

Lucas H. McCabe

Department of Computer Science
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Education

- 2023 – Present **Ph.D. in Computer Science**
The George Washington University
Dissertation Topic: *Information and Uncertainty in Generative Language Models*
Advisor: H. Howie Huang
Transferred credits from graduate mathematics courses taken 2021-2022.
- 2018 – 2020 **M.S. in Applied and Computational Mathematics**
Johns Hopkins University
Advisor: Thomas B. Woolf
- 2014 – 2018 **B.A. in Mathematics and Computer Science**
Rutgers University - New Brunswick
Minor in Biological Science

Employment

- 2024 – Present **Fellow, Data Science**
Logistics Management Institute (LMI)
- 2023 – 2024 **Principal Technical Advisor, Data Science**
Logistics Management Institute (LMI)
- 2022 – 2023 **Senior Consultant, Data Science**
Logistics Management Institute (LMI)
- 2020 – 2022 **Consultant, Data Science**
Logistics Management Institute (LMI)
- 2019 – 2020 **Senior Analyst, Data Science**
Logistics Management Institute (LMI)
- 2018 – 2018 **Analyst, Data Science**
Logistics Management Institute (LMI)

Research

Overview

The primary thrust of my research aims to advance statistical and algorithmic aspects of machine learning trustworthiness, including uncertainty and interpretability in generative language models. I also have parallel interests in interdisciplinary applications of data and network science, such as to public health.

J journal article **C** conference paper **P** preprint **O** other

Preprints and Works in Progress

- [P2] **L. H. McCabe**, S. Lukens, and H. H. Huang (2026). Can LLM Agents *Efficiently* Identify Appliance Faults? Insights From Diagnosing a Simulated Appliance. *arXiv preprint arXiv:2610.19291*.
- [P1] **L. H. McCabe** and H. H. Huang (2026). SENECA: Small-Sample Discrete Entropy Estimation via Self-Consistent Missing Mass. *arXiv preprint arXiv:2605.00668*.

Conference Proceedings

- [C6] **L. H. McCabe**, R. Melamed, T. Hartvigsen, and H. H. Huang (2026). Estimating Semantic Alphabet Size for LLM Uncertainty Quantification. In *The Fourteenth International Conference on Learning Representations*.
- [C5] R. Melamed, **L. H. McCabe**, and H. H. Huang (2025). Demystifying optimized prompts in language models. In *Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing*. Ed. by C. Christodoulopoulos, T. Chakraborty, C. Rose, and V. Peng. Suzhou, China: Association for Computational Linguistics, 2983–2999.
- [C4] R. Melamed, **L. H. McCabe**, T. Wakhare, Y. Kim, H. H. Huang, and E. Boix-Adsera (2024). Prompts have evil twins. In *Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing*. Ed. by Y. Al-Onaizan, M. Bansal, and Y.-N. Chen. Miami, Florida, USA: Association for Computational Linguistics, 46–74.
- [C3] S. Lukens, **L. H. McCabe**, J. Gen, and A. Ali (2024). Large Language Model Agents as Prognostics and Health Management Copilots. In *Annual Conference of the PHM Society*. Vol. 16. 1.
- [C2] **L. H. McCabe** (2024). Nonparametric Estimation and Comparison of Distance Distributions from Censored Data. In *2024 58th Annual Conference on Information Sciences and Systems (CISS)*. IEEE, 1–6.
- [C1] B. Horio, S. Brown, C. Johnson, S. Whittle, M. Anderson, and **L. McCabe** (2022). Modeling Fuel Replenishment Logistics and Impacts of Alternative Synthetic Fuels. In *Proceedings of the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC)*.

Journal Articles

- [J3] **L. H. McCabe**, N. Masuda, S. Casillas, N. Danneman, A. Alic, and R. Law (2024). Network analysis of U.S. non-fatal opioid-involved overdose journeys, 2018–2023. *Applied Network Science*.
- [J2] **L. H. McCabe** (2022). cosasi: Graph Diffusion Source Inference in Python. *Journal of Open Source Software*.
- [J1] H. Kantamneni, M. Zevon, M. J. Donzanti, X. Zhao, Y. Sheng, S. R. Barkund, **L. H. McCabe**, W. Banach-Petrosky, L. M. Higgins, S. Ganesan, et al. (2017). Surveillance nanotechnology for multi-organ cancer metastases. *Nature Biomedical Engineering*, 1(12), 993–1003.

Other (Competition Track Papers, Accepted Abstracts, etc.)

- [O4] S. D. Brown, S. M. Whittle, **L. H. McCabe**, B. M. Horio, C. D. Johnson, and M. L. Anderson (2023). Modeling the Operational Feasibility of Synfuel from Seawater. In *Military Operations Research Society 90th Symposium*.
- [O3] G. Perrotta, R. W. Gardner, C. Lowman, M. Taufeeque, N. Tongia, S. Kalyanakrishnan, G. Clark, K. Wang, E. Rothberg, B. P. Garrison, D. Prithviraj, C. Canavan, and **L. H. McCabe** (2022). The Second NeurIPS Tournament of Reconnaissance Blind Chess. In *Proceedings of the NeurIPS 2021 Competitions and Demonstrations Track*. Ed. by D. Kiela, M. Ciccone, and B. Caputo. Vol. 176. Proceedings of Machine Learning Research. PMLR, 53–65.
- [O2] **L. H. McCabe** and T. B. Woolf (2021). Preferential Attachment Estimation and Node Immunization Along Random Walks. In *Networks 2021*.
- [O1] V. Arvind, S. Vega, **L. H. McCabe**, P. V. Moghe, S. N. Murthy, and J. Kohn (2016). Modulating stem cell-substrate interactions and differentiation by controlling substrate topography via microphase separation. In *Frontiers in Bioengineering and Biotechnology*. Vol. 4.

Open Source Software

- cosasi Developed Python library for graph diffusion source inference; >10k downloads. See [GitHub repo](#) and [documentation](#).
- NetworkX 5 PRs integrated into core Python library for graph algorithms and network analysis, including development of the [Graph Polynomials](#) module.
- contagion Developed Python package for epidemic simulation and node immunization on networks; >24k downloads. See [GitHub repo](#) and [documentation](#).

Honors and Awards

- 2026 Top Reviewer, *Neural Information Processing Systems (NeurIPS)*
- 2024 Best Technical Paper - Industrial, *Annual Conference of the Prognostics and Health Management (PHM) Society*
- 2023 Nominated for Barchi Prize (best paper award), *Military Operations Research Society (MORS) Symposium*
- 2023 Luminary Award, *Logistics Management Institute (LMI)*
- 2022 DARPA Riser, *Defense Advanced Research Projects Agency (DARPA)*
- 2021 Best Lightning Talk, Advanced Category, Data Challenge, *Smoky Mountains Computational Sciences and Engineering Conference*
- 2016 David and Dorothy Bernstein Scholarship, *Rutgers University Biological, Mathematical, and Physical Science Interfaces (BioMaPS) Institute for Quantitative Biology*

Professional Activities

Reviewing

Conferences NeurIPS; ICLR; PHME.

Journals Network Science.

Teaching

2015 – 2016 **Peer Mentor (now known as Learning Assistant)**

Supported Recitations and held office hours.

Rutgers University - New Brunswick

– MATH 152 (2016): Calculus II for the Mathematical and Physical Sciences

– MATH 151 (2015): Calculus I for the Mathematical and Physical Sciences