

# DIANSHENG GUO

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## EDUCATION

- 2003 Ph.D., Department of Geography, Pennsylvania State University, USA  
1999 M.S., State Key Lab of Resource & Environmental Systems, Institute of Geography,  
Chinese Academy of Sciences, China  
1996 B.S., Department of Urban and Environmental Sciences, Peking University, China

## EMPLOYMENT POSITIONS

- 2004— Assistant Professor, Department of Geography, University of South Carolina  
2003—2004 Postdoctoral Fellow, Department of Geography, Pennsylvania State University  
1999—2003 Research Assistant, Department of Geography, Pennsylvania State University

## TEACHING

- 2008 Spring GEOG 731: Seminar—Quantitative Analysis in Geography  
2006—2008 GEOG 363: Introduction to Geographic Information Systems (GIS)  
2005, 2007 GEOG 763: Seminar—Spatial Data Mining and Knowledge Discovery  
2004—2006 GEOG 141: The Earth From Above  
2004—2005 GEOG 554: Spatial Programming

## AWARDS & HONORS

- 2008, Jan. National Science Foundation (NSF) CAREER Award  
2007, Oct. Semifinalist, NSF Science & Engineering Visualization Challenge  
(Top 10 entries in the Information Graphics category)  
2005, Aug. First Prize, IEEE Information Visualization Contest  
2004, Oct. Intergraph-UCGIS Young Scholar Award  
2003, June Paper Award, UCGIS Summer Assembly  
2002, June First Place, poster competition, UCGIS Summer Assembly  
2002, April E. William Miller Award, Dept. of Geography, Pennsylvania State University  
1999, Sept. Presidential Award, Excellent Master Thesis, Chinese Academy of Sciences  
1996—1997 Graduate Student Fellowship, Chinese Academy of Sciences  
1992—1995 University Scholarship, Peking University

## FUNDED RESEARCH GRANTS

- 2008-2013 Principal Investigator, “Extracting and Understanding Complex Patterns in Spatial Interactions—A Computational-Visual Framework”, National Science Foundation (NSF) CAREER Award, \$406,350  
2005-2006 Principal Investigator, “Geo-Visual and Analytical Analysis of Cancer Data”, a subcontract from Pennsylvania State University to the University of South Carolina, funded by the National Institute of Health (NIH), \$10,000

- 2005-2006 Principal Investigator, "Discovering Patterns of Terrorism Incidents Across Time, Geography, and Multivariate Space", funded by the Walker Institute of International and Area Studies, in conjunction with the Office of the Vice President for Research, University of South Carolina, \$4000
- 2005-2008 Co-PI, Center of Excellence for the Study of Terrorism and Responses to Terrorism (START), Department of Homeland Security. USC Research Team: W. Piegorsch, J. Rose, A. Bowman, M. Tompkins, D. Cowen, M. Hodgson, M. deCastro, D. Guo, and F. Hardisty, \$1,000,000.

**PEER-REVIEWED JOURNAL PUBLICATIONS** (\* denotes advisee)

- In Prep. **Guo, D.** "Local Entropy Map: A Non-Parametric Approach to Discover Spatially Varying Bivariate Relationships". To be submitted in June 2008 to International Journal of Geographical Information Science.
- 2008 Liao, K.\*, **D. Guo**. "A Clustering-Based Approach to a Capacitated Facility Location Problem". Transactions in GIS. (in press)
- 2008 **Guo, D.** "Regionalization with Dynamically Constrained Agglomerative Clustering and Partitioning (REDCAP)". International Journal of Geographical Information Science. **22**(7), pp. 801-823.
- 2008 Chen, J., A.M. MacEachren, and **D. Guo**. "Supporting the Process of Exploring and Interpreting Space-Time, Multivariate Patterns: The Visual Inquiry Toolkit ". Cartography and Geographic Information Science, **35**(1), pp. 33-50.
- 2007 **Guo, D.** "Visual Analytics of Spatial Interaction Patterns for Pandemic Decision Support". International Journal of Geographical Information Science, Special Issue on Visualization, Analytics & Spatial Decision Support. **21**(8), pp. 859-877.
- 2007 **Guo, D.**, K. Liao\*, M. Morgan\*. "Visualizing Patterns in a Global Terrorism Incident Database", Environment and Planning B: Planning and Design. **34**, pp. 767-784.
- 2006 **Guo, D.** and M. Gahegan. "Spatial Ordering and Encoding for Geographic Data Mining and Visualization", Journal of Intelligent Information Systems, **27**(3), pp. 243-266
- 2006 **Guo, D.**, J. Chen, A. M. MacEachren, and K. Liao. "A Visualization System for Spatio-Temporal and Multivariate Patterns (VIS-STAMP)", IEEE Transactions on Visualization and Computer Graphics, **12**(6), pp. 1461-1474.
- 2005 **Guo, D.**, M. Gahegan, A.M. MacEachren, and B. Zhou. "Multivariate Analysis and Geovisualization with an Integrated Geographic Knowledge Discovery Approach". Cartography and Geographic Information Science, **32**(2), pp. 113-132.
- 2003 **Guo, D.** "Coordinating Computational and Visualization Approaches for Interactive Feature Selection and Multivariate Clustering". Information Visualization, **2**(4): 232-246.
- 2003 **Guo, D.**, D. Peuquet and M. Gahegan. "ICEAGE: Interactive Clustering and Exploration of Large and High-dimensional Geodata". GeoInformatica, **7**(3): pp. 229-253.

