Qianwen Wang

Data Visualization + Machine Learning

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EDUCATION

Havard University — MA, USA
PostDoc Researcher, Department of Biomedical Informatics — *2020 -*
Supervisor: Prof. Nils Gehlenborg

Hong Kong University of Science and Technology — Hong Kong, China
PhD, Electronic and Computer Engineering — *2015 - 2020*
Supervisor: Prof. Huamin Qu

Xi'an Jiao Tong University — Shaanxi, China
BEng., Electronic Science& Technology — *2011 - 2015*

RESEARCH VISITS AND INTERNSHIPS

Oxford University, Department of Engineering Science — Oxford, UK
Research Visiting Student, supervised by Prof. Min Chen — *Aug 2019 - Dec 2019*

Tsinghua University, School of Software — Beijing, China
Research Visiting Student, supervised by Prof. Shixia Liu — *2017 - 2018*

Microsoft Research — Beijing, China
Research Intern — *2017 - 2018*

RESEARCH INTERESTS

As a visualization researcher, I contribute interactive tools to promote **Human-AI collaboration**, with a focus on **biomedical applications**. Going beyond the common algorithm-centric methods, my studies contribute **interactive visual explanations** that incorporate the feedback of users and the characteristics of tasks. These studies enable users to generate domain-meaningful insights from AI, improve AI with human domain knowledge, and thus solve complicated domain problems.

AWARDS AND FUNDS

Best Paper Honorable Mention, IEEE VIS — *2022*

Postdoctoral Fellows Research Fund, Harvard Data Science Initiative — *2022*
Three awardees in Harvard University

Best Long Abstract Award, ISMB BioVis COSI — *2022*
Top 1 out of all submissions

Best Paper Award, IMLH@ICML — *2021*
Top 2 out of 39 accepted papers

Best Abstract Award, ISMB BioVis COSI — *2021*
Top 1 out of all submissions

SENG Academic Award, HKUST — *2019*
From more than 200 PhD students in the School of Engineering

IEEE VIS Doctoral Colloquium, IEEE VIS — *2019*

Oversea Research Award, HKUST — *2019*

Award of Excellence, Microsoft Research Internship Program — *2018*

Award of Most Feasibility, Microsoft One Week Hackathon — *2017*

Outstanding Graduates Xi'an Jiao Tong University — *2015*

Educational Scholarship, Xi'an Jiao Tong University — *2012-2014*

PROFESSIONAL SERVICE

Organizing Committee

Poster Chair, IEEE Pacific Visualization Symposium *2023*

Abstract Chair, International Conference on Intelligent Systems for Molecular Biology *2022-23*

Organizer, Visualization in Biomedical AI Workshop @ IEEE VIS *2022*

Organizer, Tutorial @ ISMB *2022*
Building Interactive Visualizations of Genomics Data with Gosling

Program Committee

ACM Conference on Intelligent User Interfaces *2023*

IEEE Pacific Vis 2022 Visualization Meets AI Workshop *2022*

ChinaVis Conference *2022*

Conference Paper Review

IEEE VIS Conference *2018-2022*

ACM CHI Conference on Human Factors in Computing Systems *2019-2022*

ACM Conference on Intelligent User Interfaces *2020-2021*

ACM Conference on Intelligent User Interfaces *2020-2021*

EuroVis Conference *2019-2020*

ChinaVis Conference *2019-2021*

IEEE Pacific Visualization Symposium *2020-2021*

Invited Journal Review

IEEE Transactions on Visualization and Computer Graphics *2019-2022*

Journal of Visualization *2021-2022*

IEEE Computer Graphics and Applications *2021-2022*

Visual Informatics *2020-2022*

Oxford Bioinformatics *2022*

IEEE Transactions on Big Data *2020*

ACM Transactions on Interactive Intelligent Systems *2020, 2022*

PUBLICATIONS

Peer-reviewed Conference and Journal Publications

[J1] **Qianwen Wang**, Sehi L'Yi, Nils Gehlenborg.
DRAVA: Aligning Human Concepts with ML Latent Dimensions for the Visual Exploration of Small Multiples.
to appear Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI'23)

[J2] **Qianwen Wang**, Kexin Huang, Payal Chandak, Marinka Zitnik, Nils Gehlenborg.
Extending the Nested Model for User-Centric XAI: A Design Study on GNN-based Drug Repurposing.
IEEE Transactions on Visualization and Computer Graphics 29 (1), 1266-1276 (VIS'22)
Best Paper Honorable Mention at IEEE VIS 2022 🏆

[J3] Furui Cheng, Mark Keller, Huamin Qu, Nils Gehlenborg, **Qianwen Wang**.
Polyphony: an Interactive Transfer Learning Framework for Single-Cell Data Analysis.
IEEE Transactions on Visualization and Computer Graphics 29 (1), 591-601 (VIS'22)
Best Long Abstract Award at BioVis@ISMB 2022 🏆

