Eui Chul (Richard) Shin
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Education

University of California, Berkeley

PhD in Computer Science — January 2013–August 2020
MS in Computer Science — December 2017
Advisor: Dawn Song

BS in Electrical Engineering and Computer Science — August 2008–December 2011
Graduated with High Honors

Graduate-level Coursework: Algorithms, Convex Optimization, Theoretical Statistics, Statistical Learning Theory, Natural Language Processing, Computer Security, Computer Systems, Programming Languages, Deep Reinforcement Learning

Employment

Microsoft Semantic Machines

Principal Researcher — March 2023–present

- Designing and implementing novel techniques for large language model chaining agents, in collaboration with groups across Microsoft such as Project Turing and Office, for applications in Bing Chat and Microsoft 365 Copilot.

Senior Researcher — April 2020–February 2023

- Built an early prototype for Microsoft Microsoft 365 Chat, as part of a team with 5–10 engineers and researchers. Conceived an initial evaluation plan. Designed a framework for real-time, asynchronous client–server sync.
- Developed methodology and infrastructure for leveraging large language models in semantic parsing by paraphrasing and grammar-constrained decoding, to enhance generalization new domains and APIs.
- Mentored interns on projects relating to model compression in NLP, user privacy, and crowdsourcing. Helped formulate research questions, select benchmark datasets, and design empirical evaluations.
- Contributed to internal infrastructure for unit testing, code review, and open sourcing of research code.
- Collaborated with teams across Microsoft for sharing best practices on large language model applications.

Microsoft Research AI

Research Intern — May 2018–August 2018
Research SDE (contractor) — August 2018–October 2018; August 2019–December 2019 (part time)
Neural Program Synthesis group (manager: Alex Polozov). Investigated the use of idioms in source code for neural program synthesis. Consulted on projects about querying databases with natural language.

Intel Labs, Graduate Technical Intern — October 2018–February 2019
Intelligent Systems Lab (manager: Vladlen Koltun). Developed new architectures for converting natural language questions into database queries.

NEAR.AI, Research Engineer (part-time) — Dec 2017–May 2018
Developed a method for neural program repair and inferring execution traces for neural program synthesis.

Google, Software Engineering Intern — May 2016–August 2016
Automated theorem proving group in Google Research and Google Brain (manager: Geoffrey Irving, co-mentor: Oriol Vinyals). Performed premise selection experiments on the E theorem prover. Developed a variational autoencoder-based generative model for tree structures.

Google, Software Engineering Intern — May 2015–August 2015
Google Translate's neural machine translation team (manager: Wolfgang Macherey). Trained sequence-to-sequence LSTM models on large parallel texts using TensorFlow. Integrated sequence models into a phrase-based machine translation decoder.

Google, Software Engineer — January 2012–January 2013
Google Translate's parallel data team (manager: Thorsten Brants).

- Streamlined and modernized pipeline for finding parallel documents (which contain the same text but in different languages) from the web, scaling it to handle 5$\times$ more data.
- Participated in effort to improve low-quality languages and launch new ones, through tuning parameters and collecting analytics to enable targeted acquisition of new data.
- Implemented an experimental method for finding sentence-level rather than document-level parallel texts.

Publications

Conferences and Journals

BenchCLAMP: A Benchmark for Evaluating Language Models on Semantic Parsing.
Subhro Roy, Sam Thomson, Tongfei Chen, Richard Shin, Adam Pauls, Jason Eisner, Benjamin Van Durme.
Neural Information Processing Systems (NeurIPS) Datasets and Benchmarks Track, 2023.

Privacy-Preserving Domain Adaptation of Semantic Parsers.
Fatemehsadat Mireshghallah, Yu Su, Tatsunori Hashimoto, Jason Eisner, Richard Shin.
Association for Computational Linguistics (ACL), 2023.

Few-Shot Semantic Parsing with Language Models Trained On Code. (short paper)
Richard Shin, Benjamin Van Durme.
North American Chapter of the Association for Computational Linguistics (NAACL), 2022.

Addressing Resource and Privacy Constraints in Semantic Parsing Through Data Augmentation.
Kevin Yang, Olivia Deng, Charles Chen, Richard Shin, Subhro Roy, Benjamin Van Durme.
Findings of the Association for Computational Linguistics (ACL Findings), 2022.

