

# Panupong (Ice) Pasupat

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## Education

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**Stanford University** **Stanford, CA**  
Ph.D. in Computer Science 2013–2019  
Advisor: Percy Liang  
Dissertation Title: Natural Language Interfaces for Semi-Structured Web Pages

**Massachusetts Institute of Technology** **Cambridge, MA**  
B.S. in Electrical Engineering and Computer Science 2009–2013  
B.S. in Mathematics (double major)

## Work Experience

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**Google AI, Google** **Mountain View, CA**  
Research Scientist 2019–present

- Conducted research on semantic parsing, retrieval-augmented models, few-shot learning, and factuality.
- Led a collaboration with Google Assistant to develop a query understanding model that can patch urgent errors without retraining.
- Led a research team to develop an automated evidence-based fact checker, now powering Google Gemini’s “Double-check Response” and “Sources and Related Content” features.
- Supervised Ph.D. research interns.

**Facebook Conversational AI, Facebook** **Menlo Park, CA**  
Research Intern 2018

- Improved a neural shift-reduce model for parsing sentences into a hierarchical semantic representation.
- Analyzed errors and designed novel top-down and bottom-up parsing algorithms to address the errors.

**Google Research, Google** **Mountain View, CA**  
Software Engineering Intern 2015

- Developed deep learning models for paraphrase detection.
- Proposed negative sampling methods using linguistic resources to better distinguish closely related words.

**Speech and Dialog Research Group, Microsoft Research** **Mountain View, CA**  
Research Intern 2014

- Bootstrapped classifiers for detecting knowledge base relations in spoken queries in an unsupervised fashion.
- Mined queries from search engine query click logs and automatically labeled relations using distant supervision from knowledge graphs.

**Natural Language Processing Lab, Tokyo Institute of Technology** **Yokohama, Japan**  
Exchange Student 2013

- Experimented on Tweet sentiment analysis using different classifiers and features.
- Applied structural correspondence learning to incorporate unlabeled data.

**Spoken Language Systems Group, MIT CSAIL Lab**

Cambridge, MA

Researcher Intern

2012–2013

- Designed web interfaces on Amazon Mechanical Turk to collect spoken sentences and their semantic labeling.
- Trained sequence tagging models by implementing features for conditional random fields, resulting in English and Chinese models for categorizing words in speech queries.
- Deployed the models in speech-enabled mobile applications for movie, flight, and restaurant recommendations.

**Dropbox Inc.**

San Francisco, CA

Engineering Intern

2011

- Wrote scripts to periodically analyze the usage pattern of Dropbox users. Investigated methods to optimize data calculation and caching for the analytics team.
- Implemented bug filtering and email notification system in the error log viewer, making critical errors get noticed and fixed faster.

**Reflective Commonsense Thinking, MIT Media Lab**

Cambridge, MA

Researcher Intern

2010

- Implemented algorithms to solve error-correcting subgraph isomorphism and analogical matching problems.
- Applied the algorithms on analogy problems, enabling the system to make decisions based on past experiences.

**Language of Thought, MIT Department of Linguistics**

Cambridge, MA

Researcher Intern

2010

- Designed algorithms to automatically measure vowel formant frequencies from sound files in order to observe the patterns and constraints of vowels in spoken languages.
- Designed experiments on Amazon Mechanical Turk to study sound constraints during language acquisition.

## Publications

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**In-context learning with retrieved demonstrations for language models: A survey**

Man Luo, Xin Xu, Yue Liu, Panupong Pasupat, Mehran Kazemi

Transactions on Machine Learning Research (TMLR), 2024

**Large language models as analogical reasoners**

Michihiro Yasunaga, Xinyun Chen, Yujia Li, Panupong Pasupat, Jure Leskovec, Percy Liang, Ed H. Chi, Denny Zhou

International Conference on Learning Representations (ICLR), 2024

**Retrieval-Augmented Parsing for Complex Graphs by Exploiting Structure and Uncertainty**

Zi Lin, Quan Yuan, Panupong Pasupat, Jeremiah Z. Liu, Jingbo Shang

Empirical Methods in Natural Language Processing (EMNLP) Findings, 2023

**From Pixels to UI Actions: Learning to Follow Instructions via Graphical User Interfaces**

Peter Shaw, Mandar Joshi, James Cohan, Jonathan Berant, Panupong Pasupat, Hexiang Hu, Urvashi Khandelwal, Kenton Lee, Kristina Toutanova

Conference on Neural Information Processing Systems (NeurIPS), 2023

**PURR: Efficiently Editing Language Model Hallucinations by Denoising Language Model Corruptions**

Anthony Chen, Panupong Pasupat, Sameer Singh, Hongrae Lee, Kelvin Guu

arXiv preprint, 2023

### **Dr. ICL: Demonstration-Retrieved In-context Learning**

Man Luo, Xin Xu, Zhuyun Dai, Panupong Pasupat, Mehran Kazemi, Chitta Baral, Vaiva Imbrasaite, Vincent Y Zhao  
arXiv preprint, 2023

