

Benzmüller, Christoph Ewald

Academic Degrees: Dr.-Ing. habil. Dipl.-Inform. **Nationality:** German **ORCID ID:** 0000-0002-3392-3093
Website: christoph-benzmueller.de **Research areas:** AI, Computer Science, Philosophy, Mathematics, NL

Education

07/1999–07/2007 Habil., Dep. of Computer Science, Saarland University, Saarbrücken, DE
04/1995–07/1999 Dr.-Ing., Dep. of Computer Science, Saarland University, DE
10/1989–04/1995 Dipl.-Inform., Dep. of Computer Science, Saarland University, DE

Current and Previous Positions

10/2020–ongoing Scientific Advisor, Latentine GmbH/Smartful.ai, Berlin, DE
04/2020–09/2020 First UNA Europa (una-europa.eu) Chair, Freie Universität (FU) Berlin, DE
07/2018–03/2020 Guest Professor, Artificial Intelligence (AI), FU Berlin, DE
03/2017–12/2019 Visiting Scholar and Scientific Collaborator in AI, FSTC, University of Luxembourg, LU
09/2015–08/2016 Visiting Scholar, CSLI/Cordula Hall, Philosophy, Stanford University, CA, US
02/2012–01/2017 Heisenberg Fellow of the Deutsche Forschungsgemeinschaft (DFG), FU Berlin, DE
since 02/2012 Privatdozent, Computer Science and Mathematics, FU Berlin, DE
11/2008–04/2011 Senior Researcher, Semantic Technologies, Articulate Software, Angwin, CA, US
12/2008–12/2009 Full Professor for Formal Methods and AI, Intl. University in Germany, Bruchsal, DE
10/2006–10/2007 Senior Research Fellow, Dep. of Computer Science, University of Cambridge, GB
since 08/2007 Privatdozent, Venia Legendi in Computer Science, Saarland University, DE
01/2001–10/2008 Associate Professor (C2/C1), Dep. of Computer Science, Saarland University, DE
01/2000–12/2001 PostDoc, AI and Computer Science, The Universities of Birmingham and Edinburgh, GB
04/1995–08/1999 Research assistant (wiss. Mitarbeiter), Dep. of Computer Science, Saarland University, DE

Awards and Honors

2020 Cover story on my research in computational metaphysics in science magazine Science & Vie
2019 National Contact Point in Germany of CLAIRE AI Network (claire-ai.org)
2018 John-Jules Meyer Best Paper Award at DEON 2018 conference
2012–2017 Heisenberg Fellowship, German National Research Foundation (DFG)
2015/2016 Central teaching award of FU Berlin for lecture on Computational Metaphysics
2014 Shortlisted for Amalia Preis für Neues Denken, Weimar
1996–1998 PhD scholarship of the Studienstiftung des Deutschen Volkes

Teaching and Supervision

Lecture courses & seminars: AI, AI & Ethics, Universal Logical Reasoning, Computational Metaphysics, Expressive Logics, Automated Theorem Proving, Semantics, Mathematical Assistance Systems, Q&A Systems
Supervision: Served as supervisor, co-supervisor, committee member or mentor of ≥ 25 PhD projects, ≥ 23 MSc/Diploma projects and ≥ 17 BSc projects in Computer Science, Mathematics and Philosophy. Highlight is the PhD thesis of Dr. Alexander Steen (≥ 25 publications, summa cum laude, GI-Junior-Fellowship).