Guided K-best Selection for Semantic Parsing Annotation. (demo track)
Anton Belyy, Chieh-Yang Huang, Jacob Andreas, Emmanouil Antonios Platanios, Sam Thomson, Richard Shin, Subhro Roy, Aleksandr Nisnevich, Charles Chen, Benjamin Van Durme.
Association for Computational Linguistics (ACL), 2022.

Constrained Language Models Yield Few-Shot Semantic Parsers.
Richard Shin, Christopher H. Lin, Sam Thomson, Charles Chen, Subhro Roy, Emmanouil Antonios Platanios, Adam Pauls, Dan Klein, Jason Eisner, Benjamin Van Durme.
Empirical Methods in Natural Language Processing (EMNLP), 2021.

RAT-SQL: Relation-Aware Schema Encoding and Linking for Text-to-SQL Parsers.
Bailin Wang*, Richard Shin*, Xiaodong Liu, Oleksandr Polozov, Matthew Richardson.
Association for Computational Linguistics (ACL), 2020.

Program Synthesis and Semantic Parsing with Learned Code Idioms.
Richard Shin, Marc Brockschmidt, Miltiadis Allamanis, Oleksandr Polozov.
Neural Information Processing Systems (NeurIPS), 2019.

Synthetic Datasets for Neural Program Synthesis.
Richard Shin, Neel Kant, Kavi Gupta, Christopher Bender, Brandon Trabucco, Rishabh Singh, Dawn Song.
International Conference on Learning Representations (ICLR), 2019.

Improving Neural Program Synthesis with Inferred Execution Traces.
Richard Shin, Illia Polosukhin, Dawn Song.
Neural Information Processing Systems (NeurIPS), 2018. *Spotlight presentation*.

Parametrized Hierarchical Procedures for Neural Programming.
Roy Fox, Richard Shin, Sanjay Krishnan, Ken Goldberg, Dawn Song, Ion Stoica.
International Conference on Learning Representations (ICLR), 2018.

Making Neural Programming Architectures Generalize via Recursion.
Jonathon Cai, Richard Shin, Dawn Song.
International Conference on Learning Representations (ICLR), 2017. *Best paper award*.

PIANO: Proximity-based User Authentication on Voice-Powered Internet-of-Things Devices.
Neil Zhenqiang Gong, Altay Ozen, Yu Wu, Xiaoyu Cao, Richard Shin, Dawn Song, Hongxia Jin, Xuan Bao.
IEEE International Conference on Distributed Computing Systems (ICDCS), 2017.

ExploreKit: Automatic Feature Generation and Selection (short paper).
Gilad Katz, Richard Shin, Dawn Song.
International Conference on Data Mining (ICDM), 2016.

Latent Attention for If-Then Program Synthesis.
Xinyun Chen, Chang Liu, Richard Shin, Dawn Song, Mingcheng Chen.
Neural Information Processing Systems (NeurIPS), 2016.

Recognizing Functions in Binaries with Neural Networks.
Richard Shin, Dawn Song, Reza Moazzezi.
USENIX Security, 2015.

Joint Link Prediction and Attribute Inference Using a Social-Attribute Network.
Neil Gong, Ameet Talwalkar, Lester Mackey, Ling Huang, Richard Shin, Emil Stefanov, Elaine Shi, Dawn Song.
ACM Transactions on Intelligent Systems and Technology (TIST), 2013.

On the Feasibility of Internet-Scale Author Identification.
Arvind Narayanan, Hristo Paskov, Neil Gong, John Bethencourt, Emil Stefanov, Richard Shin, Dawn Song.
IEEE Security & Privacy, 2012.

FreeMarket: Shopping for free in Android applications (extended abstract).
Daniel Reynaud, Richard Shin, Thomas R. Magrino, Edward Wu, Dawn Song.
Network & Distributed System Security Symposium (NDSS), 2012.

A Systematic Analysis of XSS Sanitization in Web Application Frameworks.
Joel Weinberger, Prateek Saxena, Devdatta Akhawe, Matt Finifter, Richard Shin, Dawn Song.
European Symoposium on Research in Computer Security (ESORICS), 2011.

Inference and Analysis of Formal Models of Botnet Command and Control Protocols.
Chia Yuan Cho, Domagoj Babić, Richard Shin, Dawn Song.
ACM Conference on Computer and Communications Security (CCS), 2010.

Workshops

Pruning Pretrained Encoders with a Multitask Objective.
Patrick Xia, Richard Shin.
Efficient Natural Language and Speech Processing (ENLSP) Workshop at NeurIPS, 2021.

