

# Stefan Ellmauthaler

## Curriculum Vitae

*Computer Scientist on qualitative Artificial Intelligence (AI)  
and Knowledge Representation (KR)*

### Personal Data

Degrees Dr. rer. nat., Dipl.-Ing. (comparable to MSc), BSc  
Date of birth May 8, 1986  
Place of birth Vienna  
Citizenship Austrian citizen

### Education

10/2012 – 06/2018 **Doctoral study (Doctor rerum naturalium)** of Computer Science at the Leipzig University with predicate “magna cum laude”

#### Dissertation

*Multi-Context Reasoning in Continuous Data-Flow Environments*

Prof. Dr. Gerhard Brewka (supervisor, 1<sup>st</sup> reviewer)

Prof. Dr. Torsten Schaub (2<sup>nd</sup> reviewer)

10/2009 – 09/2012 **Master’s study (Dipl.-Ing.)**, “Computational Intelligence”, Vienna University of Technology, with distinction

#### Master’s thesis

*Abstract Dialectical Frameworks: Properties, Complexity, and Implementation*

Privatdoz. Dr.techn. Dipl.-Ing. Stefan Woltran (supervisor)

Proj.Ass. Dipl.-Ing. Johannes Peter Wallner, BSc (assistance)

10/2005 – 07/2009 **Bachelor’s study (BSc)**, “Medicine and Computer Science”, Vienna University of Technology

09/2000 – 06/2005 **“Matura” Certificate (Higher School Certificate)**, HTBLuVA Wiener Neustadt, Department “EDVO”

School to gain the matriculation standard in conjunction with expertise in the field of informatics and business management (graduation at the 13<sup>th</sup> school year)

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## Further Education

- 03/2023 **Managing Projects and Leading Teams for Postdocs**, *Graduate Academy TU Dresden*  
Workshop of 13 working units, Lecturer: Dr. Markus Schmittberger
- 05/2022 **Leadership Skills for Postdocs**, *Graduate Academy TU Dresden*  
Workshop of 18 working units, Lecturer: Hiu Pun Chong
- 01/2022 **Agile Projectmanagement - Methods and Processes to Cooperation in Teams**, *Center for continuing education - TU Dresden*  
Workshop of 16 working units, Lecturer: Roberto Riehle (SCRUM-Master and Agile-Coach)
- 10/2018 – 06/2020 **Saxon Higher Education Didactics Certificate**, *Center for Didactics and Higher Education Saxony (HDS)*, 240 working units
- 07/2014 **Doctoral Consortium**, *Fourteenth Conference on Principles of Knowledge Representation and Reasoning (KR) 2014*, Vienna  
Topic: Argumentation for Reactive Reasoning
- 06/2013 **Summer school**, *Advanced Course on AI (ACAI) 2013*, London

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## Employment History

- 01/2021 – today **Research associate**, *TU Dresden*, Faculty of Computer Science / Center for Advancing Electronics Dresden (cfaed), International Center for Computational Logic (ICCL), Knowledge-Based Systems Group  
Research on qualitative AI, rule-based reasoning, ontology based data access, and argumentation theory. Software development in rust, system administration, various organisational tasks, and teaching.  
**Funded by** the Federal Ministry of Education and Research (BMBF) in ScaDS.AI (Center for Scalable Data Analytics and Artificial Intelligence) and additionally in the BMBF funded industry-oriented project “InnoSale” since 01/2023.
- 10/2018 – 12/2020 **Research associate**, *Leipzig University*, Computer Science Institute, Intelligent Systems Group  
State-funded position with obligatory teaching duties and handling of COVID-19 related administrative and organisational tasks.
- 10/2012 – 09/2018 **Research associate**, *Leipzig University*, Computer Science Institute, Intelligent Systems Group
- 10/2017-09/2018 Funded by the German Research Group (DFG) Project BR-1817/7 – 2 “*New tools for graph-based formal argumentation*”.
  - 10/2015-09/2017 Research associate and administrative officer for Leipzig in the “*Hybris-A2: Advanced Solving Technology for Dynamic and Reactive Applications*” project of the German Research Group (DFG) at the Research Unit “*Hybrid Reasoning for Intelligent Systems*” (FOR 1513).
  - 10/2012-09/2015 Research associate and administrative officer for Leipzig in the projects
    - Hybris-A2: Advanced Solving Technology for Dynamic and Reactive Applications
    - Hybris-B2: From Correlation to Causality: Hybrid Reasoning Over Dynamic Protein Interaction Networksof the German Research Group (DFG) at the Research Unit “*Hybrid Reasoning for Intelligent Systems*” (FOR 1513).

