Wei Qiu

Paul G. Allen School of Computer Science & Engineering
University of Washington
Box 352350
Seattle, WA 98195

+1 206-234-6113
wqiu0528@cs.washington.edu
https://qiuweipku.github.io
@weiqiu55

RESEARCH FOCUS

* AI in Aging and Genomics: Developing AI methods for single-cell data analysis and genomics to elucidate the biological mechanisms of aging and age-related diseases
* Explainable Artificial Intelligence (XAI): Advancing and applying XAI methods to enhance transparency and efficacy in biomedical and healthcare settings

EDUCATION

University of Washington, Seattle, WA

09/2019–current Ph.D. in Computer Science & Engineering
Minor in Computational Molecular Biology
Advisor: Professor Su-In Lee

09/2019–03/2021 M.S. in Computer Science & Engineering

Peking University, Beijing, China

09/2015–08/2019 B.S. in Data Science and Big Data Technology
Dedicated to the interdisciplinary study of mathematics, computer science
Advisor: Professor Quanzheng Li

Massachusetts General Hospital, Harvard University, Boston, MA

09/2018–05/2019 Visiting student at Gordon Center for Medical Imaging
Advisor: Professor Quanzheng Li

EXPERIENCES

University of Washington, Computer Science & Engineering

09/2019–current Research Assistant, *with Prof. Su-In Lee*

* Developed advanced AI models and applied XAI methods to analyze omics data, focusing on the basic biology of aging and age-related diseases [P.1,P.2]
* Created computational frameworks that estimate biological age with accuracy and individualized explanations, integrating ML and XAI techniques [P.4,P.6]
* Established innovative strategies in dynamic feature selection, significantly improving feature selection efficiency and accuracy [P.5,W.2]

07/2020–12/2023 Research Assistant, *with Prof. Trevor Cohen and Prof. Sheng Wang*

- Introduced a new task focused on the automated generation of lay language summaries for biomedical scientific literature [P.7]
- Established CELLS, the most extensive and varied parallel corpus for lay language generation [P.3]
- Implemented retrieval-augmented models for background explanation generation and showed improvements in summary quality and simplicity [P.3]

Genentech, South San Francisco, California, United States

06/2023–09/2023 Intern-Oncology Bioinformatics, *with Dr. Andrew McKay, Dr. Suchit Jhunjhunwala*
Implemented XAI techniques on deep learning sequence-to-function models, Basset and Enformer, to design promoter and enhancer sequences

Gordon Center for Medical Imaging, MGH, Harvard University

05/2018–08/2019 Research Assistant, *with Prof. Quanzheng Li*
Developed various AI models to address challenges in medical imaging, disease prediction, data imputation, and personalized treatment [P.8,P.9,P.10,W.3,W.4]

4Paradigm, Beijing, China

04/2019–07/2019 Research Intern, *with Dr. Xia Guo*
Applied federated learning on the Electronic Health Record data from the Ruijin Hospital to predict heart disease.

Peking University, Beijing, China

02/2018–10/2018 Undergraduate Research Assistant, *with Prof. Yao Guo*
Understood Mobile App Miscategorization in the Wild

Peking University and Peking University First Hospital, Beijing, China

08/2017–04/2018 Undergraduate Research Assistant, *with Prof. Quanzheng Li and Prof. Luxia Zhang*
The changes of spectrum and etiological factors analysis of Kidney patients in China

PUBLICATIONS

*, †denote equal contribution

Manuscripts and Pre-prints

2024 P.1 **Wei Qiu**, Ayse B Dincer, Joseph D Janizek, Safiye Celik, Mikael Pittet, Kamila Naxerova†, and Su-In Lee†. A deep profile of gene expression across 18 human cancers , under minor revision at *Nature Biomedical Engineering (IF: 29.3, top journal in Biomedical Engineering)*

P.2 **Wei Qiu**, Ethan Weinberger, and Su-In Lee. Isolating structured salient variations in single-cell transcriptomic data with StrastiveVI , in preparation for submission to *Nature Biotechnology*

Peer-reviewed Conference and Journal Publications

2024 P.3 Yue Guo*, **Wei Qiu***, Gondy Leroy, Sheng Wang, and Trevor Cohen. Retrieval augmentation of large language models for lay language generation. *Journal of Biomedical Informatics*, 149:104580, 2024 *(IF: 4.5, top journal in Bioinformatics)*

2023 P.4 **Wei Qiu**, Hugh Chen, Matt Kaeberlein, and Su-In Lee. ExplaiNAble BioLogical Age (ENABL Age): an artificial intelligence framework for interpretable biological age. *The Lancet Healthy Longevity*, 4(12):e711–e723, 2023, **featured on the cover** *(IF: 13.1, top journal in Geroscience)*

P.5 Ian Connick Covert, **Wei Qiu**, Mingyu Lu, Na Yoon Kim, Nathan J White, and Su-In Lee. Learning to maximize mutual information for dynamic feature selection. In *International Conference on Machine Learning*, pages 6424–6447. PMLR, 2023

