

Jian Zhao, Ph.D.

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I am passionate about data, and novel ways of analyzing, presenting, and interacting with it.

Summary

My research lies in the intersection of *Information Visualization (InfoVis)*, *Human-Computer Interaction (HCI)*, and *Data Science*. I develop advanced interactive visualizations that promote the interplay of *human*, *machine*, and *data* within the general data science workflow: from initial exploration, to model development, and to insight storytelling. I design both *exploratory* and *explanatory* visualizations that leverage or support complex analytical processes and models, tightly integrating *the flexibility and creativity of users* with *the scalability of algorithms and machine learning*. I possess the following credentials:

- Extensive experience of developing *cutting-edge visualizations* at world-class institutions and laboratories.
- Comprehensive practice of conducting *user-centered design* of visualization tools in various applications.
- Track record of award-winning *publications, scientific contributions, and technological inventions*.
- Active involvement of *teaching* and *mentoring* talents.
- DataVis geek with hands-on multiple *development platforms* and *programming languages*.

Education

- 2015 **Ph.D. in Computer Science**, *University of Toronto*, Canada.
Thesis: Interactive Visual Data Exploration—A Multi-Focus Approach
Committee: Drs. Ravin Balakrishnan (Supervisor), Karan Singh, Khai Turong, John Stasko (External)
- 2009 **B.Eng. in Computer Science**, *Zhejiang University*, China.
Thesis: Invariant Image Features Extraction
Supervisor: Dr. Yizhou Yu

Professional Experience

- 2019.10- **Assistant Professor**, *Cheriton School of Computer Science, University of Waterloo*, Waterloo, ON.
Leading the WatVis group that is dedicated to the research on advanced visualization and interaction techniques for promoting the interplay between data, machine, and human in data science applications. [B1, J17-, C14-, S4-].
- 2019.4-2019.10 **Senior Research Scientist**, *Enterprise AI Group, FXPAL*, Palo Alto, CA.
- 2016.11-2019.3 **Research Scientist**, *Enterprise AI Group, FXPAL*, Palo Alto, CA.
Conducted the design and development of visual analytics techniques in the application domains of enterprise communication and collaboration for smart workplace. [J12-16, C29-13, 15, S2-3, P7-19].
- 2015.7-2016.10 **Postdoctoral Researcher**, *Complex Systems Group, Autodesk Research*, Toronto, ON.
Designed and implemented visualization techniques for dynamic network analysis, time-series annotation, and knowledge transfer in collaborative sense-making. [J7-11, C8, P4-6].
- 2009.9-2015.6 **Research Assistant**, *DGP (Dynamic Graphics Project) Lab, University of Toronto*, Toronto, ON.
Investigated the theoretical foundation of multi-focus visual data exploration and designed novel multi-focus visualization techniques. Developed and validated mathematical models to deeply understand user interactions on touch displays. [J1-6, C1-4, 6].
- 2014.12-2015.3 **Research Intern**, *Microsoft Research*, Redmond, WA.
Worked with machine learning experts, designed and developed a web-based visualization to facilitate data labelling and exploration in building classifiers for large text corpus.
- 2014.6-2014.9 **Research Intern**, *Adobe Research*, San Francisco, CA.
Worked with researchers and analysts, designed and developed a web-based visual analytics tool for interactive exploration of user traffic data on websites. [C7, P3].

- 2013.5-2013.8 **Research Intern**, *IBM Research*, San Jose, CA.
Designed and developed a web-based visualization for analyzing personal emotion profile timelines inferred from tweets. Worked with engineers to integrate the technique into the IBM SystemU. [C5, P2].
- 2011.6-2011.9 **Research Intern**, *Microsoft Research*, Redmond, WA.
Worked with researchers and the product team, developed a web application for exploring multi-faceted temporal events data. [S1, P1].

Awards & Honors

- 2021 **Best Paper Honorable Mention**, *top 5%*, IEEE VIS, for [J21].
- 2020 **Best Demo**, ACM SIGMOD Conference, for [W7].
- 2019 **Best Paper**, *top 1 out of 158*, ACM MobileHCI Conference, for [C14].
- 2017 **Best Paper Honorable Mention**, *top 3 out of 173*, IEEE VAST Conference, for [J11].
- 2017 **Distinguished Reviewer**, *ACM TiiS*.
- 2016-2017 **NSERC Postdoctoral Fellowship**, *\$90,000*, NSERC, (declined).
- 2016 **Mitacs Accelerate Postdoctoral Award**, *\$60,000*, Mitacs.
- 2016 **Best Paper Honorable Mention**, *top 5%*, ACM CHI Conference, for [C8].
- 2015 **Robert E. Lansdale/Okino Graduate Fellowship**, *\$2,000*, University of Toronto.
- 2015 **Best Paper Honorable Mention**, *top 5%*, ACM CHI Conference, for [C7].
- 2014 **Best Paper Honorable Mention**, *top 3 out of 148*, IEEE VAST Conference, for [J5].
- 2013 **Dataset Challenge Grand Prize Winner**, *\$5,000*, Yelp Inc..
- 2012 **Wolfond Fellowship**, *\$10,000*, University of Toronto.
- 2010-2011 **Wolfond Scholarship**, *\$5,000 (year 2010), \$6,000 (year 2011)*, University of Toronto.
- 2009-2015 **Art & Science Graduate Fellowship**, *≈ \$30,000/year*, University of Toronto.
- 2006-2008 **University Academic Scholarship**, *¥5,000/year*, Zhejiang University.
- 2006, 2008 **Chinese National Scholarship**, *¥8,000/year*, Ministry of Education of China.

