

# Jian Zhao, *Ph.D.*

Research Scientist  
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## SUMMARY

I am a data visualization researcher, designer, and coder. My research lies in the general areas of **Information Visualization (InfoVis)** and **Human-Computer Interaction (HCI)**. I focus on the design, development, and evaluation of highly interactive visualization techniques to empower data enthusiasts to effectively discover and communicate insightful knowledge in real-world applications and datasets. 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*.
- DataVis geek with hands-on multiple *development platforms* and *programming languages*.
- Active involvement of *teaching* and *mentoring* talents.

Research keywords:

- InfoVis: time-series, event sequences, multidimensional data, dynamic networks, social media text.
- HCI: direct manipulation, multi-touch interface, mobile interaction, user performance modeling.

## EDUCATION

- 2015.7 *Ph.D. in Computer Science, University of Toronto, Canada.*  
Thesis: Interactive Visual Data Exploration—A Multi-Focus Approach  
Committee: Ravin Balakrishnan (Supervisor), Karan Singh, Khai Turong, John Stasko (External)  
Coursework Average: A
- 2009.6 *B.ENG. in Computer Science, Zhejiang University, China.*  
Thesis: Invariant Image Features Extraction  
Supervisor: Yizhou Yu  
GPA: 3.9/4.0 (Rank top 3%)

## PROFESSIONAL EXPERIENCE

- 2016.11- *Research Scientist, FXPAL, Palo Alto, CA.*  
Conducting the design, development, and evaluation of highly interactive visualization techniques that empower users to effectively discover and communicate insights in application domains including enterprise messaging and social media mining. Culminated [J12, P7-8].
- 2015.7-2016.10 *Postdoctoral Researcher, Autodesk Research, Toronto, ON.*  
Designed and implemented visualization techniques for dynamic network analysis, time-series annotation, and knowledge transfer in collaborative sense-making. Culminated [C13, J9, J11, P4-6].
- 2009.9-2015.6 *Research Assistant, DGP 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. Culminated [C1-2, C5, J1-6].

- 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. Culminated [C11, P3].
- 2013.5-2013.8 *Research Intern, IBM Almaden Research Center, 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. Culminated [C8, 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. Culminated [S1, P1].
- 2008.6-2008.8 *Visiting Student, Knowledge Discovery Lab, North Carolina State University, Raleigh, NC.*  
Designed and developed a visualization system for summarizing patterns and relationships of user profiles on social networks such as Facebook.
- 2007.9-2009.9 *Research Assistant, Computer Vision Lab, Zhejiang University, Hangzhou, China.*  
Developed a new image feature matching algorithm to track objects in videos. Developed a non-photorealistic image rendering pipeline to generate cartoon-like images.

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## AWARDS & HONORS

### Scholarships

- 2016-2017 *Postdoctoral Fellowship, \$45,000/year, Natural Sciences and Engineering Research Council Canada (NSERC), (declined).*
- 2016 *Accelerate Postdoctoral Award, \$60,000, Mitacs.*
- 2015 *Robert E. Lansdale/Okino Graduate Fellowship, \$2,000, University of Toronto.*
- 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 *Academic Scholarship, ¥5,000/year, Zhejiang University.*
- 2006, 2008 *Chinese National Scholarship, ¥8,000/year, Ministry of Education of China.*

### Publication Awards

- 2017 *Best Paper Honorable Mention, IEEE VAST Conference.*
- 2016 *Best Paper Honorable Mention, ACM CHI Conference.*
- 2015 *Best Paper Honorable Mention, ACM CHI Conference.*
- 2014 *Best Paper Honorable Mention, IEEE VAST Conference.*

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## PUBLICATIONS

### Refereed Journal Articles

- [J12/C18] J. Zhao, M. Sun, F. Chen, and 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, 2017.

Acceptance rate: 21%

[J11/C17] J. Zhao, M. Glueck, P. Isenberg, F. Chevalier, and 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, 2017 (*Best Paper Honorable Mention, top 2%*).

Acceptance rate: 21%

[J10/C16] S. Fu, H. Dong, W. Cui, J. Zhao, and 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, 2017.

Acceptance rate: 21%

[J9/C15] J. Zhao, M. Glueck, S. Breslav, F. Chevalier, and 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%

[J8/C14] S. Fu, J. Zhao, W. Cui, and 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/C12] Y. Wu, N. Pitipornvivat, J. Zhao, S. Yang, G. Huang, and 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, and 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: 1.942

[J5/C9] J. Zhao, N. Cao, Z. Wen, Y. Song, Y.-R. Lin, and 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 2%*).

