

Maxwell Jones

PhD Candidate

Machine Learning Department
Carnegie Mellon University

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Education

Carnegie Mellon University

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| Machine Learning Department, PhD. Advisors: Jun-Yan Zhu and Ruslan Salakhutdinov | 2024 - Present |
| Machine Learning Department, MS (GPA: 3.93/4.3) | 2023-2024 |
| B.S Artificial Intelligence (GPA: 4.0/4.0) | 2019-2023 |
| B.S Discrete Math and Logic (GPA: 4.0/4.0) | 2019-2023 |

Thomas Jefferson High School for Science and Technology

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| High School Diploma 2019 (GPA: 4.1/5.0) | 2015-2019 |
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Publications

- Maxwell Jones, Sheng-Yu Wang, Nupur Kumari, David Bau, and Jun-Yan Zhu. *Customizing Text-to-Image Models with a Single Image Pair* . SIGGRAPH Asia 2024. [\[Paper\]](#) [\[Project Page\]](#) [\[Code\]](#).
- Dravyansh Sharma, and Maxwell Jones. *Efficiently learning the graph for semi-supervised learning* . UAI 2023. [\[Paper\]](#) [\[Code\]](#).
- Melissa Hall, Laurens Van der Maaten, Laura Gustafson, Maxwell Jones, and Aaron Adcock . *A systematic study of bias amplification* . CVPR TSRML Workshop 2022. [\[Paper\]](#) [\[Code\]](#).

Work Experience

Meta FAIR Labs

Summer 2022

Software Engineer Intern, Research Team

- Co-authored paper to benchmark algorithmic Bias Amplification of models from biased datasets
- Developed scripts to run custom config files using both bash and python
- Managed project tasks for myself and lead weekly meetings
- See third publication for results

Meta Probability and Uncertainty Team

Summer 2021

Software Engineer Intern, Research Team

- Developed data perturbation training/evaluating/testing pipeline using python, pytorch
- Tested probabilistic models including Bayesian, Ensemble, and Dropout with LeNet-5 architecture
- Evaluated models on perturbed image data (Random Cropping, Rotation, Jittering)

Fiat Chrysler Automobiles

Summer 2020

Software Engineer Intern

- Worked on amount of absentee workers prediction model across production plants
- Improved model performance by using Random Forests and XGBoost
- Cross referenced crew data across plants for more robust/generalized inference
- Significant increase in model accuracy for absentee worker prediction at all plants (2% increase, 5000+ employees)

Teaching/Involvement

- Teaching Assistant, 10423/623/723 Generative AI Fall 2025
- Member, AI Curriculum Review Committee Fall 2024
- Teaching Assistant, 10703 Deep Reinforcement Learning Fall 2024
- Teaching Assistant, 15-251, Great Ideas in Theoretical Computer Science Spring 2023
- Head Teaching Assistant, 15-151/21-128 Mathematical Foundations for Computer Science Fall 2023
- Teaching Assistant, High School AI Scholars Program @ CMU Summer 2023
- Judge, WWP Hacks 2022 (HS hackathon, \$5000+ in prizes) Spring 2023
- Head Teaching Assistant, 15-151/21-128 Mathematical Foundations for Computer Science Fall 2022
- Teaching Assistant, 15-251, Great Ideas in Theoretical Computer Science Spring 2022
- Head Teaching Assistant, 15-151/21-128 Mathematical Foundations for Computer Science Fall 2021
- Teaching Assistant, 15-251, Great Ideas in Theoretical Computer Science Spring 2021
- Teaching Assistant, 15-151/21-128 Mathematical Foundations for Computer Science Fall 2020

Awards/Honors

- CMU Machine Learning Department TA of the year (2024-2025 school year)
- ULSAC (University Leadership Student Advisory Council) 2023-2025
- CMU Rales Fellowship (~80k/yr, 2 yrs) 2024-Present
- Siebel Scholarship (35k) Spring 2024
- CMU Mark Stehlík Introductory and Service Teaching Award ([statement](#)) Spring 2023
- CMU Phi Beta Kappa Honor Society Fall 2023

Projects

- **QFormer Implementation** Fall 2025
 - Implemented [MetaQueries](#) from scratch to be given in [Generative AI](#) course as a HW
 - Connected GPT-2 embeddings with pretrained diffusion model on Cifar10 to create toy setting for students
 - Helped create homework end to end, from ideation to implementation to writeup and handout
 - Optimized training to work with extremely limited student compute
- **Decision Transformer and Action Diffusion Implementation** Fall 2024
 - Implemented [Decision Transformer](#) and [Diffusion Policy](#) from scratch to be given in [deep reinforcement learning](#) class as a HW (see Teaching Fall 2024).
 - Able to match performance of expert trajectories on openAI gym environment collected using a trained PPO model
 - Wrote the code, homework writeup, solutions, template, rubric, and exam questions pertaining to new HW material
- **Story Generation** ([project link](#)) Spring 2024
 - Generate stories on team of 4 (new story captions and corresponding images) from a single initial story caption/image
 - Generate separate story captions for story and conditioning captions to be used for text-to-image model (novel idea)
 - Finetuned Stable Diffusion for image generation and llava model for caption generation using LoRA (Low Rank Adapters)
 - Improved performance over baselines with same task
- **Solving Graph Problems with Diffusion** ([project link](#)) Spring 2024
 - Use Graph Neural Networks and Diffusion to solve graph problems like MST (minimum spanning tree) quickly on team of 3
 - Using Kruskals algorithm with ordering from our predicted edges, we find less cycles when computing the MST
- **Cozmo Depth Map** ([codebase](#)) ([slides](#)) Spring 2023
 - On team of 2, programmed a robot to use MiDaS, a relative monocular depth estimation model on camera input with 8 GB GPU
 - Given real world sparse depth from aruco markers, calculate optimal scaling factor for relative depth map
 - Allow users to query any pixel on screen and output real world depth estimate
- **MIT Battlecode!** ([full overview](#))
 - Created Java software on team of 4, for AI bot to compete against other teams in month-long MIT lead tournament, competed for 3 years
 - Leveraged distributed communication algorithms and pathfinding to increase bot's effectiveness
 - Implemented bit packing methods, Priority Queues and Stacks, and K-Means Clustering to improve performance
 - Placed top 10 out of 250 teams internationally (2021, 2022, 2023), 1st out of all first-time teams(2021), \$2000+ in prize winnings

Coursework/Skills

| Coursework: | Languages: | Tools/Frameworks: |
|---------------------------------------|-------------------|--------------------------|
| 11-777 Multimodal ML | Python | Pytorch |
| 10-708 Probabilistic Graphical Models | Java | NumPy |
| 10-703 Deep Reinforcement Learning | C | SciPy |
| 10-725 Convex Optimization | Javascript | Unix Command Line |
| 36-700 Statistics | HTML/CSS | Git |
| 15-485 Intro to Deep Learning | LaTeX | Sklearn |
| 16-385 Computer Vision | SQL | Keras |
| 10-315 Intro to Machine Learning | Julia | Pandas |
| 15-210 Parallel Algorithms | | Jupyter Notebook |
| 15-213 Computer Systems | | regex |
| 21-484 Graph Theory | | Matplotlib |
| 21-301 Combinatorics | | OpenCV |
| | | Slurm |
| | | bash script |