## BOOK CHAPTERS

- 2009 **Guo D.** “Multivariate Spatial Clustering and Geovisualization”, Geographic Data Mining and Knowledge Discovery (second edition), edited by H.J. Miller and J. Han, Taylor & Francis. (in press)

## GUEST EDITORS

- 2008 **Guo D.** and J. Mennis, “Spatial Data Mining: Methods and Applications”, A special issue of Computers, Environment and Urban Systems. (To be published in 2009).

## PEER-REVIEWED CONFERENCE PUBLICATIONS

- 2006 **Guo, D.** “Spatio-Temporal Visual Analytics for Pandemic Response and Decision Support”, Workshop on Visual Analytics & Spatial Decision Support, Münster, Germany. September 20.
- 2006 **Guo, D.** “Local Entropy Map: A Nonparametric Approach to Measure Spatially Varying Bivariate Relationships”, The Fourth International Conference on Geographic Information Science (GIScience 2006), Münster, Germany. September 20-23.
- 2006 **Guo, D.** “Mining and Visualizing Spatial Interaction Patterns for Pandemic Response”, Workshop on Spatial Data Mining, SIAM Conference on Data Mining, Bethesda, MD, USA. April 22.
- 2005 Chen, J., **Guo, D.**, & MacEachren, A. “Space-Time-Attribute Analysis and Visualization of U.S. Company Data”. IEEE Symposium on Information Visualization (InfoVis 2005), Compendium Volume, Minneapolis, MN, Oct. 23-25. (2pp. on CD)
- 2004 **Guo, D.**, M. Gahegan, and A. MacEachren. “An Integrated Environment for High-Dimensional Geographic Data Mining”, The Third International Conference on Geographic Information Science, Adelphi, MD, USA, pp. 107-110.
- 2004 Ola, A., **D. Guo**, and J. Macgill. “Exploration of Semantic Uncertainty in Parameterized Land Use/Land Cover Classifications”, The Third International Conference on Geographic Information Science, Adelphi, MD, USA, pp. 5-8.
- 2003 **Guo, D.**, M. Gahegan, D. Peuquet and A. MacEachren. “Breaking Down Dimensionality: An Effective Feature Selection Method for High-dimensional Clustering”. The Third SIAM (Society for Industrial and Applied Mathematics) International Conference on Data Mining, Workshop on Clustering High Dimensional Data and its Applications, San Francisco, CA, pp. 29-42.
- 2003 MacEachren, A.M., X. Dai, F. Hardisty, **D. Guo** and G. Lengerich. “Exploring High-D Spaces with Multiform Matrices and Small Multiples”. IEEE Symposium on Information Visualization, Seattle, WA, pp. 31-38.
- 2003 **Guo, D.** “A Geographic Visual Query Composer (GVQC) for Accessing Federal Databases”. Proceeding, dg.o.2003, National Conference for Digital Government Research, Boston, MA, pp. 397-400.
- 2002 **Guo, D.**, D. Peuquet and M. Gahegan. “Opening the Black Box: Interactive Hierarchical Clustering for Multivariate Spatial Patterns”. The 10th ACM International Symposium on Advances in Geographic Information Systems,

McLean, VA, pp. 131-136.

