

KANISHKA MISRA

Email: kmisra@utexas.edu Website: <https://kanishka.website/>

Last Updated: April 18, 2024

Academic Positions

2023–current **The University of Texas at Austin**
Postdoctoral Fellow, Department of Linguistics
Advisor: Dr. Kyle Mahowald

2024– **Toyota Technological Institute at Chicago**
Research Assistant Professor
Endowed position for upto 3 years

Education

Purdue University, West Lafayette, USA

Ph.D. in Computer Information Technology, 2018–2023

Dissertation: *On Semantic Cognition, Inductive Generalization, and Language Models*

Advisor: Dr. Julia Taylor Rayz

Committee: Dr. Allyson Ettinger, Dr. Victor Raskin, Dr. Jin Wei Kocsis, Dr. John Springer

Purdue University, West Lafayette, USA

M.S. in Computer Information Technology, 2020

Thesis: *Exploring Lexical Sensitivities in Word Prediction Models: A case study on BERT*

Advisor: Dr. Julia Taylor Rayz

Note: Work performed alongside requirements for Ph.D.

Purdue University, West Lafayette, USA

B.S. *with distinction*. Computer Information Technology, 2014–2018

Minor in Statistics

Fellowships and Assistantships

2023 **Bilsland Fellowship.** Dissertation Fellowship awarded by Purdue University.

2022–2023 **Purdue Graduate Student Mentoring Fellowship.** Selected to understand and improve the advising relationship between faculty and students at Purdue University. **Award:** \$5,000 in research and travel funds.

2021–2022 **Research Assistantship** funded through NSF EAGER Grant number 2039605. **Title:** *AI-based Humor-integrated Social Engineering Training*. **Contribution:** Co-wrote the “Technical Contribution” section, and served as key personnel. **PI:** Julia Taylor Rayz, **Co-PI:** Ida B. Ngambeki

2018–2019 **Purdue Research Foundation (PRF) Fellowship.** **Title:** *Computational Analysis of Online Predatory Texts*. **Contribution:** Wrote the proposal in its entirety. **Mentor:** Julia Taylor Rayz.

Industry Experience

- Fall 2022 **Google Research - Research Intern**
Project: Triggering Multi-Hop Reasoning in LLMs with Soft-prompts.
Host(s): Siamak Shakeri and Cicero Nogueira dos Santos.
- Summer 2021 **Pythonic AI - NLP Engineering/Research Intern**
Project: Integrating Biomedical Commonsense into Language Models.
Host: Baoqiang Cao, CTO and Co-founder.

Work In Progress and Preprints

- 2024 **Kanishka Misra**, Allyson Ettinger, and Kyle Mahowald. [Experimental Contexts Can Facilitate Robust Semantic Property Inference in Language Models, but Inconsistently.](#) *Submitted.*
- 2024 **Kanishka Misra** and Kyle Mahowald. [Language Models Learn Rare Phenomena from Less Rare Phenomena: The Case of the Missing AANNs.](#) *Submitted.*
- 2022 **Kanishka Misra**. [minicons: Enabling Flexible Behavioral and Representational Analyses of Transformer Language Models.](#) Demo Paper. *Preprint/Demo.*