Student Supervision

Supervision

Postdoctoral

- 2021.4-2021.12 **Pengcheng An**, *Postdoctoral Researcher*, University of Waterloo, Ph.D. at Eindhoven University of Technology.
- #### Graduate
- 2021.9- **Xuye Liu**, *Ph.D.*, University of Waterloo.
- 2021.9- **Yiwei Wu**, *Ph.D.*, University of Waterloo, Co-advised with Dr. Ed Lank.
- 2020.1-2020.4 **Linping Yuan**, *Ph.D. (Visiting)*, Hong Kong University of Science and Technology.
On infographic color palette recommendation
- 2019.6-2019.9 **Takanori Fujiwara**, *Ph.D. Research Intern*, FXPAL, from University of California Davis.
On contrastive layout of large graphs.
- 2018.5-2018.8 **John Wenskovitch**, *Ph.D. Research Intern*, FXPAL, from Virginia Tech.
On visualizing computational notebooks to support self-examination and collaboration [C27, P14].
- 2017.6-2017.9 **Siwei Fu**, *Ph.D. Research Intern*, FXPAL, from Hong Kong University of Science and Technology.
On visually summarizing massive conversations on team communication platforms such as Slack [C20, P10].

- 2022.1- **Paul Gege**, *M.Math.*, University of Waterloo.
- 2021.9- **Xuejun Du**, *M.Math.*, University of Waterloo.
- 2021.9- **Yue Lyu**, *M.Math.*, University of Waterloo, Co-advised with Dr. Keiko Katsuragawa.
- 2021.9- **Xinyu Shi**, *M.Math.*, University of Waterloo, Co-advised with Dr. Liping Fu.
- 2021.5- **Ziqi Zhou**, *M.Math.*, University of Waterloo.
- 2021.1- **Ehsan Jahangirzadeh Soure**, *M.Math.*, University of Waterloo.

- 2021.1- **Tengyu Cai**, *M.Math (Part-time)*, University of Waterloo.
 2020.9- **Marisabel Fryer**, *M.Math. in Data Science (Part-time)*, University of Waterloo.
 2020.1-2021.8 **Xingjun Li**, *M.Math.*, University of Waterloo.
 On search and visual exploration of computational notebooks [C18].

Undergraduate

- 2021.9-2021.12 **Justin Leung, April Li, Tim Liu, Bosen Qu, Jasper Xian, Felix Yang, Yifei Yin, Selena Zhang**, *Research Assistants*, University of Waterloo, University of Toronto.
 2021.5-2021.8 **Shriram Holla, Justin Leung, Tim Liu, Raghav Saboo**, *Research Assistants*, University of Waterloo.
 2021.1-2021.4 **Justin Leung, Yifang Li, Tim Liu, Alex Wang, Xinhai Wei, Yizhi Zhang**, *Research Assistants*, University of Waterloo.
 2020.9-2020.12 **Tim Liu, Melody Lui, Isabel Wan, Xinhai Wei**, *Research Assistants*, University of Waterloo.
 2020.5-2020.8 **Weining Li, Isabel Wan, Alex Wang, Arri Ye, Dennis Yu**, *Research Assistants*, University of Waterloo.
 2020.1-2020.4 **Yipeng Ji, Isabel Wan, Dennis Yu, Ziqi Zhou**, *Research Assistants*, University of Waterloo.
 2019.9-2019.12 **Stephanie Hu, Melanie Ren**, *Research Assistants*, University of Waterloo.
 2019.2-2019.6 **Shenyu Xu**, *Intern*, FXPAL, from University of California Davis.
 2018.6-2018.9 **Lawrence Ngo**, *Intern*, FXPAL, from University of California Santa Cruz.

Mentoring

Graduate

- 2021.1- **Anjul Tyagi**, *Ph.D.*, Stony Brook University, co-advised with Dr. Klaus Mueller.
 On human-in-the-loop generation of infographics
 2017.8-2018.4 **Zhicong Lu**, *Ph.D.*, University of Toronto, co-advised with Dr. Daniel Wigdor.
 On visual storytelling with intelligent interactive diagramming [J15]
 2015.11-2016.3 **Siwei Fu**, *Ph.D. Research Intern*, Microsoft Research Asia, co-advised with Dr. Weiwei Cui.
 On MOOC forum visualization [J8]
 2015.1-2015.5 **Yanhong Wu**, *Ph.D.*, Hong Kong University of Science and Technology, co-advised with Dr. Huamin Qu.
 On dynamic egocentric network visualization [J7]
 2014.5-2014.9 **Fan Du**, *Ph.D. Research Intern*, IBM T. J. Watson Research Center, co-advised with Dr. Nan Cao.
 On object movement trajectory bundling in animated transitions [C10]

Undergraduate

- 2017.8-2017.12 **Shenyu Xu**, *Research Assistant*, University of California Davis, co-advised with Dr. Kwan-Liu Ma.
 2013.5-2013.8 **Phoebe Chang**, *Intern*, University of Toronto, co-advised with Dr. Ravin Balakrishnan.

Thesis Committees & Examiners

- 2021 **Zehao Xu**, *Ph.D.*, University of Waterloo.
 Member of examination committee, on “Interactive and Static Statistical Graphics: Bridge to Integration.”
 2021 **Rafael Toledo**, *Ph.D.*, University of Waterloo.
 Member of advisory committee, on “Interactive graph exploration for comprehension of static analysis results.”
 2020 **Matthew Lakier**, *Ph.D.*, University of Waterloo.
 Member of advisory committee, on “Ludic playful interaction.”
 2020 **Po Ming Law**, *Ph.D.*, Georgia Institute of Technology.
 Member of examination committee, on “Automated insights for visual data analysis.”
 2019 **Sang Ho Suh**, *Ph.D.*, University of Waterloo.
 Member of advisory committee, on “Using comic strips for computer science education.”
 2018 **Takanori Fujiwara**, *Ph.D.*, University of California Davis.
 Member of examination committee, on “Visual analytics methods for multidimensional data in network applications.”
 2017 **Christopher Bryan**, *Ph.D.*, University of California Davis.
 Member of examination committee, on “Advanced techniques and cognitive considerations for explanatory visualization and data storytelling.”

