

# Alan M. MacEachren

Professor Emeritus of Geography  
The Pennsylvania State University, University Park, PA  
e-mail: maceachren@psu.edu

## ACADEMIC POSITIONS

### **Summer 2021:**

Professor Emeritus of Geography, Penn State University

### **Fall 2007 – 2021:**

Affiliate Professor of Information Sciences & Technology, Penn State University

### **Fall 2007:**

Visiting Professor, Department of Computer Science, Stanford University

### **Fall 1998 – 2020:**

Director, GeoVISTA Center, Department of Geography, Penn State University

### **Fall 1992 – 2021:**

Professor of Geography, Penn State University

### **1985-1992:**

Associate Professor of Geography

Director, Deasy GeoGraphics Laboratory, Penn State University

### **1983-85:**

Assistant Professor of Geography, University of Colorado-Boulder

### **1980-83:**

Director of the Department of Geography Spatial Analysis Laboratory, Virginia Polytechnic Institute and State University

### **1979-83:**

Assistant Professor of Geography, Virginia Polytechnic Institute and State University

Director of the Department of Geography Cartography Laboratory

## EDUCATION

**1979:** Ph.D. Geography, University of Kansas

**1976:** M.A. Geography, University of Kansas

**1974:** B.A. Geography, Ohio University

## AREAS OF SPECIALIZATION

Geovisual Analytics; Geovisualization; Exploratory Spatiotemporal Data Analysis; Geocollaboration (group work with geoinformation); Cartography; Spatial and Environmental Cognition; Applications in: Health, Environment, Crisis Management

## AWARDS & HONORS

### *Research*

- American Congress on Surveying and Mapping - **Andrew McNally Award for Research in Cartography**, 1983.
- American Congress on Surveying and Mapping - **Andrew McNally Award for Research in Cartography**, 1988.
- Named **Fellow**, American Congress on Surveying and Mapping, 1992.
- **1998-2000 Faculty Fellow**, Center for Academic Computing, Penn State University
- **Wilson Research Award**, College of Earth and Mineral Science, Penn State University, 1998.
- **2004-2007 E. Willard and Ruby S. Miller Professor of Geography**, College of Earth and Mineral Science, Penn State University.
- **Award of Distinction – Exceptional Scholarly Contributions to the Practice of Cartography**, Canadian Cartographic Association, 2004.
- **Honorary Fellow**, International Cartographic Association, 2005 (6<sup>th</sup> Fellow from U.S. since 1974).
- **2009-2013 Miller Faculty Fellow**, College of Earth and Mineral Sciences, Penn State University.
- **2010 Faculty Scholar Medal**, The Pennsylvania State University
- **2012 Distinguished Alumni Award**, Ohio University.
- **2013 Elected as a Fellow of the American Association for Advancement of Science (AAAS)**
- **2019 Association of American Geographers Wilbanks Award for Transformational Research in Geography**
- **2021 IEEE Vis Test of Time Award** for SensePlace2: GeoTwitter analytics support for situational awareness.
- Alan M. MacEachren, Anuj Jaiswal, Anthony C. Robinson, Scott Pezanowski, Alexander Savelyev, Prasenjit Mitra, Xiao Zhang, and Justine Blanford. DOI: 10.1109/VAST.2011.6102456
- **2021 Carl Mannerfelt Gold Medal from the International Cartographic Association**
- **2022 UCGIS Research Award** from University Consortium for Geographic Information Science
- **2022 CaGIS Distinguished Career Award** from the Cartography and Geographic Information Society

### *Teaching*

- Certificate of Teaching Excellence - VPI&SU, 1979-1980.
- **Distinguished Teaching Achievement Award** - National Council for Geographic Education, 1982.
- **2019 Graduate Faculty Teaching Award**, The Pennsylvania State University

## GRANTS

### *Research (externally funded)*

- Application of Environmental Learning Theories to Spatial Knowledge Acquisition from Maps, **National Science Foundation**, April 1, 1988-September 30, 1989.
- Developing Symbolization and Design Principles for Environmental Maps, U. S. **Environmental Protection Agency**, Office of Information and Resource Management (administered through Vigyan Corp., May, 1991 – June, 1992)
- The Design of Color Maps for the NCHS Mortality Atlas, (with Cynthia Brewer) Department of Health and Human Services, Centers for Disease Control, **National Center for Health Statistics**, 9/7/94 - 6/1/95.
- VisEarth, one of 11 senior researchers (others are: Paula Levin, Jerry Bolgano, Karen Flammer, Richard Carlson, Mark Detweiller, Roger Downs, Cynthia Brewer, David DiBiase, Ron Blom, Bob Crippen) on a grant

