

Frank Hardisty

John A. Dutton e-Education Institute
The GeoVISTA Center
Department of Geography
The Pennsylvania State University, University Park, PA
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A. Educational Qualifications.

Ph.D., Geography The Pennsylvania State University, University Park, PA 16802
1999 – 2003 *Dissertation*: Strategies For Designing Coordinated Geographic Visualization Software For Enumerated Data: A Component-Based Approach
Doctoral committee: Alan MacEachren (advisor and chair), Mark Gahegan, David O’Sullivan, Gouray Cai (Information Science and Technology)

M.A., Geography The Ohio State University, Columbus OH 43210
1999 *Thesis*: Visualizing Monte Carlo Simulation of Univariate Spatial Point Patterns
Master’s committee: Duane Marble (advisor and chair), Morton O’Kelly, Randall Jackson

B.A., English Lit. The Evergreen State College Olympia, WA 98505
1990 *Concentrations*: English Literature and Mathematics

B. Publications

Peer-Reviewed Journal Publications

- Hardisty, F. and A. Robinson (Accepted). "The GeoViz Toolkit: Using component-oriented coordination methods to aid geovisualization application construction." International Journal of Geographic Information Science.
- Hardisty, F. (2009). "GeoJabber: Enabling Geo-Collaborative Visual Analysis." Cartography and Geographic Information Science **36**(2): 267-280.
- Klippel, A., F. Hardisty and C. Weaver (2009). "Star Plots: How Shape Characteristics Influence Classification Tasks " Cartographic and Geographic Information Science **36**(2): 149-163.
- Klippel, A., F. Hardisty and C. Weaver (2009). "Colour Enhanced Star Plot Glyphs – Can Salient Shape Characteristics be Overcome?" Cartographica **44**(3): 217-231.
- Gorandson, C., K. Takahashi, T. Tango, A. Cajigal, M. Paladini, E. L. Murray, T. Nguyen, K. Konty and F. Hardisty (2008). "Cluster Detection Comparison in Syndromic Surveillance." Advances in Disease Surveillance **5**(1): 33.

- Hardisty, F. and J. Conley (2008). "Interactive Detection of Spatial Clusters." Advances in Disease Surveillance **5**(1): 37.
- Piegorsch, W. W., S. L. Cutter and F. Hardisty (2007). "Benchmark Analysis for Quantifying Urban Vulnerability to Terrorist Incidents." Risk Analysis **27**(5): 1141-1425.
- Griffin, A., M. A. MacEachren, F. Hardisty, B. Li and E. Steiner (2006). "A comparison of animated maps with static small-multiple maps for visually identifying space-time clusters." Annals of the Association of American Geographers **4**(4): 740-753.
- MacEachren, A. M., M. Gahegan, W. Pike, I. Brewer, G. R. Cai, E. Lengerich and F. Hardisty (2004). "Geovisualization for knowledge construction and decision support." IEEE Computer Graphics and Applications **24**(1): 13-17.
- MacEachren, A. M., F. Hardisty, X. Dai and L. Pickle (2003). "Supporting Visual Analysis of Federal Geospatial Statistics." Communications of the ACM **46**(1).
- Gahegan, M., M. Takatsuka, M. Wheeler and F. Hardisty (2002). "Introducing GeoVISTA Studio: an integrated suite of visualization and computational methods for exploration and knowledge construction in geography." Computers, Environment and Urban Systems **26**(4): 267-292.

Conference Publications, Book Chapters, and Invited Talks

- Hardisty, F. and A. MacEachren (2009). Research to Reality: Supporting Public Health Research, Surveillance, and Practice with Geovisual Analytics The Third Annual DHS University Network Summit. Washington, D.C.
- Gahegan, M., F. Hardisty, U. Demšar and M. Takatsuka (2008). GeoVISTA Studio: Reusability by Design. Open Source Approaches in Spatial Data Handling. G. B. Hall and M. G. Leahy, Springer: 201-220.
- Hardisty, F. (2008). Geographic Visualization and Analysis. CRED Lab (invited talk), NYC, NY.
- Hardisty, F. (2008). GeoJabber: Finding Significant Analytic Events in Collaborative Visual Analysis Sessions. Geospatial Visual Analytics Workshop at GIScience, Salt Lake City, Utah.
- Hardisty, F. (2008). The GeoViz Toolkit: Making Geographic Visualization Accessible. Washington URISA GIS Conference. Bellevue, WA.
- Hardisty, F. and J. Conley (2008). Interactive Detection of Spatial Clusters. International Society for Disease Surveillance. Raleigh, NC.
- Klippel, A. and F. Hardisty (2008). Visual Analytics and the Geometry of Thought—Spatial Intelligence through Sapient Interfaces. Research and Training in Spatial Intelligence. Evanston, IL.
- Robinson, A. and F. Hardisty (2008). Highlighting Methods for Geovisualization. North American Cartographic Information Society. Missoula, MT.
- Hardisty, F. (2007). ESDA for Prostate Cancer. Invited Talk. Hershey, PA.
- Robinson, A., E. Koua, F. Hardisty and A. M. MacEachren (2007). The G-EX Portal: Web-based Dissemination of Geovisual Analytic Results. ICA