- 2022 **Aishwarya Ramanathan**, *M.Math.*, University of Waterloo.
Thesis examiner, on “Hubble Spacer Telescope.”
- 2021 **Futian Zhang**, *M.Math.*, University of Waterloo.
Thesis examiner, on “Analyzing Barehand Input Mappings for Video Timeline Control and Object Pointing on Smart TVs.”
- 2021 **Anup Anand Deshmukh**, *M.Math.*, University of Waterloo.
Thesis examiner, on “Unsupervised Syntactic Structure Induction in Natural Language Processing.”
- 2020 **Kin-Pong Fung**, *M.Math.*, University of Waterloo.
Thesis examiner, on “The use of ambient lights for a video game notification system.”
- 2020 **Xianyou Yang**, *M.Sci.*, Rochester Institute of Technology.
Thesis examiner, on “The effect of synchronization and explanation of AI-assistant.”
- 2019 **Nikhita Joshi**, *M.Math.*, University of Waterloo.
Thesis examiner, on “Evaluating the speed and accuracy of touch input at the edge of a table.”

Teaching Experience

Courses

CS349 - User Interfaces, *University of Waterloo*, Winter 2021.

A 3rd year course that teaches the principles of creating user interfaces (UIs) including underlying UI architecture and algorithms, how to implement UIs from scratch and using UI frameworks, theories and methods for UI design, and an introduction to the field of HCI.

CS449/649 - Human-Computer Interaction, *University of Waterloo*, Fall 2020, Fall 2021.

A cross-listed graduate and 4th year course that teaches the fundamental issues in HCI that underlie the creation and evaluation of usable and useful computational artifacts.

Introduction to Human-Computer Interaction, *Shandong University, China*, Summer 2020, Summer 2021.

A one-week undergraduate summer school course that teaches the fundamental principles, methods, and issues in HCI and user experience (UX) design.

CS889 - Information Visualization, *University of Waterloo*, Winter 2020, Spring 2021.

A seminar-style graduate course that provides the overview of the state-of-the-art research in information visualization, and teaches how to design, develop, and evaluate visualization techniques for solving real-world data problems.

Guest Lectures

- 2018.12 **The Future of Work: Using Advanced Data Visualization Techniques for Communication and Collaboration**, *Peking University*.
The 9th Advanced Lectures on Image and Graphics (IGAL) by China Society of Image and Graphics (CSIG).
- 2018.10 **Design Visualization for the Data Science Workflow**, *University of San Francisco*.
CS686 - Reproducible Data Visualization, taught by Dr. Alark Joshi. Cross-listed graduate and 4th year course on visualization.
- 2017.2 **Design for Interactive Visualization: Illustrated with Graph Visualization**, *University of California Davis*.
ECS277 - Advanced Visualization, taught by Dr. Kwan-Liu Ma. Graduate course on information visualization.

Publications

Note in the fields of InfoVis and HCI, IEEE VIS (VAST, InfoVis, & SciVis), IEEE TVCG, and ACM CHI are considered top tier venue for timely and impactful work, which have an annual acceptance rate of around 20-25%. underline indicates the students I directly supervised; * indicates I am the corresponding author (if not the last); † indicates equal contribution.

Book Chapter

- [B1] J. Zhao, F. Chevalier, C. Collins. **Designing Tree Visualization Techniques for Discourse Analysis**. *LingVis: Visual Analytics for Linguistics*, M. Butt, A. Hautli-Janisz, V. Lyding (Editors), Chapter 3, Center for the Study of Language and Information, 2020.

Refereed Journal Articles

- [J26] J. Zhao^{†*}, S. Xu[†], S. Chandrasegaran[†], C. Bryan, F. Du, A. Mishra, X. Qian, Y. Li, K.-L. Ma. **ChartStory: Automated Partitioning, Layout, Captioning of Charts into Comic-Style Narratives**. *IEEE Transactions on Visualization and Computer Graphics*, 2021 (In Press).

- [J25] Y. Zhao, J. Shi, J. Liu, J. Zhao, F. Zhou, W. Zhang, K. Chen, X. Zhao, C. Zhu, W. Chen. **Evaluating Effects of Background Stories on Graph Perception**. *IEEE Transactions on Visualization and Computer Graphics*, 2021 (In Press). Impact factor: 4.558