- with the following PIs: Daniel Barstow, Eric Frost, Lynn Liben, Sally Ride, Randall Souviney), **National Science Foundation**, 1996-1999.
- Population Research Center Core Grant (co-Director of the Geographic Information Analysis Core, one of 5 cores within the Institute), **National Institutes of Health**, 8/01/91 - 6/31/01
  - Design and evaluation of a computerized dynamic mapping system interface, PI, Department of Health and Human Services, Centers for Disease Control, National Center for Health Statistics. 9/1/96 - 1/30/98.
  - An integrated approach for effective representation and analysis of space-time environmental data, co-PI with Peuquet, **Environmental Protection Agency**, 10/96-12/99.
  - HealthVis - Exploratory tools for spatiotemporal analysis of health data, PI, Department of Health and Human Services, Centers for Disease Control, **National Center for Health Statistics**. 8/17/98 - 12/31/99.
  - Enabling collaboration and improving understanding: The Management of Semantics for Geospatial Information, **NIMA**, NURI Program, Mark Gahegan (PI), Alan M. MacEachren (Co-PI), Masahiro Takatsuka (Co-PI), March, 2000-April, 2003
  - Multivariate Representation Methods for Geo-referenced Health Statistics Data, **National Cancer Institute**, Research Contract, Alan M. MacEachren (PI), Feb 15, 2000-Feb. 15, 2001.
  - Quality Graphics for Federal Statistical Summaries, **National Science Foundation**, Digital Government Program, Collaborative Research. Daniel Carr (PI-George Mason), Alan M. MacEachren (PI-PSU), David Scott (PI-Rice), Aug, 2000-Aug, 2003.
  - Visualization to support coordinated geospatial decision-making: Interpretation, representation of quality, data fusion, and collaboration, **NIMA**, NURI Program, Alan M. MacEachren (PI), Mark Gahegan (Co-PI), Sept., 2001-Aug, 2002.
  - Development of an exploratory spatial data analysis tool for cancer surveillance, **National Institutes of Health / National Cancer Institute**, Alan M. MacEachren (PI), Mark Gahegan (Co-PI), Sept. 1, 2002- Aug. 31, 2003.
  - Fundamental Approaches to Task-Oriented Visualization of Uncertainty, **ARDA-GI2Vis**, Mark Gahegan (Co-PI), Alan M. MacEachren (Co-PI), Subcontract from PNNL (David McGee (PI), Oct., 2002-Sept, 2004.
  - Dialogue-assisted visual environment for geoinformation: Enabling collaborative information access and decision-making through a natural, multimodal interface, **National Science Foundation – ITR**, Alan M. MacEachren (PI), Rajeev Sharma (Co-PI), Guoray Cai (Co-PI), Aug. 1, 2001- July 31, 2004 (plus no cost extensions to July, 2006).
  - Team Assessment of Socio-Technical Logistics, **Northrop Grumman/Air Force**, Michael McNeese (PI), Alan M. MacEachren (CoPI), May, 2005- February, 2007.
  - Development of classification software for the Exploratory Spatio-Temporal Analytic Toolkit (ESTAT), **National Institutes of Health / National Cancer Institute**, Alan M. MacEachren (PI), August, 2005- August 1, 2005 – July 31, 2006.
  - Human Environment Regional Observatories, **National Science Foundation**. Brent Yarnal (PI), Mark Gahegan (CoPI), Alan M. MacEachren (Co-PI), C. Gregory Knight (CoPI, 1<sup>st</sup> 3 years), William Easterling (CoPI, 1<sup>st</sup> 2 years), Aug, 2000-Aug, 2005.
  - Model GIS/Atlas for State Comprehensive Cancer Control (PEP 2003-009), **Centers for Disease Control**, Gene Lengerich (PI), Alan M. MacEachren (CoPI), David O'Sullivan (Co-PI), Gary Chase (Co-PI), Roxanne Parrott (Co-PI). July. 1, 2003- June 30, 2006.
  - STNexus: An Integrated Database and Visualization Environment for Space-Time Information Exploitation, **ARDA-GI2Vis**, Donna Peuquet (PI), Alan M. MacEachren (CoPI), March., 2005-Feb., 2007.
  - GeoDiscoverer A search engine to integrate social networks with geospatial information Lee Giles & Alan M. MacEachren (**PIs**) – Industry sponsor, July, 2006-June, 2007; extended July, 2007-May 2008.
  - Geovisualization and Spatial Analysis of Cancer Data, **National Institutes of Health / National Cancer Institute**, Alan M. MacEachren (PI), Co-Investigators: Mark Gahegan, Luc Anselin (Illinois), Gene Lengerich (PSU-Hershey), April. 1, 2002- March 31, 2009.
  - Geovisual EXplication Portal – Supplement to Geovisualization and Spatial Analysis of Cancer Data, **National Institutes of Health / National Cancer Institute**, Alan M. MacEachren (**PI**), Sept., 2006 – March, 2009.
  - GeoCollaborative Crisis Management (GCCM): Building better systems through advanced technology and deep understanding of technology-enabled group work, **National Science Foundation – Digital Government**, Alan M. MacEachren (PI), Rajeev Sharma (Co-PI), Guoray Cai (Co-PI), Michael McNeese (Co-PI), Sven Fuhrmann (Co-PI). July. 1, 2003- June 30, 2006; supplement April 2005-June 2009.
  - Regional Visualization and Analytics Center, NVAC - **Pacific Northwest National Laboratory/Department of Homeland Security**, Alan M. MacEachren (PI), Initial contract January, 2006- June, 2008.

- Symbology Development Best Practices, Alan M. MacEachren (PI), Anthony Robinson (CoPI), **Dept. of Homeland Security**, Feb. 2009 – March. 2010.
- Visual Analytics Support for Research Document Retrieval and Analysis, Alan M. MacEachren (PI), contract from **National Science Foundation**, March 2010 – Oct. 2010.
- Geographic Contextualization for Accounts of Movement (GeoCAM): Representing, extracting, mapping, and interpreting movement references in text. Alan M. MacEachren (PI), Alexander Klippel (CoPI), Presenjit Mitra (CoPI) – **National Geospatial Intelligence Agency**; Sept. 2007 – Aug. 2010 (with 2 optional years).
- New Methods for Representing and Interacting with Qualitative Geographic Information, Alan MacEachren (PI), Anthony Robinson (CoPI) – **US Army Corps of Engineers**; July, 2011-October, 2012
- 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-Fall 2013.
- Symbology Standardization Support, Alan M. MacEachren (PI), Anthony Robinson (CoPI), **Dept. of Homeland Security**, March. 2010 – March 2013; Transition phase funded July, 2013-June, 2014.
- Doctoral Dissertation Research: Assessing the Cognitive Aspects of Satellite Image Interpretation,(PI: ALAN MacEachren, CoPI: Raechel Bianchetti) – **National Science Foundation**, 9/1/2012 – 8/31-2014.
- New Methods for Representing and Interacting with Qualitative Geographic Information, Alan MacEachren (PI), Anthony Robinson (CoPI) – **US Army Corps of Engineers**; Sept, 2012-December, 2014
- Visualization and Analytics for Command, Control, and INteroperability Environments – DHS Center of Excellence for Command, Control and Interoperability, David Ebert, Purdue (PI), Alan MacEachren (CoPI) {one of several CoPIs} – **Dept. of Homeland Security**; Summer, 2009-Summer, 2014 (extended through June, 2017).
- **IGERT**: Big Data Social Science - An Integrative Education and Research Program in Social Data Analytics (one of 5 CoPIs) – **National Science Foundation**, July, 2012- June 30, 2017.

## Teaching

- Teaching Learning Grant - VPI&SU, 1981.
- Supplemental Grant from the VPI&SU Education Foundation, 1982.
- Computer Applications Course Development Grant for Computer-Assisted Cartography and Geographic Information Systems - College of Arts and Sciences, University of Colorado-Boulder, 1983-1986.

**PUBLICATIONS:** [HTTP://SCHOLAR.GOOGLE.COM/CITATIONS?USER=6K3KFDCAAAAJ&HL=EN](http://scholar.google.com/citations?user=6K3KFDCAAAAJ&hl=EN)

## Books

1. Alan M. MacEachren *SOME Truth with Maps: A Primer on Design & Symbolization*, Washington D. C.: Association of American Geographers, 1994.
2. Alan M. MacEachren and D. R. F. Taylor (co-editors) *Visualization in Modern Cartography*, Oxford: Pergamon Press, 1994.
3. Alan M. MacEachren *How Maps Work: Representation, Visualization and Design*, New York: Guilford Press, 1995.
4. Jason Dykes, Alan M. MacEachren, Menno-Jan Kraak, co-editors. 2005. *Exploring Geovisualization*, London, Elsevier Science.
5. Joshua Stevens, Jennifer M. Smith, and Raechel A. Bianchetti (2012), *Mapping Our Changing World*, Co-Edited by: Alan M. MacEachren and Donna J. Peuquet, University Park, PA: Department of Geography, The Pennsylvania State University (adaptation of online text originally written by David DiBiase beginning in 1997, with contributions at that time by James L. Sloan, Wesley Stroh, Beth Fletcher King, and many students).
6. MacEachren, A. M. 2022. *A Geo-Big Year: Pandemic Retirement is for the Birds*: Osprey View Press.