- Commission on Visualization and Virtual Environments Workshop 'From Geovisualization Toward Geovisual Analytics'. Helsinki, Finland).
- Hardisty, F. (2006). Using Cartograms for Geovisualization. Association of American Geographers Annual Meeting. Chicago.
- Hardisty, F. (2006). Digital Government -- The Geographic Dimension. Lecture Series on Digital Government. Olympia, WA.
- Li, L. and F. Hardisty (2006). Web Based Synchronous Geocollaboration. Annual Meeting of the AAG, Chicago, IL.
- Hardisty, F. (2005). Combining the GeoViz Toolkit with Infovis Methods. AAG, Denver, CO.
- Hardisty, F. (2005). The GeoViz Toolkit. Auto-Carto, Las Vegas, NV.
- Liao, K. and F. Hardisty (2005). Visualization of Long-term Temporal Data. AAG, Denver, CO.
- Macgill, J., M. Gahegan, J. Conley and F. Hardisty (2005). Appling GeoVISTA Studio for the spatial analysis of prostate cancer. AAG, Denver, CO.
- Hardisty, F. (2004). Coordinating Geographic Visualization and Spatial Statistics. Meeting of ICA Commission on Geovisualization at GIScience, University of Maryland.
- Hardisty, F. (2004). Open Source Cartography. NACIS, Portland, Maine.
- MacEachren, A. M., X. Dai, F. Hardisty, D. Guo and G. Lengerich (2003). Exploring High-D Spaces with Multiform Matrices and Small Multiples. IEEE InfoVis
- Zhou, B., C. Brewer and F. Hardisty (2003). ColorBrewer in GeoVISTA Studio: Construction and application of bivariate color schemes Joint Statistical Meetings - Section on Statistical Graphics, San Francisco, CA.
- Dai, X. and F. Hardisty (2002). Conditioned and Manipulable Matrix for Visual Exploration. National Conference for Digital Government Research, Los Angeles, CA.
- Hardisty, F. (2002). Designing and Building Usable Geovisualization Tools. EuroConference on Methods to Define Geovisualisation Contents for Users Needs, Albufeira, Portugal.
- Hardisty, F., A. M. MacEachren and M. Takatsuka (2002). Cartographic Animation in Three Dimensions: Experimenting with the Scene Graph. 20th International Cartographic Conference, Beijing, China.
- Haug, D., A. M. MacEachren and F. Hardisty (2002). The challenge of analyzing geovisualization tool use: Taking a visual approach. 20th International Cartographic Conference, Beijing, China.
- MacEachren, A. M., F. Hardisty, M. Wheeler, M. Gahegan, X. Dai, D. Guo and M. Takatsuka (2002). Supporting visual integration and analysis of geospatially-referenced statistics through web-deployable, cross-platform tools. 20th International Cartographic Conference, Beijing, China.
- Suchan, T. and F. Hardisty (2002). Usability Studies of Geovisualization Software in the Workplace. National Conference for Digital Government Research, Los Angeles.

- Hardisty, F. (2001). Applying Usability Engineering to Visualization Software Design Problems. 97th Annual Meeting of the Association of American Geographers, New York, NY.
- MacEachren, A. M., F. Hardisty, M. Gahegan, M. Wheeler, X. Dai, D. Guo and M. Takatsuka (2001). Supporting visual integration and analysis of geospatially-referenced statistics through web-deployable, cross-platform tools. dg.o.2001, National Conference for Digital Government Research, Los Angeles, CA.
- Gahegan, M., M. Takatsuka, M. Wheeler and F. Hardisty (2000). GeoVISTA Studio: a geocomputational workbench. GeoComputation, UK.
- Hardisty, F. (2000). An Example of an Interactive Animated Map. AAG Annual Meeting, Pittsburgh, PA.
- Hardisty, F. (1999). Animated Maps and Cartographic Communication. Association of American Geographers Annual Meeting. Honolulu, HI.
- Hardisty, F. (1999). Stochastic Modeling of Alternate Methods for the Generation of Event Patterns with Complete Spatial Randomness. GeoComputation 99, Fredericksburg, VA.

C. Positions and Honors.

Positions and Employment

2007-Present Research Associate and Instructor, The Pennsylvania State University
 2003-2006 Assistant Professor, University of South Carolina
 1999-2003 Academic Computing Fellow, Research Assistant, Instructor at the Pennsylvania State University
 1997-1999 Research and Teaching Assistant at the Ohio State University
 1996-1997 Instructor, International Education Center, Honam University, South Korea

Honors

August 2000 – August 2003
 Academic Computing Fellowship from Penn State

September 1999 – August 2001
 Bunton-Waller Graduate Award from Penn State

GIScience 2000 ESRI Scholarship

September 1999 – August 2000
 University Graduate Fellowship from Penn State.