### **On Compositional Uncertainty Quantification for Seq2seq Graph Parsing**

Zi Lin, Du Phan, Panupong Pasupat, Jeremiah Zhe Liu, Jingbo Shang  
International Conference on Learning Representations (ICLR), 2023

### **RARR: Researching and Revising What Language Models Say, Using Language Models**

Luyu Gao, Zhuyun Dai, Panupong Pasupat, Anthony Chen, Arun Tejasvi Chaganty, Yicheng Fan, Vincent Y. Zhao, Ni Lao, Hongrae Lee, Da-Cheng Juan, Kelvin Guu  
Association for Computational Linguistics (ACL), 2023

### **Evaluating the Impact of Model Scale for Compositional Generalization in Semantic Parsing**

Linlu Qiu, Peter Shaw, Panupong Pasupat, Tianze Shi, Jonathan Herzig, Emily Pitler, Fei Sha, Kristina Toutanova  
Empirical Methods in Natural Language Processing (EMNLP), 2022

### **Meta-Learning Fast Weight Language Models**

Kevin Clark, Kelvin Guu, Ming-Wei Chang, Panupong Pasupat, Geoffrey Hinton, Mohammad Norouzi  
Empirical Methods in Natural Language Processing (EMNLP), 2022

### **Generate-and-Retrieve: Use Your Predictions to Improve Retrieval for Semantic Parsing**

Yury Zemlyanskiy, Michiel de Jong, Joshua Ainslie, Panupong Pasupat, Peter Shaw, Linlu Qiu, Sumit Sanghai, Fei Sha  
International Conference on Computational Linguistics (COLING), 2022

### **Improving Compositional Generalization with Latent Structure and Data Augmentation**

Linlu Qiu\*, Peter Shaw\*, Panupong Pasupat, Pawel Nowak, Tal Linzen, Fei Sha, Kristina Toutanova  
North American Chapter of the Association for Computational Linguistics (NAACL), 2022

### **Controllable Semantic Parsing via Retrieval Augmentation**

Panupong Pasupat, Yuan Zhang, Kelvin Guu  
Empirical Methods in Natural Language Processing (EMNLP), 2021

### **Graph-Based Decoding for Task Oriented Semantic Parsing**

Jeremy Cole, Nanjiang Jiang, Panupong Pasupat, Luheng He, Peter Shaw  
Empirical Methods in Natural Language Processing (EMNLP) Findings, 2021

### **QA-Driven Zero-shot Slot Filling with Weak Supervision Pretraining**

Xinya Du, Luheng He, Qi Li, Dian Yu, Panupong Pasupat, Yuan Zhang  
Association for Computational Linguistics (ACL), 2021

### **Unlocking Compositional Generalization in Pre-trained Models Using Intermediate Representations**

Jonathan Herzig, Peter Shaw, Ming-Wei Chang, Kelvin Guu, Panupong Pasupat, Yuan Zhang  
arXiv preprint, 2021

### **Few-shot Intent Classification and Slot Filling with Retrieved Examples**

Dian Yu, Luheng He, Yuan Zhang, Xinya Du, Panupong Pasupat, Qi Li  
North American Chapter of the Association for Computational Linguistics (NAACL), 2021

## **Compositional Generalization and Natural Language Variation: Can a Semantic Parsing Approach Handle Both?**

Peter Shaw, Ming-Wei Chang, Panupong Pasupat, Kristina Toutanova  
Association for Computational Linguistics (ACL), 2020

## **REALM: Retrieval-Augmented Language Model Pre-Training**

Kelvin Guu\*, Kenton Lee\*, Zora Tung, Panupong Pasupat, Ming-Wei Chang  
International Conference on Machine Learning (ICML), 2020

## **SPOC: Search-based Pseudocode to Code**

Sumith Kulal\*, Panupong Pasupat\*, Kartik Chandra, Mina Lee, Oded Padon, Alex Aiken, Percy Liang  
Conference on Neural Information Processing Systems (NeurIPS), 2019

## **Span-based Hierarchical Semantic Parsing for Task-Oriented Dialog**

Panupong Pasupat, Sonal Gupta, Karishma Mandyam, Rushin Shah, Mike Lewis, Luke Zettlemoyer  
Empirical Methods on Natural Language Processing (EMNLP), 2019

## **Improving Semantic Parsing for Task Oriented Dialog**

Arash Einolghozati, Panupong Pasupat, Sonal Gupta, Rushin Shah, Mrinal Mohit, Mike Lewis, Luke Zettlemoyer  
Conversational AI Workshop at NeurIPS, 2018

## **Mapping Natural Language Commands to Web Elements**

Panupong Pasupat, Tian-Shun Jiang, Evan Liu, Kelvin Guu, Percy Liang  
Empirical Methods on Natural Language Processing (EMNLP), 2018

## **Reinforcement Learning on Web Interfaces using Workflow-Guided Exploration**

Evan Zheran Liu\*, Kelvin Guu\*, Panupong Pasupat\*, Tianlin Shi, Percy Liang  
International Conference on Learning Representations (ICLR), 2018

