

# CHAOLI WANG

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## CONTACT INFORMATION

Department of Computer Science  
Michigan Technological University  
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## EDUCATION

**PhD**, Computer and Information Science, Sep 2001-Dec 2006  
The Ohio State University, Columbus, OH

**Master of Engineering**, Computer Science, Sep 1998-Mar 2001  
Fuzhou University, Fuzhou, Fujian, China  
Graduated with Distinction, Rank 1/21

**Bachelor of Engineering**, Computer Science, Sep 1994-Jul 1998  
Fuzhou University, Fuzhou, Fujian, China  
Graduated with Distinction, Rank 1/156

## PROFESSIONAL EXPERIENCE

**Assistant Professor**, Aug 2009-Present  
Michigan Technological University, Houghton, MI

**Postdoctoral Researcher**, Jan 2007-Jul 2009  
University of California, Davis, Davis, CA

**Graduate Research Associate**, Sep 2002-Jun 2006  
The Ohio State University, Columbus, OH

**Visualization Research Intern**, Jun-Sep 2004, Jun-Sep 2005, Jun-Sep 2006  
Oak Ridge National Laboratory, Oak Ridge, TN

**Research Assistant**, Sep 1998-Mar 2001  
Fuzhou University, Fuzhou, Fujian, China

## TEACHING EXPERIENCE

**Michigan Technological University**  
CS5090-02 Data Visualization, Fall 2010  
CS4321 Introduction to Algorithms, Fall 2009, Spring 2010, Fall 2010, Spring 2011

**University of California, Davis**  
ECS20 Discrete Mathematics, Winter 2009, Co-Instructor

**The Ohio State University**  
CSE100 Introduction to Computing Technology, Autumn 2006, Instructor  
CIS780 Design and Analysis of Algorithms, Autumn 2002 and Winter 2003, Grader  
CIS694L Introduction to Scientific Visualization, Spring 2003, Grader

## PUBLICATIONS

### Journal Articles

- [15] Yu-Shuen Wang, **Chaoli Wang**, Tong-Yee Lee, and Kwan-Liu Ma, Feature-Preserving Volume Data Reduction and Focus+Context Visualization, *IEEE Transactions on Visualization and Computer Graphics*, 17(2):171-181, Feb 2011.
- [14] **Chaoli Wang** and Han-Wei Shen, Information Theory in Scientific Visualization, *Entropy (Special Issue on Advances in Information Theory)*, 13(1):254-273, Jan 2011.
- [13] Hiroshi Akiba, **Chaoli Wang**, and Kwan-Liu Ma, AniViz: A Template-Based Animation Tool for Volume Visualization, *IEEE Computer Graphics and Applications*, 30(5):61-71, Sep/Oct 2010.
- [12] Hongfeng Yu, **Chaoli Wang**, Ray W. Grout, Jacqueline H. Chen, and Kwan-Liu Ma, In Situ

Visualization for Large-Scale Combustion Simulations, *IEEE Computer Graphics and Applications*, 30(3):45-57, May/June 2010.

[11] **Chaoli Wang**, Hongfeng Yu, and Kwan-Liu Ma, Application-Driven Compression for Visualizing Large-Scale Time-Varying Data, *IEEE Computer Graphics and Applications*, 30(1):59-69, Jan/Feb 2010.

[10] Kwan-Liu Ma, **Chaoli Wang**, Hongfeng Yu, Kenneth Moreland, Jian Huang, and Robert Ross, Next-Generation Visualization Technologies: Enabling Discoveries at Extreme Scale, *SciDAC Review*, 12:12-21, Spring 2009.

[9] **Chaoli Wang**, Hongfeng Yu, and Kwan-Liu Ma, Importance-Driven Time-Varying Data Visualization, *IEEE Transactions on Visualization and Computer Graphics (Proceedings Visualization / Information Visualization 2008)*, 14(6):1547-1554, Nov/Dec 2008. [25% Acceptance Rate]

[8] **Chaoli Wang** and Kwan-Liu Ma, A Statistical Approach to Volume Data Quality Assessment, *IEEE Transactions on Visualization and Computer Graphics*, 14(3):590-602, May/June 2008.

[7] Kwan-Liu Ma, **Chaoli Wang**, Hongfeng Yu, and Anna Tikhonova, In-Situ Processing and Visualization for Ultrascale Simulations, *Journal of Physics: Conference Series (Proceedings of DOE SciDAC Conference 2007)*, 78(2007)012043, Boston, MA, June 2007.