[J4] Aditeya Pandey, Sehi L'Yi, **Qianwen Wang**, Michelle Borkin, Nils Gehlenborg.
GenoREC: A Recommendation System for Interactive Genomics Data Visualization.
IEEE Transactions on Visualization and Computer Graphics 29 (1), 570-580 (VIS'22)

[J5] Zhihua Jin, Yong Wang, **Qianwen Wang**, Yao Ming, Tengfei Ma, Huamin Qu.
GNNLens: A Visual Analytics Approach for Prediction Error Diagnosis of Graph Neural Networks.
IEEE Transactions on Visualization and Computer Graphics 2022

[J6] **Qianwen Wang**, Zhutian Chen, Yong Wang, Huamin Qu.
A Survey on ML4VIS: Applying MachineLearning Advances to Data Visualization.
IEEE Transactions on Visualization and Computer Graphics, vol.28, no.12, pp.5134-5153, Dec. 2022

[J7] Sehi L'Yi, **Qianwen Wang**, Fritz Lekschas, Nils Gehlenborg.
Gosling: A Grammar-based Toolkit for Scalable and Interactive Genomics Data Visualization.
IEEE Transactions on Visualization and Computer Graphics, vol.28, no.1, pp.140-150, Jan. 2022 (VIS'21)
Best Abstract Award at BioVis@ISMB 2021 🏆

[J8] **Qianwen Wang**, Tali Mazor, Theresa A Harbig, Ethan Cerami, Nils Gehlenborg.
ThreadStates: State-based Visual Analysis of Disease Progression.
IEEE Transactions on Visualization and Computer Graphics, vol.28, no.1, pp.238-247, Jan. 2022 (VIS'21)

[J9] **Qianwen Wang**, Zhenhua Xu, Zhutian Chen, Yong Wang, Shixia Liu, Huamin Qu.
Visual Analysis of Algorithmic Discrimination.
IEEE Transactions on Visualization and Computer Graphics, vol.27, no.2, pp.1470-1480, Feb. 2021 (VIS'20)

[J10] Theresa Harbig, Sabrina Nusrat, Tali Mazor, **Qianwen Wang**, Alexander Thomson, Hans Bitter, Ethan Cerami, Nils Gehlenborg. Bioinformatics 37.Supp 1 (2021): i59-i66.
OncoThreads: Visualization of Large Scale Longitudinal Cancer Molecular Data.

[J11] **Qianwen Wang**, William Alexander, Jack Pegg, Huamin Qu, Min Chen.
HypoML: Visual analysis for hypothesis-based evaluation of machine learning models.
IEEE Transactions on Visualization and Computer Graphics, vol.27, no.2, pp.1417-1426, Feb. 2021 (VIS'20)

[J12] **Qianwen Wang**, Jun Yuan, Shuxin Chen, Hang Su, Huamin Qu, and Shixia Liu.
Visual Genealogy of Deep Neural Networks.
IEEE Transactions on Visualization and Computer Graphics, vol.26, no.11, pp.3340-3352, Nov. 2020.

[J13] Chuan Bu, Quanjie Zhang, **Qianwen Wang**, Jian Zhang, Michael Sedlmair, Oliver Deussen, Yunhai Wang.
SineStream: Improving the readability of streamgraphs by minimizing sine illusion effects.
IEEE Transactions on Visualization and Computer Graphics, vol.27, no.2, pp.1634-1643, Feb. 2021 (VIS'20)

[J14] Zhutian Chen, Wai Tong, **Qianwen Wang**, Benjamin Bach, Huamin Qu.
Augmenting static visualizations with PapARVis designer.
In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI'20).

[J15] **Qianwen Wang**, Yao Ming, Zhihua Jin, Qiaomu Shen, Dongyu Liu, Micah J. Smith, Kalyan Veeramachaneni, and Huamin Qu. *ATMSeer: Increasing Transparency and Controllability in Automated Machine Learning.*
In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI'19).

[J16] Zhutian Chen, Yun Wang, **Qianwen Wang**, Yong Wang, Huamin Qu.
Towards automated infographic design: Deep learning-based auto-extraction of extensible timeline.
IEEE Transactions on Visualization and Computer Graphics vol.26, no.1, pp.917-926, Jan 2020 (VIS'19)

[J17] Yong Wang, Zhihua Jin, **Qianwen Wang**, Weiwei Cui, Tengfei Ma, Huamin Qu.
DeepDrawing: A Deep Learning Approach to Graph Drawing.
IEEE Transactions on Visualization and Computer Graphics , vol.26, no.1, pp.676-686, Jan 2020 (VIS'19)

[J18] **Qianwen Wang**, Zhen Li, Siwei Fu, Weiwei Cui, Huamin Qu.
Narvis: Authoring narrative slideshows for introducing data visualization designs.
IEEE Transactions on Visualization and Computer Graphics, vol.25, no.1, pp.779-788, Jan. 2019 (VIS'18)