Peer-reviewed Publications

- 2023 **Kanishka Misra**, Cicero Nogueira dos Santos, Siamak Shakeri. [Triggering Multi-hop reasoning in language models using soft-prompts and random walks.](#) *Findings of ACL 2023*
- 2023 Koustuv Sinha*, Jon Gauthier*, Aaron Mueller[†], **Kanishka Misra**[†], Keren Fuentes, Roger Levy, Adina Williams. [Language model acceptability judgments are not always robust to context.](#) *ACL 2023.* **Recipient of Outstanding Paper Award.**^{*,†}: Equal Contribution
- 2023 Freda Shi*, Xinyun Chen*, **Kanishka Misra**, David Dohan, Ed Chi, Nathan Scharli, Denny Zhou. [Large Language Models Can Be Easily Distracted by Irrelevant Context.](#) *ICML 2023.* *: Equal Contribution
- 2023 **Kanishka Misra**, Julia Taylor Rayz, Allyson Ettinger. [COMPS: Conceptual Minimal Pair Sentences for Testing Robust Property Knowledge and its Inheritance in Pre-trained Language Models.](#) *EACL 2023.* **Recipient of Best Paper Award.**
- 2022 **Kanishka Misra**, Julia Taylor Rayz, Allyson Ettinger. [A Property Induction Framework for Neural Language Models.](#) *44th Annual Conference of the Cognitive Science Society.*
- 2022 **Kanishka Misra**, Julia Taylor Rayz. [LMs Go Phishing: Adapting Pre-trained Language Models to Detect Phishing Emails.](#) *IEEE/ACM Web Intelligence Conference.*
- 2022 **Kanishka Misra**. [On Semantic Cognition, Inductive Generalization, and Language Models.](#) *AAAI 2022 Doctoral Consortium, Vancouver, Canada.*
- 2021 **Kanishka Misra**, Allyson Ettinger, Julia Taylor Rayz. [Do Language Models learn typicality judgments from text?](#) *43rd Annual Conference of the Cognitive Science Society.*

- 2021 **Kanishka Misra**, Julia Taylor Rayz. [Finding fuzziness in Neural Network models of Language Processing](#). *Annual Meeting of the North American Fuzzy Information Processing Society 2021*. **Honorable Mention for Best Student Paper**.
- 2020 **Kanishka Misra**, Allyson Ettinger, Julia Taylor Rayz. [Exploring BERT's Sensitivity to Lexical Cues using Tests from Semantic Priming](#). *Findings of the Association for Computational Linguistics: EMNLP 2020*.
- 2020 Qingyuan Hu, Yi Zhang, **Kanishka Misra**, Julia Taylor Rayz. [Exploring Lexical Irregularities in Hypothesis-Only Models of Natural Language Inference](#). *2020 IEEE 19th International Conference on Cognitive Informatics & Cognitive Computing (ICCI* CC)*.
- 2020 **Kanishka Misra**, Julia Taylor Rayz. [An Approximate Perspective on Word Prediction in Context: Ontological Semantics meets BERT](#). *Annual meeting of the North American Fuzzy Information Processing Society 2020*. Online.
- 2019 **Kanishka Misra**, Hemanth Devarapalli, Tatiana Ringenberg, Julia Taylor Rayz. [Authorship Analysis of Online Predatory Conversations using Character Level Convolution Neural Networks](#). *2019 IEEE International Conference on Systems, Man and Cybernetics (SMC)*, Bari, Italy.
- 2019 Tatiana Ringenberg, **Kanishka Misra**, Julia Taylor Rayz. [Not So Cute but Fuzzy: Estimating Risk of Sexual Predation in Online Conversations](#). *2019 IEEE International Conference on Systems, Man and Cybernetics (SMC)*, Bari, Italy. **(joint first author)**
- 2019 Tatiana Ringenberg, **Kanishka Misra**, Kathryn C. Seigfried-Spellar, Julia Taylor Rayz. [Exploring Automatic Identification of Fantasy-Driven and Contact-Driven Sexual Solicitors](#). *2019 Third IEEE International Conference on Robotic Computing (IRC)*, Naples, Italy.
- 2019 Kathryn C. Seigfried-Spellar, Marcus K Rogers, Julia T Rayz, Shih-Feng Yang, **Kanishka Misra**, Tatiana Ringenberg. [Chat analysis triage tool: Differentiating contact-driven vs. fantasy-driven child sex offenders](#). *Forensic Science International*, 2019.

Peer-reviewed Abstracts

- 2023 **Kanishka Misra** and Najoung Kim. [Abstraction via exemplars? A representational case study on lexical category inference in BERT](#). *BUCLD 48*
- 2020 **Kanishka Misra**, Allyson Ettinger, Julia Taylor Rayz. [Exploring BERT's lexical relations using Semantic Priming](#). *CogSci 2020* [poster]
- 2019 **Kanishka Misra**, Hemanth Devarapalli, Julia Taylor Rayz. [L1 Influence on Content Word errors in Learner English Corpora: Insights from Distributed Representation of Words](#). *CogSci 2019*, Montréal, Canada. [poster]

