

Hanqi Guo

CONTACT INFORMATION

9700 South Cass Avenue
Building 240
Argonne, IL 60439

Phone: 630-252-7225
Fax: 630-252-5986
E-mail: hguo@anl.gov
Web: <http://www.mcs.anl.gov/~hguo>

RESEARCH INTERESTS

Large scientific data visualization, Flow visualization, Uncertainty visualization.

EDUCATION

Peking University, Beijing, China

Ph.D., Computer Science

September, 2009–Jul, 2013

Dissertation: “Scalable Visual Analysis on Pathlines in Large-Scale Flow Field Data”

Advisor: Prof. Xiaoru Yuan

Beijing University of Posts and Telecommunications, Beijing, China

B.S., Mathematics and Applied Mathematics

September, 2005–June, 2009

Minor in Telecommunications Engineering

PROFESSIONAL EXPERIENCE

Postdoctoral Appointee,

August, 2014–present

Mathematics and Computer Science Division, Argonne National Laboratory

Research Assistant,

September, 2009–July, 2014

Key Laboratory of Machine Perception (Ministry of Education), Peking University

Department of Machine Intelligence, School of EECS, Peking University

REFEREED JOURNAL PAPERS

- **Hanqi Guo**, Wenbin He, Tom Peterka, Han-Wei Shen, Scott M. Collis, and Jonathan J. Helmus, “Finite-Time Lyapunov Exponents and Lagrangian Coherent Structures in Uncertain Unsteady Flows.” *IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE PacificVis '16)*, 22(6):1672–1682, 2016. (Acceptance rate: 30/97=30.92%, direct to journal 6/97=6.2%)
- Carolyn L. Phillips, **Hanqi Guo***, Tom Peterka, Dmitry Karpeyev, and Andreas Glatz, “Tracking Vortices in Superconductors: Extracting Singularities from a Discretized Complex Scalar Field Evolving in Time.” *Physical Review E: Statistical, Nonlinear, and Soft Matter Physics*, 93(023305), 2016. (C.L.P and H.G contributed equally to this work.)
- **Hanqi Guo**, Carolyn L. Phillips, Tom Peterka, Dmitry Karpeyev, and Andreas Glatz, “Extracting, Tracking, and Visualizing Vortices in 3D Complex-Valued Superconductor Simulation Data.” *IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE SciVis '15)*, 22(1):827–836, 2016. (Acceptance rate: 33/134=24.6%)
- **Hanqi Guo**, Jiang Zhang, Richen Liu, Lu Liu, Xiaoru Yuan, Jian Huang, Xiangfei Meng, and Jingshan Pan, “Advection-based Sparse Data Management for Visualizing Unsteady Flow.” *IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE SciVis '14)*, 20(12):2555–2564, 2014. (Acceptance rate: 35/136=25.7%)
- Fan Hong, Chufan Lai, **Hanqi Guo**, Enya Shen, Xiaoru Yuan, and Sikun Li, “FLDA: Latent Dirichlet Allocation Based Unsteady Flow Analysis.” *IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE SciVis '14)*, 20(12):2545–2554, 2014. (Acceptance rate: 35/136=25.7%)
- Richen Liu, **Hanqi Guo**, and Xiaoru Yuan, “Seismic Structure Extraction Based on Multi-scale Sensitivity Analysis.” *Journal of Visualization*, 17(3):157–166, 2014.
- **Hanqi Guo**, Xiaoru Yuan, Jian Huang, and Xiaomin Zhu, “Coupled Ensemble Flow Line Advection and Analysis.” *IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE SciVis '13)*, 19(12):2733–2742, 2013. (Acceptance rate: 31/126=24.6%)
- **Hanqi Guo**, He Xiao, and Xiaoru Yuan, “Scalable Multivariate Volume Visualization and Analysis based on Dimension Projection and Parallel Coordinates.” *IEEE Transactions on Visualization and Computer Graphics*, 18(9):1397–1410, 2012.
- **Hanqi Guo**, Ningyu Mao, and Xiaoru Yuan, “WYSIWYG (What You See Is What You Get) Volume Visualization.” *IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE Vis '11)*, 17(3):2106–2114, 2011. (Acceptance rate: 49/194=25.3%)
- Xiaoru Yuan, He Xiao, **Hanqi Guo**, Peihong Guo, Wesley Kendall, Jian Huang, and Yongxian Zhang, “Scalable Multi-variate Analytics of Seismic and Satellite-based Observational Data.” *IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE Vis '10)*, 16(3):1413–1420, 2010. (Acceptance rate: 49/185=26.4%)

