Nick Kroeger

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Education

Ph.D. in Computer Science - Machine Learning, University of Florida **Expected 2023**
GPA: 3.81/4.0

M.S. in Computer Science - Machine Learning, University of Florida **August 2021**
GPA: 3.81/4.0

B.S. in Computer Science, University of Florida **May 2018**

Minor in Music Performance – Saxophone, University of Florida
GPA: 3.84/4.0

Publications

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.

2. 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).

3. 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.

4. 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*.

5. 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.

Research Experience

Graduate Research Assistant for Dr. Paul Gader, CS Professor **August 2018 – Present**
University of Florida – Gainesville, FL

- Conduct literature review on *interpretability* for deep learning models with sequential data
- Leverage null space information in neural networks for *out-of-distribution detection*
- Develop *anomaly detection* algorithms for bio-acoustic responses indicative of underwater vehicles
- Devise *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

Tutor and Mentor **February 2022 – Present**
Uschool, Online
- 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 – March 2020**
University of Florida – Gainesville, FL
- 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"

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: MATLAB, Python, Java, R, C++, Elixir, and SQL
StrengthsQuest Top 5: Learner, Achiever, Intellection, Connectedness, Discipline