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^{st} reviewer)

Prof. Dr. Torsten Schaub (2^{nd} 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 13th school year)

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- 06/2024 **Business administration for young researcher**, *Graduate Academy TU Dresden*
 - Workshop of 16 teaching units on business administration, Lecturer: Prof. Dr. Torsten Forberg
- 05/2024 **Negotiating in Science & Academia**, *Graduate Academy TU Dresden*Workshop of 9 teaching units on negotiations during business deals and academia, Lecturer: Dr. Silvia Scheinert
- 10/2023 First Aid Training including Sports Emergencies, Deutsches Rotes Kreuz Dresden
 Course comprising 9 teaching units
- 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

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. Project management duties as a proxy for the work-package lead of InnoSale.

Funded by the Federal Ministry of Education and Research (BMBF) in ScaDS.Al (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 ${
m COVID}\text{-}19$ related administrative and organisational tasks.

10/2012 - 09/2018 Research associate, Leipzig University, Computer Science Institute, Intelligent Systems Group

- o 10/2017-09/2018 Funded by the German Research Group (DFG) Project BR-1817/7 - 2 "New tools for graph-based formal argumentation".
- o 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).
- o 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 Networks

of the German Research Group (DFG) at the Research Unit "Hybrid Reasoning for Intelligent Systems" (FOR 1513).

03/2011 Project employee, Vienna University of Technology

Skills

Expert Competencies

- Knowledge Representation
- Argumentation Theory
- Declarative Programming (Answer Set Programming)
- O LATEX
- Scientific working methods

Further Competencies

- o (agile) Projectmanagement
- Python
- O SQL, DATALOG
- Basic Machine Learning (BDT, Deep Learning) knowledge

- Qualitative AI
- Complexity Theory
- Discrete Planning and Optimisation
- Higher Education Teaching
- Research organisation
- O NIXOS, BASH/ZSH
- \circ C(++), Rust
- Git
- Basic Data Science knowledge

Used Tools/Libraries/Frameworks

Answer Set gringo, clasp, clingo Programming

Teaching Moodle, OPAL, ILIAS, OLAT

Projectmanagement github, gitlab, JIRA, Confluence

Data Science Jupyter, Google Colab, Numpy, Pandas, LibreOffice Calc Spreadsheets

Deep Learning Tensorflow

Video Production Rawtherapee, Adobe Lightroom, Audacity, Kdenlive

Languages

German native tongue

English fluent

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Awards

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

Volunteering Work

11/2023 – today Company First Aider, TU Dresden

10/2023 - today DHSZ Course/Coach, Dresden University Sports Center, TU Dresden Planning and conducting a weekly table tennis meeting lasting 90 minutes for employees of the Faculty of Computer Science.

Academic Working Experience

Reviewing

Journal Reviewing Theory and Practice of Logic Programming (TPLP), 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 AAAI 2024, ASPOCP 2024, ECAI 2024, AAAI 2023, ASPOCP 2023, ECAI Committee 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 COMMA 2018, IJCAI 2018, IJCAI 2017, IJCAI 2016, ICLP 2016, SAFA 2016, Conferences & IJCAI 2015, IULP 2015, AAAI 2014, ECAI 2014, ReactKnow 2014, ICCSW Workshops 2014, ICLP 2013, ICCSW 2013

Professional Activities

Organiser of the 5^{th} International Workshop on Systems and Algorithms for Formal Argumentation (SAFA 2024), co-located with the 10^{th} International Conference on Computational Models of Argument (COMMA 2024) at Hagen, Germany

Technical Chair of the 18^{th} Edition of the European Conference on Logics in Artificial Intelligence (JELIA 2023) at Dresden, Germany

Tutorial on Multi-Context Stream Reasoning at the 43^{rd} German Conference on Artificial Intelligence

Guest editor of the Theory and Practice on Logic Programming (TPLP) special issue on User-Oriented Logic Programming and Reasoning Paradigms

Organiser of the 2^{nd} International Workshop on User-Oriented Logic Paradigms (IULP 2017), co-located with the 14^{th} 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