- Qingya Shu, **Hanqi Guo**, Jie Liang, Limei Che, Junfeng Liu, and Xiaoru Yuan, “EnsembleGraph: Interactive Visual Analysis of Spatialtemporal Behaviors for Ensemble Simulation Data.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '16)*, pages 56–63, Taipei, April 12–15, 2016. (Acceptance rate: 30/97=30.9%)
- Jiang Zhang, **Hanqi Guo**, and Xiaoru Yuan, “Efficient Unsteady Flow Visualization with High-Order Access Dependencies.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '16)*, pages 82–97, Taipei, April 12–15, 2016. (Acceptance rate: 30/97=30.9%)
- Richen Liu, **Hanqi Guo**, Jiang Zhang, and Xiaoru Yuan, “Comparative Visualization of Vector Field Ensembles Based on Longest Common Subsequence.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '16)*, pages 96–103, Taipei, April 12–15, 2016. (Acceptance rate: 30/97=30.9%)
- Richen Liu, **Hanqi Guo**, and Xiaoru Yuan, “A Bottom-Up Scheme for User-Defined Feature Comparison in Ensemble Data.” In *Proceedings of SIGGRAPH Asia 2015 Symposium on Visualization in High Performance Computing*, pages 10:1–10:4, Kobe, Japan, Nov. 2–5, 2015.
- **Hanqi Guo**, Fan Hong, Qingya Shu, Jiang Zhang, Jian Huang, and Xiaoru Yuan, “Scalable Lagrangian-based Attribute Space Projection for Multivariate Unsteady Flow Data.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '14)*, pages 33–40, Yokohama, Japan, Mar. 4–7, 2014. (Acceptance rate: 29/99=29.3%)
- **Hanqi Guo**, Wei Li, and Xiaoru Yuan, “Transfer Function Map.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '14)*, Notes Paper, pages 262–266, Yokohama, Japan, Mar. 4–7, 2014.
- **Hanqi Guo** and Xiaoru Yuan, “Local WYSIWYG Volume Visualization.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '13)*, pages 65–72, Sydney, NSW, Australia, Feb. 26–Mar. 1, 2013. (Acceptance rate: 34/118=28.8%)
- **Hanqi Guo**, Xiaoru Yuan, Jie Liu, Guihua Shan, Xuebin Chi, and Fei Sun, “Interference Microscopy Volume Illustration for Biomedical Data.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '12)*, pages 177–184, Songdo, Korea, Feb. 28–Mar. 2, 2012. (Acceptance rate: 30/89=33.7%)
- **Hanqi Guo**, He Xiao, and Xiaoru Yuan, “Multi-Dimensional Transfer Function Design based on Flexible Dimension Projection Embedded in Parallel Coordinates.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '11)*, pages 19–26, Hong Kong, March 1–4, 2011. (Acceptance rate: 27/81=33.3%)
- **Hanqi Guo**, Zuchao Wang, Bowen Yu, Huijing Zhao, and Xiaoru Yuan, “TripVista: Triple Perspective Visual Trajectory Analytics and Its Application on Microscopic Traffic Data at a Road Intersection.” In *Proceedings of IEEE Pacific Visualization Symposium (PacificVis '11)*, pages 163–170, Hong Kong, March 1–4, 2011. (Acceptance rate: 27/81=33.3%)

