LANDON BUTLER

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EDUCATION

University of Pennsylvania, School of Engineering & Applied Science — Philadelphia, PA
Candidate for Master of Science in Engineering — **May 2022**
Accelerated Master's Program: **Data Science** — GPA: 4.00/4.00
Thesis: "Weakly Supervised Anomaly Detection for Graph Generalizations"

Candidate for Bachelor of Science in Engineering — **May 2022**
Major: **System Science & Engineering** — GPA: 3.97/4.00
Concentration: Artificial Intelligence & Data Science
Minors: Computer Science, Mathematics, Statistics

Graduate Coursework: Machine Learning, Graph Neural Networks, Network Theory, Simulation Modeling

RESEARCH

Weakly Supervised Anomaly Detection on Graph Generalizations — **May 2021 – Present**
Advised by Prof. Victor Preciado, Prof. Sanjeev Khanna, and Prof. Brett Hemenway Falk

- Developing a novel weakly-supervised anomaly detection algorithm for faulty data situated on hypergraphs
- Applying techniques to thwart against the spread of hate speech on Twitter and the prevention of fraudulent transactions on the blockchain

Convolutional Filtering and Learning with Non-Commutative Algebras — **May 2021 – Present**
Advised by Dr. Alejandro Parada-Mayorga and Prof. Alejandro Ribeiro

- Creating theory of multigraph signal processing through generalized notions of filtering and convolutions
- Leveraging such notions to design a Multigraph Neural Network to provide inference on multigraph data

Learning Connectivity for Data Distribution in Robot Teams — **Jan 2020 – May 2021**
Advised by Prof. Alejandro Ribeiro and Prof. Vijay Kumar

- Investigated collaborative learning policies for robot teams that exploit the underlying graphical structure
- Leveraged Graph Neural Networks to train multi-agent systems through Reinforcement Learning

Interests: Network Science, Machine Learning, Dynamical Systems, Optimization
Affiliations: Alelab, Warren Center for Network and Data Sciences

PUBLICATIONS

Published:

1. E. Tolstaya*, **L. Butler***, D. Mox, J. Paulos, V. Kumar, and A. Ribeiro, "Learning Connectivity for Data Distribution in Robot Teams". 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2021.

In Preparation:

1. A. Parada-Mayorga, **L. Butler**, and A. Ribeiro, "Convolutional Filtering and Neural Networks with Non Commutative Algebras". Submitting to IEEE Transactions on Signal Processing. In Preparation.
2. A. Parada-Mayorga, **L. Butler**, and A. Ribeiro, "Multigraph Signal Processing". In Preparation.

PROJECT

Equitible Optimization of the Air Transportation Network — **Aug 2021 – Present**
Senior Design Project, advised by Prof. Megan Ryerson

- Designing optimal routes for each of the major U.S. airlines that increases accessibility and reduces greenhouse gas emissions, while satisfying current demand
- Solution implemented through heterogeneous, multi-agent reinforcement learning

TEACHING

ESE 305 - Foundations of Data Science **Fall 2021**
Head Teaching Assistant

- Undergraduate course where students are introduced to a breadth of foundational machine learning models for analysis of large datasets. Learning supported with hands-on Python programming assignments

ESE 514 - Graph Neural Networks **Fall 2021**
Teaching Assistant

- Graduate course covering information processing architectures for signals supported on graphs. Graph Neural Networks enabling scalable learning on large scale problems involving high dimensional signals

ESE 542 - Statistics for Data Science: Applied Machine Learning **Spring 2021, Summer 2021**
Teaching Assistant / Head Teaching Assistant, Outstanding TA award recipient

- Graduate course in Penn's MCIT program where students are taught a broad range of statistical tools and analysis models in order to extract meaningful information from large datasets

ACTIVITIES & OUTREACH

Penn Band – Percussionist, Fanfare Honor Society Member, Former Section Leader **Aug 2018 – Present**

- Performances at an assortment of student activities, including all football and basketball games

Penn Data Science Group – TWC Project Team Member **Aug 2020 – Present**

- Partnering with Together We Can to analyze data and build predictive models in order to offer recommendations on how to best address food insecurity in the greater Philadelphia area

College ARCH Mentorship – Mentor **July 2021 – Present**

- Serving as a mentor to high school students in underrepresented communities in STEM to prepare their applications for college admissions

Penn Assistive Devices and Prosthetic Technologies (ADAPT) – Member **Aug 2018 – May 2020**

- In partnership with Overbrook School for the Blind, designed an interactive toy and online interface for helping individuals with Juvenile Macular Degeneration learn Braille

TALKS

IEEE International Conference on Intelligent Robots & Systems 2021 **September 29, 2021**

- Title: "Learning Connectivity for Data Distribution in Robot Teams"

SEAS Summer Research Symposium **August 2, 2021**

- Title: "Weakly Supervised Anomaly Detection for Multigraphs"

Project W Conference **May 6, 2021**

- Title: "Modeling Food Insecurity in Chester City, Pennsylvania"

HONORS & AWARDS

Wolf Family Award in Systems Engineering

- Presented to the senior student in Systems Engineering who has demonstrated the best overall academic performance during their studies at the University

Award for Excellence in Student Support

- Recognized as one of four outstanding teaching assistants in Penn's MCIT program, as nominated by my students, peers, and faculty

Littlejohn Fellowship

- Summer funding awarded to six undergraduates in the School of Engineering & Applied Sciences to pursue research under the supervision of a faculty member

II-VI Foundation Scholarship Recipient

- Awarded $35,000 in total scholarship by the II-VI Foundation for my potential to contribute to industry as an engineer

Eagle Scout

- Achieved Boy Scout's highest achievement after being involved in scouting for ten years

INDUSTRY EXPERIENCE

Strivr Bellevue, WA
Software Engineering Intern - Remote **Summer 2020**

- Developed encryption architecture for end-to-end protection of the telemetry data generated from a trainee's session. Deployed to over 20,000 virtual reality headsets
- Bolstered Strivr's security capabilities promoting acquisition of data-sensitive customers

Kiewit Lenexa, KS
Electrical Engineering Intern **Summer 2019**

- Orchestrated cable separation study and built simulation tool to analyze the effects of electromagnetic interference within dense circuit runs
- Used to prevent electrical faults, each costing tens of thousands of dollars in lost production

Lead Intern – Electrical Engineering **Summers 2016, 2017, 2018**

- Designed 721 power and instrumentation circuits across seven power generation projects
- Served as the point of contact for TVA Allen Fossil Plant and TVA Paradise Combined Cycle Plant to address in-office engineering design discrepancies
- Maintained circuit design efficiency expected of a 3-5 year engineer