William Knez

Github github.com/wbknez
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Education

May 2022 Master of Computer Science (Big Data Systems)
Arizona State University

Dec 2016 Bachelor of Science in Computer Science
University of New Mexico

Dec 2016 Bachelor of Science in Applied Mathematics
University of New Mexico

Jun 2015 MCTP Summer Math Program
University of New Mexico

Relevant Coursework: Nonlinear Dynamics and Chaos, Advanced Calculus I, Interpersonal Communication, Independent Research Study in both Computer Science and Mathematics

Skills

- **Highly Proficient:** C/C++, Java, Kotlin, Python, R, Unix
- **Proficient:** Matlab, Ruby
- **Languages:** English (native), French (intermediate)

Research and Projects

Spring 2019 *Exploring the Application of Convolutional Neural Networks to Undersampled Knee MRI Reconstruction and Fracture Detection*
Univerisity of New Mexico Hospital Radiology Research Day 2019
William Knez, Trilce Estrada, Ph.D., Dr. Steve Tandenberg, M.D., Esteban Guillen, M.S.

- Create data pipeline to use both raw MRI k-space and full-color data slices from single and multi-coil machines as input with variable transformations.
- Develop GPU accelerated machine learning model using PyTorchc;w to perform image reconstruction using successive up- and down-sampling operations (U-net).
- Apply model to fracture-positive images to explore whether errors in reconstruction yield insight into fracture locations.
- Utilize New York University and Facebook MRI dataset collaboration for training and validation.

Spring 2018-Present Disturbance-Based Vector Transmission Simulation
Dr. Amalie McKee

- Model the spatial distribution of disease transmission as a dynamic process influenced by host location and vector eradication.
- Combine differential equation based transmission with agent based elements to track host immune history.
- Implement cellular automata model with C++ and visualize data as animated ternary and heat plots with Python.

Fall 2016-Present Wearing Lab
Dr. Helen Wearing

- Critique the methodology, results, and conclusions of select research in the field of infectious disease modeling.
- Lead multiple meetings with presentations on both original and reviewed research on topics such as belief-based vaccination models and applied network analysis.
- Help colleagues prepare for professional presentations by providing feedback on content, style, and describing research findings to an interdisciplinary audience.

Fall 2016 *Models of Oppressive Systems*
Math 499: Independent Study
Dr. Helen Wearing

- Combined both sociodynamics and game theory to Implement a social power hierarchy as a network of agents with differing ability to influence one another.
- Quantified power as the net flux of influential actions to and from an agent over time.
- Showed that representation matters – the composition of those in power influences the types of behavior reinforced in the population.

Fall 2015 *Schelling and Giles: Ameliorating Segregation through Accommodation*
CJ 318: Language, Thought, and Behavior
Dr. Ailesha Ringer

- Combined established model of residential segregation with communication accommodation theory.
- Created an agent-based simulation to add accommodation as an attractive and stochastic force to segregation model.
- Showed that a critical value exists whereupon integration instead of segregation may take place.

Teaching

Fall 2016 Facilitator, CJ 101: Introduction to Communication
Dr. Ailesha Ringer

- Managed 3 groups of 10 students by ensuring a safe and friendly virtual environment in which they could freely ask questions of both myself and others.
- Provided weekly discussion summary and thread prompt for each module in order to facilitate relevant and helpful discussion.
- Interacted with students regularly in effort to increase comprehension of material.

Volunteer Work

Fall 2018-
Fall 2019
Patient and Family Advisory Council
Presbyterian Hospital, Albuquerque, New Mexico

- Shared personal experience to identify procedural weaknesses.
- Provided feedback on proposed hospital policies to improve patient outcomes.