Kaleigh Clary

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EDUCATION

PhD, Computer Science, *University of Massachusetts Amherst* Dec. 2023
Advisor: David Jensen, Knowledge Discovery Laboratory (Expected)
Thesis: Causal-Relational Evaluation of Learned Representations under Open-World Novelty

MS, Computer Science, *University of Massachusetts Amherst* May 2018

BA, Computer Science, Mathematics, *Hendrix College* May 2014

TECHNICAL SKILLS

Languages	Python, R, SQL, Java (proficient); MATLAB, Rust, Julia (prior experience)
Development Skills	version control software (**Git**), Linux CLI/shell script, CPU/GPU cluster job scheduling (Slurm), PyTorch, containerization (**Docker**), continuous integration testing (Github Actions, Travis)

RESEARCH EXPERIENCE

Graduate Researcher, DARPA SAIL-ON Jan. 2020 – May 2023
University of Massachusetts Amherst *Amherst, MA*

- Developed agents and machine learning models for **temporal anomaly detection** and **few-shot transfer** in four domains for sequential decision-making (SDM) under a variety of changes in the environment (open-world novelty)
- Achieved **95%** true positive detection accuracy and **6%** false positive rate in external program evaluation of anomaly detection under unrevealed forms of novelty using statistical inference with multiple hypothesis correction
- Implemented and optimized methods for few-shot transfer using **causal estimation**, model-based reinforcement learning, and simulation-based inference under diverse forms of novelty (Python, Bullet/PyBullet, Java)
- **Tested, packaged, and delivered** SDM agents developed to interoperate with external partner environments for semiannual program evaluations with performance that met or exceeded evaluation targets (Docker)

Graduate Researcher, Independent Project Feb. 2015 – Aug. 2022
University of Massachusetts Amherst *Amherst, MA*

- Developed threat models for effect estimation bias due to adversarial or non-cooperative models of user behavior in online social networks with consequences for standard **A/B testing methods** in settings with **network effects**
- Identified vulnerability to **estimation bias** in average treatment effect of up to **1.5x** the true effect in simulated A/B tests reproduced on multiple synthetic graph families and real-world networks including Facebook (R, igraph)

INDUSTRY EXPERIENCE

Fellow, in partnership with AllianceChicago May – Aug. 2018
Data Science for Social Good, University of Chicago *Chicago, IL*

- Interfaced with community health partners to develop **personalized risk prediction models** for proactive screening of patients' risk of developing diabetes in the next three years to improve over U.S. standard screening guidelines
- Increased detection rate **18%** over the standard guidelines and obtained detection comparable to U.S. guidelines requiring **25%** fewer tests in HIPAA-compliant evaluations using longitudinal patient records
- Worked in a team of four to build an end-to-end pipeline to **extract, transform, load data (ETL)** for model training and automate reporting for **analysis of model error rates** (SQL, pandas, scikit-learn)

Research Intern, AI Technology and Systems Jun. – Sep. 2017
MIT Lincoln Laboratory *Lexington, MA*

- Developed temporal-spatial models for urban zoning **label prediction** using census and historical records (R)

Graduate Researcher, in collaboration with Pratt & Whitney Jan. 2015 – May 2017
University of Massachusetts Amherst *Amherst, MA*

- Implemented **probabilistic models** of engine maintenance events for fleet-wide supply chain forecasting (R)

Publications

AAAI DC 2023	**Assessing Learned Representations under Open-World Novelty**. *Kaleigh Clary*. Proceedings of the 28th AAAI/SIGAI Doctoral Consortium (AAAI)
USENIX Security 2022	**Stick It to The Man: Correcting for Non-Cooperative Behavior of Subjects in Experiments on Social Networks**. *Kaleigh Clary*, Emma Tosch, Jeremiah Onaolapo, David D. Jensen. Proceedings of the 31th USENIX Security Symposium (USENIX)
Applied AI Letters 2021	**Measuring and Characterizing Generalization in Deep Reinforcement Learning**. Sam Witty, Jun Ki Lee, Emma Tosch, Akanksha Atrey, *Kaleigh Clary*, Michael L. Littman, David D. Jensen. Applied AI Letters (Wiley)
ICLR 2020	**Exploratory Not Explanatory: Counterfactual Analysis of Saliency Maps for Deep RL**. Akanksha Atrey, *Kaleigh Clary*, David D. Jensen. Proceedings of the 8th International Conference on Learning Representations (ICLR)
NeurIPS Workshop 2018	**Let's Play Again: Variability of Deep Reinforcement Learning Agents in Atari Environments**. *Kaleigh Clary*, Emma Tosch, John Foley, David D. Jensen. Critiquing and Correcting Trends in Reinforcement Learning Workshop at the 32nd Conference on Neural Information Processing Systems (NeurIPS)
NeurIPS Workshop 2018	**ToyBox: Better Atari Environments for Testing Reinforcement Learning Agents**. John Foley,* Emma Tosch,* *Kaleigh Clary*, David D. Jensen. Systems for Machine Learning Workshop at the 32nd Conference on Neural Information Processing Systems (NeurIPS)
KDD Workshop 2017	**A/B Testing in Networks with Adversarial Members**. *Kaleigh Clary*, David D. Jensen. Workshop on Mining and Learning with Graphs at the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)

Posters and Presentations

7 Feb. 2023	**Oral presentation**. *AAAI/SIGAI 2023 Doctoral Consortium*. Washington, DC
12 Aug. 2022	**Oral presentation**. *USENIX Security*. Boston, MA
13 Apr. 2021	**Guest lecture**. *Artificial Intelligence, University of Vermont*. Burlington, VT
7 Dec. 2018	**Oral presentation (short)**. *NeurIPS Critiquing and Correcting Trends Workshop*. Montreal, QC
8 Aug. 2018	**Oral presentation**. *Data Science Chicago Meetup Highlight, IDEO*. Chicago, IL
14 Aug. 2017	**Oral presentation (short)**. *KDD Workshop on Mining and Learning with Graphs*. Halifax, NS
18 May 2015	**Poster**. *New England Machine Learning Day, Microsoft Research*. Cambridge, MA

Professional Activities and Service

2021	**Reviewer**, *International Conference on Learning Representations (ICLR)*
2020	**Graduate Student Representative**, *UMass Amherst CICS Faculty*
2019	**Reviewer**, *Data Science for Social Good Fellowship*
2015	**Volunteer Research Programmer**, *Hack the Dinos @ AMNH, featured in NYT article*
2015	**Subreviewer**, *Association for the Advancement of Artificial Intelligence (AAAI)*
2015	**Graduate Assistant**, *UMass Amherst Computational Social Science Institute Seminar Series*

Honors, Scholarships, and Awards

2023	UMass Amherst CICS Dissertation Writing Fellowship
2023	AAAI Doctoral Consortium Fellow
2018	UMass Amherst CICS Outstanding Synthesis Award
2014	Undergraduate Distinction Award, Mathematics
2013	National Undergraduate Research Scholarship, Barry M. Goldwater Scholarship