Acceptance rate: 23%

[J4] J. Zhao, W. Soukoreff, X. Ren, and 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: 2.003

[J3/C6] J. Zhao, C. Collins, F. Chevalier, and 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/C4] J. Zhao, F. Chevalier, C. Collins, and 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/C3] J. Zhao, F. Chevalier, E. Pietriga, and 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

[C13] J. Zhao, M. Glueck, F. Chevalier, Y. Wu, and A. Khan. **Egocentric Analysis of Dynamic Networks with EgoLines**. CHI'16: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 5003-5014, 2016 (*Best Paper Honorable Mention, top 5%*).

- Acceptance rate: 20%
- [C11] J. Zhao, Z. Liu, M. Dontcheva, A. Hertzmann, and A. Wilson. **MatrixWave: Visual Comparison of Event Sequence Data**. CHI'15: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 259-268, 2015 (*Best Paper Honorable Mention, top 5%*).
- Acceptance rate: 25%
- [C10] F. Du, N. Cao, J. Zhao, and Y.-R. Lin. **Trajectory Bundling for Animated Transitions**. CHI'15: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 289-298, 2015.
- Acceptance rate: 25%
- [C8] J. Zhao, L. Gou, F. Wang, and 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%
- [C7] J. Wang, J. Zhao, S. Guo, C. North, and 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%
- [C5] J. Zhao, D. Wigdor, and R. Balakrishnan. **TrailMap: Facilitating Information Seeking in a Multi-Scale Digital Map via Implicit Bookmarking**. CHI'13: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 3009-3018, 2013.
- Acceptance rate: 20%
- [C2] R. W. Soukoreff, J. Zhao, and X. Ren. **The Entropy of a Rapid Aimed Movement: Fitts' Index of Difficulty versus Shannon's Entropy**. INTERACT'11: 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, and R. Balakrishnan. **KronoMiner: Using Multi-Foci Navigation for the Visual Exploration of Time-Series Data**. CHI'11: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 1737-1746, 2011.

Acceptance rate: 26%

### Refereed Short-Length Conference Papers

- [S1] J. Zhao, S. Drucker, D. Fisher, and 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.

### Posters, Work-in-Progress, and others

- [O4] J. Zhao, R. Jota, D. Wigdor, and R. Balakrishnan. **Augmenting Mobile Phone Interaction with Face-Engaged Gestures**. arXiv:1610.00214, 2016.
- [O3] J. Wang, J. Zhao, S. Guo, and C. North. **Clustered Layout Word Cloud for User Generated Review**. Yelp Dataset Challenge, 2013 (Grand Prize Winner).
- [O2] J. Zhao. **A Particle Filter Based Approach of Visualizing Time-varying Volume**. Lдав'12: IEEE Symposium on Large-Scale Data Analysis and Visualization, 2012.
- [O1] J. Zhao, R. W. Soukoreff, and R. Balakrishnan. **A Model of Multi-touch Manipulation**. GRAND'11: Proceedings of the 2nd annual Grand Conference, 2011.

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## PATENTS

- [P8] J. Zhao, F. Chen, and P. Chiu. **System for Visually Exploring Coordinated Relationships in Data**. Filed in 2017.

- [P7] F. Chen, J. Zhao, and Y.-Y. Chen. **System and Method for User-Oriented Topic Selection and Browsing**. Filed in 2017.
- [P6] J. Zhao, M. Glueck, and A. Khan. **Handoff Support in Asynchronous Analysis Tasks using Knowledge Transfer Graphs**. Filed in 2017.
- [P5] J. Zhao, M. Glueck, A. Khan, and S. Breslay. **Techniques For Mixed-Initiative Visualization of Data**. Filed in 2017.
- [P4] J. Zhao, M. Glueck, and A. Khan. **Node Centric Analysis of Dynamic Networks**. Filed in 2016.
- [P3] M. Dontcheva, J. Zhao, A. Hertzmann, A. Wilson, and Z. Liu. **Providing Visualizations of Event Sequence Data**. Filed in 2015.
- [P2] L. Gou, F. Wang, J. Zhao, and M. Zhou. **Personal Emotion State Monitoring from Social Media**. US Patent 20150213002 A1, 2015.
- [P1] J. Zhao, S. Drucker, D. Fisher, and D. Brinkman. **Relational Rendering of Multi-Faceted Data**. US Patent 20130194294 A1, 2013.

