Adam Kurth

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Research Interests

As an aspiring biostatistician with a diverse background in mathematics, statistics, and personal healthcare experiences, I am passionate about advancing the field of biostatistics through innovative research and applications. My interests span a wide range of areas, including functional data analysis, decision-making frameworks, survival analysis, and predictive modeling. I am particularly drawn to applying these methods in critical healthcare domains such as organ transplantation, oncology, and neuroimaging.

Education

Arizona State University — Tempe, AZ
Master of Science, Statistics – Accelerated — *Aug. 2023 – Present*
Bachelor of Science, Mathematics (Statistics) – Summa Cum Laude — *Aug. 2021 – Aug. 2024*
Minor in Philosophy — *3.85/4.00*

Scottsdale Community College — Scottsdale, AZ
General Studies — *Aug. 2020 – May 2021*
3.84/4.00

East Valley Institute of Technology — Mesa, AZ
Graphic Design — *2019-2020*

Research Experience

- **Decision Theater Network** — Tempe, AZ
  Research Aide — *Aug. 2024 – Present*
  - Enhanced research in policy initiatives by crafting briefs, conducting intricate research and analysis, managing databases, executing models, delivering presentations, and meticulously preparing materials for publication.
  - Primary objective was focused on public health policy and decision-making during planning of ASU Health.

- **NASA Glenn Research Center** — Cleveland, OH
  Internship with CHP-PRA Team — *Jun. 2024 – Aug. 2024*
  - Sole researcher in charge of implementing supervised and unsupervised NLP classification models using scikit-learn and PyTorch for health impact and assessment on planning Mars missions.
  - Addressed imbalanced multilabel classification challenge by extracting maximum contextual understanding from Mars task descriptions and predicting human system task categories, ensuring comprehensive analysis.

- **Compact X-ray Free Electron Laser (CXFEL)** — Tempe, AZ
  Research Aide/Data Analyst — *Jun. 2024 – Aug. 2024*
  - Engineered Python packages for high-throughput experimental crystallography imaging, bolstering biophysics research at the unique Compact X-ray Light Source (CXLS).
  - **cxls_hitfinder**: Developed a convolutional neural network (CNN) model, advancing Bragg peak detection in experimental images and optimizing parameter combinations for realistic scattering patterns.
  - **waterbackground_subtraction**: Innovated data acquisition methods to refine signal photon count estimates for high- and low-flux diffraction images, facilitating precise post hoc analysis of experimental datasets.

Publications

- Zheng, Y., Reiser, M., & **Kurth, A.**. (in preparation). A Monte Carlo comparison of the efficacy of Mplus, flexMIRT, PROC IRT, ltm, and mirt in IRT models estimation.
- **Kurth, A.**, Rehm, H., & Matar, M. (2025, February). Developing natural language processing and supervised machine learning techniques to classify Mars tasks. Poster to be presented at the NASA Human Research Program Investigator's Workshop, Galveston, TX.

- Matar, M., Rehm, H., & **Kurth, A.** (2025, February). Large language models and generative AI tools to depict human systems' contribution to spaceflight tasks execution. Poster to be presented at the NASA Human Research Program Investigator's Workshop, Galveston, TX.

Projects

Selected GitHub Projects

Author

- **cxls_hitfinder**: CNN model for Bragg peak detection and parameter prediction in CXFEL beam-line analysis.
- **waterbackground_subtraction**: Implemented signal processing technique for diffraction image analysis.
- **understand-astar-search**: Aimed at intuition of path-finding search algorithm.
- **understand-marching-cubes**: Demonstration of unintuitive medical imaging reconstruction algorithm.
- **understand-liver-segmentation**: Using UMAP architecture to extract organ features in DICOM files.
- **understand-neural-networks-numpy**: Focused on intuition of neural networks using NumPy on MNIST.
- **understand-jockey-logistic-sim**: Learning logistic regression through simulating horse races.
- **understand-reinforcement-learning**: PyTorch implementation of reinforcement learning of Snake game.
- **peak_gaussian_filter**: CXFEL tool for diffraction image filtering using adjustable Gaussian filters.
- **unitcell_repo**: Statistical analysis of whether unit cell volume effects on diffraction intensity after controlling for space-group variation and intensity input, used RCSB database and linear regression for analysis.