Organisation of Scientific Events and Experience as Publisher

European Summer School in Logic, Language and Information (ESSLLI 2022, area co-chair for Logic & Computation) Conf. on Intelligent Computer Mathematics (CICM 2020, co-chair), German Conf. on AI (KI 2019, co-chair), LuxLogAI conf. with public debate on AI & Ethics at KPMG (2018, co-organiser), Intl. Joint Conf. on Rules and Reasoning (RuleML+RR 2018, co-chair), Global Conf. on Artificial Intelligence (GCAI 2016, 2017, co-chair), Conf. on Automated Deduction (CADE 2015, organiser), Automated Reasoning in Quantified Non-Classical Logics (ARQNL 2014, 2016, 2018, 2010, co-chair/co-organiser)

Commissions of Trust

Jury: Kurt Gödel Preis 2019, Kurt Gödel Freundeskreis, Berlin
Reviewer: DFG (DE), Austrian Science Fund (AT), Johannes Kepler Universität Linz (AT), Cambridge University (GB), King's College (GB), Czech Science Foundation (CZ), Nat. Sciences and Engineering Research Council of Canada (CA), Recherche en sciences & technologies de l'information (FR)
Editorial board: Logic J. of the IGPL, J. of Applied Logics (IfCoLoG), Historia Logicae

Memberships of Scientific Societies

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| 2020–ongoing | Gesellschaft für Informatik, Fachbereich KI, Leitungskreis (executive committee) |
| 2020–ongoing | Intl. AIQT (AI and Quantum Technology) Foundation, Switzerland, charter member |
| 2020–ongoing | World Congress on Logic and Religion, scientific committee |
| 2020–ongoing | Conference on Intelligent Computer Mathematics (CICM), steering committee |
| 2019–ongoing | Confederation of Labs for AI Research in Europe (CLAIRE), national contact point |
| 2018–ongoing | Society of Deontic Logic and Normative Systems (DEON), steering committee |
| 2018–ongoing | Berlin Mathematical School (BMS+) |
| 2008–ongoing | Conference on Automated Deduction (CADE), elected trustee, vice-president since 2015 |
| 2015–ongoing | Association of Automated Reasoning (AAR), board member representing CADE |
| 2014–2018 | Spokesman of the section Deduction Systems of the Gesellschaft für Informatik, DE |
| 2014–2016 | Berlin Mathematical School (BMS), mentoring, gender and diversity committee |
| 2010–ongoing | The International Federation for Computational Logic (IfCoLoG), executive board |

Record of Third-Party Funded Projects

- PetraKIP (BMBF, €785.950, 2021–2024): AI-based portfolio for teacher education, Co-PI
- DELIGHT (FNR Luxembourg, 2021–2024): Deontic Logics for epistemic rights, non-contractual partner
- CRAP (Volkswagen Stiftung, €120.000, 2018–2019): Consistent Rational Argumentation in Politics, PI
- Towards a Verifiable Smart Contract Language (BILLON SP. Z O.O., Warsaw, 2018), PI
- Trustful AI in Energy Production (Innovationsregion Lausitz GmbH, Cottbus, 2018), co-PI
- Leo-III (DFG, BE 2501/11, €276,218, 2014–2018): Effective HO Automated Theorem Proving, PI
- CompMeta (FU Berlin teaching award, €10.000, 2016): Lecture Course on Computational Metaphysics, PI
- CADE-25 (DFG, BE 2501/12, €21.600, 2015): Conference Support Grant for CADE-25 in 2015 in Berlin, PI
- Heisenberg fellowship (DFG, BE 2501/9, ~€310.000, 2012–2017): Studies in Computational Metaphysics, PI
- ONTOLEO (DFG, BE 2501/6, ~€102.000, 2009–2011): Cooperative HO ATP for Ontology Reasoning, PI
- THFTPTP (EU FP7-PEOPLE, 219982, ~€130,000, 2008–2009): Intl. ATP Infrastr. for HO Logic, PI
- OMEGA (DFG SFB378, MI-04, ~€900,000, 2001–2008): Agent-oriented Proof Planing, co-PI
- DIALOG (DFG SFB378, MI-03, ~€900,000, 2001–2008): NL-based Maths Assistance Systems, co-PI
- LEO-II (EPSRC—EP/D070511/1, 2006–2007): LEO II: An Effective Higher-Order Theorem Prover, PostDoc
- CALCULEMUS (EU FP5—HPRN-CT-2000-00102, 2000–2004): Research Training Network, co-coordinator

