Gregory Gelfond

Neuro-Symbolic AI Architect • Verifiable Reasoning Systems

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Profile

Knowledge-representation scientist and language-and-compiler architect, two decades across academic research, industrial R&D, and high-assurance defense settings. The recurring role: take a reasoning system from formal semantics through to shipped implementation. Co-invented a declarative programming language and its compiler at Elemental Cognition; design verifiable neuro-symbolic architectures for high-stakes decision domains; sole architect of a working controlled-English-to-answer-set-programming compiler.

Areas of Specialization

Applied	Neuro-Symbolic & Hybrid AI, Verifiable / Trustworthy AI, Natural-Language Understanding
Foundational	Knowledge Representation & Reasoning, Answer-Set Programming, Action Languages & Epistemic Reasoning
Engineering	Programming-Language Design & Compilers

Experience

2025–present **Senior AI Research Software Engineer**, *University of Dayton Research Institute*, Autonomous Systems Group
Design and build hybrid AI systems for high-stakes domains, integrating answer-set programming with natural-language understanding and generative models.

2026–present **Founder & Chief Scientist**, *Flyover AI*
Concurrent with full-time research at UDRI. Founded a research venture building tools for verifiable, knowledge-based AI. Designed the syntax, semantics, and compiler for KRML, a controlled-English-to-answer-set-programming language, and delivered the working prototype solo. Designing an associated answer-set solver stack (in development). Vision and worked examples at flyoverlabs.ai.

2024–2025 **Research Scientist**, *Noeon Research*, Tokyo
Integrated answer-set programming with a category-theory-based compute-platform architecture.

2021–2023 **Researcher, Knowledge Representation Group**, *Elemental Cognition*
Founding member of the Knowledge Representation Group. Co-invented Cogent, a declarative programming language and core technology pillar: designed its syntax, semantics, and compiler backend, and shaped its knowledge-representation methodology.

2016–2021 **Visiting Assistant Professor / Research Fellow**, *University of Nebraska*, Department of Computer Science
Taught theory of computation, principles of programming languages, and data structures (undergraduate and graduate). Designed and launched a new undergraduate concentration in artificial intelligence; served on the undergraduate curriculum committee.

Earlier Experience

2012–2016 *Lecturer / Instructor*, Texas Tech University & Miami University. Programming languages, algorithm design, systems programming, operating systems, and artificial intelligence.

2009–2012 *Research Assistant*, Arizona State University. Action languages for dynamic multi-agent domains; IARPA-funded natural-language-understanding tools extracting social-structure information from English and Russian text.

2007–2009 *Software Developer, Trust & Safety*, eBay. Production machine-learning and NLP systems for fraud detection and prevention.

2004–2007 *Research Assistant*, Texas Tech University. Modeled the ISS electrical power system for a United Space Alliance project; temporal query-answering combining logic and imperative techniques.

Education

2018 **Ph.D., Computer Science**, *Arizona State University*
Dissertation: *Representing and Reasoning about Dynamic Multi-Agent Domains: An Action Language Approach*. Advisor: Dr. Chitta Baral.

2007 **M.S., Computer Science**, *Texas Tech University*
Thesis: *A Declarative Framework for Modeling Multi-Agent Systems*. Advisor: Dr. Richard Watson.

2003 **B.S., Computer Science**, *Texas Tech University*

Selected Publications

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 Shimizu, Denny Vrandečić, 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 Gregory Gelfond, Marcello Balduccini, David Ferrucci, Adi 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.

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

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.

Full publication list at Google Scholar.

Patent

2023 *Machine-Learning Assisted Natural Language Programming System.* D. Ferrucci, N. Rushton, A. Beck, G. Burnham, D. Nachman, M. Balduccini, C. McFate, and G. Gelfond. U.S. Patent Application Publication No. 2023/0305822 A1.

Professional Service

Reviewer and program committee: ICLP, IJCAI, LPNMR, PADL, ASPOCP (2011–2018).

Affiliations

Association for Computing Machinery (ACM); Association for Logic Programming (ALP); Texas Action Group (TAG).