

# JUSTIN LOVELACE

jl3353@cornell.edu

<https://justinlovelace.github.io/>

<https://scholar.google.com/citations?user=k2CBs3gAAAAJ>

## EDUCATION

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### Cornell University

August 2022 - Present

- PhD in Computer Science
- Advisor: Prof. Kilian Q Weinberger
- Google PhD Fellow in Machine Learning & ML Foundations

### Carnegie Mellon University

August 2020 - August 2022

GPA: 4.10

- M.S. in Language Technologies, School of Computer Science
- Advisor: Prof. Carolyn Rosé

### Texas A&M University

August 2016 - May 2020

GPA: 4.0

- B.S. in Computer Science, Minor in Mathematics
- Advisor: Prof. Bobak Mortazavi
- Honors Fellow, Undergraduate Research Scholar
- USA Powerlifting: All-American, 2019 Collegiate National Runner-Up

## HONORS AND AWARDS

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### Google PhD Fellowship—Machine Learning & ML Foundations

2025-2027

### NSF National Artificial Intelligence Research Resource (NAIRR) Pilot Award

2024

#### *Principal Investigator*

- Project: “Enhancing Large Language Model Alignment through Diffusion Generated Soft-Prompts”
- Award: 10,000 GPU Hours on TACC Vista Supercomputer

### Keri Family PhD Fellowship

2022-2023

#### *Cornell University*

### Carnegie Mellon University Research Fellowship

2020-2022

### CRA’s Outstanding Undergraduate Researcher Award (Honorable Mention)

2020

## PUBLICATIONS

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1. “SpeechOp: Inference-Time Task Composition for Generative Speech Processing”  
**Justin Lovelace**, Rithesh Kumar, Jiaqi Su, Ke Chen, Kilian Q Weinberger, Zeyu Jin  
ICLR, 2026
2. “Adaptive Moments are Surprisingly Effective for Plug-and-Play Diffusion Sampling”  
Christian Belardi, **Justin Lovelace**, Kilian Q Weinberger, Carla P Gomes  
ICLR, 2026
3. “Pre-training Limited Memory Language Models with Internal and External Knowledge”  
Linxi Zhao, Sofian Zalouk, Christian Belardi, **Justin Lovelace**, Jin Peng Zhou, Kilian Q Weinberger, Yoav Artzi, Jennifer Sun  
ICLR, 2026  
*NeurIPS 2025 CCFM Workshop, Best Paper Runner Up*

4. "Stop-Think-AutoRegress: Language Modeling with Latent Diffusion Planning"  
**Justin Lovelace**, Christian Belardi, Sofian Zalouk, Adhitya Polavaram, Srivatsa Kundurthy, Kilian Q Weinberger  
COLM, 2025
5. "Improving Multislice Electron Ptychography with a Generative Prior"  
Christian Belardi, Chia-Hao Lee, Yingheng Wang, **Justin Lovelace**, Kilian Q Weinberger, David Muller, Carla Gomes  
Computer Vision for Materials Science Workshop (CV4MS) at ICCV, 2025
6. "Sample-Efficient Diffusion for Text-To-Speech Synthesis"  
**Justin Lovelace**, Soham Ray, Kwangyoun Kim, Kilian Q Weinberger, Felix Wu  
Interspeech, 2024
7. "Diffusion Guided Language Modeling"  
**Justin Lovelace**, Varsha Kishore, Yiwei Chen, Kilian Q Weinberger  
Findings of the Annual Meeting of the Association for Computational Linguistics (Findings of ACL), 2024
8. "Latent Diffusion for Language Generation"  
**Justin Lovelace**, Varsha Kishore, Chao Wan, Eliot Shekhtman, Kilian Q Weinberger  
Conference on Neural Information Processing Systems (NeurIPS), 2023
9. "IncDSI: Incrementally Updatable Document Retrieval"  
Varsha Kishore, Chao Wan, **Justin Lovelace**, Yoav Artzi, Kilian Q Weinberger  
International Conference on Machine Learning (ICML), 2023
10. "A Framework For Adapting Pre-Trained Language Models to Knowledge Graph Completion"  
**Justin Lovelace** and Carolyn Rosé  
Conference on Empirical Methods in Natural Language Processing (EMNLP), 2022
11. "Robust Knowledge Graph Completion with Stacked Convolutions and a Student Re-Ranking Network"  
**Justin Lovelace**, Denis Newman-Griffis, Shikhar Vashishth, Jill Fain Lehman, and Carolyn Rosé  
Annual Meeting of the Association for Computational Linguistics and the International Joint Conference on Natural Language Processing (ACL-IJCNLP), 2021
12. "Learning to Generate Clinically Coherent Chest X-Ray Reports"  
**Justin Lovelace**, Bobak Mortazavi  
Findings of the Conference on Empirical Methods in Natural Language Processing (Findings of EMNLP), 2020
13. "Dynamically Extracting Outcome-Specific Problem Lists from Clinical Notes with Guided Multi-Headed Attention"  
**Justin Lovelace**, Nathan C. Hurley, Adrian Haimovich, Bobak Mortazavi  
Machine Learning for Healthcare Conference (MLHC), 2020