[6] **Chaoli Wang**, Antonio Garcia, and Han-Wei Shen, Interactive Level-of-Detail Selection Using Image-Based Quality Metric for Large Volume Visualization, *IEEE Transactions on Visualization and Computer Graphics*, 13(1):122-134, Jan/Feb 2007.

[5] **Chaoli Wang** and Han-Wei Shen, LOD Map - A Visual Interface for Navigating Multiresolution Volume Visualization, *IEEE Transactions on Visualization and Computer Graphics (Proceedings Visualization / Information Visualization 2006)*, 12(5):1029-1036, Sep/Oct 2006. [27% Acceptance Rate]

[4] Sean Ahern, Jamison R. Daniel, Jinzhu Gao, George Ostrouchov, Ross J. Toedte, and **Chaoli Wang**, Multi-Scale Data Visualization for Computational Astrophysics and Climate Dynamics at Oak Ridge National Laboratory, *Journal of Physics: Conference Series (Proceedings of DOE SciDAC Conference 2006)*, 46(2006)550-555, Denver, CO, June 2006.

[3] Jinzhu Gao, **Chaoli Wang**, Liya Li, and Han-Wei Shen, A Parallel Multiresolution Volume Rendering Algorithm for Large Data Visualization, *Parallel Computing (Special Issue on Parallel Graphics and Visualization)*, 31(2):185-204, Feb 2005.

[2] Qingxiang Fu, **Chaoli Wang**, and Jianfeng Sun, An Optimal Algorithm for Gallery Shortest Path Problem, *Journal of Computer-Aided Design & Computer Graphics*, 14(12):1138-1141, Dec 2002.

[1] **Chaoli Wang**, Jianfeng Sun, and Qingxiang Fu, Some Technical Problems in the Implementation of GIS Application System, *Journal of Fuzhou University (Natural Science Edition)*, 28(2):6-10, Mar/Apr 2000.

### Conference Papers

[13] **Chaoli Wang**, Hongfeng Yu, Ray W. Grout, Kwan-Liu Ma, and Jacqueline H. Chen, Analyzing Information Transfer in Time-Varying Multivariate Data, In *Proceedings of IEEE Pacific Visualization Symposium 2011*, Hong Kong, China, pages 99-106, Mar 2011. [33% Acceptance Rate]

[12] Cheng-Kai Chen, **Chaoli Wang**, Kwan-Liu Ma, and Andrew T. Wittenberg, Static Correlation Visualization for Large Time-Varying Volume Data, In *Proceedings of IEEE Pacific Visualization Symposium 2011*, Hong Kong, China, pages 27-34, Mar 2011. [33% Acceptance Rate]

[11] Yi Gu and **Chaoli Wang**, A Study of Hierarchical Correlation Clustering for Scientific Volume Data, In *Proceedings of International Symposium on Visual Computing 2010*, Las Vegas, NV, pages 437-446, Nov 2010.

[10] Jishang Wei, **Chaoli Wang**, Hongfeng Yu, and Kwan-Liu Ma, A Sketch-Based Interface for Classifying and Visualizing Vector Fields, In *Proceedings of IEEE Pacific Visualization Symposium*

2010, Taipei, Taiwan, pages 129-136, Mar 2010. [32% Acceptance Rate]

[9] Jeffrey Sukharev, **Chaoli Wang**, Kwan-Liu Ma, and Andrew T. Wittenberg, Correlation Study of Time-Varying Multivariate Climate Data Sets, In *Proceedings of IEEE Pacific Visualization Symposium 2009*, Beijing, China, pages 161-168, Apr 2009. [39% Acceptance Rate]

[8] Hongfeng Yu, **Chaoli Wang**, and Kwan-Liu Ma, Massively Parallel Volume Rendering using 2-3 Swap Image Compositing, In *Proceedings of ACM/IEEE Supercomputing Conference 2008*, Austin, TX, Nov 2008. [21% Acceptance Rate]

[7] **Chaoli Wang** and Kwan-Liu Ma, Information and Knowledge Assisted Analysis and Visualization of Large-Scale Data, In *Proceedings of ACM/IEEE Supercomputing Ultrascale Visualization Workshop 2008*, Austin, TX, pages 1-8, Nov 2008.

[6] Kwan-Liu Ma and **Chaoli Wang**, Social-Aware Collaborative Visualization for Large Scientific Projects, In *Proceedings of International Symposium on Collaborative Technologies and Systems 2008*, Irvine, CA, pages 190-195, May 2008.