Selected Keynotes

- *Ethico-legal governance of intelligent artificial agents – Can post-hoc normative reasoning competencies prevent AI systems from going rogue?* International Conferences on Logic and AI, Hangzhou, China, 2020.
- *Ethisch-rechtliche Kontrolle autonomer Systeme – Machbar?* AI in Automotive, Holiday Inn München, 2019.
- *Ethisch-rechtliche Kontrolle von KI Systemen.* AI Camp Wolfsburg, 2019.
- *Human vs. Nonhuman – The Need for Ethical Intelligent Systems.* Maria Sibylla Merian Centre Conviviality-Inequality in Latin America (Mecila) & Goethe-Institut São Paulo, Brazil, 2019.
- *Computational Metaphysics: New Insights on Gödel’s Ontological Argument and Modal Collapse.* Formal Methods and Science in Philosophy III, Dubrovnik, Croatia, 2019.
- *A Flexible Infrastructure for Normative Reasoning.* DEON 2018, Utrecht, The Netherlands, 2018.
- *Erwachen der Roboter.* Bundeszentrale für politische Bildung – bpb, invited panel debate, Berlin, 2016.
- *The Online Educa Berlin (OEB) Plenary Debate 2016.*

Career Breaks

2009–2010 12 months parental leave

2011–2012 3 months parental leave + 2 months care service

Experience and Skills

Agile software development, different programming languages (functional & typed, object-oriented, logical; including: Ocaml, Haskell, Scala, Scheme, Java, Python, Perl, Prolog, λ -Prolog, Modula-2, etc.), different operating systems (Mac OS X, Linux, Windows), specification & verification tools, automated reasoning tools, machine learning tools, data mining, natural language processing tools, semantic web tools, version control tools, basic web development, different scripting languages, various office tools, various textprocessing tools, digital workspace tools, conference management tools, presentation tools, databases, cognitive computing, robot process automation, smart contracts, etc., etc.

Selected Publications

Citations (Google Scholar, 29 December 2020): 4148

h-index (Google Scholar, 29 December 2020): 33

i10-index (Google Scholar, 29 December 2020): 113

ResearchGate score (29 December 2020) 26.83

Erdős Number: 3 (D.M. Gabbay/S. Shelah/P. Erdős and also D.S. Scott/A. Tarski/P. Erdős)

Research Manifesto (Trustworthy AI)

1. Benz Müller, C. and B. Lomfeld (2020a). “Reasonable Machines: A Research Manifesto”. In: *KI 2020: Advances in Artificial Intelligence – 43rd German Conference on Artificial Intelligence, Bamberg, Germany, September 21–25, 2020, Proceedings*. Ed. by U. Schmid, F. Klügl, and D. Wolter. Vol. 12352. Lecture Notes in Artificial Intelligence. Springer, Cham, pp. 251–258. DOI: 10.1007/978-3-030-58285-2_20. Preprint: <https://dx.doi.org/10.13140/RG.2.2.28918.63045>
2. Benz Müller, C. and B. Lomfeld (2020b). “Träumen vernünftige Maschinen von Gründen? Eine reale Utopie”. In: *VerantwortungKI – Künstliche Intelligenz und gesellschaftliche Folgen (Berlin-Brandenburgische Akademie der Wissenschaften)* 3. In print. Preprint: <https://doi.org/10.13140/RG.2.2.26808.57604>

Ten selected articles with scientific quality assurance (in reversed chronological order)

