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Employment

2019-present Assistant Professor, Department of Computer Science, Rutgers University.

2016-2019 Researcher, Galois, Inc.

Education

2010-2016 Doctor of Philosophy (Ph.D.) in Computer Science

Department of Computer Science, Purdue University, West Lafayette, Indiana, USA

Publications

[TACAS'23] Yuning Wang and **He Zhu**. Verification-guided Programmatic Controller Synthesis. In 29th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2023.

[TAI'22] Ziheng Chen, Fabrizio Silvestri, Gabriele Tolomei, Jia Wang, **He Zhu**, Hongshik Ahn. Explain the Explainer: Interpreting Model-Agnostic Counterfactual Explanations of a Deep Reinforcement Learning Agent. In *IEEE Transactions on Artificial Intelligence*, 2022.

[CIKM'22] Ziheng Chen, Fabrizio Silvestri, Jia Wang, **He Zhu**, Hongshik Ahn and Gabriele Tolomei. ReLAX: Reinforcement Learning Agent eXplainer for Arbitrary Predictive Models. In *31st ACM International Conference on Information and Knowledge Management* (*CIKM*), 2022.

[CIKM'22] Hanxiong Chen, Yunqi Li, **He Zhu** and Yongfeng Zhang. MANAS: Modularized Adaptive Neural Architecture Search for Recommendation. *To appear* in *31st ACM International Conference on Information and Knowledge Management* (*CIKM*), 2022.

[ECML'22] Zikang Xiong, Joe Eappen, **He Zhu** and Suresh Jagannathan. Defending Observation Attacks in Deep Reinforcement Learning via Detection and Denoising. In *European Conference on Machine learning and knowledge discovery in databases* (*ECML PKDD*), 2022.

[ICLR'22] Wenjie Qiu, **He Zhu**. Progammatic Reinforcement Learning without Oracles. In *International Conference on Learning Representations* (*ICLR*), 2022. Spotlight

[WSDM'22] Hanxiong Chen, Yunqi Li, Shaoyun Shi, Shuchang Liu, **He Zhu** and Yongfeng Zhang. Graph Collaborative Reasoning. In *ACM International Conference on Web Search and Data Mining* (*WSDM*), 2022.

[NeurIPS'21] Guofeng Cui, **He Zhu**. Differentiable Synthesis of Program Architectures. In *Neural Information Processing Systems* (*NeurIPS*), 2021.

[FMCAD'20] Xuankang Lin, **He Zhu**, Roopsha Samanta, Suresh Jagannathan. ART: Abstraction Refinement-Guided Training for Provably Correct Neural Networks. In *Formal Methods in Computer-Aided Design* (*FMCAD*), 2020.

[PLDI'19] **He Zhu**, Zikang Xiong, Stephen Magill and Suresh Jagannathan. An Inductive Synthesis Framework for Verifiable Reinforcement Learning. In *ACM SIGPLAN Programming Language Design and Implementation* (*PLDI*), 2019.

Distinguished Paper Award

[PLDI'18] **He Zhu**, Stephen Magill and Suresh Jagannathan. A Data-Driven CHC Solver. In *ACM SIGPLAN Programming Language Design and Implementation* (*PLDI*), 2018.

Distinguished Paper Award

[PLDI'16] **He Zhu**, Gustavo Petri and Suresh Jagannathan. Automatically Learning Shape Specifications. In *ACM SIGPLAN Programming Language Design and Implementation* (*PLDI*), 2016.

[ICFP'15] **He Zhu**, Aditya Nori and Suresh Jagannathan. Learning Refinement Types. In *ACM SIGPLAN International Conference on Functional Programming* (*ICFP*), 2015.

[CAV'15] **He Zhu**, Gustavo Petri and Suresh Jagannathan. Poling: SMT Aided Linearizability Proofs. In *International Conference on Computer Aided Verification* (*CAV*), 2015.

[VMCAI'15] **He Zhu**, Aditya Nori and Suresh Jagannathan. Dependent Array Type Inference from Tests. In *International Conference on Verification, Model Checking, and Abstract Interpretation* (*VMCAI*), 2015.

[VMCAI'13] **He Zhu** and Suresh Jagannathan. Compositional and Lightweight Dependent Type Inference for ML. In *International Conference on Verification, Model Checking, and Abstract Interpretation* (*VMCAI*), 2013.

[FMCAD'09] **He Zhu**, Fei He, W.N.N. Hung, Xiaoyu Song, and Ming Gu. Data Mining Based Decomposition for Assume-guarantee Reasoning. In *International Conference on Formal Methods in Computer-Aided Design* (*FMCAD*), 2009.

External Funding

2021-2025 FMitF: Track I: Synthesis and Verification for Programmatic Reinforcement Learning (**NSF**). **PI**. **$749,708.**

2020-2023 SHF: Small: Formal Symbolic Reasoning of Deep Reinforcement Learning Systems (**NSF**). **PI**. **$499,995.**

2020-2024 Symbiotic Design for Cyber Physical Systems (**DARPA**). **PI**. **$326,609.**

Professional Service

Committee Chair — International Conference on Computer Aided Verification - Artifact Evaluation 2020

Session Chair — 8th Workshop on Horn Clauses for Verification and Synthesis, 2021

Program Committee Member — Neural Information Processing Systems (NeurIPS) 2023; ACM SIGPLAN Programming Language Design and Implementation (PLDI) 2023, 2021; The OOPSLA issue of the Proceedings of the ACM on Programming Languages (PACMPL) 2022; International Conference on Machine Learning (ICML) 2022; International Conference on Computer Aided Verification (CAV) 2020; Horn Clauses for Verification and Synthesis (HCVS) 2021, 2019; Principles of Programming Languages (POPL) Artifact Evaluation 2018

Journal Reviewer — IEEE Transactions on Software Engineering 2021, 2020, 2019; Formal Methods in System Design 2022