- 2002 Steiner, E., A. MacEachren and **D. Guo**. “Developing and Assessing Light-weight Data-driven Exploratory Geovisualization Tools for the Web”. *Advances in Spatial Data Handling, Proceedings of the 10th International Symposium on Spatial Data Handling*, ed. D. E. Richardson and P. v. Oosterom, Springer: pp. 487-500.
- 2002 **Guo, D.**, D. Peuquet, M. Gahegan and A. MacEachren. “Interactive Subspace Clustering for Mining High-Dimensional Spatial Patterns”. *The Second International Conference on Geographic Information Science*, Boulder, CO, pp. 60-63.
- 2001 MacEachren, A., F. Hardisty, M. Gahegan, M. Wheeler, X. Dai, **D. Guo** and M. Takatsuka. “Supporting Visual Integration and Analysis of Geospatially-referenced Statistics Through Web-deployable, Cross-platform Tools”. *Proceeding, dg.o.2001, National Conference for Digital Government Research*, Los Angeles, CA, pp.17-24.
- 2000 Peuquet, D. and **D. Guo**. “Mining Spatial Data Using An Interactive Rule-based Approach”. *The First International Conference on Geographic Information Science*, Savannah, GA , pp. 152-153.
- 2000 Mennis, J., D. Peuquet and **D. Guo**. “A Semantic GIS Database Model for the Exploration Of Spatio-Temporal Environmental Data”. *The 4th International Conference on Integrating GIS and Environmental Modeling (GIS/EM4): Problems, Prospects, and Research Needs*, Banff, Alberta, Canada. Paper available at <http://www.colorado.edu/research/cires/banff/pubpapers/197>
- 1999 Zhang, J., **D. Guo** and Q. Wan. “Geospatial Data Mining and Knowledge Discovery using Decision Tree Algorithm-A Case Study of Soil Data Set of Yellow River Delta (YRD)”. *Geoinformatics'99*, Ann Arbor, MI.
- 1999 Wan, Q., C. Zhou and **D. Guo**. “Web-Based Distributed Collaborative Spatial Decision-Making System”. *Towards Digital Earth—Proceedings of the International Symposium on Digital Earth*. Beijing, Science Press.
- 1998 Zhang, J. and D. Guo. “A Preliminary Study on Geographical Data Sharing by WebGIS”. *Geoinformatics'98*, Beijing.

## BOOK REVIEWS

- 2005 **Guo D.** “GIS: A Computing Perspective (Second Edition) by Michael F. Worboys and Matt Duckham”, *Transactions in GIS*, 9 (4): 632-634.

## INVITED WORKSHOP PARTICIPANTION

- 2008 DoD/DHS Workshop on Social Science Modeling and Information Visualization, Sponsored by Department of Defense and Department of Homeland Security, January 23-25, 2008 (Arlington, VA).
- 2005 NISS/SAMSI Workshop on Collaborations in the Mathematical Geosciences, Sponsored by NSF, October 6-7, 2005 (Research Triangle Park, NC).
- 2003 UCGIS Workshop on Geospatial Visualization and Knowledge Discovery, sponsored by the Advanced Research and Development Activity (ARDA) and the

United States Geological Survey (USGS), November 18 – 20, 2003  
(Landsdowne, VA).

