

# Nick Kroeger

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## Education

<b>Ph.D. in Computer Science – Machine Learning</b> , University of Florida GPA: 3.81/4.0	<b>Expected 2025</b>
<b>M.S. in Computer Science – Machine Learning</b> , University of Florida GPA: 3.81/4.0	<b>August 2021</b>
<b>B.S. in Computer Science</b> , University of Florida <i>Minor in Music Performance – Saxophone</i> , University of Florida GPA: 3.84/4.0	<b>May 2018</b>

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## Publications

- Kroeger, N. M.**, Ley, D., Krishna, S., Agarwal, C., Lakkaraju, H. (2023). In-Context Explainers: Harnessing LLMs for Explaining Black Box Models. arXiv preprint arXiv:2310.05797.
  - Meerdink, S., Bocinsky, J., Zare, A., **Kroeger, N. M.**, McCurley, C., Shats, D., & Gader, P. (2022). Multitarget Multiple-Instance Learning for Hyperspectral Target Detection. *IEEE Transactions on Geoscience and Remote Sensing*, 60, 1–14.
  - Koelmel, J. P., Tan, W. Y., Li, Y., Bowden, J. A., Ahmadireskety, A., Patt, A. C., Orlicky, D. J., Mathé, E., **Kroeger, N. M.**, Thompson, D. C., Cochran, J. A., Golla, J. P., Kandyliari, A., Chen, Y., Charkoftaki, G., Guingab-Cagmat, J. D., Tsugawa, H., Arora, A., Veselkov, K., ... Vasilou, V. (2021). Lipidomics and Redox Lipidomics Indicate Early Stage Alcohol-Induced Liver Damage. *Hepatology Communications*.
  - Koelmel, J. P., Paige, M. K., Aristizabal-Henao, J. J., Robey, N. M., Nason, S. L., Stelben, P. J., Li, Y., **Kroeger, N. M.**, Napolitano, M. P., Savvaides, T., Vasiliou, V., Rostkowski, P., Garrett, T. J., Lin, E., Deigl, C., Jobst, K., Townsend, T. G., Godri Pollitt, K. J., & Bowden, J. A. (2020). Toward Comprehensive Per- and Polyfluoroalkyl Substances Annotation Using FluoroMatch Software and Intelligent High-Resolution Tandem Mass Spectrometry Acquisition. *Analytical Chemistry*, 92(16), 11186–11194.
  - Koelmel, J. P., **Kroeger, N. M.**, Ulmer, C. Z., Bowden, J. A., Patterson, R. E., Cochran, J. A., Beecher, C. W. W., Garrett, T. J., & Yost, R. A. (2017). LipidMatch: An automated workflow for rule-based lipid identification using untargeted high-resolution tandem mass spectrometry data. *BMC Bioinformatics*, 18(1).
  - Koelmel, J. P., **Kroeger, N. M.**, Gill, E. L., Ulmer, C. Z., Bowden, J. A., Patterson, R. E., Yost, R. A., & Garrett, T. J. (2017). Expanding Lipidome Coverage Using LC-MS/MS Data-Dependent Acquisition with Automated Exclusion List Generation. *Journal of The American Society for Mass Spectrometry*, 28(5), 908–917.
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## Research Experience

<b>Graduate Research Assistant</b> for Dr. Vincent Bindschaedler, CS Professor University of Florida – Gainesville, FL	<b>March 2023 – Present</b>
<ul style="list-style-type: none"><li>■ Develop “Cluster Path” neural network <i>interpretability</i> method to understand how samples traverse each layer’s feature space (manuscript in progress)</li><li>■ Introduce novel metrics for Cluster Path <i>stability</i>, <i>faithfulness</i>, and <i>complexity</i></li><li>■ Improve <i>outlier detection</i>, <i>debugging</i>, and insights into misclassifications and learned patterns</li></ul>	
<b>Research Intern</b> for Dr. Himabindu Lakkaraju, HBS & CS Professor Harvard University – Cambridge, MA	<b>May 2023 – July 2023</b>
<ul style="list-style-type: none"><li>■ Key contributor to a cutting-edge AI explainability project on Large Language Models (LLMs)</li><li>■ Engaged in extensive coding and experiments using OpenAI’s API, playing a crucial role in team-based research</li><li>■ Developed a streamlined framework for efficient and repeatable AI research experiments</li></ul>	