[5] Hongfeng Yu, **Chaoli Wang**, and Kwan-Liu Ma, Parallel Hierarchical Visualization of Large Time-Varying 3D Vector Fields, In *Proceedings of ACM/IEEE Supercomputing Conference 2007*, Reno, NV, Nov 2007. [20% Acceptance Rate]

[4] **Chaoli Wang** and Han-Wei Shen, Hierarchical Navigation Interface: Leveraging Multiple Coordinated Views for Level-of-Detail Multiresolution Volume Rendering of Large Scientific Data Sets, In *Proceedings of International Conference on Information Visualisation 2005*, London, England, pages 259-267, Jul 2005.

[3] **Chaoli Wang**, Jinzhu Gao, Liya Li, and Han-Wei Shen, A Multiresolution Volume Rendering Framework for Large-Scale Time-Varying Data Visualization, In *Proceedings of Eurographics/IEEE VGTC Workshop on Volume Graphics 2005*, Stony Brook, NY, pages 11-19, Jun 2005.

[2] **Chaoli Wang**, Jinzhu Gao, and Han-Wei Shen, Parallel Multiresolution Volume Rendering of Large Data Sets with Error-Guided Load Balancing, In *Proceedings of Eurographics Symposium on Parallel Graphics and Visualization 2004*, Grenoble, France, pages 23-30, Jun 2004.

[1] Jonathan Woodring, **Chaoli Wang**, and Han-Wei Shen, High Dimensional Direct Rendering of Time-Varying Volumetric Data, In *Proceedings of IEEE Visualization Conference 2003*, Seattle, WA, pages 417-424, Oct 2003. [32% Acceptance Rate]

### Abstracts, Posters, and Tutorials

[5] Hongfeng Yu, Chaoli Wang, Ching-Kuang Shene, and Jacqueline H. Chen, Hierarchical Streamline Bundles for Visualizing 2D Flow Fields, *IEEE VisWeek Posters 2010*, Salt Lake City, UT, Oct 2010.

[4] Jian Huang, Chaoli Wang, Heike Jänicke, and Jonathan Woodring, Multivariate Temporal Features in Scientific Data, *IEEE Visualization Tutorial 2009*, Atlantic City, NJ, Oct 2009.

[3] Chaoli Wang, Han-Wei Shen, Klaus Mueller, and Huamin Qu, Perception-Driven Techniques for Effective Visualization of Large Volume Data, *IEEE Visualization Tutorial 2008*, Columbus, OH, Oct 2008.

[2] Jeffrey Sukharev, Chaoli Wang, and Kwan-Liu Ma, Statistical Analysis and Visualization of Time-Varying Multivariate Climate Data Sets, *IEEE Visualization Knowledge-Assisted Visualization Workshop 2008*, Columbus, OH, Oct 2008.

[1] Chaoli Wang, Hongfeng Yu, and Kwan-Liu Ma, Knowledge-Assisted Visualization of Turbulent Combustion Simulations, *IEEE Visualization Knowledge-Assisted Visualization Workshop 2007*, Sacramento, CA, Oct 2007.

### COVER IMAGE CREDITS

Analyzing Information Transfer in Time-Varying Multivariate Data  
*Proceedings of IEEE Pacific Visualization Symposium*, 2011.

Static Correlation Visualization for Large Time-Varying Volume Data  
*Proceedings of IEEE Pacific Visualization Symposium*, 2011.

Correlation Study of Time-Varying Multivariate Climate Data Sets  
*Proceedings of IEEE Pacific Visualization Symposium*, 2009.

Importance-Driven Time-Varying Data Visualization  
*IEEE Transactions on Visualization and Computer Graphics*, 14(6), 2008.

A Statistical Approach to Volume Data Quality Assessment  
*IEEE Transactions on Visualization and Computer Graphics*, 14(3), 2008.

## GRANTS

### Awarded

**PI:** A Unified Approach to Streamline Selection and Viewpoint Selection for 3D Flow Visualization, MTU Research Excellence Fund - Research Seed Grants, 2011-2012, \$7,240.

**MTU Site PI:** NSF IIS-1017935, Collaborative Research: An Information-Theoretic Framework for Large-Scale Data Analysis and Visualization (Lead PI: Han-Wei Shen, Ohio State), 2010-2013, MTU Amount: \$207,283.

**Co-PI:** NSF OCI-0905008, Collaborative Research: Petascale Computing, Visualization, and Science Discovery of Turbulent Sooting Flames (PI: Kwan-Liu Ma, UC Davis), 2009-2012, MTU Amount: \$13,497.