## **National Reports**

1. National Research Council *Rediscovering Geography: New Relevance for the New Century*, Washington, D. C.: National Academy of Science Press, 1997. (one of 14 authors; Wilbanks, T., R. Adams, M. Church, W. Clark, A. deSouza, P. Gilmartin, W. Graf, J. Harrington, S. Horn, R. Kates, A. MacEachren, A. Murphey, G. Rushton, E. Sheppard, B. Turner and C. Willmott)
2. National Research Council. *IT Roadmap to a Geospatial Future*, Washington, D. C.: National Academy of Science Press, 2003. (one of 8 authors: Richard R. Muntz, Tom Barclay, Jeff Dozier, Christos Faloutsos, Alan M. MacEachren, Joanne L. Martin, Cherri M. Pancake, Mahadev Satyanarayanan).
3. Pacific Northwest National Laboratory and Department of Homeland Security. *Illuminating the Path: The Research and Development Agenda for Visual Analytics*, 2005. (one of 26 authors, James J. Thomas and Kristin A. Cook, editors).

## **Journal Special Issues (Guest Co-Editor) & Proceedings Co-Editor**

1. *Cartography and Geographic Information Systems*, Special Content Issue: Geographic Visualization (co-editor with Mark Monmonier), Vol. 19, No. 4, 1992
2. *Computers & Geoscience*, Print and electronic special Issue: Exploratory Cartographic Visualization, (co-editor with Menno-Jan Kraak) 23(4) May, 1997 print, CD-ROM, and WWW: [[www.elsevier.nl/locate/cgvis](http://www.elsevier.nl/locate/cgvis)].
3. *International Journal of Geographic Information Science*, special issue on Geographic Visualization for Space-Time Analysis, (co-editor with Menno-Jan Kraak), 13 and web supplement: [www.geovista.psu.edu/ica/ijgis.html](http://www.geovista.psu.edu/ica/ijgis.html)
4. *Cartography and Geographic Information Systems*, Special Content Issue: Research Challenges in Geovisualization, Alan M. MacEachren and Menno-Jan Kraak, Vol. 28, No. 1, 2001.
5. *Cartography and Geographic Information Systems*, Special Content Issue: Geovisualization, Menno-Jan Kraak and Alan M. MacEachren, Vol. 32, No. 2, 2005
6. *Computer Graphics & Applications*, Special Content Issue: Geovisualization, Theresa-Marie Rhyne, Alan M. MacEachren, and Jason Dykes, Vol. 26, No. 4, 2006
7. *International Journal of Geographic Information Science*, special issue on Visualization, Analytics, and Spatial Decision Support, Gennady Andrienko, Natlaia Andrienko, Piotr Jankowski, and Alan M. MacEachren, Vol. 21, No. 8, 2007.
8. Alan M. MacEachren and Silvia Miksch co-editors. 2010. *Proceedings, IEEE Conference on Visual Analytics Science and Technology*, 2010. VAST 2010. Piscataway, NJ, IEEE.
9. *Journal of Visual Languages & Computing*, special issue on Visualization, Analytics, and Spatial Decision Support, Gennady Andrienko, Natlaia Andrienko, Daniel Keim, Alan M. MacEachren, Stefan Wrobel, Vol 6, 2011.
10. *IEEE Transactions on Visualization & Computer Graphics* Special Section on the IEEE Conference on Visual Analytics Science and Technology (VAST), Alan M. MacEachren and Silvia Miksch, Vol 18, No. 5, 2012.

## **Journal publications**

1. MacEachren, A.M., 1979. The evolution of thematic cartography: A research methodology and historical review. *Canadian Cartographer*, 16: 17-33.
2. MacEachren, A.M., 1980. Travel time as the basis of cognitive distance. *Professional Geographer*, 32(1): 30-36.
3. MacEachren, A.M., 1982. Map complexity: comparison and measurement. *American Cartographer*, 9: 31-46.
4. MacEachren, A.M., 1982. On Ewing's 'sensitivity of conclusions'. *Professional Geographer*, 34(3): 345-347.
5. MacEachren, A.M., 1982. The role of complexity and symbolization method in thematic map effectiveness. *Annals of the Association of American Geographers*, 72: 495-513.

6. MacEachren, A.M., 1985. Accuracy of thematic maps: Implications of choropleth symbolization. *Cartographica*, 22(1): 38-58.
7. MacEachren, A.M., 1985. Compactness of geographic shape: comparison and evaluation of measures. *Geografiska Annaler*, 67B(1): 53-67.
8. MacEachren, A.M., 1986. A linear view of the world: Strip maps as a unique form of cartographic representation. *American Cartographer*, 13(1): 7-25.
9. MacEachren, A.M., 1986. Map use and map making education: Attention to sources of geographic information. *Cartographic Journal*, 23(2): 115-122.
10. MacEachren, A.M., 1986. A spatial and topical assessment of digital geographic database activities in the U.S. *The Professional Geographer*, 38(4): 397-405.
11. MacEachren, A.M., 1987. The evolution of computer mapping and its implications for geography. *Journal of Geography*, 86(3): 100-108.
12. MacEachren, A.M. and Davidson, J.V., 1987. Sampling and isometric mapping of continuous geographic surfaces. *The American Cartographer*, 14(4): 299-320.
13. MacEachren, A.M. and Johnson, G.B., 1987. The evolution, application and implications of strip format travel maps. *The Cartographic Journal*, 24: 147-158.
14. MacEachren, A.M. and DiBiase, D.W., 1990. Animated maps of aggregated data: Conceptual and practical problems (abstract). *Cartographic Perspectives*, 4((Winter 1989/90)): 32.
15. MacEachren, A.M. and Ganter, J.H., 1990. A pattern identification approach to cartographic visualization. *Cartographica*, 27(2): 64-81.
16. MacEachren, A.M., 1991. The role of maps in spatial knowledge acquisition. *Cartographic Journal*, 28(2): 152-162.
17. MacEachren, A.M. and DiBiase, D.W., 1991. Animated maps of aggregate data: Conceptual and practical problems. *Cartography and Geographic Information Systems*, 18(4): 221-229.
18. DiBiase, D., MacEachren, A.M., Krygier, J.B. and Reeves, C., 1992. Animation and the role of map design in scientific visualization. *Cartography and Geographic Information Systems*, 19(4): 201-214, 265-266.
19. Goldberg, J.H., MacEachren, A.M. and Kotval, X.P., 1992. Mental image transformations in terrain map comparison. *Cartographica*, 29(2): 46-59.
20. MacEachren, A.M., 1992. Application of environmental learning theory to spatial knowledge acquisition from maps. *Annals of the Association of American Geographers*, 82(2): 245-274.
21. MacEachren, A.M., 1992. Learning from maps: Can orientation bias be overcome? *The Professional Geographer*, 44(4): 431-443.
22. MacEachren, A.M., 1992. Visualizing uncertain information. *Cartographic Perspectives*(13): 10-19.
23. MacEachren, A.M. and Mistrick, R.A., 1992. The role of brightness differences in figure-ground: is darker figure? *Cartographic Journal*, 29(2): 91-100.
24. MacEachren, A.M. and Monmonier, M., 1992. Geographic Visualization: Introduction. *Cartography and Geographic Information Systems*, 19(4): 197-200.
25. Howard, D. and MacEachren, A.M., 1996. Interface design for geographic visualization: Tools for representing reliability. *Cartography and Geographic Information Systems*, 23(2): 59-77.
26. Brewer, C.A., MacEachren, A.M., Pickle, L.W. and Herrmann, D., 1997. Mapping mortality: Evaluating color schemes for choropleth maps. *Annals of the Association of American Geographers*, 87(3): 411-438.
27. Kraak, M.J., Edsall, R. and MacEachren, A.M., 1997. Kartografische animaties en legenda's voor temporele kaarten: exploratie en/of interactie. *Kartografisch tijdschrift*, 23(4): 13-18.