## **PRESENTATIONS AND INVITED TALKS**

- 2008 “REDCAP—A Toolkit for Multivariate Visualization and Regionalization”, The 104th Annual Meeting, Association of American Geographers, Boston, BA, April 15-19.
- 2008 “Visualizing Complex Spatial Interactions and Networks”, DoD/DHS Workshop on Social Science Modeling and Information Visualization, Arlington, VA, January 23-25.
- 2007 “Regionalization with Spatially Constrained Multivariate Clustering: Methodologies and Applications”, The 103rd Annual Meeting, Association of American Geographers, San Francisco, CA, April 17-21.
- 2006 “Spatio-Temporal Visual Analytics for Pandemic Response and Decision Support”, Workshop on Visual Analytics & Spatial Decision Support, Münster, Germany. September 20.
- 2006 “Local Entropy Map: A Nonparametric Approach to Measure Spatially Varying Bivariate Relationships”, The Fourth International Conference on Geographic Information Science (GIScience 2006), Münster, Germany. September 20-23.
- 2006 “Visual Analytics for Space-Time and Multivariate Patterns: Methodologies and Applications”, State Key Lab of Resources and Environmental Information System (LREIS), Chinese Academy of Sciences, June 2, Beijing, China.
- 2006 “Spatial Ordering for Geographic Data Mining and Visualization”, National Cancer Institute (NCI), U.S. National Institutes of Health (NIH), April 19, Rockville, MD.
- 2006 “Mining and Visualizing Spatial Interaction Patterns for Pandemic Response”, Workshop on Spatial Data Mining, SIAM Conference on Data Mining, April 22, Bethesda, MD, USA.
- 2006 “On the Ordering Problem in Spatial Data Mining and Geovisualization: Methods and Applications”, The 102nd Annual Meeting, Association of American Geographers, March 7-11, 2006, Chicago, IL.
- 2005 “Measuring Geographically Varying Bivariate Patterns”. Presented the Annual Meeting, Association of American Geographers, April 5-9, 2005, Denver, CO.
- 2005 “Unsupervised Feature Selection for Geovisualization and Spatial Data Mining”. Presented at the Auto Carto 2005, Las Vegas, NV, USA, March 21-23, 2005.
- 2004 “An Integrated Environment for High-Dimensional Geographic Data Mining”. Presented at the *Third International Conference on Geographic Information Science*, October 19-23, Adelphi, MD.
- 2004 “An Integrated Approach to Geographic Knowledge Discovery – Exploring Multivariate Spatial Patterns”. Presented the *100th Annual Meeting, Association of American Geographers*, March, Philadelphia, PA.
- 2003 “Choosing Attributes for Analysis: Effective and Efficient Feature Selection for Exploring High-Dimensional Data”. Presented at the Summer Assembly, University Consortium for Geographic Information Science, June 16-20, Pacific

Grove, CA.

- 2003 “A Geographic Visual Query Composer (GVQC) for Accessing Federal Databases”. Presented at the *NSF's National Conference on Digital Government Research*, May 18-21, Boston, MA.
- 2003 “Breaking Down Dimensionality: An Effective Feature Selection Method for High-dimensional Clustering” (first author with M. Gahegan, D. Peuquet and A. MacEachren). Presented at the *Third SIAM International Conference on Data Mining*, May 1-3, San Francisco, CA.
- 2002 “Opening the Black Box: Interactive Hierarchical Clustering for Multivariate Spatial Patterns” (first author with D. Peuquet and M. Gahegan). Presented at the *10th ACM International Symposium on Advances in Geographic Information Systems*, Nov. 8-9, McLean, VA.
- 2003 “Interactive Subspace Clustering for Mining High-Dimensional Spatial Patterns” (first author with D. Peuquet, M. Gahegan and A. MacEachren). Presented at the *Second International Conference on Geographic Information Science*, Sept. 25-28, Boulder, CO.
- 2003 “Developing and Assessing Light-weight Data-driven Exploratory Geovisualization Tools for the Web” (third author with E. Steiner and A. MacEachren). Presented at the *10th International Symposium on Spatial Data Handling*, July 8-12, Ottawa, Canada.
- 2003 “Spatial Cluster Ordering for High-Dimensional Geographic Knowledge Discovery”. Presented at the Summer Assembly, University Consortium for Geographic Information Science (UCGIS), June 27-29, Athens, GA.
- 2003 “Towards A True Human-Machine Collaboration For Spatial Multivariate Clustering”. Presented at the *98th Annual Meeting, Association of American Geographers*, March 19-23, Los Angeles, CA.
- 2001 “Implementation and Comparison of Two Data Models for Managing Climatologic Data with Object-oriented Databases” (first author with D. Peuquet and J. Mennis). Presented at the *97th Annual Meeting, Association of American Geographers*, Feb. 27 – March 3, New York, NY .
- 2000 “Mining Spatial Data Using An Interactive Rule-based Approach” (coauthor with D. Peuquet and J. Mennis). Presented at the *First International Conference on Geographic Information Science*, Oct. 28-31, Savannah, GA.