Achievements

- ***2024***: Rising Star Nomination NASA GRC, Accelerated Master's Award, John W. Luttrell Children's Network Scholarship, BioXFEL Scholar.
- ***2023***: Pediatric Cancer Research Foundation Survivor Scholarship, Coats & Todd Overcoming Disability Scholarship, Ruth Cheatham Foundation, HPFY Beyond Disability Scholarship.
- ***2022***: Burress Family Foundation Underdog Scholarship, John W. Luttrell Children's Network Scholarship.
- ***2021***: ASU Alumni Legacy Scholarship, President's List

Technical Skills & Interests

- **Mathematics & Statistics**: Real Analysis/Advanced Calculus, probability theory, generalized linear models, regression analysis, deep learning, Natural Language Processing, linear algebra, geometry, machine learning.
- **Programming Languages**: Python, R/RStudio, Bash, Linux/Command Line (CL), MATALAB, Java, LaTeX.
- **Technical Skills**: PyTorch, Scikit-Learn, Git/GitHub/GitLab, Tableau, Sphinx/GitPages, and web development.
- **Research Interests**: Biostatistics, causal inference, measure theory, medical imaging, prediction, survival analysis, forecasting, informed decision making, deep/machine learning.
- **Data Visualization**: ggplot2, Matplotlib, Seaborn, Plotly, Tableau
- **Soft Skills**: Public speaker, and presenter in technical and non-technical settings.
- **Interests**: classical literature, analytical/continental philosophy, Emerson, fitness, meditation.

Conferences & Presentations

- **NASA Human Research Program Investigator's Workshop (IWS)** – Poster, Galveston, TX Feb. 2025
  Using Natural Language Processing AI Tools to Analyze Mars Tasks, Kurth A., Rehm H., Matar M.
- **NASA CHP-PRA Summer Student Research Discussion** – Presentation, Cleveland, OH Aug. 2024
  Using Natural Language Processing AI Tools to Analyze Mars Tasks, Kurth A., Rehm H., Matar M.
- **Biodesign Fusion Research Conference** – Poster, Phoenix, AZ Apr. 2024
  Peak Intensity Analysis for Serial Femtosecond Crystallography Experiments at CXLS, Kurth A., Botha, S.
- **BioXFEL Annual Symposium** – Poster, Tempe, AZ Feb. 2024
  Peak Intensity Analysis for Serial Femtosecond Crystallography Experiments at CXLS, Kurth A., Botha, S.

Volunteering & Community Engagement

- **AZBIO: Voice of the Patient** – Talk, Phoenix, AZ Sep. 2024
  Talk request from AZBIO discussing personal story and patient perspective for community engagement, and transplantation awareness.
- **ASU News: Math and stats grad beats the odds...** – Article, Tempe, AZ May 2024
  Discussed personal story to ASU News and discussed the university's role in overcoming challenges.
- **APHON AZ: Patient Panel** – Talk, Phoenix, AZ Apr. 2024
  Spoke at the Association of Pediatric Hematology/Oncology Nurses – AZ Chapter's annual conference on a patient panel, discussing patient perspective and personal story.
- **Donate Life Arizona**: Tempe, AZ Sep. 2022 – present
  Actively contribute to organ donation awareness and education, aligning with biostatistical interests in transplantation outcomes and healthcare ethics.
  - **Campus Challenge: ASU Diablo's Club Zero**: Aug. 2024
  - **Speaker's Workshop**: Mar. 2024
  - **Annual Fiesta Bowl Parade**
  - **Donate Life AZ 2022 Calendar Feature & Interview**
    Interview and featuring in Donate Life AZ annual calendar. Discussing personal story in interview format for community outreach for organ donation.
  - **Monthly Volunteer Meetings**
- **Children's Organ Transplant Association**: Remote/Scottsdale, AZ Apr. 2020 – present
  Community awareness for children transplantation. Fund-raising for the cost of life-long immunesuppresants and general increased medical costs.
  - **2022 COTA Calendar** – Nov. 2022
    Promotion and featuring in annual calendar by discussing personal story for community engagement for transplantation awareness.
  - ***The Mulligan* Golf Tournament** – May 2022
    Main contributor in planning golf tournament operations, catering and overall planning and organization. This fundraising event was to raise money for my life-long reliance on immunosupressant medication due to transplantaion. All proceeds went to COTA for Adam K.

References

Sally Morton, Mentor
Executive VP Knowledge Enterprise ASU
Phone: 480-965-4087
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Mona Matar, Supervisor
Research Mathematician, NASA GRC
Phone: 704-706-5350
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Yi Zheng, P.I., Professor
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