28. MacEachren, A.M. and Kraak, M.-J., 1997. Exploratory cartographic visualization: advancing the agenda. *Computers & Geosciences*, 23(4): 335-343.
29. MacEachren, A.M., 1998. Cartography, GIS and the World Wide Web. *Progress in Human Geography*, 22(4): 575-585.
30. MacEachren, A.M., Brewer, C.A. and Pickle, L., 1998. Visualizing Georeferenced data: Representing reliability of health statistics. *Environment and Planning: A*, 30: 1547-1561.
31. Kraak, M.-J. and MacEachren, A.M., 1999. Visualization for exploration of spatial data (editorial introduction to special issue). *International Journal of Geographical Information Science*, 13(4): 285-287.
32. MacEachren, A.M., Wachowicz, M., Haug, D., Edsall, R. and Masters, R., 1999. Constructing Knowledge from Multivariate Spatiotemporal Data: Integrating Geographic Visualization with Knowledge Discovery in Database Methods. *International Journal of Geographic Information Science*, 13(4): 311-334.
33. Harrower, M., MacEachren, A.M. and Griffin, A., 2000. Design, implementation, and assessment of geographic visualization tools to support earth science education. *Cartography & Geographic Information Systems*, 27(4): 279-293.
34. MacEachren, A.M., 2000. Cartography and GIS: facilitating collaboration. *Progress in Human Geography*, 24(3): 445-456.
35. Fuhrmann, S. and MacEachren, A.M., 2001. Navigation in virtuellen Geo-Welten. *Kartographische Nachrichten*, 51(3): 132-142.
36. MacEachren, A.M., 2001. Cartography and GIS: Extending collaborative tools to support virtual teams. *Progress in Human Geography*, 25(3): 431-444.
37. MacEachren, A.M., 2001. An evolving cognitive-semiotic approach to geographic visualization and knowledge construction. *Information Design Journal*, 10(1): 26-36.
38. MacEachren, A.M. and Brewer, I., 2001. Collaborative geovisualization to support different-place knowledge construction and decision-making. *Kartographische Nachrichten*(3): 132-142.
39. MacEachren, A.M. and Kraak, M.-J., 2001. Research Challenges in Geovisualization. *Cartography and Geographic Information Science*, 28(1): 3-12.
40. MacEachren, A. M., Hardisty, F., Dai, X. P., & Pickle, L. 2003, Supporting visual analysis of federal geospatial statistics. *Communications of the ACM*, 46(1), 59-60.
41. Sharma, R., Yeasin, M., Krahnstoever, N., Rauschert, I., MacEachren, A., Cai, G., Sengupta, K., & Brewer, I. 2003, (invited) Role of Speech/Gesture Driven Multimodal Interfaces for Crisis Management. *Proceedings of the IEEE*, 91(9), 1327-1354.
42. MacEachren, A. M. & Brewer, I. 2004, Developing a conceptual framework for visually-enabled geocollaboration. *International Journal of Geographical Information Science*, 18(1): 1-34.
43. MacEachren, A. M., Gahegan, M., Hardisty, F., Pike, W., Brewer, I., & Cai, G. 2004, Geovisualization for knowledge construction and decision-support. *Computer Graphics & Applications*, 24(1), 13-17
44. Carr, D. B., White, D., & MacEachren, A. M. 2005, Conditioned choropleth maps and hypothesis generation. *Annals of the Association of American Geographers*, 95(1): 32-53.
45. MacEachren, A. M., Cai, G., Sharma, R., Rauschert, I., Brewer, I., Bolelli, L., Shaparenko, B., Fuhrmann, S., & Wang, H. 2005, Enabling collaborative geoinformation access and decision-making through a natural, multimodal interface. *International Journal of Geographical Information Science*, 19(3), 293-317.
46. Kraak, M. J. & A. M. MacEachren. 2005. Geovisualization and GIScience. *Cartography and Geographic Information Science*, 32(2), 67-68.
47. Pike, W., Yarnal, B., MacEachren, A. M., Gahegan, M., & Yu, C. 2005, Infrastructure for Human-Environment Collaboration: Building a Prototype for the Future of Science. *Environment*, 47(2), 8-21.

