked on a grant in conjunction with the United Space Alliance to model 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.

## Publications and Patents

2025 Vinay K. Chaudhri, Chaitan Baru, Brandon Bennett, Mehul Bhatt, Darion Cassel, Anthony G. Cohn, Rina Dechter, Esra Erdem, Dave Ferrucci, Ken Forbus, Gregory Gelfond, Michael Genesereth, Andrew S. Gordon, Benjamin Grosof, Gopal Gupta, Jim Hendler, Sharat Israni, Tyler R. Josephson, Patrick Kyllonen, Yuliya Lierler, Vladimir Lifschitz, Clifton J. McFate, Hande Küçük Mcginty, Leora Morgenstern, Alessandro Oltramari, Praveen K. Paritosh, Dan Roth, Blake Shepard, Cogan Shimzu, Denny Vrandevci'c, Mark Whiting, and Michael Witbrock. "A Community-driven vision for a new Knowledge Resource for AI". In: *AI Magazine* 46. URL: https://api.semanticscholar.org/CorpusID:279464617.

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". Pat. 18114218.

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*. Ed. 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, p. 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*. Ed. by Eduardo Fermé and João Leite. Vol. 8761. Lecture Notes in Computer Science. Springer International Publishing, pp. 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*. Ed. by João Leite, Tran Cao Son, Paolo Torroni, Leon Torre, and Stefan Woltran. Vol. 8143. Lecture Notes in Computer Science. Springer Berlin Heidelberg, pp. 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*. Ed. by Esra Erdem, Joohyung Lee, Yuliya Lierler, and David Pearce. Vol. 7265. Lecture Notes in Computer Science. Springer Berlin Heidelberg, pp. 509–526.

2011 Chitta Baral and Gregory Gelfond. "On Representing Actions in Multi-Agent Domains". In: *Proceedings of the Symposium on Constructive Mathematics*. Ed. by Marcello Balduccini and Tran Cao Son. Springer, pp. 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, pp. 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, pp. 259–266.

2007 Gregory Gelfond. "A Declarative Framework for Modeling Multi-Agent Systems". MA 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.

## Organizations & Affiliations

Member, Association for Computing Machinery (ACM)

Member, Association for Logic Programming (ALP)

Member, Texas Action Group (TAG)

## 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)