## **Macro Grammars and Holistic Triggering for Efficient Semantic Parsing**

Yuchen Zhang, Panupong Pasupat, Percy Liang  
Empirical Methods on Natural Language Processing (EMNLP), 2017

## **From Language to Programs: Bridging Reinforcement Learning and Maximum Marginal Likelihood**

Kelvin Guu, Panupong Pasupat, Evan Zheran Liu, Percy Liang  
Association for Computational Linguistics (ACL), 2017

## **Inferring Logical Forms From Denotations**

Panupong Pasupat, Percy Liang  
Association for Computational Linguistics (ACL), 2016

## **Simpler Context-Dependent Logical Forms via Model Projections**

Reginald Long, Panupong Pasupat, Percy Liang  
Association for Computational Linguistics (ACL), 2016

## **Compositional Semantic Parsing on Semi-Structured Tables**

Panupong Pasupat, Percy Liang  
Association for Computational Linguistics (ACL), 2015

## **Unsupervised Relation Detection Using Automatic Alignment of Query Patterns Extracted from Knowledge Graphs and Query Click Logs**

Panupong Pasupat, Dilek Hakkani-Tür  
Interspeech, 2015

## **Zero-Shot Entity Extraction from Web Pages**

Panupong Pasupat, Percy Liang  
Association for Computational Linguistics (ACL), 2014

## **Query Understanding Enhanced by Hierarchical Parsing Structures**

Jingjing Liu, Panupong Pasupat, Yining Wang, Scott Cyphers, Jim Glass  
Automatic Speech Recognition and Understanding Workshop (ASRU), 2013

## **ASGARD: a Portable Architecture for Multilingual Dialogue Systems**

Jingjing Liu, Panupong Pasupat, Scott Cyphers, Jim Glass  
International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2013

## **A Conversational Movie Search System Based on Conditional Random Fields**

Jingjing Liu, Scott Cyphers, Panupong Pasupat, Ian Mcgraw, Jim Glass  
Interspeech, 2012

## **Patents**

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### **Retrieval-Augmented Language Model Pre-Training and Fine-Tuning**

Kenton Chiu Tsun Lee, Kelvin Gu, Zora Tung, Panupong Pasupat, Ming-Wei Chang  
US Patent, 2021

### **Semantic Entity Relation Detection Classifier Training**

Dilek Hakkani-Tür, Panupong Pasupat  
US Patent, 2019

## **Honors and Awards**

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### **Putnam Mathematical Competition**

Ranked 23rd 2009

### **International Olympiad in Informatics (IOI)**

Gold Medal (Ranked 2nd) 2008

### **International Mathematical Olympiad (IMO)**

Gold Medal 2007  
2 Silver Medals 2005, 2006

## **Teaching Experience**

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### **Information Retrieval and Web Search (CS 276)**

Head Course Assistant

**Stanford University**

Spring 2016

## Services

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### Conference Area Chair

- Association for Computational Linguistics (ACL) 2023
- European Chapter of the Association for Computational Linguistics (EACL) 2022
- International Conference on Computational Linguistics (COLING) 2022
- Empirical Methods on Natural Language Processing (EMNLP) 2021

### Journal Reviewer

- Transactions of the Association for Computational Linguistics (TACL) 2022, 2023, 2024

### Conference Reviewer (Program Committee Member)

- Association for the Advancement of Artificial Intelligence (AAAI) 2020
- Association for Computational Linguistics (ACL) 2016, 2017, 2018, 2020, 2021
- Conference on Automated Knowledge Base Construction (AKBC) 2019, 2020, 2021
- International Conference on Computational Linguistics (COLING) 2020
- Conference on Natural Language Learning (CoNLL) 2019
- European Chapter of the Association for Computational Linguistics (EACL) 2021
- Empirical Methods on Natural Language Processing (EMNLP) 2015, 2017, 2019, 2020, 2022
- International Conference on Learning Representations (ICLR) 2020
- North American Chapter of the Association for Computational Linguistics (NAACL) 2019, 2021
- Joint Conference on Lexical and Computational Semantics (\*SEM) 2017, 2018, 2019

### Rolling Review Reviewer

- ACL Rolling Review (2 month cycles for top-tier conferences: ACL, EACL, NAACL, and EMNLP) 2024

### Workshop Reviewer

- Machine Reading for Question Answering (MRQA) 2021
- Natural Language Processing for Programming (NLP4Prog) 2021
- Widening Natural Language Processing (WiNLP) 2020

### Website Chair

- North American Chapter of the Association for Computational Linguistics (NAACL) 2021, 2022

### Coordinator and Grader

- International Mathematical Olympiad (IMO) 2015
- USA Mathematical Olympiad (USAMO) 2011, 2013

## Skills

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**Programming:** fluent in Python (TensorFlow, PyTorch), JavaScript, Java

**Languages:** Thai (native), English (fluent), Japanese (intermediate), Chinese (beginner)