48. Cai, G., Wang, H., MacEachren, A. M., & Fuhrmann, S. 2005, Natural Conversational Interfaces to Geospatial Databases. *Transactions in GIS*, 9(2), 199-221.
49. Cai, G. & MacEachren, A. M. 2005, Supporting Effective Human Interactions with Geographic Information During Crisis Response. *Geomatica*, 59(4), 415-425.
50. Guo, D., Gahegan, M., MacEachren, A. M., & Zhou, B. 2005, Multivariate Analysis and Geovisualization with an Integrated Geographic Knowledge Discovery Approach. *Cartography and Geographic Information Science*, 32(2): 113-132 .
51. MacEachren, A. M., A. Robinson, S. Hopper, S. Gardner, R. Murray, & M. Gahegan. 2005. Visualizing Geospatial Information Uncertainty: What we know and what we need to know. *Cartographic and Geographic Information Science*, 32(3): 139-160.
52. Fuhrmann, S., MacEachren, A., DeBerry, M., Bosley, J., Taylor, R., Gehegan, M., & Downs, R. 2005, MapStats for Kids: Making geographic and statistical facts available to children. *Journal of Geography*, 104(6): 233-243.
53. Robinson, A. C., Chen, J., Lengerich, E. J., Meyer, H. G., & MacEachren, A. M. 2005, Combining Usability Techniques to Design Geovisualization Tools for Epidemiology. *Cartography and Geographic Information Science*, 32(4): 243-255.
54. Griffin, A. L., MacEachren, A. M., Hardisty, F., Steiner, E., & Li, B. 2006, A comparison of animated with static small multiple maps for visually identifying space-time clusters. *Annals of the Association of American Geographers*, 96(4): 740-753.
55. MacEachren, A. M., Pike, W., Yu, C., Brewer, I., Weaver, S., Gahegan, M., & Yarnal, B. 2006, Building a GeoCollaboratory: Supporting Human-Environment Regional Observatory (HERO) Collaborative Science Activities. *Computers, Environment and Urban Systems*, 30(2): 201-225.
56. Koua, E. L., MacEachren, A., & Kraak, M.-J. 2006, Evaluating the usability of an exploratory geovisualization environment. *International Journal of Geographical Information Systems*, 20(4): 225-448.
57. MacEachren, A. M., Cai, G., Brewer, I., & Chen, J. 2006, Supporting map-based geocollaboration through natural interfaces to large-screen display. *Cartographic Perspectives* 54: 16-34.
58. Rhyne, T.-M., MacEachren, A. M., & Dykes, J. 2006, Exploring geovisualization. *IEEE Computer Graphics and Applications*, 26(4), 20-21.
59. MacEachren, A.M. and Fuhrmann, S., 2006. Kartographische Lernumgebungen im behördlichen Internetangebot (Cartographic Learning Activities for Government Agency Web Portals). *Kartographische Nachrichten*, 57(2), 92-99.
60. Cai, G., R. Sharma, A. M. MacEachren, I. Rauschert, & I. Brewer. 2006. Human-GIS Interaction Issues in Crisis Management. *International Journal of Risk Assessment and Management*, 6: 388-407.
61. MacEachren, A. M. & Cai, G. 2006, Supporting Group Work in Crisis Management: Visually mediated human-GIS-human dialogue. *Environment and Planning B*, 33: 435-456.
62. Gou, Diansheng, Chen, Jin, Liao, Ke, and MacEachren, A. 2006. VA-STAMP: Visual Analytics of Space-Time and Multivariate Patterns, *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 12(6): 1461-1474.
63. Andrienko, G., Andrienko, N., Jankowski, P., Keim, D., Kraak, M.-J., MacEachren, A. M., & Wrobel, S. 2007, Geovisual Analytics for Spatial Decision Support: Setting the Research Agenda. *International Journal of Geographical Information Science*, 21(8): 839 - 857.
64. Weaver, C., Fyfe, D., Robinson, A., Holdsworth, D., Peuquet, D., & MacEachren, A. M. 2007, Visual Analysis of Historic Hotel Visitation Patterns. *Information Visualization*, 6: 89-103.
65. Hopfer, S. & MacEachren, A. M. 2007, Leveraging the potential of geospatial annotations for group decisions: a communication theory perspective. *International Journal of Geographical Information Science*, 21(8): 921 - 934.



66. Bhowmick, T., Griffin, A.L., MacEachren, A.M., Kluhsman, B.C. and Lengerich, E.J., 2008. Informing geospatial toolset design: Understanding the process of cancer data exploration and analysis. *Health and Place*, 14: 576-607.
67. Chen, J., MacEachren, A.M. and Guo, D., 2008. Supporting the Process of Exploring and Interpreting Space-Time, Multivariate Patterns: The Visual Inquiry Toolkit. *Cartography and Geographic Information Science*, 35(1): 33-50.
68. Bhowmick, T., Robinson, A.C., Adrienne Gruver, MacEachren, A.M. and Lengerich, E., 2008. Distributed Usability Evaluation of the Pennsylvania Cancer Atlas. *International Journal of Health Geographics*, 7(6).
69. Chen, J. and MacEachren, A.M., 2008. Resolution Control for Balancing Overview + Detail in Spatial Multivariate Analysis. *The Cartographic Journal*, 45: 261-273.
70. MacEachren, A.M., Crawford, S., Mamata Akella and Lengerich, G., 2008. Design and Implementation of a Model, Web-based, GIS-Enabled Cancer Atlas. *The Cartographic Journal*, 45: 246-260.
71. Yu, C., MacEachren, A.M., Yarnal, B. and Peuquet, D.J. 2009. Integrating scientific modeling with a GeoAgent-based representation of human-environment interactions for supporting dynamic hazard management: a drought example in Pennsylvania, USA, *Environmental Modelling & Software*, 27, 923-960.
72. Chen, J., MacEachren, A.M. and Peuquet, D. 2009. Constructing overview + detail dendrogram-matrix views, *IEEE Transactions on Visualization and Computer Graphics*, 15(6): 889-896.
73. MacEachren, A.M., Stryker, M.S., Turton, I.J. and Pezanowski, S. 2010: HEALTH GeoJunction: Visual-computationally Enabled Browsing of Health Publications and Their Contents. *International Journal of Health Geographics*, <http://www.ij-healthgeographics.com/content/9/1/23>
74. Du, P., Lemkin, A., Kluhsman, B., MacEachren, A., Meyers, C., Zurlo, J. and Lengerich, E. 2010: The roles of social domains, screening, and HPV infection in spatial clusters of US cervical cancer mortality: Not all the clusters are the same. *Cancer Causes and Control* 21, 1669-1683.
75. Auer, T., MacEachren, A.M., McCabe, C. and Pezanowski, S. 2011: HerbariaViz: A web-based client-server interface for mapping and exploring flora observation data. *Ecological Informatics* 6(2): 93-110 doi:10.1016/j.ecoinf.2010.09.001.
76. Tomaszewski, B., Blanford, J., Ross, K., Pezanowski, S. and MacEachren, A. 2011: Supporting geographically-aware web document foraging and sensemaking. *Computers, Environment and Urban Systems* 35, 192-207.
77. Robinson, A.C., Roth, R.E. and MacEachren, A.M. 2011: Designing web-delivered learning materials for geographic visualization in public health. *Health Informatics Journal* 17(3): 191-208.
78. Andrienko, G., Andrienko, N., Keim, D., MacEachren, A.M. and Wrobel, S. 2011: Challenging Problems of Geospatial Visual Analytics (editorial introduction). *Journal of Visual Languages & Computing* 22: 251-256.
79. Robinson, A.C., Roth, R.E. and MacEachren, A.M. 2011: Understanding User Needs for Map Symbol Standards in Emergency Management. *Journal of Homeland Security and Emergency Management* 8, Article 33.
80. Roth, R.E., Finch, B.G., Blanford, J.I., Klippel, A., Robinson, A.C. and MacEachren, A.M. 2011: The card sorting method for map symbol design *Cartography & GIS*, 38(2): 89-99.
81. Jaiswal, A., X. Zhang, P. Mitra, S. Pezanowski, I. Turton, S. Xu, A. Klippel, and A. M. MacEachren. 2011. GeoCAM: A Geovisual Analytics Workspace to Contextualize and Interpret Statements about Movement. *Journal of Spatial Information Science* 3:65-101.
82. Robinson, A.C., Roth, R.E., Blanford, J., Pezanowski, S. and Maceachren, A.M. 2011: A Collaborative Process for Developing Map Symbol Standards. *Proceedia Social and Behavioral Sciences (STGIS 2011: Spatial Thinking and Geographic Information Sciences)* 21, 93-102.
83. Blanford, J.I., Kumar, S., Luo, W. and MacEachren, A.M. 2012: It's a long, long walk: accessibility to health facilities in Niger. *International Journal of Health Geographics*.