Presentations and Invited Talks

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| Spring 2024 | <i>Controlled Rearing of Language Models can reveal Linguistic Insight</i> (Invited Talk)
SynSem Seminar, UT Austin Linguistics.
South by Semantics Workshop, Austin |
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Fall 2023	<i>Analyzing Robust Conceptual Knowledge and Property Inheritance in Language Models</i> (Invited Talk) Guest lecture for <i>Topics in Natural Language Processing</i> (taught by Eunsol Choi) Toyota Technological Institute at Chicago. C.Psyd Lab (Marten van Schijndel's lab), Cornell University.
Fall 2023	<i>Language model acceptability judgments are not always robust to context</i> UT Austin NLL Reading Group.
Spring 2023	<i>COMPS: Conceptual Minimal Pair Sentences for testing Robust Property Knowledge and its Inheritance in Pre-trained Language Models</i> EACL 2023, Main Conference
Spring 2023	<i>On the synthetic semantic cognition of language models</i> (Invited Talk) EvLab and LINGO lab. MIT. Toyota Technological Institute at Chicago.
Fall 2022	<i>Conceptual Minimal Pairs for testing Robust Property Knowledge and its Inheritance in Pre-trained Language Models</i> (Invited Talk) CompLing Lab, University of Chicago Human and Machine Learning Lab. New York University Computation and Psycholinguistics Lab. New York University CompLang/Ev Lab joint meeting. MIT Language Evolution, Acquisition and Processing Workshop. University of Chicago
Fall 2022	<i>Triggering Multi-Hop Reasoning in LLMs using Soft-Prompts</i> Prompt-tuning sync. Google Research.
Spring 2022	<i>On Semantic Cognition, Inductive Generalization, and Language Models</i> AAAI 2022 Doctoral Consortium. Vancouver (held online).
Fall 2021	<i>Finding fuzziness in Neural Network Models of Language Processing</i> NAFIPS 2021 (held online).
Summer 2021	<i>Do Language Models Learn Typicality Judgments from Text?</i> CogSci 2021 Main Conference (held online).

Honors and Awards

- 2023 **Paula Menyuk Travel Award.** BUCLD 48. **Amount:** \$385.
- 2023 **Outstanding Paper Award.** ACL 2023.
- 2023 **Best Paper Award.** EACL 2023. **Amount:** \$1000.
- 2022 **Best Student Poster (runner-up)** PPI Holistic Safety and Security Research Impact area. **Amount:** \$250.

- 2022 **Fellow**, *Purdue Graduate Student Mentoring Fellows Program*. **Amount:** \$5,000 in research funds.
- 2021 **Honorable Mention for Best Student Paper**, *North American Fuzzy Information Processing Society*. **Amount:** \$100.
- 2019 **Holistic Safety and Security Research Travel Grant**, *Purdue Polytechnic Institute*. **Amount:** \$500.
- 2019 **CIT Research Travel Grant Award**, *Purdue CIT*. **Amount:** \$1200 (CogSci 2019), \$600 (IEEE-SMC 2019).
- 2019 **Best HSS Poster Presentation**, *CERIAS Symposium*. Award presented by committee on Holistic Safety and Security (HSS) research impact area. [[link](#)].
- 2019 **Conference Travel Award**, *Chicago R Unconference*. **Amount:** \$150.
- 2018 **PRF Fellowship**, *Purdue Research Foundation*. Covered two semesters worth of graduate school, in addition to stipend.
- 2018 **Best Poster Award - PPI**, *Purdue Office of Undergraduate Research Expo*. **Amount:** \$250. [[link](#)]
- 2018 **Research Scholarship**, *Purdue Office of Undergraduate Research*. **Amount:** \$500.
- 2017 **First Place**. *Indy Civic Hackathon*. **Amount:** \$2000 split across 4 team members.

Teaching

Teaching Assistant - *Database Fundamentals* (CNIT 272)

Timeline: Fall 2019, Spring 2020, Fall 2020

Course Professor: Dr. Dawn D. Laux

Developed lecture videos and taught fundamentals of relational databases and SQL to three lab sections (\approx 70 students on average across three semesters).

