

Nick Kroeger

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Education

Ph.D. in Computer Science - Machine Learning , University of Florida GPA: 3.81/4.0	Expected 2023
M.S. in Computer Science - Machine Learning , University of Florida GPA: 3.81/4.0	August 2021
B.S. in Computer Science , University of Florida Minor in Music Performance - Saxophone , University of Florida GPA: 3.84/4.0	May 2018

Publications

- 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.
 - 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., 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., Vasilou, 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., 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*.
 - 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.
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Research Experience

Graduate Research Assistant for Dr. Paul Gader, CS Professor University of Florida – Gainesville, FL	August 2018 – Present
<ul style="list-style-type: none">Conduct literature review on <i>interpretability</i> for deep learning models with sequential dataLeverage null space information in neural networks for <i>out-of-distribution detection</i>Develop <i>anomaly detection</i> algorithms for bio-acoustic responses indicative of underwater vehiclesDevise <i>unsupervised learning algorithms</i> for characterization of underwater coral reef soundscapes	
Undergraduate Research Assistant for Dr. Paul Gader, CS Professor University of Florida – Gainesville, FL	October 2016 – May 2018
<ul style="list-style-type: none">Translated and optimized hyperspectral unmixing algorithms from Matlab to C++ that detect materials, or endmembers, in an imageAnalyzed convolutional and morphological neural networks' ability for detecting landmines	
Undergraduate Research Assistant , SECIM Core 1: Mass Spectrometry University of Florida – Gainesville, FL	January 2015 – August 2016
<ul style="list-style-type: none">Designed computer programs and scripts in R for cutting edge research in biomarker discoveryPresented software in oral presentations and co-authored in 2 peer reviewed articlesOptimized previous in-house software from hour run times to minute run times	

Professional Experience

Founder of "Explainable Artificial Intelligence (XAI)" Slack Group February 2022 – Present

- Established an international community for 180+ researchers and XAI enthusiasts (and growing)
- Provide monthly opportunities for XAI research and paper discussions from notable authors
- Recruit researchers, promote conferences and events, and share state-of-the-art literature
- Maintain and curate content for the @XAI_Research Twitter account

Tutor and Mentor February 2022 – Present

"Uschool" and "Sequoia Gifted and Creative"

- Mentor high school students, weekly, by instilling confidence and preparing them for college
- Tutor high school students, weekly, in introductory and intermediate machine learning topics

Research Mentor March 2019 – Present

University of Florida – Gainesville, FL

- Teach and mentor a graduate student on how to conduct machine learning research and experiments
- Mentored two undergraduate students to create a GUI for labeling underwater acoustic data
- Teach 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 June 2015 – May 2018

University of Florida – Gainesville, FL

- 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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Projects

Genre Classification – Language: Python (library used: PyTorch) March 2019 – May 2019

- Created models to classify raw audio as either Progressive or Non-Progressive Rock
- Extracted Mel-frequency cepstral coefficient features from audio
- Compared four types of neural networks: 1) fully-connected, 2) convolutional-recurrent, 3) encoder-decoder long-short term memory (LSTM), and 4) residual encoder-decoder LSTM with self-attention

Musical Instrument Classification – Language: Python January 2018 – May 2018

- Implemented a *trainable* fully-connected neural network (using stochastic gradient descent) *from scratch* in Python that supports any number of layers
- Classified raw audio as belonging to one of these nine instruments: cello, clarinet, double bass, flute, guitar, saxophone, trumpet, tuba, or violin

TigerIsland – Language: Java March 2017 – April 2017

- Implemented a two-player board game using Agile and test-driven development methods
- Produced an AI to play tournaments against other AIs via server/network protocols

Flight Delay Predictor – Languages: PHP, Python, & SQL

January 2017 – April 2017

- Developed a website where users can enter their flight information, to find out the probability that their flight will be delayed using a machine learning algorithm

Comparison of Classification Techniques – Language: MATLAB

January 2017 – April 2017

- Created a multi-class classification algorithm using least-squares regression on four datasets, then we compared the results to a multi-class support vector machine algorithm

Awards & Affiliations**Graduate Student Preeminence Award**

Fall 2018

GSPA is awarded to the strongest Ph.D. applicants to support highly competitive research

Gartner Group Info Tech Scholarship

Spring 2017

Awarded by the UF's Computer Science Awards & Recognition Committee to four undergraduate students that exhibited outstanding GPA, research, awards, and professional services

John & Mittie Collins Engineering Scholarship

Spring 2016

Awarded to a student in the Herbert Wertheim College of Engineering at UF who promotes scholarly excellence and innovation through UF's engineering programs

Resident Assistant of Distinction – Service

Spring 2016

An award, chosen by coworkers, to honor an RA that demonstrated outstanding crisis management

Dean's List

Fall 2014, Spring 2015, Fall 2015, Spring 2016

Awarded for achieving 3.2 GPA or higher with at least 14 credits a semester

Skills & Strengths

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

StrengthsQuest Top 5: Learner, Achiever, Intellection, Connectedness, Discipline