Hierarchical Imitation Learning via Variational Inference of Control Programs.
Roy Fox, Richard Shin, William Paul, Yitian Zou, Dawn Song, Ken Goldberg, Pieter Abbeel, Ion Stoica.
Infer to Control Workshop on Probabilistic Reinforcement Learning and Structured Control, at NeurIPS, 2018.

Synthetic Datasets for Neural Program Synthesis (extended abstract).
Richard Shin, Neel Kant, Kavi Gupta, Christopher Bender, Brandon Trabucco, Rishabh Singh, Dawn Song.
Neural Abstract Machines & Program Induction Workshop, at ICML, 2018.

Imitation Learning of Hierarchical Programs via Variational Inference (extended abstract).
Roy Fox,* Richard Shin,* Pieter Abbeel, Ken Goldberg, Dawn Song, Ion Stoica.
Neural Abstract Machines & Program Induction Workshop, at ICML, 2018.

Towards Specification-Directed Program Repair.
Richard Shin, Dawn Song, Illia Polosukhin.
International Conference on Learning Representations (ICLR) workshop track, 2019.

Differentiable Neural Network Architecture Search.
Richard Shin,* Charles Packer,* Dawn Song.
International Conference on Learning Representations (ICLR) workshop track, 2018.

JPEG-resistant Adversarial Images.
Richard Shin, Dawn Song.
Machine Learning and Computer Security Workshop, at NeurIPS, 2017.

Exploring Privacy Preservation in Outsourced K-Nearest Neighbors with Multiple Data Owners.
Frank Li, Richard Shin, Vern Paxson.
ACM Cloud Computing Security Workshop (CCSW), at ACM CCS, 2015.

The Emperor's New APIs: On the (In)Secure Usage of New Client-side Primitives.
Steve Hanna, Richard Shin, Devdatta Akhawe, Arman Boehm, Prateek Saxena, Dawn Song.
Web 2.0 Security and Privacy Workshop (W2SP), at IEEE S&P, 2010.

Pre-prints

Privacy-Preserving In-Context Learning with Differentially Private Few-Shot Generation.
Xinyu Tang, Richard Shin, Huseyin A. Inan, Andre Manoel, Fatemehsadat Mireshghallah, Zinan Lin, Sivakanth Gopi, Janardhan Kulkarni, Robert Sim.
arXiv:2309.11765 [cs.LG].

Hierarchical Variational Imitation Learning of Control Programs.
Roy Fox, Richard Shin, William Paul, Yitian Zou, Dawn Song, Ken Goldberg, Pieter Abbeel, Ion Stoica.
arXiv:1912.12612 [cs.LG].

Encoding Database Schemas with Relation-Aware Self-Attention for Text-to-SQL Parsers.
Richard Shin.
arXiv:1906.11790 [cs.LG].

Teaching and Mentoring

Graduate Student Instructor

Special Topics in Deep Learning, UC Berkeley — Fall 2016, Spring 2017
Artificial Intelligence (CS 188), UC Berkeley — Fall 2015

Undergraduate Research Mentoring — Fall 2015–present

Mentored undergrad/masters students and interns on projects relating to domain adaptation in NLP, neural program synthesis, machine learning for identification and analysis of crypters and packers, fuzz testing, adversarial inputs to neural networks, neural network watermarking, neural code completion, etc.

Summer Research Mentoring — Summer 2014

Mentored two undergraduate students (from TRUST REU) and two high school students (from BFOIT) on a project about applying convolutional neural networks for securing wearable devices.

Awards and Honors

Outstanding Reviewer, ICLR — 2021

Top Reviewer, ICML — 2020

Highest-scoring Reviewer (top 400), NeurIPS — 2019

Best Paper Award, ICLR 2017:
Making Neural Programming Architectures Generalize via Recursion — 2017

EECS Departmental Graduate Fellowship, UC Berkeley — 2013

Jim and Donna Gray Endowment Fund, UC Berkeley — 2009

Represented UC Berkeley at the ACM ICPC regional competition — 2009–2011

Eta Kappa Nu and Tau Beta Pi — 2009

Service

Reviewing for ACL Rolling Review, Data Mining and Knowledge Discovery (2017). ICDM (secondary), ICLR, ICML, NeurIPS, TMLR.

UC Berkeley EECS Outreach Program — 2014–2017

Gave science demos to students at elementary and middle schools.

UC Berkeley EECS Graduate Admissions — 2014

Reviewed applications from underrepresented minorities.