Takateru Yamakoshi

Contact Information

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Education

Stanford University, PhD in Computer Science 09/2025 -
University of Tokyo, Bachelor of Medicine 04/2018 - 03/2025
Princeton University, Exchange Student 09/2019 - 05/2020

Awards

2025. JASSO Scholarship
2023. Clinical Clerkship Best Student Award
2022. UTokyo–Princeton Strategic Partnership Seed Grant ($10,000)
2019. Ito Foundation USA, FUTI Scholarship

Journal Papers (∗: equal contributions)

[1] Kumar, S.*, Sumers, T.R.*, **Yamakoshi, T.**, Goldstein, A., Hasson, U., Norman, K.A., Griffiths, T.L., Hawkins, R.D., Nastase, S.A. (2024). Shared functional specialization in transformer-based language models and the human brain. *Nature Communications.*

Proceedings Papers (∗: equal contributions)

[2] **Yamakoshi, T.**, Griffiths, T.L., McCoy, R.T.*, Hawkins, R.D.* Evaluating distillation methods for data-efficient syntax learning. *Findings of EMNLP 2025.*
[3] **Yamakoshi, T.**, McClelland, J.L., Goldberg A.E., Hawkins, R.D. (2023). Causal interventions expose implicit situation models for commonsense language understanding. *Findings of ACL 2023.*
[4] **Yamakoshi, T.**, Griffiths, T.L., Hawkins, R.D. (2022). Probing BERT's priors with serial reproduction chains. *Findings of ACL 2022.*
[5] Hawkins, R.D.*, **Yamakoshi, T.***, Griffiths, T.L., Goldberg, A.E. (2020). Investigating representations of verb bias in neural language models. *EMNLP 2020.*

Presentations

2023. Invited talk at Princeton Computational Cognitive Science Lab
2023. The 61st Annual Meeting of the Association for Computational Linguistics [2]
2022. The 60th Annual Meeting of the Association for Computational Linguistics [3]
2021. Go Global Meeting
- Information session for exchange programs at UTokyo.
2020. Conference on Empirical Methods in Natural Language Processing (EMNLP) [4]
2020. Final project presentation at the Neuromatch Academy (https://academy.neuromatch.io/)
- Developed a method to identify functional connectivity using Neuropixels data.
- Selected as one of the highlighted projects.

Research Experiences

1. Natural Language Processing & Cognitive Science (with Prof. Tom Griffiths)

1-1. Distillation as Probe for Inductive Bias (Findings of EMNLP 2025 [2]) 09/2022 - 05/2024

- Investigated whether attention matrices contain syntactic inductive biases using knowledge distillation.
- Revealed logits are a better source of inductive biases than attention matrices.

1-2. Situation Models in Language Models (Findings of ACL 2023 [3]) 09/2021 - 05/2022

- Investigated how language models construct "situation models" to perform commonsense reasoning.
- Revealed circuits inside language models via causal interventions.

1-3. Sampling from Masked Language Models (Findings of ACL 2022 [4]) 09/2020 - 05/2021

- Derived a mathematically rigorous way to sample from masked language models.
- Identified model biases by comparing samples from BERT and those from Wikipedia.

1-4. Grammatical Constructions in Language Models (EMNLP 2020 [5]) 01/2020 - 05/2020

- Investigated whether language models learn grammatical constructions.
- Uncovered the process in which the models build up grammatical constructions.

2. Natural Language Processing & Neuroscience

2-1. Aligning Neuropixels with Speech Models (with Prof. Edward Chang) 09/2024 - 12/2024

- Extended [1] to target speech processing in the brain using Neuropixels data and Whisper.
- Identified hierarchical neural computations in speech processing.

2-2. Aligning fMRI with Language Models (Nat. Commun. [1]) 09/2020 - 05/2022

- Proposed a representation that captures how words get contextualized better than embeddings.
- Revealed a shared trend of functional specialization in BERT and the brain.

3. Natural Language Processing & Aphasia (with Prof. Eiji Aramaki)

3-1. Modeling Aphasia Symptoms using Language Models (in prep.) 09/2024 - 12/2024

- Reverse-engineered aphasia symptoms by perturbing vision-language models.
- Revealed how changes in sampling methods can partially account for aphasia symptoms.

4. Computational Neuroscience

4-1. Grid Cell Disruption in Alzheimer's Disease (with Dr. Louis Kang) 04/2024 - 05/2024

- Analyzed how grid cells are affected in the Alzheimer's disease using a computational model.

4-2. Ca^{2+} Oscillation Frequency Encoding in Sleep (with Prof. Hiroki Ueda) 11/2021 - 03/2023

- Developed a computational model on how neurons encode the frequency of Ca^{2+} oscillations.

4-3. Motor Learning in Marmosets (with Prof. Masanori Matsuzaki) 11/2020 - 03/2021

- Identified the anatomical layout of motion patterns using Ca^{2+} imaging data.

Professional Service

Ad Hoc Reviewer

- ACL Annual Rolling Reviews.
- California Meeting on Psycholinguistics (CAMP).
- Workshop on Representation Learning for NLP (RepL4NLP).

Treasurer for the students & alumni association of UTokyo Medical School, 2023–2024

Skills

Natural Languages:	Japanese (native), English (fluent), Spanish, Italian (beginner)
Programming Languages:	Python, R, MATLAB, JavaScript, Prolog
Technologies:	PyTorch, Git, Docker, LaTeX