**Graduate Research Assistant** for Dr. Paul Gader, CS Professor**August 2018 – March 2023**

University of Florida – Gainesville, FL

- Conducted literature review on *interpretability* for deep learning models with sequential data
- Leveraged null space information in neural networks for *out-of-distribution detection*
- Developed *anomaly detection* algorithms for bio-acoustic responses indicative of underwater vehicles
- Devised *unsupervised learning algorithms* for characterization of underwater coral reef soundscapes

**Undergraduate Research Assistant** for Dr. Paul Gader, CS Professor**October 2016 – May 2018**

University of Florida – Gainesville, FL

- Translated and optimized hyperspectral unmixing algorithms from Matlab to C++ that detect materials, or endmembers, in an image
- Analyzed convolutional and morphological neural networks' ability for detecting landmines

**Undergraduate Research Assistant, SECIM Core 1: Mass Spectrometry****January 2015 – August 2016**

University of Florida – Gainesville, FL

- Designed computer programs and scripts in R for cutting edge research in biomarker discovery
- Presented software in oral presentations and co-authored in 2 peer reviewed articles
- Optimized previous in-house software from hour run times to minute run times

**Professional Experience****Founder of "Explainable Artificial Intelligence (XAI)" Research Community****February 2022 – Present**

- Establish an international forum of 400 (and growing) researchers and XAI enthusiasts
- Create and promote monthly XAI research presentations from notable authors
- Recruit researchers, promote conferences and events, and share state-of-the-art literature
- Maintain and curate content for @XAI\_Research on Twitter/X and @XAIRResearch on Youtube

**Tutor and Mentor****February 2022 – Present**

Freelance, "Uschool," and "Sequoia Gifted and Creative"

- Mentor middle and high school students, weekly, by instilling confidence for college via time management skills, goal setting, and strengths and weakness analysis
- Tutor middle and high school students, weekly, in computer science and machine learning projects
- Teach students coding basics to state-of-the-art neural networks specifically, Transformer models

**Research Mentor****November 2023 – December 2023**

University of Florida – Gainesville, FL

- Coordinated and supervised 28 undergraduate students on a spectrogram labeling effort
- Gave a lecture on the k-nearest neighbors algorithm and another on the k-means algorithm

**Research Mentor****March 2019 – July 2021**

University of Florida – Gainesville, FL

- Mentored a graduate student on machine learning research and experiment design
- Guided two undergraduates to create a spectrogram GUI for labeling underwater acoustic data
- Taught students to implement and train various models for fish-call classification

**Teaching Assistant** for "Computer Programming for Engineers - MATLAB"**May 2017 – August 2017**

University of Florida – Gainesville, FL

- Graded student assignments and held office hours for one-on-one programming assistance

**Founder and President, ACM's Artificial Intelligence Club****January 2016 – April 2017**

University of Florida – Gainesville, FL

- Created interest among 250+ students at UF in the field of Artificial Intelligence/Machine Learning
- Conducted weekly presentations, with coding demonstrations, ice breakers, and project discussion
- Led meetings to prepare for semester projects, presentations, promotion, and funding

**Resident Assistant**, Department of Housing & Residence Education  
University of Florida – Gainesville, FL

**June 2015 – May 2018**

- Planned and executed 10-15 programs per semester aimed to promote campus involvement, inclusion, academic excellence, and health
- Built community for 40 diverse residents through advising and educational events

**Volunteer Programming Teacher at the Boys & Girls Club**

**January 2016 – August 2016**

Alachua County, FL

- Educated and motivated diverse and underprivileged youth of Alachua County to train for higher levels of education through computer programming
- Taught 9-14 year-old kids how to program games in the computer language “Scratch”

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## **Skills & Strengths**

**Programming Languages:** Python, MATLAB, Java, R, C++, Elixir, and SQL

**Strengths**Quest Top 5: Learner, Achiever, Intellection, Connectedness, Discipline