

KANISHKA MISRA

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Appointments

2023–2024 **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* [[link](#)]

Advisor: 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

- 2023 **Kanishka Misra** and Najoung Kim. On Lexical Category Abstraction in Pre-trained Language Models. *Work in Progress*.
- 2023 Mourad Heddaya, **Kanishka Misra**, and Allyson Ettinger. On Meaning and Prediction in Language Models and Humans. *Work in Progress*.
- 2022 **Kanishka Misra**. minicons: Enabling Flexible Behavioral and Representational Analyses of Transformer Language Models. Demo Paper. [[preprint](#)]

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**.
- 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*.
- 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. [[preprint](#)]
- 2021 **Kanishka Misra**, Allyson Ettinger, Julia Taylor Rayz. Do Language Models learn typicality judgments from text? *43rd Annual Conference of the Cognitive Science Society*. [[preprint](#)]

- 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*. [[preprint](#)] **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*. [[link](#)]
- 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)*. [[link](#)]
- 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. [[preprint](#)]
- 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. [[link](#)]
- 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**) [[link](#)]
- 2019 Qiaofei Ye, **Kanishka Misra**, Hemanth Devarapalli, Julia Taylor Rayz. A Sentiment Based Non-Factoid Question-Answering Framework. *2019 IEEE International Conference on Systems, Man and Cybernetics (SMC)*., Bari, Italy. [[link](#)]
- 2019 **Kanishka Misra**, Hemanth Devarapalli, Julia Taylor Rayz. Measuring the Influence of L1 on Learner English Errors in Content Words within Word Embedding Models. *17th International Conference on Cognitive Modelling 2019*., Montréal, Canada. [[link](#)]
- 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. [[link](#)]
- 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. [[link](#)]

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](#)] [[link](#)]
- 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](#)] [[link](#)]

Presentations and Invited Talks

Fall 2023	<i>Robust Testing of Semantic Knowledge in Large Language Models (Upcoming)</i> Toyota Technological Institute at Chicago. C.Psyd Lab (Marten van Schijndel's lab), Cornell University.
Spring 2023	<i>On the synthetic semantic cognition of language models (Invited Talk)</i> 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 (Invited Talk)</i> 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. <i>BUCLD 48.</i> Amount: \$385.
2023	Outstanding Paper Award. <i>ACL 2023.</i>
2023	Best Paper Award. <i>EACL 2023.</i> Amount: \$1000.
2022	Best Student Poster (runner-up) <i>PPI Holistic Safety and Security Research Impact area.</i> Amount: \$250.
2022	Fellow, <i>Purdue Graduate Student Mentoring Fellows Program.</i> Amount: \$5,000 in research funds.
2021	Honorable Mention for Best Student Paper, <i>North American Fuzzy Information Processing Society.</i> Amount: \$100.
2019	Holistic Safety and Security Research Travel Grant, <i>Purdue Polytechnic Institute.</i> 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 (≈ 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

- 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	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)
Book	Chapman & Hall/CRC Press Statistics Series (2020, 2021).

Service

- **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, Hindi, 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. Julia Taylor Rayz, Dr. Allyson Ettinger, Dr. Kyle Mahowald

Teaching: Dr. Dawn Laux

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