## ACADEMIC EXPERIENCE

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### ML Core Lab at Cornell University

*Graduate Research Assistant*

August 2022 - Present

*Advisor: Dr. Kilian Q. Weinberger*

- Developing latent diffusion language models.

### Teledia Lab at Carnegie Mellon University

*Graduate Research Assistant*

August 2020 - August 2022

*Advisor: Dr. Carolyn Rosé*

- Adapted pre-trained language models to improve the coverage of knowledge graphs.

## STMI Lab at Texas A&M University

*Undergraduate Researcher*

April 2018 - May 2020

*Advisor: Dr. Bobak Mortazavi*

- Developed convolutional attention models to extract information from clinical notes and predict adverse outcomes for ICU patients.
- Developed an abstractive radiology report generation framework that improved the clinical correctness of generated reports.

## INDUSTRY EXPERIENCE

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### Meta FAIR

*Research Scientist Intern - Audiobox Team*

May 2025 - August 2025

*New York City, NY*

- Developed autoregressive diffusion models for speech generation.
- Demonstrated that they improve upon non-autoregressive approaches in terms of naturalness and latency.

### Adobe Research

*Research Scientist Intern- Speech AI Group*

May 2024 - August 2024

*San Francisco, CA*

- Developed SpeechOp, a multi-task latent diffusion model transforming pre-trained TTS into a universal speech processor (TTS, enhancement, separation).
- Introduced novel inference-time Implicit Task Composition (ITC), achieving state-of-the-art content preservation in speech enhancement using Whisper guidance.

### ASAPP

*Research Intern*

May 2023 - August 2023

*New York City, NY*

- Developed the first diffusion model for text-to-speech synthesis that does not require explicit phoneme alignment for generation.
- Outperformed the state-of-the-art autoregressive TTS system using less than 2% the training data.

## PATENTS

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"Text-to-Audio Conversion with Byte-Encoding Vectors," **Justin Lovelace**, Soham Ray, Felix Wu, Kilian Q. Weinberger, Kwangyoun Kim. U.S. Patent Application No. 20250104692, Filed January 8, 2024, Patent Granted.

## TEACHING EXPERIENCE

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### Cornell University

*Instructor of Record and Course Developer*

January 2024 - May 2024

*CS 4782: Introduction to Deep Learning*

- Served as instructor of record (with one co-instructor) for the pilot offering of Cornell's undergraduate deep learning course; course is now part of the permanent curriculum
- Designed complete curriculum including lectures, assignments, and projects for 4000-level CS course
- Covered fundamentals of neural networks, computer vision, NLP, generative models, and reinforcement learning

## SERVICE

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### Reviewer

- NeurIPS (2025)
- ICML (2025)
- ACL Rolling Review (2024, 2025)

- ACM Conference on Health, Inference, and Learning (2020, 2021)
- NeurIPS Machine Learning for Health (ML4H) Workshop (2019, 2020, 2021)

## TECHNICAL SKILLS

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**Python, C++, SQL, Pytorch, Git**