- [J24] M. Sun, A. Namburi, D. Koop, J. Zhao, T. Li, H. Chung. **Towards Systematic Design Considerations for Visualizing Cross-View Data Relationships**. IEEE Transactions on Visualization and Computer Graphics, 2021 (In Press). Impact factor: 4.558
- [J23] E. Jahangirzadeh Soure[†], E. Kuang[†], M. Fan, J. Zhao. **CoUX: Collaborative Visual Analysis of Think-Aloud Usability Test Videos for Digital Interfaces**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VIS'21), 28(1), pp. 643-653, 2022. Impact factor: 4.558
- [J22] T. Fujiwara, X. Wei, J. Zhao, K.-L. Ma. **Interactive Dimensionality Reduction for Comparative Analysis**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VIS'21), 28(1), pp. 758-768, 2022. Acceptance rate: 25%
- [J21] M. Sun, A. Shaikh, H. Alhoori, J. Zhao. **SightBi: Exploring Cross-View Data Relationships with Biclusters**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VIS'21), 28(1), pp. 54-64, 2022 (*Best Paper Honorable Mention, top 5%*). Acceptance rate: 25%
- [J20] L. Yuan, Z. Zhou, J. Zhao*, Y. Guo, F. Du, H. Qu. **InfoColorizer: Interactive Recommendation of Color Palettes for Infographics**. IEEE Transactions on Visualization and Computer Graphics, 2021 (In Press). Acceptance rate: 25%
- [J19] J. Zhao*, M. Sun, F. Chen, P. Chiu. **Understanding Missing Links in Bipartite Networks with MissBiN**. IEEE Transactions on Visualization and Computer Graphics, 2020 (In Press). Impact factor: 4.558
- [J18] J. Zhao*, M. Fan, M. Feng. **ChartSeer: Interactive Steering Exploratory Visual Analysis with Machine Intelligence**. IEEE Transactions on Visualization and Computer Graphics, 2020 (In Press). Impact factor: 4.558
- [J17] M. Fan, K. Wu[†], J. Zhao[†], Y. Li, W. Wei, K. Truong. **VisTA: Integrating Machine Intelligence with Visualization to Support the Investigation of Think-Aloud Sessions**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of InfoVis'19), 26(1), pp. 343-352, 2020. Impact factor: 4.558
- [J16] M. Sun, J. Zhao, H. Wu, K. Luther, C. North, N. Ramakrishnan. **The Effect of Edge Bundling and Seriation on Sensemaking of Biclusters in Bipartite Graphs**. IEEE Transactions on Visualization and Computer Graphics, 25(10), pp. 2983-2998, 2019. Acceptance rate: 25%
- [J15] Z. Lu, M. Fan, Y. Wang, J. Zhao, M. Annett, D. Wigdor. **InkPlanner: Supporting Prewriting via Intelligent Visual Diagramming**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'18), 25(1), pp. 277-287, 2019. Impact factor: 3.780
- [J14] S. Xu[†], C. Bryan[†], K. Li[†], J. Zhao, K.-L. Ma. **Chart Constellations: Effective Chart Summarization for Collaborative and Multi-User Analyses**. Computer Graphics Forum (Proceedings of EuroVis'18), 37(3), pp. 75-86, 2018. Acceptance rate: 25%
- [J13] W. Zhong, W. Xu, K. Yager, G. Doerk, J. Zhao, Y. Tian, S. Ha, C. Xie, Y. Zhong, K. Mueller, K. van Dam. **Multi-SciView: Multivariate Scientific X-ray Image Visual Exploration with Cross-Data Space Views**. Visual Informatics (Proceedings of PacificVAST 2018), 2(1), pp. 14-25, 2018. Acceptance rate: 29%
- [J12] J. Zhao, M. Sun, F. Chen, P. Chiu. **BiDots: Visual Exploration of Weighted Coordinated Relationships**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'17), 24(1), pp. 195-204, 2018. Acceptance rate: 37%
- [J11] J. Zhao, M. Glueck, P. Isenberg, F. Chevalier, A. Khan. **Supporting Handoff in Asynchronous Collaborative Sensemaking Using Knowledge-Transfer Graphs**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'17), 24(1), pp. 340-350, 2018 (*Best Paper Honorable Mention, top 3 out of 173*). Acceptance rate: 21%
- [J10] S. Fu, H. Dong, W. Cui, J. Zhao, H. Qu. **How Do Ancestral Traits Shape Family Trees over Generations?** IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'17), 24(1), pp. 205-214, 2018. Acceptance rate: 21%
- [J9] J. Zhao, M. Glueck, S. Breslav, F. Chevalier, A. Khan. **Annotation Graphs: A Graph-Based Visualization for Meta-Analysis of Data based on User-Authored Annotations**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'16), 23(1), pp. 261-270, 2017. Acceptance rate: 21%

- Acceptance rate: 21%
- [J8] S. Fu, J. Zhao, W. Cui, H. Qu. **Visual Analysis of MOOC Forums with iForum**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'16), 23(1), pp. 201-210, 2017.
- Acceptance rate: 21%
- [J7] Y. Wu, N. Pitipornvivat, J. Zhao, S. Yang, G. Huang, H. Qu. **egoSlider: Visual Analysis of Egocentric Network Evolution**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'15), 22(1), pp. 260-269, 2016.
- Acceptance rate: 22%
- [J6] J. Zhao, W. Soukoreff, R. Balakrishnan. **Exploring and Modeling Unimanual Object Manipulation on Multi-Touch Displays**. International Journal of Human-Computer Studies, 78(0), pp. 68-80, 2015.
- Five-year impact factor: 2.517
- [J5] J. Zhao, N. Cao, Z. Wen, Y. Song, Y.-R. Lin, C. Collins. **#FluxFlow: Visual Analysis of Anomalous Information Spreading on Social Media**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'14), 20(12), pp. 1773-1782, 2014 (*Best Paper Honorable Mention, top 3 out of 148*).
- Acceptance rate: 23%
- [J4] J. Zhao, W. Soukoreff, X. Ren, R. Balakrishnan. **A Model of Scrolling on Touch-Sensitive Displays**. International Journal of Human-Computer Studies, 72(12), pp. 805-821, 2014.
- Five-year impact factor: 2.517
- [J3] J. Zhao, C. Collins, F. Chevalier, R. Balakrishnan. **Interactive Exploration of Implicit and Explicit Relations in Faceted Datasets**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST'13), 19(12), pp. 2080-2089, 2013.
- Acceptance rate: 26%
- [J2] J. Zhao, F. Chevalier, C. Collins, R. Balakrishnan. **Facilitating Discourse Analysis with Interactive Visualization**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of InfoVis'12), 18(12), pp. 2639-2648, 2012.
- Acceptance rate: 24%
- [J1] J. Zhao, F. Chevalier, E. Pietriga, R. Balakrishnan. **Exploratory Analysis of Time-series with ChronoLenses**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of InfoVis'11), 17(12), pp. 2422-2431, 2011.

