

**Gerhard Brewka**  
**Short CV (last update Sept. 2018)**

**Personal Information:**

Born in 1955, I am married and have three daughters. Moreover, I am a proud grandfather with 5 grandchildren, all born between 2015 and 2018. They do their best to keep me young.

**Education and Professional Career:**

I studied Philosophy and Computer Science at University of Bonn where I received my diploma with distinction in 1984. I then joined the Artificial Intelligence Group of Gesellschaft für Mathematik und Datenverarbeitung (GMD), Sankt Augustin, which by now has become a Fraunhofer Institute. This group focused on Expert Systems, then the hottest topic in AI. While still working at GMD, I received a Ph.D. in Computer Science from University of Hamburg in 1989. I was supervised by Bernd Neumann (Hamburg) and Wolfgang Bibel (Vancouver, then Darmstadt). The topic of my thesis was default reasoning.

I stayed in the GMD group until 1994 - with a 1 year interruption as visiting postdoctoral researcher at the International Computer Science Institute, Berkeley, CA, from 1991 to 1992. In January 1995 I became full professor for Knowledge Based Systems at the Technical University of Vienna. For family reasons I decided to accept an offer from Leipzig University. Since September 1996 I hold my current position as chair for Intelligent Systems at Leipzig University.

**Scientific Interests and Main Contributions:**

My area of research is knowledge representation and reasoning. I am particularly interested in (nonmonotonic) reasoning with exceptions, answer set programming, preference and inconsistency handling, reasoning about action, computational models of argumentation and multi-context reasoning. In the following I list what I consider to be my main contributions in these areas:

- *Preferred subtheories*: this is an approach to default reasoning and inconsistency handling based on a preference relation on the formulas in a knowledge base. The approach was developed in my PhD thesis and published in a paper at IJCAI 89 [24]. This paper is still my most cited paper with over 550 citations.
- *Prioritized default logic*: in a joint Artificial Intelligence paper with Thomas Eiter [21] we showed how preferences among default rules can be used to identify the most interesting extensions of a Reiter default theory.
- *Preferences in answer set programming*: the work on preferences in default theories was foundational also for my interest in prioritized answer set programming. I developed a variant of logic programs (logic programs with ordered disjunction) [19] where alternatives come with a ranking which can be used to identify the preferred answer sets. Just recently I was involved in the development of the asprin approach [8] to prioritized answer set programming (with Jim Delgrande, Javier Romero, Torsten Schaub). This approach has now been integrated into Potassco, the Potsdam

Answer Set Solving Collection, arguably the world's leading answer set solving software.

- *Strong inconsistency*: this is very recent joint work with Markus Ulbricht and Matthias Thimm, first published at IJCAI-17 [6]. In classical reasoning the notion of minimal inconsistent subsets plays an important role, e.g. for the generation of diagnoses (via Reiter's hitting set theorem), or for explanations. For nonmonotonic logics this notion is not useful as in such formalisms (minimal) inconsistent subsets may be part of consistent knowledge bases. We identified strong inconsistency as the relevant generalization of inconsistency to arbitrary logics.
- *Computational models of argumentation*: At KR 2010 [15] Stefan Woltran and I introduced ADFs (abstract dialectical frameworks), a powerful generalization of the widely used Dung argumentation frameworks. Whereas Dung's system is able to express attack relationships among arguments, ADFs can represent arbitrary relations including support, group attack and the like. This is achieved by using explicit acceptance conditions for arguments. In [11] we generalized and streamlined the definitions of the various semantics for ADFs. We are currently developing a multi-valued variant of ADFs which allows fine-grained acceptance degrees for arguments to be expressed [3].
- *Nonmonotonic multi-context systems*: At AAI 2007 [16] Thomas Eiter and I introduced a nonmonotonic variant of multi-context systems (MCS) where not only the contexts themselves, but also the bridge rules used to model the information exchange among contexts are nonmonotonic. MCS provide a principled way of integrating heterogeneous knowledge. The approach has been further developed to account for operations beyond the addition of information to another [14] and to cover online applications reacting to changes in a dynamic environment [1].