2022 P.6 **Wei Qiu**, Hugh Chen, Ayse Berceste Dincer, Scott Lundberg, Matt Kaeberlein, and Su-In Lee. Interpretable machine learning prediction of all-cause mortality. *Nature communications Medicine*, 2022

2021 P.7 Yue Guo*, **Wei Qiu***, Yizhong Wang, and Trevor Cohen. Automated Lay Language Summarization of Biomedical Scientific Reviews. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 35, pages 160–168, 2021

P.8 **Wei Qiu***, Yangsibo Huang*, and Quanzheng Li. IFGAN: Missing Value Imputation using Feature-specific Generative Adversarial Networks. In *2020 IEEE International Conference on Big Data (Big Data)*, pages 4715–4723. IEEE, 2020

2020 P.9 **Wei Qiu***, Jiaming Guo*, Xiang Li*, Mengjia Xu, Mo Zhang, Ning Guo, and Quanzheng Li. Multi-label detection and classification of red blood cells in microscopic images. In *2020 IEEE International Conference on Big Data (Big Data)*, pages 4257–4263. IEEE, 2020

2019 P.10 Jiaming Guo*, **Wei Qiu***, Xiang Li*, Xuandong Zhao, Ning Guo, and Quanzheng Li. Predicting Alzheimer's disease by hierarchical graph convolution from positron emission tomography imaging. In *2019 IEEE international conference on big data (big data)*, pages 5359–5363. IEEE, 2019

Posters, Extended Abstracts, Workshop Papers and Technical Reports

2024 W.1 **Wei Qiu**, Ethan Weinberger, and Su-In Lee. Isolating structured salient variations in single-cell transcriptomic data with StrastiveVI, *Machine Learning in Computational Biology*, 2024

2023 W.2 Nicasia Beebe-Wang, **Wei Qiu**, and Su-In Lee. Explanation-guided dynamic feature selection for medical risk prediction. In *ICML 3rd Workshop on Interpretable Machine Learning in Healthcare (IMLH)*, 2023

2019 W.3 Hui Ren, **Wei Qiu**, Aoxiao Zhong, Sijia Yu, Xiang Li, Ning Guo, and Quanzheng Li. Recurrent Neural Network Enhance Phenotyping in Heart Failure With Preserved Ejection Fraction Using Electronic Health Record. *Circulation*, 140(Suppl_1):A12835–A12835, 2019

W.4 Hui Ren, Sijia Yu, Xiang Li, **Wei Qiu**, Aoxiao Zhong, Ning Guo, and Quanzheng Li. Personalized Treatment for Heart Failure With Preserved Ejection Fraction Using Deep Reinforcement Learning. *Circulation*, 140(Suppl_1):A15036–A15036, 2019

INVITED TALKS

2024 **Decoding the Biology of Aging: How AI and XAI Illuminate Fundamental Processes**
Nathan Shock Centers Directors Meeting – American Aging Association Annual Meeting 2024
ENABL Age: an AI framework for interpretable biological age
AIMBA (AI Meets Biology of Aging) Workshop

2023 **ENABL Age: an AI framework for interpretable biological age**
Genentech OMNI-Biomarker Development Group Meeting

TEACHING EXPERIENCES

Teaching Assistant

09/2022–01/2023 **CSE 527 Computational Biology**, University of Washington
Held TA office hours, graded problem sets weekly and advise final projects for 30 students

09/2020–01/2021 **CSE 527 Computational Biology**, University of Washington
Held TA office hours, graded problem sets weekly and advise final projects for 40 students

09/2017–01/2018 **Freshmen Seminar of Data Science and IT**, Peking University
Arranged the course syllabus, invited relevant professors, guided students in exploring topics of interest in data science and taught students presentation skills

Guest Lecturer

06/2021 **Interpretable machine learning prediction of all-cause mortality**
In CSE 427, Computational Biology (undergraduate), University of Washington

MENTORING EXPERIENCES

03/2024–present **Sehaj Dhillon** (CSE Undergraduate at UW)
Developing a multi-organ interpretable biological age using the ENABL Age framework

01/2024–present **Allison Li** (Ph.D. Student in Biology at UW)
Using StrastiveVI to identify genes contributing to Alzheimer's disease

01/2024–present **Yufen Lin** (Master's Student in Bioengineering at UW)
Conducting endosome images analysis to identify features related to Alzheimer's disease

03/2023–03/2024 **Sai Sunku** (CSE undergraduate at UW)
Using UK Biobank data to predict multiple phenotypes through multi-task learning

06/2021–03/2022 **Hamsa Shankar** (CSE undergraduate at UW)
Using interpretable machine learning model to predict biological age

PROFESSIONAL SERVICE

Organizing Committees

2024 **AIMBA** (AI Meets Biology of Aging) workshop

Paper Reviewing

CompBio **MLCB** 2022, 2023, 2024; **RECOMB** 2022, 2023

AI **AI4Science** (ICML 2024), **MLGenX** (ICLR 2024), **XAIA** (NeurIPS 2023)

HONORS AND AWARDS

2018 Merit student
Peking University

2017 Kwang-Hua Scholarship
Peking University

2015 The Third Prize of Freshman Scholarship
Peking University

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