84. Tomaszewski, B. and MacEachren, A.M. 2012: Geovisual Analytics to Support Crisis Management: Information Foraging for Geo-Historical Context. *Information Visualization {invited extension of paper originally published in Proceedings of IEEE VAST 2010}*, 11(4): 339-359.
85. MacEachren, A.M., Roth, R.E., O'Brien, J., Li, B., Swingley, D. and Gahegan, M. 2012: Visual Semiotics & Uncertainty Visualization: An Empirical Study. *IEEE Transactions on Visualization & Computer Graphics* 18, 2496-2505.
86. Robinson, A.C., Roth, R.E., Blanford, J., Pezanowski, S. and Maceachren, A.M. 2012: Developing map symbol standards using a distributed, asynchronous process. *Environment and Planning B: Planning and Design. {invited extension of paper originally published in Procedia Social and Behavioral Sciences}* 39, 1034-1048.
87. Roth, R.E., Ross, K.S., Finch, B.G., Luo, W. and MacEachren, A.M. 2013: Spatiotemporal Crime Analysis in U.S. Law Enforcement Agencies: Current Practices and Unmet Needs. *Government Information Quarterly*, 30: 226-240.
88. Robinson, A.C., Pezanowski, S., Troedson, S., Bianchetti, R., Blanford, J., Stevens, J., Guidero, E., Roth, R.E. and MacEachren, A.M. 2013: SymbolStore.org: A Web-based Platform for Sharing Map Symbols. *Cartography & Geographic Information Science* <http://dx.doi.org/10.1080/15230406.2013.803833>.
89. MacEachren, A.M. 2013: Cartography as an Academic Field: A Lost Opportunity or a New Beginning? *Cartographic Journal* 50, 1-6. {non-refereed invited essay}
90. Luo, W., Di, Q., Yin, P., Hardisty, F. and MacEachren, A.M. 2014: A Geovisual Analytic Approach to Understanding Geo-Social Relationships in the International Trade Network. *PLoS One*, 9(2): DOI: 10.1371/journal.pone.0088666
91. Luo, W. and MacEachren, A.M. 2014: Geo-Social Visual Analytics. *Journal of Spatial Information Science*.
92. Xu, S., Klippel, A., MacEachren, A.M. and Mitra, P. 2014: Exploring regional variation in spatial language using spatially-stratified web-sampled route direction documents. *Spatial Cognition and Computation*, 14(4):255-283.
93. Kinkeldey, C., MacEachren, A.M. and Schiewe, J. 2014: How to Assess Visual Communication of Uncertainty? A Systematic Review of Geospatial Uncertainty Visualization User Studies. *Cartographic Journal* 51, 372-386.
94. Roth, R. and MacEachren, A.M. 2015: Geovisual Analytics and the Science of Interaction: An Empirical Interaction Study. *Cartography & Geographic Information Science*. Online ahead of print: 10.1080/15230406.2015.1021714
95. Roth, R.E., Ross, K.S. and MacEachren, A.M. 2015: User-Centered Design for Interactive Maps: A Case Study in Crime Analysis. *ISPRS International Journal of Geo-Information*, 4: 262-301
96. Blanford, J.I., Huang, Z., Savelyev, A. and MacEachren, A.M. 2015: Geo-located tweets. Enhancing mobility maps and capturing cross-border movement. *PlosOne*, 1-16.
97. Bianchetti, R.A. and MacEachren, A.M. 2015: Cognitive themes emerging from air photo interpretation texts published to 1960. *ISPRS International Journal of Geo-Information* 4, 551-571.
98. Nelson, J.K., Quinn, S., Swedberg, B., Chu, W. and MacEachren, A.M. 2015: Geovisual Analytics Approach to Exploring Public Political Discourse in Twitter. *ISPRS International Journal of Geo-Information* 4, 337-366.
99. Kinkeldey, C., MacEachren, A.M., Riveiro, M. and Schiewe, J. 2015: Evaluating the Effect of Visually Represented Geodata Uncertainty on Decision Making: Systematic Review, Lessons Learned and Recommendations. *Cartography & Geographic Information Science* 44, 1-21. Published online: 17 Sep 2015
100. Leonard, L., MacEachren, A.M. and Madduri, K. 2016: Graph-based Visual Analysis for Large-scale Hydrological Models. *Information Visualization*, 16(3), 205-216. Published online 9 Aug. 2016
101. Quinn, S. and MacEachren, A.M., 2018. A geovisual analytics exploration of the OpenStreetMap crowd. *Cartography & Geographic Information Science*, 42(2), 140-155. Published online 27 Jan 2017

102. Pezanowski, S., MacEachren, A.M., Savelyev, A. and Robinson, A.C. 2018: SensePlace3: A geovisual framework to analyze place-time-attribute information in social media. *Cartography & Geographic Information Science*. Published online 11 Sept. 2017
103. Wallgrün, J.O., MacEachren, A.M., Karimzadeh, M. and Pezanowski, S. 2018. GeoCorpora: Building a Corpus to Test and Train Microblog Geoparsers, *International Journal of Geographic Information Science*, 32(1), 1-29. Published online: 11 Sep 2017
104. Yang, L., MacEachren, A.M., Mitra, P. and Onorati, T. 2018: Visually-enabled Active Deep Learning for (geo) Text and Image Classification: A Review. *ISPRS International Journal of Geo-Information* 7, online only. Published online 20 Feb 2018
105. MacEachren, A.M. 2018: (re)Considering Bertin in the Age of Big Data and Visual Analytics, *Cartography & Geographic Information Science*, online first.
106. Savelyev, A. and MacEachren, A. M. 2018. Augmenting geovisual analytics with heterogeneous information network mining - cognitive plausibility assessment, *Plos One*. • <https://doi.org/10.1371/journal.pone.0206906>
107. Karimzadeh, M.P., Scott; MacEachren, Alan M.; Wallgrün, Jan 2019: GeoTxt: A Scalable GeoParsing System for Unstructured Text Geolocation. *Transactions in GIS*, 23(1), 118-136.
108. Yang, N., MacEachren, A.M. and Yang, L. 2019: TIN-Based Tag Map Layout. *Cartographic Journal*, 56(2), 101-116.
109. Karimzadeh, M. & Maceachren, A.M., 2019. Geoannotator: A collaborative semi-automatic platform for constructing geo-annotated text corpora. *ISPRS International Journal of Geo-Information*, 8 (4).
110. Savelyev, A. and MacEachren, A.M. 2020: Advancing the theory and practice of system evaluation: a case study in geovisual analytics of social media. *International Journal of Cartography* 6, 202-221. Available from: <https://doi.org/10.1080/23729333.2019.1637488>.
111. Felmler, D.H., Blanford, J.I., Matthews, S.A. and MacEachren, A.M. 2020: The geography of sentiment towards the Women's March of 2017. *PLoS ONE* 15, e0233994.
112. Xin, Y. and MacEachren, A.M. 2020: Characterizing traveling fans: a workflow for event-oriented travel pattern analysis using Twitter data. *International Journal of Geographical Information Science*, 34(12), 2497-2516.
113. Yang, N., MacEachren, A.M. and Domanico, E. 2020: Utility and usability of intrinsic tag maps. *Cartography & Geographic Information Science*, 47(4), 291-304.
114. Nelson, J.K. and MacEachren, A.M. 2020: User-centered Design and Evaluation of a Geovisualization Application Leveraging Aggregated Quantified-Self Data. *Cartographic Perspectives*, 7-31.
115. Pezanowski, S., A. M. MacEachren, and P. Mitra. 2022. Differentiating geographic movement described in text documents. *Transactions in GIS*. Online first, <https://doi.org/10.1111/tgis.12893>
116. Pezanowski, S., P. Mitra, and A. M. MacEachren. (in press). Exploring descriptions of movement through geovisual analytics. *KN - Journal of Cartography and Geographic Information*, 72, 5-27.
117. Yang, N., G. Wu, A. M. MacEachren, X. Pang, and H. Fang. 2023. Comparison of font size and background color strategies for tag weights on tag maps. *Cartography and Geographic Information Science*:1-16.