- Jiang Zhang, **Hanqi Guo**, and Xiaoru Yuan, “High Performance Flow Field Visualization with High-Order Access Dependencies.” *IEEE VIS 2015 (Poster)*, Chicago, IL, USA, October 25–30, 2015.
- Richen Liu, **Hanqi Guo**, and Xiaoru Yuan, “A Bottom-Up Scheme for User-Defined Feature Exploration in Vector Field Ensembles.” *IEEE VIS 2015 (Poster)*, Chicago, IL, USA, October 25–30, 2015.
- **Hanqi Guo**, Carolyn L. Phillips, Tom Peterka, Dmitry Karpeyev, and Andreas Glatz, “Extracting, Tracking and Visualizing Magnetic Flux Vortices in 3D Complex-Valued Superconductor Simulation Data.” *SciDAC PI Meeting*, Bethesda, MD, USA, July 22–24, 2015.
- Jiang Zhang, **Hanqi Guo**, and Xiaoru Yuan, “High Order Access Dependency based Flow Data Management for Field Line Computation.” *IEEE Pacific Visualization Symposium 2015 (Poster)*. Hangzhou, China, April 14–17, 2015.
- Richen Liu, **Hanqi Guo**, Jiang Zhang, and Xiaoru Yuan, “Longest Common Subsequence based Multi-Scale Analysis for Vector Field Ensembles.” *IEEE Pacific Visualization Symposium 2015 (Poster)*. Hangzhou, China, April 14–17, 2015.
- Qingya Shu, **Hanqi Guo**, Limei Che, Weicong Lyu, and Xiaoru Yuan, “EnsembleGraph: Visualizing Variations for Ensemble Simulation Exploration.” *IEEE VIS 2014 (Poster)*, Paris, France, November 9–14, 2014. (Honorable Mention Award)
- Fan Hong, Siming Chen, **Hanqi Guo**, Xiaoru Yuan, Jian Huang, and Yongxian Zhang, “Visual Analysis of Ionospheric Disturbance Hypotheses about Earthquake.” *IEEE VIS 2013 (Poster)*, Atlanta, GA, USA, October 13–18, 2013.
- **Hanqi Guo**, Wei Li, and Xiaoru Yuan, “Transfer Function Map: A Collaborative Design Space.”

IEEE Pacific Visualization Symposium 2013 (Poster). Sydney, NSW, Australia, Feb. 26–Mar. 1, 2013.

- Zuchao Wang, **Hanqi Guo**, and Xiaoru Yuan, “Visual Analysis on Traffic Trajectory Data.” *Discovery Exhibition, IEEE VisWeek 2011*. Providence, RI, USA, October 22–28, 2011.
- **Hanqi Guo**, He Xiao, Min Lu, and Xiaoru Yuan, “Scalable Multivariate Volume Visualization and Analysis.” *IEEE Symposium on Large-Scale Data Analysis and Visualization 2011 (Poster)*. Providence, RI, USA, October 23–24, 2011.
- Zuchao Wang, **Hanqi Guo**, Bowen Yu, and Xiaoru Yuan. “Interactive Visualization of 160 Years’ Global Hurricane Trajectory Data.” *IEEE Pacific Visualization Symposium 2011 (Poster)*. Hong Kong, March 1–4, 2011.
- **Hanqi Guo**, Peihong Guo, He Xiao, and Xiaoru Yuan, “Projection Space Based Multi-Dimensional Transfer Function Design.” *2010 International Symposium on Machine Perception and Cognition (Poster)*. Beijing, August 4–5, 2010.
- **Hanqi Guo**, Peihong Guo, He Xiao, and Xiaoru Yuan, “Multi-Dimensional Transfer Function Design based on Combined Interface of Parallel Coordinates and Dimension Projection.” *IEEE Visualization Conference 2010 (Poster)*, Salt Lake City, UT, USA, October 24–29, 2010.
- **Hanqi Guo**, Ning Zhang, and Xiaoru Yuan, “A Visual Analytics Tool for Traffic Data Analysis.” *IEEE Pacific Visualization Symposium 2010 (Poster)*. Taipei, March 2–5, 2010.
- **Hanqi Guo** and Xiaoru Yuan, “Streamline Seed Points Placement Strategy for Multi-resolution 2D Flow Visualization.” *IEEE Pacific Visualization Symposium 2009 (Poster)*. Beijing, China, April 20–23, 2009.