### **Publications:**

According to Harzing's Publish or Perish my H Index (as of Sept. 2018) is 39, and I have > 6700 citations. The system finds 293 papers with my name. For exact references to most of these papers please refer to dblp. Let me just add that since 2017 I published 5 IJCAI/AAAI papers.

### **Honours:**

Since 2002 I am an ECCAI Fellow selected by the European Coordinating Committee of Artificial Intelligence, now called EurAI.

In 2007 I received the AAI outstanding senior PC member award.

### **Organization:**

I have been involved in the organization of numerous national and international workshops and conferences. For instance, I was program chair of ECAI-06, the 17th European Conference on Artificial Intelligence (Riva del Garda, Italy, August 28th to Sep. 1st 2006), LPNMR 2007 (Logic Programming and Nonmonotonic Reasoning) (Tempe, Arizona, May

2007), KR-2008, the International Conference on Principles of Knowledge Representation and Reasoning (Sydney, September 2008). Moreover, I was general chair of KR-2012, the International Conference on Principles of Knowledge Representation and Reasoning, Rome, June 2012 and of IJCAI 2016 in New York. I also was a member of the advisory board of IJCAI-09 and IJCAI-13.

I was a member of the ECCAI-board (executive board of the European Coordinating Committee for Artificial Intelligence representing 29 national European AI societies) from August 2006 to 2012. From July 2008 onwards I was president of ECCAI for 4 years. ECCAI changed its name to EurAI in 2016. Starting in 2012 I was president of KR, inc., the organization behind the most prestigious conference in knowledge representation and reasoning, for 2 years. Since 2013 I am an IJCAI trustee. My term as a trustee ends after IJCAI 2018.

I was invited speaker at various conferences and workshops, e.g. CAEPIA 2005 (the Spanish AI conference), the Swedish AI-workshop (SAIS-06), ICLP 2007 (International Conference on Logic Programming), COMMA (Computational Models of Argument) 2010, NMR 2010, JELIA 2010, RR 2012, LPNMR/CLIMA 2013, JURIX 2013, KI 2017, (German Conference on Artificial Intelligence) and FOIKS 2018.

I was appointed as an associate editor of the Artificial Intelligence Journal (2008-2013), the Journal of Artificial Intelligence Research (JAIR) (2008-2011) and AI Magazine (2015-2018). I am regularly reviewing for the most prestigious conferences and journals in AI and knowledge representation.

### **Supervision:**

I initiated and headed Leipzig University's doctoral programme in knowledge representation which produced about 40 PhDs from 1998 to 2008. I directly supervised 10 PhD students, namely Markus Ulbricht (submission Oct. 2018), Stefan Ellmauthaler, Oliver Gil, Frank Loebe, Hannes Strass, Ringo Baumann (honourable mention as runner up for the EurAI distinguished dissertation award), Rafal Grabos, Alexander Nittka, Eva Richter, Stefan Weber. In addition, 3 members of my group successfully submitted their habilitation, namely Frank Wolter, Steffen Lange and Hannes Strass.

### **Projects:**

The major source of funding for my research has been Deutsche Forschungsgemeinschaft (DFG), the German national science foundation. I obtained funding for a 10 year doctoral school which I coordinated (around 1,8 M Euros) and for a total of 7 projects with a duration of 3 years each (total amount of support for these projects over 1.5 M Euros).

I am currently running 2 DFG-funded projects. One of them a joint project with TU Vienna (Prof. Woltran) on computational models of argumentation, the other one a joint project with Gabriele Kern-Isberner (Dortmund) and Torsten Schaub (Potsdam) entitled Advanced Solving Technology for Dynamic and Reactive Applications.

