

# Keunwoo Peter Yu

## Curriculum Vitae

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### Research Interests

Multi-modal learning, vision-language models (videos), embodied AI.

### Education

- 2020–present **Ph.D.**, *University of Michigan*, Ann Arbor, MI  
Computer Science and Engineering  
Advised by Joyce Chai in the Situated Language & Embodied Dialogue (SLED) lab  
Candidacy achieved in February 2022
- 2020–2022 **M.S.E.**, *University of Michigan*, Ann Arbor, MI  
Computer Science and Engineering  
Artificial Intelligence
- 2009–2013 **B.S.E.**, *Princeton University*, Princeton, NJ  
Computer Science  
Cum Laude, Member of the Society of Sigma Xi

### Publications

#### Published/Accepted Peer-reviewed

- [1] **Keunwoo Peter Yu**, Zheyuan Zhang, Fengyuan Hu, Shane Storks, and Joyce Chai. Eliciting in-context learning in vision-language models for videos through curated data distributional properties. In *Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing*, 2024.
- [2] Shane Storks, **Yu, Keunwoo Peter**, Ziqiao Ma, and Joyce Chai. NLP reproducibility for all: Understanding experiences of beginners. In Anna Rogers, Jordan Boyd-Graber, and Naoaki Okazaki, editors, *Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, pages 10199–10219, Toronto, Canada, July 2023. Association for Computational Linguistics.
- [3] Yuwei Bao, **Keunwoo Peter Yu**, Yichi Zhang, Shane Storks, Itamar Bar-Yossef, Alex de la Iglesia, Megan Su, Xiao Lin Zheng, and Joyce Chai. Can foundation models watch, talk and guide you step by step to make a cake? In *Findings of the Association for Computational Linguistics: EMNLP 2023*, 2023.
- [4] Yichi Zhang, Jianing Yang, Jiayi Pan, Shane Storks, Nikhil Devraj, Ziqiao Ma, **Yu, Keunwoo Peter**, Yuwei Bao, and Joyce Chai. DANLI: Deliberative agent for following natural language instructions. In Yoav Goldberg, Zornitsa Kozareva, and Yue Zhang, editors, *Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing*, pages 1280–1298, Abu Dhabi, United Arab Emirates, December 2022. Association for Computational Linguistics.

#### Other Manuscripts

- [1] **Yu, Keunwoo Peter**. Constructing temporal dynamic knowledge graphs from interactive text-based games. *arXiv preprint arXiv:2311.01928*, 2023.
- [2] Yichi Zhang, Jianing Yang, **Yu, Keunwoo Peter**, Yinpei Dai, Shane Storks, Yuwei Bao, Jiayi

Pan, Nikhil Devraj, Ziqiao Ma, and Joyce Chai. Seagull: An embodied agent for instruction following through situated dialog. In *Alexa Prize SimBot Challenge Proceedings*, 2023. **Winner of the Alexa Prize SimBot Challenge.**

- [3] **Yu, Keunwoo Peter** and Yi Yang. One model to recognize them all: Marginal distillation from ner models with different tag sets. *arXiv preprint arXiv:2004.05140*, 2020.

## Patents

- [1] Yi Yang and **Yu, Keunwoo Peter**. System, method, and computer program for obtaining a unified named entity recognition model with the collective predictive capabilities of teacher models with different tag sets using marginal distillation, November 1 2022. US Patent 11,487,944.

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## Industry Experience

- 2020–2020 **Summer Researcher Intern**, *Toyota Rsearch Institute*, Los Altos, CA
- Researched vision-language models for long-form videos.
  - Conducted large-scale, distributed training of vision-language models on video-text data using SageMaker.
  - Ran extensive evaluations on the current SOTA vision-language models.
- 2019–2020 **NLP Researcher**, *ASAPP*, New York, NY
- Developed a novel algorithm to train a unified named entity recognition model from multiple resources with different tag sets.
  - Architected an internal natural language processing library that streamlined NLP model deployment to production.
- 2017–2019 **Lead Software Engineer**, *ASAPP*, New York, NY
- Refactored a monolithic server into microservices communicating over protobuf-based RPC calls and an AMQP message queue to scale real-time chat message delivery and support more resilient websocket connection handling.
  - Improved the deployment system to deliver true continuous integration and deployment.
  - Developed and deployed a set of microservices to support the “omni-channel” chat experience where customers can chat using their preferred communication channel, e.g. Apple Business Chat, push notifications, SMS, etc.
  - Conducted research in proprietary, multi-lingual customer intent classifier.
  - Mentored junior developers through the onboarding process.
- 2016–2017 **Software Engineer**, *Etsy*, New York, NY
- Developed and launched Guest Checkout, a critical project that added millions of dollars to Etsy’s global merchandise sales.
- 2016–2016 **Software Engineer**, *DWNLD*, New York, NY
- Developed and maintained an API written in Scala (Finch, Finagle) that allowed mobile apps to make purchases using Google In-app Billing.
  - Extended a Rails API to add new features such as in-app authentication.
  - Wrote and deployed a number of big data analytics job using Celery, RabbitMQ, Spark and HBase.
  - Developed and maintained an internal web app (Scala Finch, Postgres, Slick) that allowed employees to tag images with predefined characteristics to construct a data set that would be used to train a machine learning model.
- 2013–2015 **Software Engineer**, *AppNexus*, New York, NY
- Implemented a Kubernetes-like system to integrate Docker to AppNexus’ cloud system.
  - Developed, automated and maintained a system that rapidly generates clones of the production system that can be used as sand boxes by developers and external clients.
  - Developed a proprietary configuration system similar to Puppet’s Hiera.
  - Managed a summer intern to successfully complete his project.
  - Developed and maintained tools to manage AppNexus’ cloud system, including a job scheduler and a server management web application.

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## Technical Skills

- Programming Languages: Python, Golang, Typescript, Javascript, C#, C/C++, Scala, Java, PHP, SQL

- Libraries: PyTorch, Hugging Face Transformers, PyTorch Lightning, TensorFlow, \psi, spaCy, NLTK, pytest, NumPy, scikit-learn, pandas, matplotlib, seaborn
- Developer Tools: Git, LaTeX, Slurm, SageMaker, Docker, GitHub Actions, GitLab Pipelines, Jupyter

## Honors and Awards

2023 **First-place Winner, Alexa Prize SimBot Challenge**, *Amazon*

## Academic Appointments

2021–2022 **Graduate Student Instructor**, *University of Michigan*, Ann Arbor, MI

- Assisted the professor in running a graduate-level course in natural language processing with 100+ students for two semesters.
- Supported students through office hours.
- Designed assignments and supervised a team of graders.
- Gave guest lectures on specialized topics such as graph neural networks and the SLURM Workload Manager.

## Service

2022–present **Peer Reviewer**

COLING 2022; ACL-Industry 2023; EMNLP 2024; COLING 2025