

Christopher Hahn

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Current Positions

- Stanford University Stanford, USA
Visiting Assistant Professor 2022 - now
- CISPA Helmholtz Center for Information Security Saarbrücken, Germany
Research Group Leader (on leave) 2022 - now

Education

- Saarland University Saarbrücken, Germany
Dr. rer. nat. (PhD) with summa cum laude 2017 - 2021
Thesis: “Logical and Deep Learning Methods for Temporal Reasoning”
- Saarland University Saarbrücken, Germany
M.Sc. with Distinction, Computer Science 2016 - 2017
- Saarland University Saarbrücken, Germany
B.Sc., Computer Science (major) and Computer Linguistics (minor) 2013 - 2016
- Eleonorenschule Darmstadt, Germany
High school diploma for non-students 2013

Publications

Preprints

- **H. C.**, Schmitt F., Tillman J. J., Metzger N., Siber J., Finkbeiner B., Formal Specifications from Natural Language, (*arXiv preprint*).
- Metzger N., **H. C.**, Siber J., Schmitt F., Finkbeiner B., Attention Flows for General Transformers, (*arXiv preprint*).
- Kreber J. U., **H. C.**, Generating Temporal Reasoning Problems with Transformer GANs, (*arXiv preprint*).

Conference Papers

- Coenen N., Finkbeiner B., Frenkel H., **H. C.**, Metzger N., Siber J., Temporal Causality in Reactive Systems, *In Proceedings of the 20th International Symposium on Automated Technology for Verification and Analysis (ATVA '22)*.
- Coenen N., Dachzelt R., Finkbeiner B., Frenkel H., **H. C.**, Horak T., Metzger N., Siber J., Explaining Hyperproperty Violations, *In Proceedings of the 34th International Conference on Computer-Aided Verification (CAV'22)*.
- Horak T., Coenen N., Metzger N., **H. C.**, Flemisch T., Méndez J., Dimov D., Finkbeiner B., Dachzelt R., Visual Analysis of Hyperproperties for Understanding Model Checking Results, *IEEE VIS: Visualization & Visual Analytics (IEEE VIS '21)*.
- Schmitt F., **H. C.**, Rabe M. N., Finkbeiner B., Neural Circuit Synthesis from Specification Patterns, *35th Conference on Neural Information Processing Systems (NeurIPS '21)*.
- Coenen N., Finkbeiner B., **H. C.**, Hofmann J., Schillo Y., Runtime Enforcement of Hyperproperties, *The 19th International Symposium on Automated Technology for Verification and Analysis (ATVA '21)*.
- **H.C.**, Schmitt F., Kreber J., Rabe M.N., Finkbeiner B., Teaching temporal logics to neural networks, *Ninth International Conference on Learning Representations (ICLR'21)*

- Coenen N., Finkbeiner B., **H.C.**, Hofmann J., The hierarchy of hyperlogics: a knowledge reasoning perspective, *17th International Conference on Principles of Knowledge Representation and Reasoning (KR'20)*
- Finkbeiner B., **H.C.**, Hofmann J., Tentrup L., Realizing omega-regular Hyperproperties, *In Proceedings of 32nd International Conference on Computer-Aided Verification (CAV'20)*
- **H. C.**, Algorithms for monitoring hyperproperties, *in Proceedings of International Conference on Runtime Verification (RV'19)*, **Tutorial at 3rd World Congress on Formal Methods (FM Week '19)**.
- Coenen N, Finkbeiner B., **H. C.**, Hofmann J., The hierarchy of hyperlogics, *In Proceedings of 34th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS'19)*.
- **H. C.**, Stenger M., Tentrup L., Constraint-based monitoring of hyperproperties, *In Proceedings of 25th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'19)*.
- Finkbeiner B., **H. C.**, Hans T., MGHyper: Checking satisfiability of HyperLTL formulas beyond the $\exists^*\forall^*$ fragment, *In Proceedings of 16th International Symposium on Automated Technology for Verification and Analysis (ATVA'18)*.
- Finkbeiner B., **H. C.**, Lukert P., Stenger M., Tentrup L., Synthesizing reactive systems from hyperproperties, *In Proceedings of 30th International Conferences on Computer-Aided Verification (CAV'18)*.
- Finkbeiner B., **H. C.**, Torfah H., Model checking quantitative hyperproperties, *In Proceedings of 30th International Conferences on Computer-Aided Verification (CAV'18)*.
- Finkbeiner B., **H. C.**, Stenger M., Tentrup L., RVHyper: A runtime verification tool for temporal hyperproperties, *In Proceedings of 24th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'18)*.
- Finkbeiner B., **H. C.**, Stenger M., Tentrup L., Monitoring hyperproperties, *In Proceedings of 17th International Conference on Runtime Verification (RV'17)*.
- Finkbeiner B., **H. C.**, Stenger M., EAHyper: Satisfiability, implication and equivalence checking of hyperproperties, *In Proceedings of 29th International Conference on Computer-Aided Verification (CAV'17)*.
- Finkbeiner B., **H. C.**, Deciding hyperproperties, *In Proceedings of 27th International Conference on Concurrency Theory (CONCUR'16)*.