## 25 Most Relevant Publications

1. Gerhard Brewka, [Stefan Ellmauthaler](#), [Ricardo Gonçalves](#), [Matthias Knorr](#), [João Leite](#), [Jörg Pührer](#): Reactive Multi-context Systems: Heterogeneous Reasoning in Dynamic Environments. [Artif. Intell. 256](#): 68-104 (2018)
2. [Ringo Baumann](#), Gerhard Brewka: The Equivalence Zoo for Dung-style Semantics. [J. Log. Comput. 28\(3\)](#): 477-498 (2018)
3. Gerhard Brewka, [Hannes Strass](#), [Johannes Peter Wallner](#), [Stefan Woltran](#): Weighted Abstract Dialectical Frameworks. [AAAI 2018](#): 1779-1786
4. [Markus Ulbricht](#), [Matthias Thimm](#), Gerhard Brewka: Measuring Strong Inconsistency. [AAAI 2018](#): 1989-1996
5. Gerhard Brewka, [Martin Diller](#), [Georg Heissenberger](#), [Thomas Linsbichler](#), [Stefan Woltran](#): Solving Advanced Argumentation Problems with Answer Set Programming. [AAAI 2017](#): 1077-1083
6. Gerhard Brewka, [Matthias Thimm](#), [Markus Ulbricht](#): Strong Inconsistency in Nonmonotonic Reasoning. [IJCAI 2017](#): 901-907
7. [Gabriele Kern-Isberner](#), Gerhard Brewka: Strong Syntax Splitting for Iterated Belief Revision. [IJCAI 2017](#): 1131-1137
8. Gerhard Brewka, [James P. Delgrande](#), [Javier Romero](#), [Torsten Schaub](#): aspirin: Customizing Answer Set Preferences without a Headache. [AAAI 2015](#): 1467-1474
9. [Ringo Baumann](#), Gerhard Brewka: AGM Meets Abstract Argumentation: Expansion and Revision for Dung Frameworks. [IJCAI 2015](#): 2734-2740
10. Gerhard Brewka, [Stefan Woltran](#): GRAPPA: A Semantical Framework for Graph-Based Argument Processing. [ECAI 2014](#): 153-158
11. Gerhard Brewka, [Hannes Strass](#), [Stefan Ellmauthaler](#), [Johannes Peter Wallner](#), [Stefan Woltran](#): Abstract Dialectical Frameworks Revisited. [IJCAI 2013](#): 803-809
12. Gerhard Brewka, [Thomas Eiter](#), [Mirosław Truszczyński](#): Answer Set Programming at a Glance. [Commun. ACM 54\(12\)](#): 92-103 (2011)
13. Gerhard Brewka, [Paul E. Dunne](#), [Stefan Woltran](#): Relating the Semantics of Abstract Dialectical Frameworks and Standard AFs. [IJCAI 2011](#): 780-785
14. Gerhard Brewka, [Thomas Eiter](#), [Michael Fink](#), [Antonius Weinzierl](#): Managed Multi-Context Systems. [IJCAI 2011](#): 786-791
15. Gerhard Brewka, [Stefan Woltran](#): Abstract Dialectical Frameworks. [KR 2010](#): 102-111
16. Gerhard Brewka, [Thomas Eiter](#): Equilibria in Heterogeneous Nonmonotonic Multi-Context Systems. [AAAI 2007](#): 385-390
17. Gerhard Brewka, [Floris Roelofsen](#), [Luciano Serafini](#): Contextual Default Reasoning. [IJCAI 2007](#): 268-273
18. Gerhard Brewka, [Salem Benferhat](#), [Daniel Le Berre](#): Qualitative choice logic. [Artif. Intell. 157\(1-2\)](#): 203-237 (2004)
19. Gerhard Brewka, [Ilkka Niemelä](#), [Tommi Syrjänen](#): Logic Programs with Ordered Disjunction. [Computational Intelligence 20\(2\)](#): 335-357 (2004)
20. Gerhard Brewka, [Ilkka Niemelä](#), [Mirosław Truszczyński](#): Answer Set Optimization. [IJCAI 2003](#): 867-872
21. Gerhard Brewka, [Thomas Eiter](#): Preferred Answer Sets for Extended Logic Programs. [Artif. Intell. 109\(1-2\)](#): 297-356 (1999)
22. [Cees Witteveen](#), Gerhard Brewka: Skeptical Reason Maintenance and Belief Revision. [Artif. Intell. 61\(1\)](#): 1-36 (1993)
23. Gerhard Brewka: Cumulative Default Logic: In Defense of Nonmonotonic Inference Rules. [Artif. Intell. 50\(2\)](#): 183-205 (1991)
24. Gerhard Brewka: Preferred Subtheories: An Extended Logical Framework for Default Reasoning. [IJCAI 1989](#): 1043-1048
25. Gerhard Brewka: The Logic of Inheritance in Frame Systems. [IJCAI 1987](#): 483-488