1. Benz Müller, C., X. Parent, and L. van der Torre (2020). “Designing Normative Theories for Ethical and Legal Reasoning: LogiKEy Framework, Methodology, and Tool Support”. In: *Artificial Intelligence* 287, p. 103348. DOI: 10.1016/j.artint.2020.103348. Preprint: <https://www.researchgate.net/publication/342146653> or <https://arxiv.org/abs/1903.10187> — Scimago journal rating Q1 (AI, Language and Linguistics, Linguistics and Language)¹
2. Benz Müller, C. and D. S. Scott (2020). “Automating Free Logic in HOL, with an Experimental Application in Category Theory”. In: *Journal of Automated Reasoning* 64.1, pp. 53–72. DOI: 10.1007/s10817-018-09507-7. Preprint: <http://doi.org/10.13140/RG.2.2.11432.83202> — Scimago rating Q2 (AI, Comp. Theory and Mathematics, Software)
3. Benz Müller, C. (Sept. 2020). “A (Simplified) Supreme Being Necessarily Exists, says the Computer: Computationally Explored Variants of Gödel’s Ontological Argument”. In: *Proceedings of the 17th International Conference on Principles of Knowledge Representation and Reasoning, KR 2020*. IJCAI organization, pp. 779–789. DOI: 10.24963/kr.2020/80 — CORE conference rating A* (AI, KR&R)²
4. Benz Müller, C. and D. Fuenmayor (2020). “Computer-supported Analysis of Positive Properties, Ultrafilters and Modal Collapse in Variants of Gödel’s Ontological Argument”. In: *Bulletin of the Section of Logic* 49.2, pp. 127–148. DOI: 10.18778/0138-0680.2020.08 — Scimago rating Q1 (Philosophy)
5. Kirchner, D., C. Benz Müller, and E. N. Zalta (2020). “Mechanizing Principia Logico-Metaphysica in Functional Type Theory”. In: *Review of Symbolic Logic* 13.1, pp. 206–218. DOI: 10.1017/S1755020319000297. Preprint: <https://www.researchgate.net/publication/321160582> — Scimago rating Q1 (Logic, Mathematics, Philosophy)
6. Benz Müller, C. (2017). “Cut-Elimination for Quantified Conditional Logic”. In: *Journal of Philosophical Logic* 46.3, pp. 333–353. DOI: 10.1007/s10992-016-9403-0. Preprint: <https://www.researchgate.net/publication/293488069> — Scimago rating Q1 (Philosophy)
7. Benz Müller, C. and B. Woltzenlogel Paleo (2016). “The Inconsistency in Gödel’s Ontological Argument: A Success Story for AI in Metaphysics”. In: *IJCAI 2016*. Ed. by S. Kambhampati. Vol. 1-3. AAAI Press, pp. 936–942. Url: <http://www.ijcai.org/Proceedings/16/Papers/137.pdf>; Preprint: <https://www.researchgate.net/publication/301295955> — CORE rating A* (AI, Machine Learning)
8. Benz Müller, C., N. Sultana, L. C. Paulson, and F. Theiss (2015). “The Higher-Order Prover LEO-II”. in: *Journal of Automated Reasoning* 55.4, pp. 389–404. DOI: 10.1007/s10817-015-9348-y — Scimago rating Q2 (AI, Comp. Theory and Mathematics, Software)
9. Benz Müller, C. and A. Pease (2012). “Higher-order Aspects and Context in SUMO”. in: *Journal of Web Semantics (Special Issue on Reasoning with context in the Semantic Web)* 12-13, pp. 104–117. DOI: 10.1016/j.websem.2011.11.008. Preprint: <https://www.researchgate.net/publication/221677796> — Scimago rating Q1 (Comp. Networks and Commun., Comp. Science Applic., Inform. Systems)
10. Benz Müller, C. and L. C. Paulson (2013). “Quantified Multimodal Logics in Simple Type Theory”. In: *Logica Universalis (Special Issue on Multimodal Logics)* 7.1, pp. 7–20. DOI: 10.1007/s11787-012-0052-y. Preprint: <https://www.researchgate.net/publication/221677897> — Scimago rating Q2 (Applied Mathematics, Logic)

¹See <https://www.scimagojr.com>; Q1 ist best.

²See <http://portal.core.edu.au/conf-ranks/>; A* ist best.