D. Research Support

Ongoing Research Support

(role: Research Assistant, Senior Scientist)

R01 CA95949-01

Alan M. MacEachren (PI)

4/1/ 2002-

3/31/2009

National Institutes of Health / National Cancer Institute

Geovisualization and Spatial Analysis of Cancer Data

The goal of this research has been to develop, implement and assess an integrated suite of cross-platform visual-statistical-computational, methods and tools that enable geovisualization and exploratory spatial data analysis to support public health research and policy directed to cancer etiology, surveillance, and control.

(role: Senior Scientist)

Subcontract 22193

Alan M. MacEachren (PI)

1/1/2006-

4/24/2008

Pacific Northwest National Laboratory/Department of Homeland Security

Knowledge-enabled Visual Analytics: Supporting individuals and teams from analysis through action

This grant funds a regional center that coordinates with the National Center for Visualization and Analytics at PNNL and four other regional centers to develop, implement, test, and deploy visual analytic methods to support analytical reasoning with complex data in domains relevant to Homeland Security (e.g., infectious disease, crisis management, and threat assessment).

(role: Senior Scientist)

Supplement to: R01 CA95949-01 Alan M. MacEachren (PI)

9/1/2006-

3/30/2009

National Institutes of Health / National Cancer Institute

Geovisual EXplication Portal – Supplement to Geovisualization and Spatial Analysis of Cancer Data

This supplement to the *Geovisualization and Spatial Analysis of Cancer Data* grant (listed above) is focused on developing and assessing a web-based strategy for enhanced explication and dissemination of the surveillance research methods and tools developed and of the surveillance research that they enable.

(role: Senior Scientist)

Evaluation of Candidate Vaccine Technologies Using Computational Models, Donald Burke U of Pittsburgh (PI), Neil Ferguson (CoPI), Bryan Grenfell (CoPI) {one of 7 other penn State investigators} – Gates Foundation; Spring 2008-Spring 2012.

The goal of this project is to develop and deploy computational models and simulations of infectious disease transmission dynamics and vaccine logistics, to be used in support of the new vaccine technologies programs of the BMGF “Grand Challenges” and in support of WHO Communicable Disease Control efforts more broadly.

Completed Research Support

13540-04-1087 (role: PI)
Frank Hardisty (PI) 1/1/ 2005-
6/1/2006

South Carolina Army National Guard

Improving Geographic Visualization for Data Analysis

This grant funded the development of star-plot maps, a means of doing multivariate geographic data visualization. It also funded continued development of the GeoViz Toolkit, including inclusion of a HTML help system, and the first version of re-loadable designs.

N00140510629 (role: Co-PI)
Gary LaFree (PI) 6/1/ 2005-
12/31/2006

Department of Homeland Security

National Consortium for the Study of Terrorism and the Responses to Terrorism

The National Consortium for the Study of Terrorism and Responses to Terror (START) is a U.S. Department of Homeland Security Center of Excellence, tasked by the Department of Homeland Security's Science and Technology Directorate with using state-of-the-art theories, methods, and data from the social and behavioral sciences to improve understanding of the origins, dynamics, and social and psychological impacts of terrorism.

E. Master's Students Supervised

Chris Saylor, June 2005
Linna Li, June 2006
Chris Goranson, June 2009
Jon Jones, June 2009
Andrew Parker, June 2009
Allen Cousins, Projected Graduation 2010
Desmond Carroll, Projected Graduation 2011

E. Technical Skills

Programming Languages: Expert in Java 1.1 to 1.6, Visual Basic 4.0 to 6.0, Some experience in C#, VB.Net, Python and Jython, Pascal, Lisp, Prolog, and Logo.

Programming Methodologies:	Software Patterns (GoF), Component-Based Development, Unit Testing, Scripting, Proving Programs Correct
Java Technologies:	UML, XML, Eclipse, Ant, Maven, JNI (Java Native Interface), Tomcat, GeoTools, JDom, Hudson, JDBC, RMI (Remote Method Invocation), Colt, JTS (Java Topology Suite), Servlets
Mathematical Expertise:	Multivariate Statistics, Spatial Statistics, Decision Trees, Neural Networks, Computational Geometry, Non-Euclidean Geometry

F. Recent Collaborators & Other Affiliations

Alan MacEachren (Pennsylvania State University), Alex Klippel (Pennsylvania State University), Anthony Robinson (Pennsylvania State University), Jamison Conley (West Virginia University), Jeremy Mennis (Temple University), Linna Li (University of California at Santa Barbara), Diansheng Guo (University of South Carolina), Sara Fabrikant (University of Zurich), Duane Marble (Ohio State University)