**Co-PI:** NSF OCI-0850566, In-Situ Processing & Visualization for Peta- and Exa-scale Simulations (PI: Kwan-Liu Ma, UC Davis), 2009-2012, MTU Amount: N/A.

### Pending

**Co-PI:** Augmented Reality Toward Surgeon and Surgical Robot Navigation for Minimally Invasive Spine Surgery, (PI: Jindong Tan, Co-PIs: Chaoli Wang, Paul Ward, and Scott Kuhl), NSF Cyber-Physical Systems Program, Submitted Mar 2011.

## PRESENTATIONS

### Invited Talks

Analysis and Visualization of Data at Scales  
 Siemens Corporate Research, Princeton, NJ, 4 May 2011

Data Analysis Using Information Theory  
 Los Alamos National Laboratory, 29 Jul 2010

Enabling User Interfaces for Time-Varying Data Analysis and Visualization  
 CScADS Summer Workshops, Snowbird, UT, 31 Jul 2008

Scalable Parallel Vector Field Visualization  
 SIAM Conference on Parallel Processing for Scientific Computing, Atlanta, GA, 14 Mar 2008

Quality-Driven Multiresolution Volume Visualization  
 University of California, Davis, 21 Aug 2006

### Research Seminars

Effective Streamline Visualization for Understanding 3D Flow Fields  
 MTU Center for Computer Systems Research (CCSR) Seminar, 8 April 2011

Multivariate Analysis: Opportunities and Challenges (with Laura Brown)  
 MTU CSERI Computational Discovery and Innovation (CDI) Exchange, 26 Mar 2010

A Multiresolutional Approach for Large Data Visualization  
 The Ohio State University, 29 Nov 2005

Towards Effective Multiresolution Volume Visualization  
 Oak Ridge National Laboratory, 13 Sep 2004

### Guest Lectures

Human Computer Interaction and Visualization (with Robert Pastel)  
 CS/EE1000: Explorations in Computing, Michigan Technological University, 29 Nov 2010

Introduction to Artificial Intelligence (with Laura Brown and Nilufer Onder)  
 CS/EE1000: Explorations in Computing, Michigan Technological University, 29 Oct 2009

Information Theory and Visualization  
 ECS276: Advanced Topics in Visualization, University of California, Davis, 24 Feb 2009

Large-Scale Scientific Data Analysis and Visualization (Distance Learning Lecture)  
 MSIM842: Advanced Visualization II, Old Dominion University, 11 Feb 2009

Ultrascale Visualization (Distance Learning Lecture)  
 MSIM842: Advanced Visualization II, Old Dominion University, 2 Apr 2008

Views on Visualization  
 ECS272: Information Visualization, University of California, Davis, 11 Jan 2008

### **Papers, Posters, and Tutorials**

IEEE Pacific Visualization Symposium, Hong Kong, China, 2 Mar 2011  
 NSF SDCI/STCI Workshop, Arlington, VA, 28 Jan 2010  
 IEEE Visualization Tutorial, Atlantic City, NJ, 13 Oct 2009  
 IEEE Visualization Conference, Columbus, OH, 23 Oct 2008  
 IEEE Visualization Tutorial, Columbus, OH, 19 Oct 2008  
 International Symposium on Collaborative Technologies and Systems, Irvine, CA, 21 May 2008  
 IEEE Visualization Knowledge-Assisted Visualization Workshop, Sacramento, CA, 29 Oct 2007  
 IEEE Visualization Conference, Baltimore, MD, 2 Nov 2006  
 Eurographics/IEEE VGTC Workshop on Volume Graphics, Stony Brook, NY, 20 Jun 2005

### **AWARDS**

Jacqueline H. Chen, Kwan-Liu Ma, Hongfeng Yu, Ray W. Grout, Chaoli Wang, Chun Sang Yoo, Edward Richardson, and Ramanan Sankaran, A Lifted Ethylene-Air Jet Flame Stabilized by the Interaction between a Fuel Jet and the Surrounding Preheated Air, DOE OASCR<sup>1</sup> Award for Outstanding Achievement in Scientific Visualization, San Diego, CA, Jun 2009.

Kwan-Liu Ma, Jacqueline H. Chen, Hongfeng Yu, Chaoli Wang, Cheng-Kai Chen, and Chun Sang Yoo, Visualization of Lifted Turbulent Jet Flames in a Heated Coflow, DOE SciDAC Electronic Visualization and Poster Night People's Choice Award, Seattle, WA, Jul 2008.

Qingxiang Fu, Chaoli Wang, Jianfeng Sun, Honghui Ke, and Xiaodong Wang, Integrated Service Platform for Real Estate Information based on Geographic Information System, Third Prize, Fujian Province Science & Technology Award, Fujian, China, Nov 2002.

