Tyler A. Chang

he/him/his
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EDUCATION

University of California San Diego 2020-Present
PhD Student in Cognitive Science
Halıcıoğlu Data Science Institute, Graduate Fellow

Carleton College, Northfield, MN 2016-2020
BA in Mathematics, summa cum laude
BA in Cognitive Science, with distinction

Budapest Semesters in Mathematics Fall 2018
Eötvös Loránd University, Budapest, Hungary

Carleton Linguistics and Culture Spring 2018
Doshisha University, Kyoto, Japan

RESEARCH INTERESTS

- **Natural language processing**: large language models, deep learning interpretability and analysis.
- **Cognitive linguistics**: distributional semantics, discourse processes, language acquisition.

INDUSTRY

Google Research, Responsible AI, PhD Student Researcher 2022-Present
- Pre-training, tuning, and analysis of large language models.

Amazon Science, Applied Scientist Intern Summers 2021, 2022
- AWS Comprehend: linguistic dataset drift and out-of-domain language model generalization.
- Alexa AI: content change prediction on the web for intelligent web crawling.

Google, Software Engineering Intern Summers 2018, 2019, 2020
- Cloud AI Translation: automatic sentence pair extraction from human-translated documents, generating training data for neural machine translation models.
- Geo Machine Perception: designed and implemented data pipelines to generate ground truth alignment metrics between aerial and street level imagery datasets at scale.
- Chrome (Engineering Practicum Intern): built an independent server for retrieving and displaying support issues on the Chrome Web Store, serving tens of millions of monthly users.

ACADEMIA

Graduate Student Researcher, UC San Diego 2020-Present
Language and Cognition Lab; Machine Learning, Perception, and Cognition Lab
- Conduct research in natural language processing and computational linguistics.

Research Assistant, Carleton College 2019-2020
Language and Cognition Lab, Cognitive Science Research Lab
- Ran eye-tracking studies examining how people identify objects in conversation.
- Conducted interviews assessing knowledge representation in children.

TEACHING

Teaching Assistant, UC San Diego 2021
COGS188 AI Algorithms,
COGS108 Data Science in Practice.

Course Staff, Carleton College 2019
CS254 Computability and Complexity,
CS111 Introduction to Computer Science.

AWARDS AND FELLOWSHIPS

Graduate Prize Fellowship, Halıcıoğlu Data Science Institute	2020-2024
Glushko Travel and Research Award, UCSD Cognitive Science	2020-2024
Roy O. Elveton Prize in Cognitive Science and Philosophy, Carleton College	2020
Google Spot Bonus, Google Geo Machine Perception	2019
Patricia V. Damon Scholarship, Carleton College	2019-2020
Phi Beta Kappa Third-Year Inductee, Carleton College	2019
Phi Beta Kappa First Year Prize, Carleton College	2018
Dean's List, Carleton College	2017, 2018, 2019
Stuebe Endowed Scholarship, Carleton College	2017-2020
National Merit Scholar, National Merit Scholarship Corporation	2016-2020

PUBLICATIONS

Peer-reviewed.

Note: top-tier venues in natural language processing are often conference proceedings rather than journals.

Chang, T. A., & Bergen, B. K. (2023). Language model behavior: A comprehensive survey. *Computational Linguistics*. To appear.

Michaelov, J., Arnett, C., **Chang, T. A.**, & Bergen, B. K. (2023). Structural priming demonstrates abstract grammatical representations in multilingual language models. *Proceedings of the Conference on Empirical Methods in Natural Language Processing* (EMNLP).

Chang, T. A., Halder, K., Anna John, N., Vyas, Y., Benajiba, Y., Ballesteros, M., & Roth, D. (2023). Characterizing and measuring linguistic dataset drift. *Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics* (ACL).

Trott, S.*, Jones, C. R.*, **Chang, T. A.**, Michaelov, J., & Bergen, B. K. (2023). Do large language models know what humans know? *Cognitive Science*. *Equal contribution.

Chang, T. A., Tu, Z., & Bergen, B. K. (2022). The geometry of multilingual language model representations. *Proceedings of the Conference on Empirical Methods in Natural Language Processing* (EMNLP).

Chang, T. A., & Bergen, B. K. (2022). Word acquisition in neural language models. *Transactions of the Association for Computational Linguistics* (TACL). Presented at ACL 2022.

Chang, T. A., & Bergen, B. K. (2022). Does contextual diversity hinder early word acquisition? *Proceedings of the 44th Annual Conference of the Cognitive Science Society* (CogSci).

Jones, C. R., **Chang, T. A.**, Coulson, S., Michaelov, J., Trott, S., & Bergen, B. K. (2022). Distributional semantics still can't account for affordances. *Proceedings of the 44th Annual Conference of the Cognitive Science Society* (CogSci).

Chang, T. A., Xu, Y., Xu, W., & Tu, Z. (2021). Convolutions and self-attention: Re-interpreting relative positions in pre-trained language models. *Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing* (ACL-IJCNLP).

Xu, Y., Xu, W., **Chang, T. A.**, & Tu, Z. (2021). Co-scale conv-attentional image transformers. *Proceedings of the IEEE/CVF International Conference on Computer Vision* (ICCV).

WORKSHOPS AND ABSTRACTS

Peer-reviewed.

Arnett, C., **Chang, T. A.**, Michaelov, J., & Bergen, B. K. (2023). Crosslingual structural priming and the pre-training dynamics of bilingual language models. *3rd Multilingual Representation Learning Workshop* (workshop at EMNLP). Extended abstract.

Chang, T. A., & Rafferty, A. N. (2020). Encodings of source syntax: Similarities in NMT representations across target languages. *Proceedings of the 5th Workshop on Representation Learning for NLP* (workshop at ACL).

OTHER WORK

Chang, T. A., Tu, Z., & Bergen, B. K. (under review). Learning, forgetting, and stability: Characterizing learning curves during language model pre-training.

Chang, T. A., Arnett, C., Tu, Z., & Bergen, B. K. (under review). When is multilinguality a curse? Language modeling for 250 high- and low-resource languages.

Chang, T. A. (2020). Emergence of hierarchical syntax in neural machine translation. *Carleton Digital Commons*. Undergraduate thesis, Carleton College Cognitive Science. With distinction.

Chang, T. A. (2020). Topology of second order tensor fields. *Carleton Digital Commons*. Undergraduate thesis, Carleton College Mathematics and Statistics.

SERVICE

ACL reviewer (Annual Meeting of the Association for Computational Linguistics)	2023
FAccT reviewer (Conference on Fairness, Accountability, and Transparency)	2023
EMNLP reviewer (Conference on Empirical Methods in NLP)	2022, 2023
CogSci reviewer (Conference of the Cognitive Science Society)	2022, 2023
PNAS reviewer (Proceedings of the National Academy of Sciences)	2022
UCSD Graduate Application Mentorship Program, mentor	2022-2023
ICLR volunteer (International Conference on Learning Representations)	2022
ACL conference volunteer (Association for Computational Linguistics)	2020, 2021, 2022
EMNLP conference volunteer (Empirical Methods in NLP)	2020, 2022
Carleton Alumni Relations Office, student supervisor	2017-2020
Carleton Alumni Relations Office, student caller	2016-2017