Instructor Rating: 4.8 (on average across three semesters)

Guest Lecturer - *Natural Language Technologies* (CNIT 519)

Timeline: Fall 2019, Fall 2020, Spring 2022

Course Professor: Dr. Julia Taylor Rayz

- Two lectures on Neural Network models of Natural Language Processing

- Developed two assignments on language model interpretability and evaluation.

Mentorship

- 2023– **William Sheffield** (PhD Student at UT Austin). **Topic(s):** *Discourse-sensitive properties of Language Models*
- 2023– **Juan Diego Rodriguez** (PhD Student at UT Austin). **Topic(s):** *Conceptual Organization and Inference in Language Models*

- 2023– **Jwalanthi Ranganathan** (Undergraduate at UT Austin). **Topic:** *Projecting Contextualized Word Embeddings onto Interpretable Semantic Spaces.*
- 2023– **Daniel Brubaker** (Undergraduate at UT Austin). **Topic:** *Exploring pragmatic inference in LMs with Discourse Connectives.*
- 2022 **Sam Huang** (UChicago Undergraduate). **Topic:** *Assessing reasoning behavior in LMs in presence of distraction.*
- 2020 **Qingyuan “Carol” Hu and Yi Zhang** (Undergraduates). **Topic:** *Exploring Lexical Irregularities in Hypothesis-only Models of Natural Language Inference.* **Outcome:** Publication in *IEEE ICC* CI 2020*, and a presentation at *PURC 2020*, which was awarded second place across all students from the Purdue Polytechnic Institute.
- 2018–19 **John Phan** (Undergraduate). **Topic:** *Gender Bias in Word Embeddings.* Awarded NSF REU scholarship. **Outcome:** Two poster presentations.

Reviewing

Conference	CogSci (2024); EMNLP (2023); CoNLL (2023); ACL (2023); EACL (2023); CogSci (2020, 2021, 2022); CoNLL (2021, 2022); ARR (2021, 2022); *SEM 2022; EMNLP 2020; IJCAI 2020; *SEM 2019; IEEE-IRC 2019.
Workshop	Blackbox NLP (2023)
Journal	<i>Cognitive Science</i> (2023); <i>Open Mind</i> (2023); <i>PNAS Nexus</i> (2024)
Book	Chapman & Hall/CRC Press Statistics Series (2020, 2021).

Service

- **Area Chair**, *Interpretability and Analysis of Models*. ACL / ARR 2024 (Feb, April).
- **Area Chair**, *Linguistic Theory, Cognitive Modeling, and Psycholinguistics*. LREC-COLING 2024.
- **Session Chair**, *Linguistic Theory, Cognitive Modeling, and Psycholinguistics*. ACL 2023 (on-site).
- **Organizer**, *Neural Nets for Cognition*. Discussion group at CogSci 2022.
- **Local Arrangements Chair**, *Annual Meeting of the North American Fuzzy Information Processing Society 2021 (NAFIPS 2021) held at Purdue University*.
- **Program Committee**: CoNLL (2021, 2022).
- **Volunteer**, *36th AAAI Conference on Artificial Intelligence*.
- **Graduate Student Advisor**, *Purdue CIT Student Council*.
- **Organizer**, *Undergraduate Research Panel*, Purdue CIT.

Skills

Programming

Python, R, pytorch, jax, SQL, \LaTeX

Natural Languages

English (near-native), Hindi (near-native), Gujarati, Odiya

Software Developed

minicons A toolkit to facilitate behavioral and representational analyses of transformer-based language processing models. [[github](#)]

Professional Affiliations

- Association of Computational Linguistics (ACL)
- Cognitive Science Society (CogSci)
- Institute of Electrical and Electronic Engineers (IEEE)
- Center for Education and Research in Information Assurance and Security (CERIAS)
- Society for Mathematical Psychology (MathPsych)

References

NLP Research: Dr. Allyson Ettinger, Dr. Kyle Mahowald, Dr. Julia Taylor Rayz, Dr. Junyi Jessy Li

Teaching: Dr. Dawn Laux

Industry: Dr. Cicero Nogueira dos Santos, Dr. Baoqiang Cao.