Teaching experience

Teaching responsibilities

- WT 2021, ST 2022 Transfer of teaching responsibilities on knowledge based systems at TU Dresden Lectures/Courses
- ST 2023, WT 2023 **CMS Team Project**, *Software Team Project*, 8.0h per week, 300hours Advanced MSc module course in computer science with software engineering and teamwork focus
 - 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

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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)

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 tplp 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. K1 - Künstliche Intelligenz, 32(2):199–200, Aug 2018.
- [4] Gerhard Brewka, Stefan Ellmauthaler, Ricardo Gonçalves, Matthias Knorr, 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] Alex Ivliev, Stefan Ellmauthaler, Lukas Gerlach, Maximilian Marx, Matthias Meißner, Simon Meusel, and Markus Krötzsch. Nemo: First glimpse of a new rule engine. In *Proceedings 39th International Conference on Logic Programming: ICLP 2023 Technical Communications*, volume 385 of *EPTCS*, pages 333–335, September 2023.
- [7] 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.

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- [8] 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.
- [9] 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.
- [10] 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.
- [11] Gerhard Brewka, Stefan Ellmauthaler, Ricardo Gonçalves, Matthias Knorr, João Leite, and Jörg Pührer. Inconsistency management in reactive multicontext systems. In Loizos Michael and Antonis C. Kakas, editors, European Conferenceon Logics in Artificial Intelligence (JELIA 2016), volume 10021 of Lecture Notes in Computer Science, pages 529–535, 2016.
- [12] 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.
- [13] 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.
- [14] 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.
- [15] 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

[16] Stefan Ellmauthaler and Lukas Gerlach. Adf-bdd.dev: Insights to undecided statements in abstract dialectical frameworks. In Gianvincenzo Alfano and Stefano Ferilli, editors, *Proceedings of the 7th Workshop on Advances in*

- Argumentation in Artificial Intelligence (AI^3 2023) co-located with the 22nd International Conference of the Italian Association for Artificial Intelligence (AIxIA 2023), Rome, Italy, November 9, 2023, volume 3546 of CEUR Workshop Proceedings. CEUR-WS.org, December 2023.
- [17] Stefan Ellmauthaler and Lukas Gerlach. Adf-bdd.dev: Debug abstract dialectical frameworks with binary decision diagrams. In *The Fourth Workshop on Explainable Logic-Based Knowledge Representation (XLoKR 2023)*, September 2023.
- [18] Stefan Ellmauthaler and Jörg Pührer. Stream packing for asynchronous multicontext 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.
- [19] Gerhard Brewka, Stefan Ellmauthaler, Ricardo Gonçalves, Matthias Knorr, João Leite, and Jörg Pührer. Towards inconsistency management in reactive multicontext 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.
- [20] Gerhard Brewka, Stefan Ellmauthaler, and Jörg Pührer. Mulit-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.
- [21] 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.
- [22] 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 (OASIcs), pages 17–24. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, September 2013.
- [23] 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 treaties

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

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

Other academic contributions

- [26] Stefan Ellmauthaler, Markus Krötzsch, and Stephan Mennicke. Answering Queries with Negation over Existential Rules. *CoRR*, abs/2112.07376, 2021.
- [27] 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/.
- [28] 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.
- [29] Stefan Ellmauthaler and Jörg Pührer. Asynchronous multi-context systems. In Thomas Eiter, Hannes Strass, Miroslaw Truszczynski, 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

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

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Poster

- [41] Logic-Based Knowledge Representation for Intelligent Data Access Theory and Practice of Existential Rules. All-Hands-Meeting BMBF funding priority Al, Munich (online), 2022.
- [42] Argumentation for Reactive Reasoning. Doctoral Consortium, 14^{th} International Conference on Principles of Knowledge Representation and Reasoning(KR), Vienna, 2014.
- [43] A DIAMOND in Argumentation. Advanced Course on Artificial Intelligence (ACAI), King's College, London, 2013.