### **Refereed proceedings papers/chapters**

1. Kraak, M.-J. and MacEachren, A.M., 1994. Visualization of spatial data's temporal component. In: T.C. Waugh and R.G. Healy (Editors), *Proceedings, Spatial Data Handling, Advances in GIS Research*. IGU, Edinburgh, Scotland, 5-9, September, 1994, pp. 391-409.
2. Fauerbach, E., Edsall, R., Barnes, D. and MacEachren, A., 1996. Visualization of uncertainty in meteorological forecast models. In: M.J. Kraak and M. Molenaar (Editors), *Proceedings of the International Symposium on Spatial Data Handling*. Taylor & Francis, Delft, The Netherlands, August 12-16, pp. 465-476.

3. MacEachren, A.M., Boscoe, F.P., Haug, D. and Pickle, L.W., 1998. Geographic Visualization: Designing Manipulable Maps for Exploring Temporally Varying Georeferenced Statistics, *Proceedings, Information Visualization '98*. IEEE Computer Society, Reliegh-Durham, NC, Oct. 19-20, 1998, pp. 87-94.
4. Fuhrmann, S. and MacEachren, A.M., 1999. Navigating Desktop GeoVirtual Environments, *IEEE Information Visualization 99, Late Breaking Hot Topics Proceedings. IEEE*, San Francisco, CA, Oct. 23-28, 1999, pp. 11-14.
5. MacEachren, A.M., Edsall, R., Haug, D., Baxter, R., Otto, G., Masters, R., Fuhrmann, S. and Qian, L., 1999. Virtual Environments for Geographic Visualization: Potential and Challenges. In: D. Ebert and C. Shaw (Editors), *Proceedings of the ACM Workshop on New Paradigms in Information Visualization and Manipulation*. ACM, Kansas City, KS, Nov. 6, 1999 (also at: [www.geovista.psu.edu/publications/NPIVM99/ammNPIVM.pdf](http://www.geovista.psu.edu/publications/NPIVM99/ammNPIVM.pdf)), pp. 35-40.
6. Brewer, I., MacEachren, A.M., Abdo, H., Gundrum, J. and Otto, G., 2000. Collaborative Geographic Visualization: Enabling shared understanding of environmental processes, *IEEE Information Visualization Symposium*. IEEE, Salt Lake City Utah, Oct. 9-10, 2000, pp. 137-141.
7. Edsall, R. M., MacEachren, A. M., & Pickle, L. J. 2001, Case Study: Design and Assessment of an Enhanced Geographic Information System for Exploration of Multivariate Health Statistics. *Proceedings of the IEEE Symposium on Information Visualization 2001*, San Diego, CA, October 22-25, 2001, pp. 159-162.
8. MacEachren, A. M., Hardisty, F., Gahegan, M., Wheeler, M., Dai, X., Guo, D., & Takatsuka, M. 2001, 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, May 21-23, 2001, pp. 17-24.
9. MacEachren, A. M., Harrower, M., Li, B., Howard, D., Downs, R., & Gahegan, M. 2002, Supporting statistical, graphic/cartographic, and domain literacy through online learning activities: MapStats for Kids. *Digital Government 2002*, Los Angeles, May 20-22, pp. 309-313.
10. Rauschert, I., Agrawal, P., Fuhrmann, S., Brewer, I., Wang, H., Sharma, R., Cai, G., & MacEachren, A. 2002, Designing a human-centered, multimodal gis interface to support emergency management. *ACM GIS'02, 10th ACM Symposium on Advances in Geographic Information Systems*, Washington, DC, USA, November, 2002, pp. 119-124.
11. Steiner, E., MacEachren, A. M., & Guo, D. 2002, Developing lightweight, data-driven exploratory geovisualization tools for the web. *Lecture Notes in Computer Science, Spatial Data Handling*, Ottawa, Canada, July 8-12, 2002.
12. Fuhrmann, S., Bosley, J., Li, B., Crawford, S., MacEachren, A., Downs, R., & Gahegan, M. 2003, Assessing the Usefulness and Usability of Online Learning Activities: MapStats for Kids. *Digital Government 2003*, Los Angeles, May 19-21, pp. 137-140.
13. Guo, D., Peuquet, D., Gahegan, M., & MacEachren, A. 2003, Braking Down Dimensionality: An Effective Subspace Selection Method for High-Dimensional Clustering. *SIAM (Society of Industry and Applied Mathematics) workshop on High-Dimensional Clustering*.
14. Cai, G., Wang, H., & MacEachren, A. 2003, Communicating Vague Spatial Concepts in Human-GIS Interactions: A Collaborative Dialogue Approach. *COSIT 2003: Conference on Spatial Information Theory, Lecture Notes in Computer Science (LNCS) 2825*, Ittingen, Switzerland, 24-28 September, pp. 287-300
15. MacEachren, A., Dai, X., Hardisty, F., Guo, D., & Lengerich, G. 2003, Exploring High-D Spaces with Multiform Matrices and Small Multiples. *Proceedings of the International Symposium on Information Visualization*, Seattle, WA, pp. 31-38
16. MacEachren, A. M., Gahegan, M., & Pike, W. 2004, Visualization for Constructing and Sharing Concepts. *Proceedings of the National Academy of Science, invited paper for Sackler Colloquium on Mapping Knowledge Domains*, Irvine, CA, May 9-11, 2003, pp. 5279-5286.
17. Wang, H., MacEachren, A. M., & Cai, G. 2004, Design of Human-GIS Dialogue for Communication of Vague Spatial Concepts Based on Human Communication Framework. *Proceedings of GIScience 2004*, College Park, MD, Oct. 20-23, 2004. pp. 220-223.