Journal Papers

- Finkbeiner B., **H. C.**, Stenger M., Tentrup L., Efficient monitoring of hyperproperties using prefix trees. *In International Journal on Software Tools for Technology Transfer (STTT'20)*, **TACAS Special Issue**.
- Finkbeiner B., **H. C.**, Philip L., Stenger M., Tentrup L., Synthesis from hyperproperties, *In International Journal Acta Informatica (ACTA'19)*, **SYNT Special Issue**.
- Finkbeiner B., **H. C.**, Stenger M., Tentrup L., Monitoring hyperproperties, *In International Journal on Formal Methods in System Design (FMSD'19)*, **RV Special Issue**.

Honors and Awards

Invitation to Special Issues	RV'17, CAV'18, and TACAS'19
2018 Busy Beaver Award	For outstanding teaching performance in 'Programming 1', awarded by the computer science student council.
2017 BeStE Award	For student initiatives and extraordinary commitment, awarded by the presidential board of Saarland University.
Departmental Ph.D. Scholarship	Awarded by the Graduate School of Computer Science.
German National Scholarship	Awarded by the Federal Ministry of Education.

Service

PC member: IJCAI'21, IJCAI-ECAI'22, ICML'22

Reviewer: LICS'19, ATVA'19, STTT'20, CSL'20, CONCUR'20, LICS'21, CAV'21, CONCUR'21, ATVA'21

Talks

- “Runtime Enforcement of Hyperproperties” at the 19th International Symposium on Automated Technology for Verification and Analysis (ATVA) in Gold Coast and virtual, Australia, Oct '21.
- “Teaching Temporal Logics to Neural Networks” at the Ninth International Conference on Learning Representations (ICLR), virtual only, May '21.
- “Transformers Generalize to the Semantics of Logics” at University of California, Berkeley, USA, Aug '20.
- “Teaching Temporal Logics to Neural Networks” at Google Research, Mountain View, USA, June '20.
- “Realizing ω -regular Hyperproperties” at the 32nd International Conference on Computer-Aided Verification (CAV), Los Angeles and virtual, July '20.
- “Algorithms for Monitoring Hyperproperties” Tutorial at RV at the 3rd World Congress on Formal Methods in Porto, Portugal, Oct '19.
- “Temporal Hyperproperties” Invited Tutorial at TU Munich, Germany, July '19.
- “Deciding Realizability of HyperQPTL Specifications” at the 8th Workshop on Synthesis in New York (SYNT@CAV), USA, July '19.
- “Monitoring Hyperproperties” at the 17th International Conference on Runtime Verification in Seattle (RV), USA, Sep '17.
- “EAHyper: Satisfiability, Implication, and Equivalence Checking of Hyperproperties” at the 29th International Conference on Computer-Aided Verification (CAV) in Heidelberg, Germany, July '17.
- “Deciding Hyperproperties” at Highlights of Logics, Games and Automata in Brussels, Belgium, Sep '16.
- “Deciding Hyperproperties” at the 27th International Conference on Concurrency Theory (CONCUR) in Quebec, Canada, Aug '16.

Teaching

Summer 20	Advisor for seminar on 'Neural-Symbolic Computing'.
Summer 19	Advisor for seminar on 'Software Reliability'.
Winter 18/19	Advisor for seminar on 'Hyperproperties'.
Summer 18	Advisor for seminar on 'Formal Verification of Security Protocols'.
Winter 17/18	Teaching Assistant for 'Programming 1' (won Busy Beaver award).
Summer 17	Lecturer for mathematics preparation course for CS freshmen (won BeStE award).
Winter 16/17	Teaching Assistant for 'Verification'.
Summer 16	Lecturer and Coach for mathematics preparation course for CS freshmen.
Summer 16	Student TA for 'Concurrent Programming'.
Winter 15/16	Organizer didactics seminar for re-exam student TAs.
Winter 15/16	Supervision Student TA for 'Programming 1'.
Summer 15	Coach for mathematics preparation course for CS freshmen.
Winter 14/15	Organizer of didactics seminar for re-exam student TAs.
Winter 14/15	Student TA for 'Programming 1'.
Summer 14	Student TA for mathematics preparation course for CS freshmen.
Winter 13/14	Re-exam student TA for 'Programming 1'.

Teaching Videos

- Programming 1 at Saarland University: YouTube-Channel (in German):
<https://www.youtube.com/channel/UCVAodHZqVrgCeUrvDQgMijw>.
- mathematics preparation course for CS freshmen at Saarland University: YouTube-Channel (in German):
https://www.youtube.com/channel/UCLS4RYPaUVSg_TLtr2-oU0g.

Supervision

Matthias Cosler	ongoing	Master Thesis
Ayham Omar	ongoing	Bachelor Thesis
Jens Kreber	2022	Generating and Solving Temporal Logic Problems with Adversarial Transformers
Tobias Hans	2021	Algorithms for Deciding HyperCTL*, Master Thesis
Frederik Schmitt	2020	LTLSynthesis from specification patterns with neural networks, Master Thesis
Frederik Schmitt	2020	Research Immersion Lab, co-advised by Bernd Finkbeiner
Matthias Cosler	2019	Towards Synthesizing Smart Contracts, Bachelor Thesis, co-advised by Jana Hofmann
Jens Heinen	2018	Model Checking Timed Hyperproperties, Master Thesis
Philip Lukert	2018	HyperLTL Synthesis, Bachelor Thesis
Tobias Hans	2018	MGHyper, Bachelor Thesis

Languages

German	Native proficiency
English	Full professional proficiency
French	Elementary proficiency

Christopher Hahn, Stanford, USA, August 29, 2022