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03/2011 **Project employee**, *Vienna University of Technology*

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## Awards

- 07/2017 7<sup>th</sup> **Answer Set Programming Competition Modelling Competition**, *International Conference on Logic Programming and Nonmonotonic Reasoning (LPNR 2017)*, Espoo, Finland, 1<sup>st</sup> Place
- 07/2014 **ASP Modelling Contest**, *International Conference on Logic Programming (ICLP) 2014 during the Vienna Summer of Logic 2014 Olympics*, Vienna, Austria, 3<sup>rd</sup> Place
- 08/2013 20<sup>th</sup> **PROLOG Programming Contest**, *International Conference on Logic Programming (ICLP) 2013*, Istanbul, Turkey, 1<sup>st</sup> Place

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## Academic Working Experience

### Reviewing

- Journal Reviewing ACM Transactions on Database Systems (TODS), Artificial Intelligence Review (AIRE), IfCoLog Journal of Logics and their Applications, Journal of Artificial Intelligence Research (JAIR), International Journal of Approximate Reasoning (IJA)
- Program Committee AAAI 2024, AAAI 2023, ASPOCP 2023, ECAI 2023, ASPOCP 2022, SAFA 2022, ASPOCP 2020, COMMA 2020, SAFA 2020, ASPOCP 2019, AAAI 2018, SAFA 2018, COMMA 2016, SAFA 2016, IJCAI 2015 (KR Track)
- Reviewing Conferences & Workshops COMMA 2018, IJCAI 2018, IJCAI 2017, IJCAI 2016, ICLP 2016, SAFA 2016, IJCAI 2015, IULP 2015, AAAI 2014, ECAI 2014, ReactKnow 2014, ICCSW 2014, ICLP 2013, ICCSW 2013

### Professional Activities

- Technical Chair of the 18<sup>th</sup> *Edition of the European Conference on Logics in Artificial Intelligence (JELIA 2023)* at Dresden, Germany
- Tutorial on Multi-Context Stream Reasoning at the 43<sup>rd</sup> *German Conference on Artificial Intelligence*
- Guest editor of the *Theory and Practice in Logic Programming (TPLP)* special issue on *User-Oriented Logic Programming and Reasoning Paradigms*
- Organiser of the 2<sup>nd</sup> *International Workshop on User-Oriented Logic Paradigms (IULP 2017)*, co-located with the 14<sup>th</sup> *International Conference on Logic Programming and Nonmonotonic Reasoning (LPNMR 2017)* at Espoo, Finland
- Organiser of the *International Workshop on User-Oriented Logic Programming (IULP 2015)*, co-located with the *International Conference on Logic Programming (ICLP 2015)* at Cork, Ireland
- Organiser of the *International Workshop on Reactive Concepts in Knowledge Representation (ReactKnow 2014)*, co-located with the *European Conference on Artificial Intelligence (ECAI 2014)* at Prague, Czech

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## Teaching experience

### Teaching responsibilities

WT 2021, ST 2022 Transfer of teaching responsibilities on knowledge based systems at TU Dresden

### Lectures/Courses

- WT 2021 **Rule-Based Paradigms in Knowledge Representation**, *Seminar*, 2.0h per week, winter term  
Advanced MSc module course in computer science
- ST 2015 – 2020 **Knowledge Based Systems**, *Exercise*, 1.0h per week, summer term  
BSc course for computer science students; lecture (2.0h per week) held by G. Brewka
- ST 2015 – 2020 **Knowledge Based Systems**, *Lecture*, 2.0h per week, summer term, represented G. Brewka at Topic “ASP”  
BSc course for computer science students
- WT 2019 **Knowledge Representation**, *Seminar*, 2.0h per week, winter term  
MSc course for computer science students
- WT 2019 **Knowledge Representation**, *Lecture*, 2.0h per week, winter term, presented Multi-Context Systems  
MSc course for computer science students
- WT 2017 – 2020 **Knowledge Representation**, *Practical Course*, 2.0h per week, winter term  
MSc course for computer science students
- WT 2014 **Intelligent Systems**, *Seminar*, 2.0h per week, winter term  
MSc course for computer science students
- ST 2014 **Logic in Computer Science**, *Seminar*, 2.0h per week, summer term  
MSc course for computer science students
- WT 2013 **Knowledge Representation**, *Seminar*, 2.0h per week, winter term  
MSc course for computer science students
- ST 2013 **Semantic Web Technologies**, *Seminar*, 2.0h per week, summer term  
MSc course for computer science students

