OWEN QUEEN

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EDUCATION

Stanford University September 2024 - Present
Ph.D. in Computer Science
Knight-Hennessy Scholar

Harvard Medical School 2022 - 2024
Research Associate in Biomedical Informatics
Advisor: Marinka Zitnik

University of Tennessee, Knoxville 2018 - 2022
B.S. Honors Computer Science and Honors Mathematics, Minor: Statistics GPA: 3.99/4.0

PUBLICATIONS

Conference and Workshop

1. Shanghua Gao, Teddy Koker, **Owen Queen**, Thomas Hartvigsen, Theodoros Tsiligkaridis, and Marinka Zitnik. UniTS: Building a unified time series model. In *Neural Information Processing Systems (NeurIPS)*, 2024
2. **Owen Queen**, Thomas Hartvigsen, Teddy Koker, Huan He, Theodoros Tsiligkaridis, and Marinka Zitnik. Encoding time-series explanations through self-supervised model behavior consistency. In *Neural Information Processing Systems (NeurIPS)*, 2023. (Spotlight)
3. Ashley Babjac*, **Owen Queen***, Shawn-Patrick Barhorst, Kambiz Kalhor, Andrew D. Steen, and Scott J. Emrich. Protein language models for explainable fine-grained evolutionary pattern discovery. In *2023 IEEE International Conference on Bioinformatics and Biomedicine (BIBM), DLBIBM Workshop*, 2023
4. Huan He, **Owen Queen**, Teddy Koker, Consuelo Cuevas, Theodoros Tsiligkaridis, and Marinka Zitnik. Domain adaptation for time series under feature and label shifts. In *International Conference on Machine Learning (ICML)*, 2023
5. Cai W John*, **Owen Queen***, Wellington Muchero, and Scott J Emrich. Deep learning for reference-free geolocation of poplar trees. In *NeurIPS 2022 AI for Science: Progress and Promises*, 2022
6. Chirag Agarwal*, **Owen Queen***, Himabindu Lakkaraju, and Marinka Zitnik. An explainable AI library for benchmarking graph explainers. In *The Web Conference 2022, Workshop of Graph Learning Benchmarks*, 2022
7. **Owen Queen** and Scott J Emrich. Lasso-based feature selection for improved microbial and microbiome classification. In *2021 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pages 2301–2308. IEEE, 2021

Journal

1. Ruth Johnson, Michelle M Li*, Ayush Noori*, **Owen Queen***, and Marinka Zitnik. Graph AI in medicine. *Annual Review of Biomedical Data Science*, 2024
2. **Owen Queen**, Gavin A. McCarver, Saitheeraj Thatigotla, Brendan P. Abolins, Cameron L. Brown, Vasileios Maroulas, and Konstantinos D. Vogiatzis. Polymer graph neural networks for multitask property learning. *npj Computational Materials*, 9(11):1–10, 2023. ISSN 2057-3960. doi: 10.1038/s41524-023-01034-3
3. Chirag Agarwal*, **Owen Queen***, Himabindu Lakkaraju, and Marinka Zitnik. Evaluating explainability for graph neural networks. *Scientific Data*, 10(1):144, 2023

Preprints

1. **Owen Queen***, Yepeng Huang*, Robert Calef*, Valentina Giunchiglia, Tianlong Chen, George Dasoulas, LeAnn Tai, Yasha Ektefaie, Ayush Noori, Joseph Brown, Tom Cobley, Karin Hrovatin, Tom Hartvigsen, Fabian J. Theis,

Bradley Pentelute, Manolis Kellis, and Marinka Zitnik. Procyon: A multimodal foundation model for protein phenotypes. *biorXiv preprint 10.1101/2024.12.10.627665*, 2024

2. Anusha Doshi, **Owen Queen**, Elizabeth Senter, D. Michael Senter, Susan Keen, Kaitlin Shartle, and Ross J. Simpson Jr. Family history and chronic medical conditions associated with sudden death among working age adults. In submission, 2023

3. **Owen Queen**, Vincent Jodoin, Leigh B. Pearcy, and W. Christopher Strickland. Agent-based dynamics of a SPAHR opioid model on social network structures. *arXiv preprint arXiv:2202.12261*, 2022

* denotes equal contribution

RESEARCH EXPERIENCE

Stanford University
Rotation student - PI: *Jure Leskovec* Autumn 2024

- Worked on data selection for pretraining protein language models. Running parallel and distributed PyTorch code to conduct operations with 140m embeddings.
- Implemented SOTA clustering algorithms from scratch on GPUs using parallel computing principles.

Harvard Medical School
Research Associate - PI: *Marinka Zitnik* August 2022 - 2024

- Innovating multimodal language models with proteins and drugs for target identification and refinement. Leveraging state-of-the-art language modeling such as instruction tuning to maximize compatibility with practitioners.
- Building interpretable, robust models for time series prediction tasks in a variety of domains. Published in ICML 2023 and a spotlight paper in NeurIPS 2023.
- Collaborating closely with researchers at MIT CSAIL, MIT Chemistry, and MIT Lincoln Laboratory.

Undergraduate Researcher - PI: *Marinka Zitnik* June 2021 - May 2022

- Selected for the Summer Institute in Biomedical Informatics (SIBMI) within Dept. of Biomedical Informatics.
- Built a benchmarking system for explainability methods for graph neural networks, published in *Scientific Data*.