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## STUDENT SUPERVISION

### Supervision

- 2017.6-2017.9 *Siwei Fu, Research Intern, FXPAL.*  
On visually summarizing massive conversations on team communication platforms such as Slack.
- 2013.5-2013.8 *Phoebe Xinyi Chang, Undergraduate Research Assistant, University of Toronto.*  
On visualizing food nutritions with mobile phones (co-advised with Dr. Ravin Balakrishnan).

### Mentoring

- 2015.11-2016.3 *Siwei Fu, Research Intern, Microsoft Research Asia.*  
On MOOC forum visualization [J8] (co-advised with Dr. Weiwei Cui)
- 2015.1-2015.5 *Yanhong Wu, Ph.D. student, Hong Kong University of Science and Technology.*  
On dynamic egocentric network visualization [J7] (co-advised with Dr. Huamin Qu).
- 2014.5-2014.9 *Fan Du, Research Intern, IBM T. J. Watson Research Center.*  
On object movement trajectory bundling in animated transitions [C10] (co-advised with Dr. Nan Cao).

### Ph.D. Committees

- 2017 *Christopher Bryan, University of California Davis.*  
Member of supervisory committee. Thesis topic: advanced techniques and cognitive considerations for explanatory visualization and data storytelling.
- 2017 *Siwei Fu, Hong Kong University of Science and Technology.*  
Member of supervisory committee. Thesis topic: visual analytics techniques for user-generated text with online platforms.

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## TEACHING EXPERIENCE

### Guest Lecture

- 2017.2 *Design for Interactive Visualization: Illustrated with Graph Visualization, University of California Davis.*  
Graduate course, ECS 277 - Advanced Visualization, taught by Dr. Kwan-Liu Ma.

### Teaching Assistantships

- 2009-2011, 2015 *CSC108 - Introduction to Computer Programming, University of Toronto.*  
1st year undergraduate course. Led tutorials, conducted lab sessions, and graded assignments on introductory Python programming.
- 2010, 2013 *CSC148 - Introduction to Computer Science, University of Toronto.*  
1st year undergraduate course. Led tutorials, conducted lab sessions, and graded assignments on object-oriented programming (in Python), basic data structures, and fundamental algorithms.
- 2011-2013 *CSC318 - Design of Interactive Computational Media, University of Toronto.*  
3rd year undergraduate course. Led tutorials, graded assignments, and advised students' group projects.
- 2012 *CSC309 - Programming on the Web, University of Toronto.*  
3rd year undergraduate course. Led tutorials and graded assignments in Java, Javascript, jQuery, CSS and other web-related technologies.
- 2014 *CSC428/2514 - Human Computer Interaction, University of Toronto.*  
Cross-listed graduate and 4th year undergraduate course. Led tutorials, graded assignments, advised students' group projects, and guided students write HCI research reports.

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## ACADEMIC SERVICES

### Program Committee

- 2017 IEEE VAST Conference
- 2017 International Symposium on Graph Drawing and Network Visualization (GD)
- 2017 China Visualization and Visual Analytics Conference (ChinaVis)
- 2016-2018 IEEE Pacific Visualization Symposium (PacificVis)
- 2016 ACM Conference on Human Factors in Computing Systems - Late Breaking Work
- 2016-2017 International Symposium of Chinese CHI (Chinese CHI)
- 2014-2015 International Symposium on Visual Computing (ISVC)

### Conference Paper Reviewer

- IEEE VIS (VAST, InfoVis, and SciVis) Conference
- IEEE Pacific Visualization (PacificVis) Symposium
- IEEE Eurographics/VGTC Symposium on Visualization (EuroVis)
- 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)

### Journal Article Reviewer

- Information Visualization
- International Journal of Human-Computer Interaction (IJHCI)
- Informatics
- Human-Centric Computing and Information Sciences (HCIS)
- ACM Transactions on Interactive Intelligent Systems (TiiS)
- IEEE Transactions on Visualization and Computer Graphics (TVCG)

### Student Volunteer

- 2014 ACM Conference on Human Factors in Computing Systems (CHI)  
2010-2011 IEEE VIS (VAST, InfoVis, and SciVis) Conference

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## TALKS

### Conference Presentations

- 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.

### Invited Talks

- 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**.