## **CONFERENCE COMMITTEES AND SESSIONS**

- 2008 Program Committee, IEEE International Conference on Data Mining (ICDM), December 15-19, Pisa, Italy.
- 2008 Session Organizer and Chair, “Spatial Data Mining and Exploratory Data Analysis”, The 104th AAG Annual Meeting, April 15-19, 2008, Boston, MA.
- 2007 Program Committee, International Workshop on Spatial and Spatio-temporal Data Mining (In conjunction with IEEE ICDM), October 28, 2007, Omaha, NE, USA.
- 2007 Program Committee, the 5th International Conference on Coordinated & Multiple Views in Exploratory Visualization (CMV06), 2007, Zurich, Switzerland.
- 2007 Session Organizer and Chair, “Spatial Data Mining and Exploratory Data

- Analysis”, 103th AAG Annual Meeting, April 17-21, 2007, San Francisco, CA.
- 2006 Program Committee, the 4th International Conference on Coordinated & Multiple Views in Exploratory Visualization (CMV06), July 4, 2006, London, UK.
- 2006 Session Organizer and Chair, “Spatial Data Mining and Exploratory Data Analysis (1)”, The 102th AAG Annual Meeting, March 7-11, 2006, Chicago, IL.
- 2005 Program Committee, The 9th International Conference on Information Visualization (IV05), July 6-8, 2005, London, UK
- 2004 Program Committee, The 8th International Conference on Information Visualization (IV04), July 14-16, 2004, London, UK

### **REVIEWER FOR JOURNALS / CONFERENCES / FUNDING AGENCIES**

- 2008 National Science Foundation, Geography and Regional Science Program (once)
- 2006 – 2008 IEEE Transactions on Pattern Analysis and Machine Intelligence (3 times)
- 2005 – 2008 International Journal of Geographical Information Science (6 times)
- 2008 IEEE VIS/InfoVis/Visual Analytics Conference (twice)
- 2004 – 2008 Information Visualization (twice)
- 2008 Cartographic Journal, published by British Cartographic Society (twice)
- 2008 IV08: Visual Data Mining and Analytics (VDMA) (twice)
- 2007 Research Council for Natural Sciences and Engineering, Academy of Finland (1)
- 2007 Review Panel, National Cancer Institute, NIH (once)
- 2007 Environment and Planning B (once)
- 2007 International Workshop on Spatial and Spatio-temporal Data Mining (twice)
- 2007 The Professional Geographer (once)
- 2005 – 2006 IEEE Transactions on Visualization and Computer Graphics (twice)
- 2006 Computers, Environment and Urban Systems (once)
- 2006 GIScience and Remote Sensing (once)
- 2006 Urban Studies (once)
- 2006 – 2007 Coordinated & Multiple Views in Exploratory Visualization (4 times)
- 2005 IEEE Computer Graphics and Applications (once)
- 2004 – 2005 Journal of Photogrammetry and Remote Sensing (twice)
- 2004 Book: Self-Organizing Maps: Applications in GIScience
- 2004 – 2005 International Conference on Information Visualization (4 times)

### **PROFESSIONAL SOCIETY MEMBERSHIP AND SERVICE**

- 2000 – present Member, Association of American Geographers (AAG)
- 2005 – present Member, South East Division of AAG (SEDAAG)
- Serve as the South Carolina State Representative

- 2004 – present           Member, Association for Computing Machinery (ACM)
- 2004 – present           Member, IEEE Computer Society
- 2000 – present           Member, International Association of Chinese Professionals in Geographic Information Sciences (CPGIS)
  - Served on the membership committee (2007-2008)
  - Serve as the Vice President (2008-2009)

## **GRADUATE STUDENT ADVISING**

### **Chaired Dissertation/Thesis Committees**

- 2006 – present           Ke Liao (Ph.D., to complete in 2009)
- 2006 – present           Michael Morgan (M.S., to complete in 2009)
- 2008 – present           Jiayu Wang (M.S., continuing)

### **Membership on Dissertation/Thesis Committees**

- 2004 – present           Zhongwu Wang (Ph.D., to complete in 2008)
- 2006 – present           Kevin Borden (Ph.D., continuing)
- 2005 – 2008             Mathew Schmittlein (Ph.D., completed)
- 2004 – 2005             Chris Saylor (M.S., completed)
- 2005 – 2006             Linna Li (M.S., completed)
- 2006 – 2008             Clio Andris (M.S., completed)
- 2006 – 2008             Shoumik Rahman (M.S., Department of Health Sciences, completed)

## **DEPARTMENTAL/COLLEGE/UNIVERSITY SERVICE**

- 2008 – present           Chair, Computer Policy Committee, Department of Geography
- 2005 – present           Undergraduate Advisor, Department of Geography
- 2004 – present           Awards and Scholarships Committee, Department of Geography
- 2005 – 2007             United Way Ambassador, Department of Geography
- 2005 – 2007             Graduate Day Judge, University of South Carolina