Acceptance rate: 26%

Refereed Full-Length Conference Papers

- [C21] G. Fernandez-Nieto, P. An, J. Zhao, S. B. Shum, R. Martinez-Maldonado. **Classroom Dandelions: Visualising Participants' Position, Trajectories and Body Orientation Augments Teachers' Sensemaking**. CHI'22: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, 2022 (In Press).
- [C20] P. An[†], Z. Zhou[†], Q. Liu[†], Y. Yin, L. Du, D.-Y. Huang, J. Zhao. **VibEmoji: Exploring User-authoring Multimodal Emoticons in Social Communication**. CHI'22: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, 2022 (In Press).
- [C19] M. Fan, X. Yang[†], T.-T. Yu[†], V. Liao, J. Zhao. **Human-AI Collaboration for UX Evaluation: Effects of Explanation and Synchronization**. CSCW'22: Proceedings of the ACM Conference on Computer Supported Cooperative Work and Social Computing, 2022 (In Press).
- [C18] X. Li, Y. Wang, H. Wang, Y. Wang, J. Zhao. **NBSearch: Semantic Search and Visual Exploration of Computational Notebooks**. CHI'21: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 308:1-308:14, 2021.
- Acceptance rate: 26%
- [C17] S. Xia, N. Anzum, S. Salihoglu, J. Zhao. **KTabulator: Interactive Ad hoc Table Creation using Knowledge Graphs**. CHI'21: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 100:1-100:14, 2021.
- Acceptance rate: 26%
- [C16] T. Fujiwara, J. Zhao*, F. Chen, K.-L. Ma. **A Visual Analytics Framework for Contrastive Network Analysis**. VAST'20: Proceedings of the IEEE Conference on Visual Analytics Science and Technology, pp. 48-59, 2020.
- Acceptance rate: 29%
- [C15] J. Wenskovich, J. Zhao*, S. Carter, M. Cooper, C. North. **Albireo: An Interactive Tool for Visually Summarizing Computational Notebook Structure**. VDS'19: Proceedings of the Symposium on Visualization in Data Science, pp. 1-10, 2019.

Acceptance rate: 29%

- [C14] M. Loorak, W. Zhou, H. Trinh, J. Zhao, W. Li. **Hand-Over-Face Input Sensing for Interaction with Smartphones through the Built-in Camera**. MobileHCI'19: Proceedings of the ACM International Conference on Human-Computer Interaction with Mobile Devices and Services, 32:1–32:12, 2019 (*Best Paper, top 1 of 158*).
Acceptance rate: 26%
- [C13] H.-F. Cheng, B. Yu, S. Fu, J. Zhao, B. Hecht, J. Konstan, L. Terveen, S. Yarosh, H. Zhu. **Teaching UI Design at Global Scales: A Case Study of the Design of Collaborative Capstone Projects for MOOCs**. LS'19: Proceedings of the ACM Conference on Learning at Scale, pp. 11:1–11:11, 2019.
Acceptance rate: 25%
- [C12] C. Bhatt, M. Cooper, J. Zhao. **SeqSense: Video Recommendation Using Topic Sequence Mining**. MMM'18: Proceedings of the International Conference on Multimedia Modeling, pp. 252–263, 2018.
Acceptance rate: 29%
- [C11] J. Zhao, C. Bhatt, M. Cooper, D. Shamma. **Flexible Learning with Semantic Visual Exploration and Sequence-Based Recommendation of MOOC Videos**. CHI'18: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 329:1–329:13, 2018.
Acceptance rate: 25%
- [C10] S. Fu, J. Zhao*, H. Cheng, H. Zhu, J. Marlow. **T-Cal: Understanding Team Conversation Data with Calendar-based Visualization**. CHI'18: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 500:1–500:13, 2018.
Acceptance rate: 25%
- [C9] M. Zhao, Y. Su, J. Zhao, S. Chen, H. Qu. **Mobile Situated Analytics of Ego-centric Network Data**. SA'17: Proceedings of the SIGGRAPH Asia Symposium on Visualization, pp. 14:1–14:8, 2017.
- [C8] J. Zhao, M. Glueck, F. Chevalier, Y. Wu, A. Khan. **Egocentric Analysis of Dynamic Networks with EgoLines**. CHI'16: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 5003–5014, 2016 (*Best Paper Honorable Mention, top 5%*).
Acceptance rate: 20%
- [C7] J. Zhao, Z. Liu, M. Dontcheva, A. Hertzmann, A. Wilson. **MatrixWave: Visual Comparison of Event Sequence Data**. CHI'15: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 259–268, 2015 (*Best Paper Honorable Mention, top 5%*).
Acceptance rate: 25%
- [C6] F. Du, N. Cao, J. Zhao, Y.-R. Lin. **Trajectory Bundling for Animated Transitions**. CHI'15: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 289–298, 2015.
Acceptance rate: 25%
- [C5] J. Zhao, L. Gou, F. Wang, M. Zhou. **PEARL: An Interactive Visual Analytic Tool for Understanding Personal Emotion Style Derived from Social Media**. VAST'14: Proceedings of the IEEE Conference on Visual Analytics Science and Technology, pp. 203–212, 2014.
Acceptance rate: 37%
- [C4] J. Wang, J. Zhao, S. Guo, C. North, N. Ramakrishnan. **ReCloud: Semantics-Based Word Cloud Visualization of User Reviews**. GI'14: Proceedings of the Graphics Interface Conference, pp. 151–158, 2014.
Acceptance rate: 37%
- [C3] J. Zhao, D. Wigdor, R. Balakrishnan. **TrailMap: Facilitating Information Seeking in a Multi-Scale Digital Map via Implicit Bookmarking**. CHI'13: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 3009–3018, 2013.
Acceptance rate: 20%
- [C2] R. W. Soukoreff, J. Zhao, X. Ren. **The Entropy of a Rapid Aimed Movement: Fitts' Index of Difficulty versus Shannon's Entropy**. INTERACT'11: Proceedings of the 13th IFIP TC13 International Conference on Human Computer Interaction, Part 4, LNCS 6949, pp. 222–239, 2011.
Acceptance rate: 27%
- [C1] J. Zhao, F. Chevalier, R. Balakrishnan. **KronoMiner: Using Multi-Foci Navigation for the Visual Exploration of Time-Series Data**. CHI'11: Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 1737–1746, 2011.
Acceptance rate: 26%
- Refereed Short-Length Conference Papers**
- [S5] J. Zhao*, M. Sun, P. Chiu, F. Chen, B. Liew. **Know-What and Know-Who: Document Searching and Exploration using Topic-Based Two-Mode Networks**. Proceedings of the IEEE Pacific Visualization Symposium, pp. 81–85, 2021.
Acceptance rate: 43%