PROFESSIONAL
SERVICE

Conference Program Committee Members

- IEEE VIS (SciVis) **2015–2016**
- IEEE Pacific Visualization Symposium **2016–2017**
- IEEE Pacific Visualization Symposium, Visualization Notes **2015–2016**
- China Visualization and Visual Analytics Conference (ChinaVis) **2014–2016**
- HPC China, Visualization Track **2014–2016**

Conference Organizing Committee Members

- IEEE VIS Conference, Student Volunteer Co-Chair **2015**

Journal Paper Reviewers

- Transactions on Visualization and Computer Graphics (TVCG), IEEE **2014**
- Computer Graphics Forum (CGF), Wiley **2015**
- Journal of Visualization (JOV), Springer **2014–2016**
- Information Visualization, SAGE Publications **2016**
- Journal of Computer Science and Technology (JCST), Springer **2013**

Conference Paper External Reviewers

- IEEE Scientific Visualization Conference (IEEE SciVis) **2012, 2014**
- IEEE Information Visualization Conference (IEEE InfoVis) **2016**
- Eurographics/IEEE-VGTC Symposium on Visualization (EuroVis) **2015–2016**
- IEEE Pacific Visualization Symposium (PacificVis) **2014–2015**
- IEEE Symposium on Biological Data Visualization (BioVis) **2013**
- Eurographics/IEEE-VGTC Symposium on Visualization (EuroVis), State-of-the-Art Reports (STARs) **2016**
- International Conference on Computer-Aided Design and Computer Graphics (CAD/CG) **2013**
- International Conference on Information Visualization Theory and Applications (IVAPP) **2014**

Proposal Reviewers

- U.S. National Science Foundation **2015**

Conference Session Chairs

- IEEE Pacific Visualization Symposium (PacificVis), Molecular Visualization Session **2016**

STUDENT
MENTORING

Mathematics and Computer Science Division, Argonne National Laboratory

- Wenbin He (Ohio State University), Summer 2015. Worked on FTLE and LCS computation of uncertain flows, which led to a PacificVis/TVCG publication in 2016.
- Wenbin He (Ohio State University), Summer 2016. Worked on partial reduction algorithms in flow visualization.
- Jiang Zhang (Peking University), Summer 2016. Worked on dynamic load balancing algorithms

in flow visualization.

PUBLIC TALKS

- 10/23/16, Scalable Ensemble and Uncertain Flow Field Visualization, IEEE VIS 2016 Tutorial “Recent Advancements of Feature-based Flow Visualization and Analysis” with Jun Tao, Bei Wang, Christopher Garth, and Tino Weinkauf, Baltimore, MD, USA
- 4/28/16, FTLE and LCS in Uncertain Unsteady Flows, Department of Energy Computer Graphics Forum (DOECGF), Pacific Grove, CA, USA
- 7/18/15, Panelist, How to Write a High Quality Paper, ChinaVis 2015 Conference, Tianjin, China
- 7/11/15, Large Data Visualization Combining SciVis and InfoVis, 7th Visualization Summer School, Peking University, Beijing, China
- 7/7/14, Large Scientific Data Visualization and Visual Analytics, 6th Visualization Summer School, Peking University, Beijing, China
- 1/21/14, Scalable Lagrangian-based Visual Analysis on Multivariate Ensemble Simulations, Mathematics and Computing Science Seminar, Argonne National Laboratory, Argonne, IL, USA
- 8/17/13, Introduction and Practice on High Performance Visualization, 5th Visualization Summer School, Peking University, Beijing, China

HONOURS AND AWARDS

- Best Paper Award, China Visualization and Visual Analytics Conference (ChinaVis) **2016**
- Honorable Mention Award, IEEE VIS Posters **2014**
- Excellent Paper Award, The Annual Academic Conference for Ph.D. Candidates, China Association for Science and Technology **2014**
- Top 10 Student Paper Award, School of EECS, Peking University **2014**
- SEMPIO Scholarship, Peking University **2013**
- National Scholarship for Graduate Students, Ministry of Education, China **2012**
- Founder Scholarship, Peking University **2012**
- Top 10 Student Paper Award, School of EECS, Peking University **2012**
- Excellent Paper Award, Academician Shi Qingyun Fund, Peking University **2012**
- Excellent Undergraduate Thesis Award, Beijing Univ. of Posts and Telecoms. **2009**
- Excellent Student Leader Award, Beijing Univ. of Posts and Telecoms. **2008**

ACTIVITIES

- Student Volunteer, IEEE VisWeek/VIS **2010, 2011, 2013, 2015**
- Student Volunteer, IEEE Pacific Visualization 2009, Beijing, China **2009**
- Vice-President, Student Orchestra in Beijing Univ. of Posts and Telecoms. **2006–2008**