### **HONORS**

#### **Scholarship**

ASTRO<sup>2</sup> Fellowship, Oak Ridge National Laboratory, 2005, 2006  
 University Fellowship, The Ohio State University, 2001  
*Nokia* Scholarship for Outstanding Student, 2000  
 Graduate Scholarship, Fuzhou University, 1999, 2000  
*Fu Guang* Scholarship for Outstanding Student, 1996, 1997  
 Undergraduate Scholarship, Fuzhou University, 1994-1997

#### **Honor Society**

Phi Kappa Phi, 2003  
 Upsilon Pi Epsilon, 2002

### **STUDENTS**

#### **PhD Students**

<sup>1</sup>Office of Advanced Scientific Computing Research  
<sup>2</sup>Advanced Short-Term Research Opportunity

Yi Gu  
 Jun Ma (Co-advising with Ching-Kuang Shene)  
 Jun Tao (Co-advising with Ching-Kuang Shene)

### **Master Students**

Huan Zhang

### **Undergraduate Students**

Yanliang Gu, Volumetric Data Reduction and Indexing, Summer 2011  
 John P. Reese, Text Analysis and Visualization, Summer 2010 and Spring 2011  
 GuFeng Pan, Force-Directed Graph Layout, Summer 2010

## INTERNAL SERVICES

### **University**

Reviewer, Strategic Faculty Hiring Initiative in Energy and Health, Spring 2010

### **Department**

Member, Graduate Committee, Fall 2010-Present  
 Co-examiner, Algorithms Qualifier Exam, Jan 2011  
 Reviewer, Faculty Hiring, Spring 2010

### **PhD Dissertation Proposal Defense Committee**

Yifei Li, Computer Science, Apr 2011  
 Zhenzhou Shao, Electrical and Computer Engineering, Apr 2011  
 Shuo Huang, Electrical and Computer Engineering, Aug 2010

### **PhD Qualifying Oral Exam Committee**

Zhenzhou Shao, Electrical and Computer Engineering, Dec 2010

## EXTERNAL SERVICES

### **Program Committee**

IEEE Visualization Conference, 2011  
 IEEE Pacific Visualization Symposium, 2008-2010  
 IEEE VisWeek Visualization Posters, 2009  
 International Conference on Information Visualization Theory and Applications, 2010-2011  
 International Conference on Information Visualisation, 2010

### **Tutorial Organizer**

IEEE Visualization Tutorial (with Jian Huang, Heike Jänicke, and Jonathan Woodring), 2009  
 IEEE Visualization Tutorial (with Han-Wei Shen, Klaus Mueller, and Huamin Qu), 2008

### **Journal Reviewer**

IEEE Transactions on Visualization and Computer Graphics (TVCG), 2007-2010  
 IEEE Computer Graphics and Applications (CG&A), 2008-2011  
 Computer Graphics Forum (CGF), 2009  
 The Visual Computer (TVCJ), 2007  
 Computers & Graphics (C&G), 2009-2010  
 International Journal of Computer Assisted Radiology and Surgery (IJCARS), 2008-2010  
 Australasian Physical & Engineering Sciences in Medicine (APESM), 2011

### **Conference Reviewer**

IEEE Visualization Conference (VIS), 2004-2007, 2009-2010  
IEEE Information Visualization Conference (INFOVIS), 2006-2007, 2009  
IEEE Symposium on Visual Analytics Science and Technology (VAST), 2006-2007  
Eurographics/IEEE VGTC Symposium on Visualization (EuroVis), 2008, 2010  
IEEE Pacific Visualization Symposium (PacificVis), 2011  
ACM SIGGRAPH Asia, 2009  
Annual Conference of the European Association for Computer Graphics (Eurographics), 2009  
Pacific Conference on Computer Graphics and Applications (Pacific Graphics), 2006-2007  
IEEE Virtual Reality Conference (VR), 2011  
Eurographics Symposium on Parallel Graphics and Visualization (EGPGV), 2011  
Eurographics/IEEE VGTC Symposium on Volume Graphics (VG), 2007  
International Conference on Visualisation (VIZ), 2009  
International Conference on Geometric Modeling & Imaging (GMAI), 2007-2008  
International Conference on Information Visualisation (IV), 2006

**MEMBERSHIPS**

Institute of Electrical and Electronics Engineers (IEEE), Since 2003  
IEEE Visualization and Graphics Technical Committee (VGTC), Since 2004