- [S4] C. Park, I. Na, Y. Jo, S. Shin, J. Yoo, B. C. Kwon, J. Zhao, H. Noh, Y. Lee, J. Choo. **SANVis: Visual Analytics for Understanding Self Attention Networks**. Proceedings of IEEE VIS Conference, pp. 146-150, 2019. Acceptance rate: 31%
- [S3] J. Zhao, M. Sun, F. Chen, P. Chiu. **MissBiN: Visual Analysis of Missing Links in Bipartite Networks**. Proceedings of IEEE VIS Conference, pp. 71-75, 2019. Acceptance rate: 31%
- [S2] M. Sun, D. Koop, J. Zhao, C. North, N. Ramakrishnan. **Interactive Bicluster Aggregation in Bipartite Graphs**. Proceedings of IEEE VIS Conference, pp. 246-250, 2019. Acceptance rate: 31%
- [S1] J. Zhao, S. Drucker, D. Fisher, D. Brinkman. **TimeSlice: Interactive Faceted Browsing of Timeline Data**. AVI'12: Proceedings of the International Working Conference on Advanced Visual Interfaces, pp. 433-436, 2012. Acceptance rate: 28%

Work-in-Progress and Others

- [W8] Z. Yang, P. An, J. Yang, S. Strojny, Z. Zhang, D. Sun, J. Zhao. **Designing Mobile EEG Neurofeedback Games for Children with Autism: Implications from Industry Practice**. Proceedings of ACM International Conference on Mobile Human-Computer Interaction (Industry Perspectives), pp. 23:1-23:6, 2021.
- [W7] B. Glasbergen, M. Abebe, K. Daudjee, D. Vogel, J. Zhao. **Sentinel: Understanding Data Systems**. Proceedings of the ACM SIGMOD Conference, pp. 2729-2732, 2020. (*Best Demo*).
- [W6] C. Bhatt, J. Zhao, H. Oda, F. Chen, M. Lee. **OPaPi: Optimized Parts Pick-up Routing for Efficient Manufacturing**. HILDA'19: Proceedings of the ACM SIGMOD Workshop on Human-In-the-Loop Data Analytics, 5:1-5:8, 2019.
- [W5] J. Zhao, F. Chen, P. Chiu. **A Generic Visualization Framework for Understanding Missing Links in Bipartite Networks**. SA'18: Proceedings of the ACM SIGGRAPH Asia Conference (Poster), 2018.
- [W4] M. Cooper, J. Zhao, C. Bhatt, D. Shamma. **Using Recommendation to Explore Educational Video**. ICMR'18: Proceedings of the ACM International Conference on Multimedia Retrieval (Demo), 2018.
- [W3] J. Wang, J. Zhao, S. Guo, C. North. **Clustered Layout Word Cloud for User Generated Review**. Yelp Dataset Challenge, 2013 (Grand Prize Winner).
- [W2] J. Zhao. **A Particle Filter Based Approach of Visualizing Time-varying Volume**. Lдав'12: Proceedings of the IEEE Symposium on Large-Scale Data Analysis and Visualization (Poster), 2012.
- [W1] J. Zhao, R. W. Soukoreff, R. Balakrishnan (Poster). **A Model of Multi-touch Manipulation**. GRAND'11: Proceedings of the 2nd Annual Grand Conference, 2011.

Patents

- [P19] T. Fujiwara, J. Zhao, F. Chen. **System and Method for Contrastive Network Analysis and Visualization**. Filed in 2020.
- [P18] J. Zhao. **System and Method for Summarizing and Steering Multi-User Collaborative Data Analysis**. Filed in 2019.
- [P17] J. Zhao, F. Chen. **System and Method for Automatically Sorting Ranked Items and Generating a Visual Representation of Ranked Results**. Filed in 2019.
- [P16] H. Oda, C. Bhatt, J. Zhao. **Optimized Parts Pickup List and Routes for Efficient Manufacturing using Frequent Pattern Mining and Visualization**. Filed in 2019.
- [P15] J. Zhao, F. Chen, P. Chiu. **A Visual Analysis Framework for Understanding Missing Links in Bipartite Networks**. Filed in 2018.
- [P14] J. Wenskovitch, J. Zhao, M. Cooper, S. Catter. **System and Method for Computational Notebook Interface**. Filed in 2018.
- [P13] F. Chen, J. Zhao, Y. Chen. **System and Method for Generating Titles for Summarizing Conversational Documents**. Filed in 2018.
- [P12] J. Zhao, Y. Chen, F. Chen. **System and Method for Creating Visual Representation of Data based on Generated Glyphs**. Filed in 2018.
- [P11] J. Zhao, C. Bhatt, M. Cooper, A. Shamma. **System and Method for Visualizing and Recommending Media Content Based on Sequential Context**. Filed in 2018.