### Co-supervised bachelor's thesis at TU Dresden

2022 Justus Möller: *Construction of Human-Solvable Sudoku Puzzles*

### Co-supervised bachelor's thesis at Leipzig University

- 2020 Tobias Krawetzke: *Dialectical Models Encoding in C++ neu betrachtet: Analyse, Benutzbarkeit und Modifikation*, “good” grade
- 2017 Kevin Kubsch: *Application and Implementation of splitting procedures to Abstract Dialectical Frameworks* “very good” grade
- 2014 Jakob Runge: *CARBON - a Web application and a RESTful API for argumentation*

### Teaching Assistance

2006-2009 **Tutor**, *Vienna University of Technology, Institute of Computer Aided Automation*  
Tutor for the bachelor's course “EProg” (Introduction to Programming)

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## Skills

### Expert Competencies

- Knowledge Representation
- Argumentation Theory
- Declarative Programming (Answer Set Programming)
- L<sup>A</sup>T<sub>E</sub>X
- Scientific working methods
- Qualitative AI
- Complexity Theory
- Discrete Planning and Optimisation
- Higher Education Teaching
- Research organisation

### Further Competencies

- (agile) Projectmanagement
- Python
- SQL, DATALOG
- Basic Machine Learning (BDT, Deep Learning) knowledge
- NIXOS, BASH/ZSH
- C(++), Rust
- Git
- Basic Data Science knowledge

### Used Tools/Libraries/Frameworks

Answer Set Programming	gringo, clasp, clingo
Teaching	Moodle, OPAL, ILIAS, OLAT
Data Science	Jupyter, Google Colab, Numpy, Pandas, LibreOffice Calc Spreadsheets
Deep Learning	Tensorflow
Video Production	Rawtherapee, Adobe Lightroom, Audacity, Kdenlive

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## Languages

German	native tongue
English	fluent

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## Publications and Talks

### Journals

- [1] Stefan Ellmauthaler. Multi-context reasoning in continuous data-flow environments. *KI - Künstliche Intelligenz*, 33(1):101–104, Mar 2019.
- [2] Stefan Ellmauthaler and Claudia Schulz. Introduction to the tlp special issue on user-oriented logic programming and reasoning paradigms. *Theory and Practice of Logic Programming*, 19(2):109–113, 2019.
- [3] Gerhard Brewka, Stefan Ellmauthaler, Gabriele Kern-Isberner, Philipp Obermeier, Max Ostrowski, Javier Romero, Torsten Schaub, and Steffen Schieweck. Advanced solving technology for dynamic and reactive applications. *KI - Künstliche Intelligenz*, 32(2):199–200, Aug 2018.
- [4] Gerhard Brewka, Stefan Ellmauthaler, Ricardo Gonçalves, Matthias Knorr,

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João Leite, and Jörg Pührer. Reactive multi-context systems: Heterogeneous reasoning in dynamic environments. *Artificial Intelligence*, 256:68–104, 2018.

- [5] Gerhard Brewka, Stefan Ellmauthaler, Hannes Strass, Johannes P. Wallner, and Stefan Woltran. Abstract dialectical frameworks. an overview. *IfCoLog Journal of Logics and their Applications Volume 4, number 8. Formal Argumentation*, 4(8):2263–2317, 10 2017.