Workshop Papers and Posters

[W1] **Qianwen Wang**, Nils Gehlenborg.
Interactive Exploration of Tissues and Cells Guided by Visual Pattern Mining
International Conference on Intelligent Systems for Molecular Biology (ISMB 2022)

[W2] **Qianwen Wang**, Kexin Huang, Payal Chandak, Marinka Zitnik, Nils Gehlenborg.
Interactive Visual Explanations for Deep Drug Repurposing
Interpretable Machine Learning for Healthcare Workshop @ICML 2021 (**Best Paper Award** 🏆)

[W3] **Qianwen Wang**.
Towards Better Application of Machine Learning Models: A Data Visualization Perspective
VIS 2019 Doctoral Consortium

MEDIA COVERAGE

Nature Technology Feature, A graphics toolkit for visualizing genome data
MIT News, Cracking open the black box of automated machine learning
DeepTech, ATMSeer

INVITED TALKS

Invited Talk, Genetech — *Jan 2023*
Interpreting and Steering AI Explanations with Interactive Visualizations

Panel on AI+VIS, ChinaVis — *Jun 2022*
Bridge the Capabilities of AI with the Needs of Human Users

Invited Talk, Zhejing University Visualization Summer School — *Jun 2022*
Bridge the Capabilities of AI with the Needs of Human Users

Keynote Presentation, PacificVis 2021 VIS meets AI — *Apr, 2021*
From Data to Decisions, a Mixed Path of Data Visualization and Machine Learning

Invited Talk, Microsoft Research Asia — *Oct, 2019*
Visualization to Guide the Application of Machine Learning

Invited Talk, Zhijing Lab, Zhejiang University — *Jul, 2019*
Visualization to Guide the Application of Machine Learning

Invited Talk, Huawei 2012 Lab — *Oct, 2018*
Visualization in the Life Cycle of AI Products

TEACHING EXPERIENCE

Course Specialist, Harvard — *2021-2023*
Data Visualization for Biomedical Applications (BMI 706)
- A graduate-level course with 40-60 students
- Leading the teaching fellows
- Designing the course materials and the programming assignments

Tutorial, Conference on Intelligent Systems for Molecular Biology (ISMB) — *2022*
Building Interactive Visualizations of Genomics Data with Gosling
- A half-day tutorial with 40-50 participants from diverse backgrounds
- Developing and teaching the tutorial

Lecturer, Harvard HPREP Program — *2022-2023*
- HPREP is a science enrichment program for high school students from underrepresented backgrounds
- Developing and teaching the curriculum materials

Guest Lecturer, UC Davis — *2022*
AI + VIS Seminar
- A graduate-level seminar with 20-30 students
- Developing and teaching lectures about the application of ML in data visualization
- Leading the seminar discussion

Teaching Assistant, HKUST — *2017-2018*
Probability Theory and Stochastic Processes (ELEC2600)
- A undergraduate-level course with more than 50 students
- Designing and grading assignments

Teaching Assistant, HKUST — *2016-2017*
Signals and Systems (ELEC2700)
- A undergraduate-level course with more than 50 students
- Creating and running coding labs

STUDENT MENTORING

Doctoral Students

Furui Cheng, visiting PhD student at Harvard
Interactive Transfer Learning for Single-Cell Data Analysis [**J3**]
Won the Best Abstract Award at BioVis@ISMB
2021-2022

Aditeya Pandey, visiting PhD student at Harvard
Recommendation System for Interactive Genomics Data Visualization [**J4**]
2020-2021

Micah J. Smith, PhD student at MIT
Visual Analysis of AutoML [**J15**]
2018-2019

Zhenhua Xu, PhD student at HKUST
Visual Analysis of Algorithmic Discrimination [**J9**]
2018-2019

Zhihua Jin, PhD student at HKUST
Visual Analysis of AutoML and Graph Neural Networks [**J5, J15, J17**]
2019-2022

Master Students

Katrina Liu, master student at Harvard Medical School
Automatic Interpretation and Generation of Genomic Visualizations
2022-now

Man Qing Liang, master student at Harvard Medical School
Automatic Interpretation and Generation of Genomic Visualizations
2022-now

Chuan Bu, master student at Shandong University
Improving the Readability of Streamgraphs by Minimizing Sine Illusion Effects [**J13**]
2019-2020

Undergraduate Students

Erica Stutz, undergraduate student at Harvard Summer Intern Program
Edge Bundling for Genomic Visualization [**deployed online**]
2022

Cynthia Rosas, undergraduate student at Harvard Summer Intern Program
Theme Library for Gosling Visualization [**deployed online**]
2021

William Alexander, undergraduate student at Oxford University
Hypothesis-based Evaluation of Machine Learning Models [**J11**]
2019

Jun Yuan, undergraduate student at Tsinghua University)
Visual Genealogy of Deep Neural Networks [**J12**]
2018