- [P10] [J. Zhao](#) and [S. Fu](#). **System and Method for Analyzing and Visualizing Team Conversational Data**. Filed in 2017.
- [P9] [J. Zhao](#), [F. Chen](#), [P. Chiu](#). **System and Method for Visual Exploration of Sub-Network Patterns in Two-Mode Networks**. Filed in 2017.
- [P8] [J. Zhao](#), [F. Chen](#), [P. Chiu](#). **System for Visually Exploring Coordinated Relationships in Data**. Filed in 2017.
- [P7] [F. Chen](#), [J. Zhao](#), [Y.-Y. Chen](#). **System and Method for User-Oriented Topic Selection and Browsing**. Filed in 2017.
- [P6] [M. Glueck](#), [A. Khan](#), [J. Zhao](#). **Handoff Support in Asynchronous Analysis Tasks using Knowledge Transfer Graphs**. US20180081885 A1, 2018.
- [P5] [J. Zhao](#), [M. Glueck](#), [A. Khan](#), [S. Breslay](#). **Techniques For Mixed-Initiative Visualization of Data**. US20180081862 A1, 2018.
- [P4] [J. Zhao](#), [M. Glueck](#), [A. Khan](#). **Node Centric Analysis of Dynamic Networks**. US Patent US10142198 B2, 2018.
- [P3] [M. Dontcheva](#), [J. Zhao](#), [A. Hertzmann](#), [A. Wilson](#), [Z. Liu](#). **Providing Visualizations of Event Sequence Data**. US Patent US9577897 B2, 2017.
- [P2] [L. Gou](#), [F. Wang](#), [J. Zhao](#), [M. Zhou](#). **Personal Emotion State Monitoring from Social Media**. US Patent 20150213002 A1, 2015.
- [P1] [J. Zhao](#), [S. Drucker](#), [D. Fisher](#), [D. Brinkman](#). **Relational Rendering of Multi-Faceted Data**. US Patent 20130194294 A1, 2013.

Services

Cheriton School of Computer Science

2019-2021 Graduate Committee: General Subcommittee Member

Journal Guest Editor

2020 IEEE Computer Graphics and Applications (CG&A) Special Issue on Powering Visualization with Deep Learning

Conference Organizing Committees

2022 IEEE PacificVis: Paper Co-Chair

2021 ChinaVis: Paper Co-Chair

2021 IEEE VIS: Publication Co-Chair

2020 ISVC: Visualization Area Co-Chair

2019-2020 IEEE VIS: Fast Forward and Video Preview Co-Chair

2019 IEEE PacificVis: Visual Data Storytelling Contest Co-Chair

2019-2020 ChinaVis: Poster Co-Chair

Conference Program Committees

2022 IEEE Conference on Visualization (VIS)

2020 IEEE Conference on Information Visualization (InfoVis)

2020-2021 Graphics Interface Conference (GI)

2019-2020 ACM Conference on Human Factors in Computing Systems (CHI)

2017-2019 IEEE Conference on Visual Analytics Science & Technology (VAST)

2017 International Symposium on Graph Drawing and Network Visualization (GD)

2017-2018 China Visualization and Visual Analytics Conference (ChinaVis)

2016-2018, IEEE Pacific Visualization Symposium (PacificVis)

2020

2016 ACM Conference on Human Factors in Computing Systems (CHI) - Late Breaking Work

2016-2019 International Symposium of Chinese CHI (Chinese CHI)

2014-2015 International Symposium on Visual Computing (ISVC)

Conference Session Chairs

2020 IEEE VIS: Dynamic Graphs and Hypergraphs

2019 ACM CHI: Storytelling with Visualization

2018 IEEE VIS: Text

Invited Grant Proposal Reviewers

2020,2022 Mitacs Accelerate

Invited Conference Reviewers

IEEE VIS Conference (VAST, InfoVis, and SciVis)

IEEE Pacific Visualization Symposium (PacificVis)

IEEE Eurographics/VGTC Symposium on Visualization (EuroVis)

ACM SIGGRAPH

ACM Conference on Designing Interactive Systems (DIS)

ACM Conference on Human Factors in Computing Systems (CHI)

ACM Conference on User Interface Software and Technology (UIST)

ACM Graphics Interface Conference (GI)

ACM World Wide Web Conference (WWW)

ACM Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI)

ACM Nordic Conference on Human-Computer Interaction (NordiCHI)

ACM Asia Pacific Conference on Computer Human Interaction (APCHI)

International Conference on the Learning Sciences (ICLS)

International Symposium of Chinese CHI (Chinese CHI)

AAAI Conference on Artificial Intelligence

I regularly review Visualization and HCI venues.

Invited Journal Reviewers

Information Visualization

International Journal of Human-Computer Interaction (IJHCI)

Informatics

Human-Centric Computing and Information Sciences (HCIS)

ACM Transactions on Computer-Human Interaction (TOCHI)

ACM Transactions on Intelligent Systems and Technology (TIST)

ACM Transactions on Interactive Intelligent Systems (TiiS)

IEEE Transactions on Visualization and Computer Graphics (TVCG)

IEEE Transactions on Affective Computing

IEEE Transactions on Knowledge and Data Engineering (TKDE)

Journal of Visual Languages and Computing

I regularly review Visualization and HCI venues.

Professional Organization

2018 ICACHI (International Chinese Association of Computer Human Interaction) Council Member

Student Volunteers

2014 ACM Conference on Human Factors in Computing Systems (CHI)

2010-2011 IEEE VIS (VAST, InfoVis, and SciVis) Conference

Talks

Invited Talks

2021.10 **Moving Between Academia and Industry**, *IEEE VIS*, Panelist, Online.

2021.7 **Empower the People with Predictive, Interactive, and Expressive Visualization**, *Zhejiang University Visualization Summer School*, Online.

2021.6 **Power the People with Data: An Introduction to Information Visualization**, *UW HFES Student Chapter Lecture Series*, Online.