#### Conferences

- [6] Stefan Ellmauthaler, Sarah Alice Gaggl, Dominik Rusovac, and Johannes P. Wallner. Adf - BDD : An ADF solver based on binary decision diagrams. In *Proceedings of the 9th International Conference on Computational Models of Argument (COMMA 2022)*, volume 220146 of *FAIA*, pages 355–356. IOS Press, September 2022.
- [7] Stefan Ellmauthaler, Sarah Alice Gaggl, Dominik Rusovac, and Johannes P. Wallner. Representing abstract dialectical frameworks with binary decision diagrams. In Georg Gottlob, Daniela Inclezan, and Marco Maratea, editors, *Proceedings of the 16th International Conference on Logic Programming and Non-monotonic Reasoning (LPNMR 2022)*, pages 177–189. Springer International Publishing, 2022.
- [8] Stefan Ellmauthaler, Markus Krötzsch, and Stephan Mennicke. Answering Queries with Negation over Existential Rules. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 36(5), pages 5626–5633, June 2022.
- [9] Stefan Ellmauthaler and Hannes Strass. DIAMOND 3.0 - A native C++ implementation of DIAMOND. In *International Conference on Computational Models of Argument (COMMA 2016)*, Potsdam, Germany, 12-16 September, 2016., volume 287 of *Frontiers in Artificial Intelligence and Applications*, pages 471–472. IOS Press, 2016.
- [10] Gerhard Brewka, Stefan Ellmauthaler, Ricardo Gonçalves, Matthias Knorr, João Leite, and Jörg Pührer. Inconsistency management in reactive multi-context systems. In Loizos Michael and Antonis C. Kakas, editors, *European Conference on Logics in Artificial Intelligence (JELIA 2016)*, volume 10021 of *Lecture Notes in Computer Science*, pages 529–535, 2016.
- [11] Stefan Ellmauthaler and Hannes Strass. The DIAMOND system for computing with abstract dialectical frameworks. In Simon Parsons, Nir Oren, Chris Reed, and Federico Cerutti, editors, *International Conference on Computational Models of Argument (COMMA 2014)*, volume 266 of *Frontiers in Artificial Intelligence and Applications*, pages 233–240. IOS Press, September 2014.
- [12] Gerhard Brewka, Stefan Ellmauthaler, and Jörg Pührer. Multi-context systems for reactive reasoning in dynamic environments. In Torsten Schaub, Gerhard Friedrich, and Barry O’Sullivan, editors, *European Conference on Artificial Intelligence (ECAI 2014)*, volume 263 of *Frontiers in Artificial Intelligence and Applications*, pages 159–164. IOS Press, 2014.

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- [13] Gerhard Brewka, Stefan Ellmauthaler, Hannes Strass, Johannes Peter Wallner, and Stefan Woltran. Abstract dialectical frameworks revisited. In Francesca Rossi, editor, *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI 2013)*. IJCAI/AAAI, August 2013.
- [14] Stefan Ellmauthaler and Johannes Peter Wallner. Evaluating Abstract Dialectical Frameworks with ASP. In Bart Verheij, Stefan Szeider, and Stefan Woltran, editors, *International Conference on Computational Models of Argument (COMMA 2012)*, volume 245, pages 505–506. IOS Press, 2012.

#### Workshops

- [15] Stefan Ellmauthaler and Jörg Pührer. Stream packing for asynchronous multi-context systems using ASP. In Thomas Eiter, Wolfgang Faber, and Stefan Woltran, editors, *Proceedings of the Workshop on Trends and Applications of Answer Set Programming (TAASP 2016)*, 2016.
- [16] Gerhard Brewka, Stefan Ellmauthaler, Ricardo Gonçalves, Matthias Knorr, João Leite, and Jörg Pührer. Towards inconsistency management in reactive multi-context systems. In Richard Booth, Giovanni Casini, Szymon Klarman, Gilles Richard, and Ivan José Varzincza, editors, *Proceedings of the International Workshop on Defeasible and Ampliative Reasoning (DARe-16) co-located with the 22th European Conference on Artificial Intelligence (ECAI 2016)*, The Hague, Holland, August 29, 2016., CEUR Workshop Proceedings. CEUR-WS.org, 2016.
- [17] Gerhard Brewka, Stefan Ellmauthaler, and Jörg Pührer. Multi-context systems for reactive reasoning in dynamic environments. In Stefan Ellmauthaler and Jörg Pührer, editors, *International Workshop on Reactive Concepts in Knowledge Representation (ReactKnow 2014)*, pages 23–30, 2014.
- [18] Stefan Ellmauthaler and Jörg Pührer. Asynchronous multi-context systems. In Stefan Ellmauthaler and Jörg Pührer, editors, *International Workshop on Reactive Concepts in Knowledge Representation (ReactKnow 2014)*, pages 31–38, 2014.
- [19] Stefan Ellmauthaler. Generalizing multi-context systems for reactive stream reasoning applications. In Andrew V. Jones and Nicholas Ng, editors, *Proceedings of the 2013 Imperial College Computing Student Workshop (ICCSW 2013)*, OpenAccess Series in Informatics (OASIs), pages 17–24. Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, September 2013.
- [20] Stefan Ellmauthaler and Hannes Strass. The DIAMOND system for argumentation: Preliminary report. In Michael Fink and Yuliya Lierler, editors, *Proceedings of the International Workshop on Answer Set Programming and Other Computing Paradigms (ASPOCP 2013)*, volume abs/1312.6140, September 2013.

