

# Austin Okray

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## Education

- 2014 - 2020 **University of Wyoming.**  
*B.S. in Computer Science*  
◦ Minors in Mathematics and Statistics

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## Research and Work Experience

2018 - **Undergraduate Research Assistant**

*University of Wyoming Department of Computer Science, Laramie, WY*

- Advisor: Dr. Chao Lan
- Topics: fair machine learning, kernel methods, multi-view learning, anomaly detection
- Details: Nonlinear fair machine learning is a field with limited research, and Publication [1] below addresses this with a novel kernel feature embedding method. Multi-view anomaly detection research is detailed in the COSC4010: Special Topics - Machine Learning for Cybersecurity course project.

2019 - **Research Intern**

*Teton Simulation Software, Laramie, WY*

- Supervisor: Dr. Jeff Selden
- Tasks: utilizing machine learning methods, optimization techniques, and various mathematical methods to solve problems related to optimizing 3D printed parts.

2017 - 2019 **Database Developer**

*University of Wyoming Information Technology, Laramie, WY*

- Supervisors: Julie Schroyer
- Tasks: developed and maintained the custom student teaching application, communicated with College of Education department heads to implement new functionality/features, utilized Python and R to visualize application data to deliver critical usage information to clients.

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## Publications

- [1] **A. Okray**, H. Hu, C. Lan, "Fair Kernel Regression via Fair Feature Embedding in Kernel Space", In: *International Conference on Tools in Artificial Intelligence*. 2019.
- [2] Z. Wang, S. Muknahallipatna, M. Fan, **A. Okray**, C. Lan, "Music Classification using an Improved CRNN with Multi-Directional Spatial Dependencies in Both Time and Frequency Dimensions", In: *International Joint Conference on Neural Networks*. 2019.

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## Oral Presentations

- Nov 2019 Fair Kernel Regression via Fair Feature Embedding in Kernel Space  
◦ At ICTAI 2019. Portland, Oregon.

- July 2019 Music Classification using an Improved CRNN with Multi-Directional Spatial Dependencies in Both Time and Frequency Dimensions
- o At IJCNN 2019. Budapest, Hungary.

## Teaching Experience

- Fall 2019 **Teaching Assistant**, *COSC4550: Introduction to Artificial Intelligence*, UWyo.
- o Tasks: grading, preparing and giving tutorials on  $\text{\LaTeX}$ , the basics of machine learning in Sci-kit Learn and TensorFlow. Delivered a lecture on Dimensionality Reduction and Clustering techniques.

## Course Projects

- Spring 2018 **Heuristic Time Weighted k-NN for NBA Game Prediction\***  
COSC4555: Machine Learning  
Dr. Chao Lan, Department of Computer Science
- o Predicting the winners of sports games is a challenging task, millions of dollars of investments and betting ride on the outcomes. This project focused on developing and implementing a novel time-based heuristic weighting scheme for k-NN to predict the winners of NBA games.
- Spring 2019 **Investing for Low-Income Investors with Managed Risk as a Convex Optimization Problem**  
EE5490: Convex Optimization  
Dr. John McInroy, Department of Electrical Engineering
- o This project implemented a version of a risk averse convex optimization, such that lower income peoples could invest with the confidence that their money generally wouldn't lose value if they needed to pull it out early (e.g. in several weeks/months, as opposed to several years), but would still grow.
- Fall 2019 **Fairness for All (F4A): A website to educate non-technical audiences on Fair ML\***  
COSC4010: Independent Study  
Dr. Chao Lan, Department of Computer Science
- o Machine learning is a complex subject, explaining how machine learning predictions can be biased is even more complex. The goal of F4A is to educate non-technical audiences about machine learning prediction bias through exploration and experimentation with various ML models, features, and hyperparameters. Results are stored for later look-up to speed up the application. Built with Postgres, Python, Javascript, HTML, and CSS.
- Fall 2019 **Splitting Single View Data into Multiple Views for Multi-View Anomaly Detection\***  
COSC4010: Special Topics - Machine Learning for Cybersecurity  
Dr. Diksha Shukla, Department of Computer Science
- o Multi-view data is difficult to find in the field of anomaly detection. For most multi-view anomaly detection (MVAD) research, experiments are performed on views made from random view splits. This can lead to sub-optimal and more variable results. This project focused on developing a method to split single-view data into multiple views for use in MVAD.

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\* Denotes continuing work

## Professional Activities and Mentorship

Co-Reviewer IEEE Big Data 2019, ICBK 2019, PAKDD 2020  
Session Chair IJCNN Applications of Deep Networks session  
Mentor Guided an undergraduate student group researching Educational Data Mining  
Club Activity Vice President of Data Science Club

## Fellowships and Awards

2019 University of Wyoming Engineering Fund for Enrichment Award Recipient  
Fall 2018 Dean's Honor Roll

## Computer Skills

Programming Python, R, SQL, Javascript, C++, Java, Groovy  
Libraries Sci-kit Learn, NumPy, SciPy, Matplotlib

## Other Interests

Travelling, photography, mountain biking, paleontology, strategy games