

# Maxwell Jones

PhD Candidate

Machine Learning Department

Carnegie Mellon University

website: [maxwelljon.es](https://maxwelljon.es)

mjones2 [at] andrew [dot] cmu [dot] edu

## Education

### Carnegie Mellon University

Machine Learning Department, PhD

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

2015-2019

High School Diploma 2019 (GPA: 4.1/5.0)

## 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. [\[Paper\]](#).
- Dravyansh Sharma, and **Maxwell Jones**. *Efficiently learning the graph for semi-supervised learning*. UAI 2023. [\[Paper\]](#).
- Melissa Hall, Laurens Van der Maaten, Laura Gustafson, **Maxwell Jones**, and Aaron Adcock. *A systematic study of bias amplification*. CVPR TSRML Workshop 2022. [\[Paper\]](#).

## 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

- 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

## Projects

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- **Decision Transformer and Action Diffusion Implementation** Fall 2024
    - Implemented [Decision Transformer](#) and [Action Diffusion](#) from scratch to be given in deep reinforcement learning class as a HW (see Teaching Fall 2024).
    - Implemented Value Guidance (similar to classifier guidance) from [diffusion RL paper](#), improving diffusion performance
    - Able to match performance of expert trajectories on openAI gym environment collected using a trained PPO model
  - **Story Generation** 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) ([project link](#))
    - Improved performance over baselines with same task
  - **Solving Graph Problems with Diffusion** 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 ([project link](#))
  - **Cozmo Depth Map** 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 ([codebase](#)) ([slides](#))
  - **MIT Battlecode!**
    - 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 ([full overview](#))

## Awards/Honors

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- ULSAC (University Leadership Student Advisory Council) 2023-Present
  - CMU Rales Fellowship (~80k/yr, 2 yrs) 2024-Present
  - Siebel Scholarship (35k) Spring 2024
  - CMU Mark Stehlik Introductory and Service Teaching Award ([statement](#)) Spring 2023
  - CMU Phi Beta Kappa Honor Society Fall 2023

## Coursework/Skills

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### Coursework:

11-777 Multimodal ML  
10-708 Probabilistic Graphical Models  
10-703 Deep Reinforcement Learning  
10-725 Convex Optimization  
36-700 Statistics  
15-485 Intro to Deep Learning  
16-385 Computer Vision  
10-315 Intro to Machine Learning  
15-210 Parallel Algorithms  
15-213 Computer Systems  
21-484 Graph Theory  
21-301 Combinatorics

### Languages:

Python  
Java  
C  
Javascript  
HTML/CSS  
LaTeX  
SQL  
Julia

### Tools/Frameworks:

Pytorch  
NumPy  
SciPy  
Unix Command Line  
Git  
Sklearn  
Keras  
Pandas  
Jupyter Notebook  
regex  
Matplotlib  
OpenVS  
Slurm  
bash script