

Kaleigh Clary

<http://cs.umass.edu/~kclary> | [linkedin.com/in/kaleigh-clary](https://www.linkedin.com/in/kaleigh-clary)
github.com/kclary

Northampton, MA, USA

kclary@cs.umass.edu | (501) 743-9848

EDUCATION

PhD, Computer Science, *University of Massachusetts Amherst*

Dec. 2024

Advisor: David Jensen, Knowledge Discovery Laboratory

MS, Computer Science, *University of Massachusetts Amherst*

BA, Computer Science, Mathematics, *Hendrix College*

RESEARCH & INDUSTRY EXPERIENCE

Graduate Researcher, DARPA SAIL-ON

Jan. 2020 – May 2023

University of Massachusetts Amherst

Amherst, MA

- Developed RL 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
- Built **simulation environments** for classic control problems using numerical integration (2D) and the Bullet physics engine (3D) with API support for on-the-fly reconfiguration of physical parameters (Python, Docker)

Graduate Researcher, Independent Project

Feb. 2015 – Aug. 2022

University of Massachusetts Amherst

Amherst, MA

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

Graduate Researcher, DARPA XAI

Sep. 2017 – Dec. 2019

University of Massachusetts Amherst

Amherst, MA

- Developed methods to **explain decisions and behavior of deep neural networks** using counterfactual reasoning for applications in classification and reinforcement learning relevant to human-AI decision support
- Trained a corpus of black-box model variants for evaluation and comparison of on-policy and out-of-distribution performance across deep learning policy architectures (Tensorflow, **PyTorch**)
- Increased testing efficiency by as much as **4.4x** and enabled new evaluation designs via development of a reconfigurable software mock for a set of common deep reinforcement learning benchmarks (Python, Rust)

Fellow, in partnership with AllianceChicago

May – Aug. 2018

Data Science for Social Good, University of Chicago

Chicago, IL

- Increased detection rate **18%** over U.S. screening guidelines for patients' risk of developing diabetes using **personalized risk prediction models** in HIPAA-compliant evaluations from longitudinal patient records
- Worked in a team of seven 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 spatial-relational models for urban zoning prediction using census and historical data (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)

TECHNICAL SKILLS

Languages Python, R, SQL, Java, MATLAB, Rust, Julia

Development Skills version control software, Linux CLI/shell scripting, PyTorch, CPU/GPU cluster computing, API design, containerization (Docker), code review, continuous integration testing

TEACHING EXPERIENCE

- Teaching Assistant, Ethics and Responsible Computing (Graduate)** Jan. 2024 – May 2024
Supervised by Prof. Peter Haas, University of Massachusetts Amherst Amherst, MA
- Facilitated ethics activities for CICS 696DS Industry Mentorship (Graduate); designed interactive ethics scenarios for PEArCE education platform; presented and developed ML-specific materials for topics in responsible computing
- Teaching Assistant, COMPSCI 589: Machine Learning (Undergraduate)** Sep. 2023 – Jan. 2024
Supervised by Prof. Hui Guan, University of Massachusetts Amherst Amherst, MA
- Designed homework assignments; developed coding and proof solutions; offered weekly office hours
- Teaching Assistant, COMPSCI 691DD: Research Methods (Graduate)** Sep. 2019 – Jan. 2020
Supervised by Prof. David Jensen, University of Massachusetts Amherst Amherst, MA
- Consulted and mentored students in empirical research design for student original research projects

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 Onalapo, 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
- 13 Oct. 2016 **Oral presentation.** Career Mixer, UMass Amherst Center for Data Science. Amherst, MA
- 18 May 2015 **Poster.** New England Machine Learning Day, Microsoft Research. Cambridge, MA

PROFESSIONAL ACTIVITIES AND SERVICE

- 2024 **Expert Reviewer**, *Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*
- 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 UMass Amherst CICS Victor Lessor Scholarship
- 2014 Undergraduate Distinction Award (Mathematics), Hendrix College
- 2013 National Undergraduate Research Scholarship, Barry M. Goldwater Scholarship