- 2021.3 **Support Effective Decision Making by Engaging Humans with Predictive Models via Interactive Visualization**, *International Workshop on Human-Engaged Computing*, Online.
- 2021.2 **Towards an Integrated Environment of Data, Machines, and Humans**, *Mightex Inc*, Online.
- 2020.7 **The Flow of Knowledge: Applying Visualization in Communication and Collaboration**, *Shandong University Visualization Summer School*, Online.
- 2020.7 **Integrating Predictive Models with Interactive Visualization**, *GAMES: Graphics And Mixed Environment Seminar*, Online.
- 2019.11 **Towards an Integrated Environment of Data, Machines, and Humans using Visualization**, *Adobe Research*, San Jose, CA.
- 2019.8 **Connecting Data, Models, and Users with Visualization**, *Brookhaven National Laboratory*, Upton, NY.
- 2019.8 **Connecting Data, Models, and Users with Visualization**, *Stonybrook University*, Stonybrook, NY.
- 2018.12 **Design Visualization for the Data Science Workflow**, *Jilin University*, Changchun, China.
- 2018.9 **Design Visualization for the Data Science Workflow**, *Google AI China Center*, Beijing, China.
- 2018.9 **Design Visualization for the Data Science Workflow**, *Peking University*, Beijing, China.
- 2018.7 **Design Visualization for the Data Science Workflow**, *Zhejiang University*, Hangzhou, China.
- 2015.11 **Visualization and Design: What I Did and What I Learned**, *Mnubo Inc.*, Montreal, QC.
- 2015.6 **Supporting Data Analytics with Interactive Visualization**, *CaseWare International Inc.*, Toronto, ON.
- 2015.5 **Bridging Data and User with Interactive Visualization**, *Peking University*, Beijing, China.
- 2014.11 **Bridging Data and User with Interactive Visualization**, *Autodesk Research*, Toronto, ON.
- 2014.9 **Visual Comparison of Event Sequence Data**, *Adobe Research*, San Francisco, CA.
- 2013.12 **Visual Data Exploration: A Multi-Focus Approach**, *University of Ontario Institute of Technology*, Oshawa, ON.
- 2013.9 **Visual Analytics of Online Social Media with PEARL**, *IBM Almaden Research Center*, San Jose, CA.
- 2013.4 **TrailMap: Facilitating Information Seeking in a Multi-Scale Digital Map via Implicit Bookmarking**, *ToRCHI Seminar*, Toronto, ON.
- 2011.8 **TimeSlice: Interactive Faceted Browsing of Timeline Data**, *Microsoft Research*, Redmond, WA.
- 2010.12 **Modeling Scrolling Interactions on Touch Screens**, *Jilin University*, Changchun, China.
- 2010.9 **KronoMiner: Using Multi-Foci Navigation for the Visual Exploration of Time-Series Data**, *KMDI Seminar, University of Toronto*.
- Conference Presentations**
- 2021.10 **Understanding Missing Links in Bipartite Networks with MissBiN**, *IEEE VIS*, Online.
- 2021.10 **ChartSeer: Interactive Steering Exploratory Visual Analysis with Machine Intelligence**, *IEEE VIS*, Online.
- 2019.10 **The Effect of Edge Bundling and Seriation on Sensemaking of Biclusters in Bipartite Graphs**, *IEEE VIS*, Vancouver, BC.
- 2019.10 **MissBiN: Visual Analysis of Missing Links in Bipartite Networks**, *IEEE VIS*, Vancouver, BC.
- 2017.10 **BiDots: Visual Exploration of Weighted Coordinated Relationships**, *IEEE VIS*, Phoenix, AZ.
- 2017.10 **Supporting Handoff in Asynchronous Collaborative Sensemaking Using Knowledge-Transfer Graphs**, *IEEE VIS*, Phoenix, AZ.
- 2016.11 **Annotation Graphs: A Graph-Based Visualization for Meta-Analysis of Data based on User-Authored Annotations**, *IEEE VIS*, Baltimore, MA.
- 2016.5 **Egocentric Analysis of Dynamic Networks with EgoLines**, *ACM CHI*, San Jose, CA.
- 2015.4 **Visual Comparison of Event Sequence Data**, *ACM CHI*, Seoul, South Korea.
- 2014.11 **#FluxFlow: Visual Analysis of Anomalous Information Spreading on Social Media**, *IEEE VIS*, Paris, France.
- 2014.11 **PEARL: An Interactive Visual Analytic Tool for Understanding Personal Emotion Style Derived from Social Media**, *IEEE VIS*, Paris, France.

- 2013.5 **TrailMap: Facilitating Information Seeking in a Multi-Scale Digital Map via Implicit Bookmarking**, *ACM CHI*, Paris, France.
- 2012.10 **Facilitating Discourse Analysis with Interactive Visualization**, *IEEE VisWeek*, Seattle, WA.
- 2011.10 **Exploratory Analysis of Time-series with ChronoLenses**, *IEEE VisWeek*, Providence, RI.
- 2011.5 **KronoMiner: Using Multi-Foci Navigation for the Visual Exploration of Time-Series Data**, *ACM CHI*, Vancouver, BC.
- 2011.5 **A Model of Multi-touch Manipulation**, *GRAND*, Vancouver, BC.

Selected Media Coverage

- 2021.11 **A Snapshot of IEEE VIS 2021**, *ACM SIGGRAPH Blog*, by Theresa-Marie Rhyne and Georges Hattab.
<https://blog.siggraph.org/2021/11/a-snapshot-view-of-ieee-vis-2021.html>
- 2021.07 **Best of arXiv.org for AI, Machine Learning, and Deep Learning – June 2021**, *Inside Big Data*, by Daniel Gutierrez.
<https://insidebigdata.com/2021/07/19/best-of-arxiv-org-for-ai-machine-learning-and-deep-learning-june-2021/>
- 2020.12 **Toward Effective Data Journeys in Exploratory Visual Analysis**, *Nightingale*, Data Visualization Society.
<https://medium.com/nightingale/toward-effective-data-journeys-in-exploratory-visual-analysis-9137fda07073>
- 2011.11 **The Most Interesting Papers at the Infovis Conference – VisWeek 2011**, *VizWorld*, by Randall Hand.
<https://vizworld.com/2011/11/interesting-papers-infovis-conference-visweek-2011/>

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