#### Academic treatises

- [21] Stefan Ellmauthaler. *Multi-Context Reasoning in Continuous Data-Flow Environments*. PhD thesis, Leipzig University, 2018.

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- [22] Stefan Ellmauthaler. Abstract Dialectical Frameworks: Properties, Complexity, and Implementation. Master's thesis, Technische Universität Wien, Institut für Informationssysteme, 2012.

#### Other academic contributions

- [23] Stefan Ellmauthaler, Markus Krötzsch, and Stephan Mennicke. Answering Queries with Negation over Existential Rules. *CoRR*, abs/2112.07376, 2021.
- [24] Hannes Strass and Stefan Ellmauthaler. goDIAMOND 0.6.6 – ICCMA 2017 system description, 2017. Second International Competition on Computational Models of Argumentation: <http://www.dbai.tuwien.ac.at/iccma17/>.
- [25] Gerhard Brewka, Stefan Ellmauthaler, Ricardo Gonçalves, Matthias Knorr, João Leite, and Jörg Pührer. Reactive multi-context systems: Heterogeneous reasoning in dynamic environments. *CoRR*, abs/1609.03438, 2016.
- [26] Stefan Ellmauthaler and Jörg Pührer. Asynchronous multi-context systems. In Thomas Eiter, Hannes Strass, Mirosław Truszczyński, and Stefan Woltran, editors, *Advances in Knowledge Representation, Logic Programming, and Abstract Argumentation - Essays Dedicated to Gerhard Brewka on the Occasion of His 60th Birthday*, volume 9060 of *Lecture Notes in Computer Science*. Springer, 2015.

#### Additional Talks

- [27] Abstract Dialectical Frameworks meet Binary Decision Diagrams. ScaDS.AI Dresden Topic Exchange Meeting, TU Dresden, 02.05.2023.
- [28] Representing Abstract Dialectical Frameworks with Binary Decision Diagrams. Research Seminar Logic and AI, ICCL, TU Dresden, 01.09.2022.
- [29] Agile Project Management - An overview on techniques and the agile mindset. Research Seminar Logic and AI, ICCL, TU Dresden, 17.02.2022.
- [30] Multi-Context Stream Reasoning. German Conference on Artificial Intelligence Tutorial, Bamberg (online), 21.09.2020.
- [31] Multi-Context Reasoning in Continuous Data-Flow Environments - Modelling with reactive Multi-Context Systems. Stream Reasoning Workshop, Linköping, 16.04.2019.
- [32] Asynchronous Multi-Context Systems. Stream Reasoning Workshop, Zürich, 16.01.2018.
- [33] Inconsistency Management in Reactive Multi-Context Systems. Stream Reasoning Workshop, Berlin, 8.12.2016.
- [34] Inconsistency Management in Reactive Multi-Context Systems. 8<sup>th</sup> Hybris Workshop, Dresden, 29.11.2016.
- [35] Asynchronous Multi-Context Systems 5<sup>th</sup> Hybris Workshop, Potsdam, 8.6.2015.
- [36] Generalizing Multi-Context Systems for Reactive Stream Reasoning Applications. 3<sup>rd</sup> Hybris Workshop, Dresden, 20.11.2013.
- [37] Abstract Dialectical Frameworks. 1<sup>st</sup> Hybris Workshop, Aachen, 15.11.2012.

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## Poster

- [38] Logic-Based Knowledge Representation for Intelligent Data Access - Theory and Practice of Existential Rules. All-Hands-Meeting BMBF funding priority AI, Munich (online), 2022.
- [39] Argumentation for Reactive Reasoning. Doctoral Consortium, 14<sup>th</sup> International Conference on Principles of Knowledge Representation and Reasoning(KR), Vienna, 2014.
- [40] A DIAMOND in Argumentation. Advanced Course on Artificial Intelligence (ACAI), King's College, London, 2013.

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