University of Tennessee, Knoxville
Undergraduate Researcher - PI: *Scott Emrich* January 2021 - May 2023

- Explored feature selection methods with machine learning for high-dimensional genomic data to predict 1) risk of sepsis from *E. coli* and 2) drought tolerance of poplar trees from rhizosphere bulk sequencing. Published in IEEE BIBM 2021.
- Built neural networks to geolocate poplar trees via genomics. Achieved results comparable to methods using aligned data while using pre-alignment fragment data. Published in AI for Science workshop at NeurIPS 2022.
- Trained language models to predict expression levels from codon-level representations of genomic sequences.
- Employed protein language models for environmental gradient prediction of protein sequences from ocean microbiomes. Used explainable AI techniques and collaborated with biologists to interpret model behavior, published in IEEE BIBM 2023.

Undergraduate Researcher - PI: *Vasileios Maroulas & Konstantinos Vogiatzis* May 2020 - August 2022

- Applied topological data analysis tools to extract topological information from small molecules. Interpreted outputs to provide results from large-scale screening of molecular databases.
- Collaborated with Eastman Chemical Company to build a model based on graph neural networks and deep set learning to predict properties of polymers. Trained models on a custom database provided by collaborators. Achieved state-of-the-art results for polymer property prediction, published in *npj Computational Materials*.

Undergraduate Researcher - PI: *Christopher Strickland* January 2020 - May 2021

- Developed agent-based models on social networks to explore the relaxation of the well-mixing principle for ODE-based models. Applied this work to study opioid addiction epidemiology based on data from the state of Tennessee.
- Presented work at numerous institutional and state-wide events to discuss the usefulness of quantitative approaches for studying opioid addiction dynamics.

University of North Carolina, Chapel Hill
Visiting Research Assistant - PI: *Ross Simpson Jr.* June 2021 - September 2021

- Collaborated on a project about sudden cardiac death in the UNC School of Medicine Division of Cardiology. Submitted to American Journal of Preventive Medicine.
- Analyzed health records to examine correlation of comorbidities to sudden death occurrences.

HONORS AND AWARDS

- Knight-Hennessy Scholar May 2024
- Undergraduate Researcher of the Year, UTK May 2022
- Posters on the Hill Presentation Event Acceptance April 2022
- John H. Barrett Award, UTK Dept. of Mathematics April 2022
- Barry Goldwater Scholarship March 2021
- Posters at the Capitol (Tennessee) Presentation Acceptance (*Cancelled due to COVID-19*) January 2021
- Outstanding Computer Science Sophomore, UTK Dept. of Electrical Eng. & Computer Science April 2020
- Tutor of the Year, UTK Academic Success Center April 2020
- Duke Univ. Electrical and Computer Eng. REU Acceptance (*Cancelled due to COVID-19*) March 2020

EDUCATION EXPERIENCE

University of Tennessee, Knoxville - Academic Success Center
Lead Tutor August 2021 - May 2022

- Led approximately 60 other tutors from multiple subjects across the university.
- Conducted evaluations of tutors, providing constructive criticism of tutoring style and approach. Organize trainings and events for tutors, leading workshops to train new and returning tutors.
- Communicated with ASC staff and supervisors, relaying ideas and concerns from other tutors on improvements and adjustments to policy.

Tutor January 2019 - May 2021

- Tutored students in mathematics, physics, and computer science across the university. Led and attended educational trainings to build one-on-one communication and sensitivity skills for working with students on challenging academic subjects.
- Worked with numerous divisions across the university, including the Veterans Center and Success Academy (a program for students from underserved communities).

Supplemental Instruction Leader August 2020 - December 2020

- Led online review sessions for 280 students from Introduction to Computer Science course.
- Coordinated with the course instructor to plan review sessions on course content, including exam reviews. Created worksheets and study guides to supplement live review sessions.

SERVICE AND LEADERSHIP

Talks and Seminars

- Poster presenter, Harvard Medical School Dept. of Biomedical Informatics Science Day, 2023.
- Poster presenter, MIT Lincoln Laboratory Graph Exploitation Symposium, 2022.
- Poster presenter, NCUR Posters on the Hill, 2022.
- Speaker, UTK Honors and Scholars Programs Scholar Series, 2022.
- Poster presenter, Tennessee Posters at the Capitol, 2022.
- Speaker, Duke Univ. New Connections in Mathematics Conference, 2021.
- Poster presenter, ACM Conf. on Bioinformatics, Computational Biology, and Health Informatics (BCB), 2021.
- Poster presenter, National Conference of Undergraduate Research, 2021.
- Speaker, Virginia Tech Mid-Atlantic Undergraduate Research Conference, 2021.
- Speaker, UTK Honors and Scholars Programs Scholar Series, 2020.
- Poster presenter, NIMBioS Undergraduate Research Conference, 2020.

Clubs and Volunteer Work

- Remote Area Medical CORE Volunteer, Dental Sterilization 2023 - Present
- UTK Machine Learning Club - Director of Education 2020 - 2022
- Remote Area Medical Student Chapter (UTK) - Member 2019 - 2022
- Chancellor's Honors Program 2018 - 2022

Reviewing: NeurIPS Generative AI and Biology Workshop (2023), NeurIPS New Frontiers of AI for Drug Discovery and Development Workshop (2023), NeurIPS AI for Scientific Discovery Workshop (2023), ISMB (2023), Pacific Biocomputing Symposium (2023), Pursuit Undergraduare Research Journal (2021)