Benjamin P. Danek

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Education

Arizona State University, *2017 - 2021*
Bachelors of Science, Computer Science
GPA: 3.7/4.0,

Research Interests

I am interested in **AI algorithms, systems, and applications** to real world problems. My recent work has been in healthcare, concretely:

- **Generation:** Systems of language models, LLM reasoning, resource augmented generation.
- **Prediction:** Private, and fair predictive models on clinical, and *-omics.
- **Systems:** Federated learning, distributed ML Systems

Papers

- **Danek, B. P.**, Makarious, M. B., Dadu, A., Vitale, D., Nalls, M. A., Sun, J., & Faghri, F. (2023). Federated Learning for multi-omics: a performance evaluation in Parkinson's disease. bioRxiv. https://doi.org/10.1101/2023.10.04.560604
  (Proofing stage, Cell Patterns)

- Yang, C., Wu, Z., Jiang, P., Lin, Z., Gao, J., **Danek, B. P.**, & Sun, J. (2023). PyHealth: A Deep Learning Toolkit for Healthcare Applications. Proceedings of the 29th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 5788–5789. https://doi.org/10.1145/3580305.3599178

Work History

Graduate Research Assistant *2023 - present*
Sunlab, University of Illinois at Urbana-Champaign

Member of research group guided by Prof. Jimeng Sun working on the following projects:

- Use **prompt engineering** and multithreaded programming to implement networks of LLMs for information retrieval in clinical trial tasks in real time.
- Utilize specialized **generative language models** to boost clinical classification model accuracy for underrepresented groups for MIMIC4 and eICU datasets.
- Facilitate domain specialized code generation using **resource augmented generation (RAG)**.
- Contribute to **open source** deep learning toolkit, PyHealth.

Machine Learning Research Scientist *2023 - present*
CARD, National Institutes of Health

Leveraging AI to understand and develop treatment for neurodegenerative diseases. Supporting the Center for Alzheimer's and Related Dimentias (CARD) advanced analytics team working on:

- Benchmark **disease classification models** trained using **federated learning on distributed datasets** against models trained centrally.
- Utilizing ***-omic**, and clinical data to generate multimodality patient representations.
- Develop prototype domain specialized **generative AI assistant** to improve cross institutional genetics research.

Software Engineer *2021 - 2023*
Errors tracking, New Relic Inc.

Full stack software on Errors Inbox (SaaS) product team, where I operate within a **300,000 line code base** implemented in Java and Typescript. As an engineer, my functions entail:

- Developing an intuitive, responsive user interface using React, and GraphQL.
- Implement **automated testing**, infrastructure **monitoring**, **continuous integration** for Java applications processing petabytes of application performance logs.
- Implement in architecture proposals, and product development planning.

Undergraduate Research Assistant *2018 - 2019*
Design Informatics Lab, Arizona State University
Engage in research to support the development of safe, and graceful autonomous vehicle control. My contributions to this work were

- Establish if it is possible to elicit behavior from **deep reinforcement learning** (RL) agents by augmenting the agent environment.
- Propose, and evaluate methods for remediating **adversarial attack** susceptibility of Deep RL agents.

Undergraduate Teaching Assistant *2019*
Arizona State University
Teaching assistant for CSE 240: Introduction to Programming Languages.

Projects

- **Contributor**, PyHealth - Open source package designed to make healthcare AI more approachable for data scientists.
- **Research Lead**, Fulton Undergraduate Research Initiative - Efficacy of adversarial examples in deep reinforcement learning models, in the context of autonomous cars.

Awards and Achievements

- Intramural Research Training Award, National Institute of Aging *May 2023*
- 3rd Coast AI for Health Bowl 2nd place, Northwestern University *April 2023*
- Fulton Undergraduate Research Initiative, ASU *2019*
- Academic Achievement Scholar, ASU *2017 - 2021*
- Golden State Award, ASU *2017 - 2021*