18. Robinson, A. C., Chen, J., Meyer, H. G., & MacEachren, A. M. 2004, Human-Centered Design of Geovisualization Tools for Cancer Epidemiology. Proceedings of GIScience 2004, College Park, MD, Oct. 20-23, 2004.
19. Guo, D., Gahegan, M., & MacEachren, A. M. 2004, An Integrated Environment for High-dimensional Geographic Data Mining. Proceedings of GIScience 2004, College Park, MD, Oct. 20-23, 2004, pp. 107-110.
20. Cai, G., MacEachren, A. M., Bolelli, L. 2004, GCCM: Map-mediated collaboration among emergency operation centers and mobile teams. Proceedings of GIScience 2004, College Park, MD, Oct. 20-23, 2004, pp. 262-265.
21. Thomson, J., Hetzler, B., MacEachren, A., Gahegan, M., & Pavel, M. 2005, Typology for visualizing uncertainty. Conference on Visualization and Data Analysis 2005 (part of the IS&T/SPIE Symposium on Electronic Imaging 2005), San Jose, CA USA, 16-20 January 2005, pp. 146-157.
22. MacEachren, A. 2005. Moving geovisualization toward support for group work. in Dykes, J., MacEachren, A., and Kraak, Menno-Jan. Exploring Geovisualization, Amsterdam: Elsevier; pp. 445-461
23. Fuhrmann, S., Cox, A., & MacEachren, A. 2005, Gesture and Speech-Based Maps to Support Use of GIS for Crisis Management: First User Studies. *AutoCarto 2005*, Las Vegas, NV, March 18-23, 2005.
24. Robinson, A. C., Chen, J., Lengerich, E. J., Meyer, H. G., & MacEachren, A. M. 2005, Combining Usability Techniques to Design Geovisualization Tools for Epidemiology. *AutoCarto 2005*, Las Vegas, NV, March 18-23, 2005, pp. 18-23.
25. Cai, G., MacEachren, A. M., Brewer, I., Mike McNeese, Sharma, R., & Fuhrmann, S. 2005, Map-Mediated GeoCollaborative Crisis Management. IEEE 3rd Symposium on Intelligence and Security Informatics; Lecture Notes in Computer Science, Vol. 3495, Atlanta, GA, May 19-20, 2005, pp. 429-435.
26. MacEachren, A. M. 2005. Moving geovisualization toward support for group work. In J. Dykes & A. M. MacEachren & M.-J. Kraak (Eds.), Exploring Geovisualization (pp. 445-461): Elsevier.
27. Terrell, I., McNeese, M. D., Huang, H., Fuhrmann, S., & MacEachren, A. 2005, The Use of Mobile Devices by West Nile Virus Field Workers. Human Factors and Ergonomics Society's 49th Annual Meeting, Orlando, Orlando, Florida, September 26-30, 2005., CD-ROM
28. Bhowmick, T., Gruver, A., Robinson, A. C., MacEachren, A. M., & Lengerich, E. 2006, Using e-Delphi to Evaluate the Pennsylvania Cancer Atlas. *AutoCarto 2006*, Vancouver, WA, June 26-28, 2006 (CD).
29. Chen, J., MacEachren, A. M., & Guo, D. 2006, Visual Inquiry Toolkit – An Integrated Approach for Exploring and Interpreting Space-Time, Multivariate Patterns. *AutoCarto 2006*, Vancouver, WA, June 26-28, 2006 (CD).
30. Tomaszewski, B. M. & MacEachren, A. M. 2006, A Distributed Spatiotemporal Cognition Approach to Visualization in Support of Coordinated Group Activity. Proceedings of the 3rd International ISCRAM Conference, Newark, NJ, May 2006, pp. 347-351.
31. Foley, J., Card, S., Ebert, D., MacEachren, A.M. and Ribarsky, B., 2006. Visual Analytics Education. In: C. Stu (Editor), IEEE Symposium On Visual Analytics Science And Technology, Baltimore, MD, pp. 209-211.
32. Weaver, C., Fyfe, D., Robinson, A., Holdsworth, D., Peuquet, D., & MacEachren, A. M. 2006, Visual Analysis of Historic Hotel Visitation Patterns. IEEE Symposium on Visual Analytics Science and Technology 2006, Baltimore, MD, October 31 - November 2, 2006, pp. 35-42.
33. Chen, C., Zhu, W., Tomaszewski, B., & MacEachren, A. 2007, Tracing Conceptual and Geospatial Diffusion of Knowledge. HCI International 2007, Lecture Notes in Computer Science, Beijing, P.R. China, 22-27 July, 2007, pp. 265–274.
34. Pan, C.-C. et al., 2007. VAST 2007 Contest TexPlorer. In: A.R. Jaiswal (Editor), Visual Analytics Science and Technology, 2007. VAST 2007. IEEE Symposium on, pp. 243-244.
35. Pezanowski, S., Tomaszewski, B. and MacEachren, A.M., 2007. An Open GeoSpatial Standards-Enabled Google Earth Application to Support Crisis Management, Proceedings, The 3rd International Symposium on Geo-information for Disaster Management, Toronto, Canada, pp. 225-238.

36. Robinson, A.C., Koua, E., Hardisty, F., Chen, J. and MacEachren, A.M., 2007. The G-EX Portal: Web-Based Dissemination of Geovisual Analytic Results, International Cartographic Association Commission on Visualization & Virtual Environments Workshop: From Geovisualization Toward Geovisual Analytics, Technical University of Helsinki, Finland (web).
37. Tomaszewski, B.M., Pan, C.-C., Mitra, P. and MacEachren, A.M., 2007. Facilitating Situation Assessment through GIR with Multi-scale Open Source Web Documents, 4th Workshop on Geographic Information Retrieval, held at CIKM 2007, Lisbon, pp. 95-96.
38. Tomaszewski, B.M., Robinson, A.C., Weaver, C., Stryker, M. and MacEachren, A.M., 2007. GeoVisual Analytics and Crisis Management. In: B. Van de Walle, P. Burghardt and C. Nieuwenhuis (Editors), Proceedings of the 4th International ISCRAM Conference, Delft, the Netherlands, pp. 173-179.
39. Fuhrmann, S., MacEachren, A. M., & Cai, G. 2008, Geoinformation technologies to support collaborative emergency management. In H. Chen & L. Brandt & V. Gregg & R. Traunmüller & S. Dawes & E. Hovy & A. Macintosh & C. A. Larson (Eds.), Digital Government: Advanced Research and Case Studies: Springer, 395-420.
40. Fuhrmann, S., MacEachren, A. M., Gahegan, M., & Downs, R. 2008, Geospatial Online Learning Activities for Middle School Students. In A. J. Milson & M. Alibrandi (Eds.), Digital Geography: Geo-Spatial Technologies in the Social Studies Classroom. Charlotte, NC: Information Age Publishing, pp. 135-145.
41. Chen, J., MacEachren, A. and Lengerich, E., 2008. Visual Analytics of Spatial Scan Statistic Results, Workshop on Geospatial Visual Analytics at GIScience '08, Park City, Utah.
42. Stryker, M., Turton, I. and MacEachren, A.M., 2008. Health GeoJunction: Geovisualization of news and scientific publications to support situation awareness, Workshop on Geospatial Visual Analytics at GIScience '08, Park City, Utah.
43. Turton, I. and MacEachren, A.M., 2008. Visualizing Unstructured Text Documents using Trees and Maps, Workshop on Geospatial Visual Analytics at GIScience '08, Park City, Utah.
44. Wang, H., Cai, G. and MacEachren, A.M., 2008. GeoDialogue: A Software Agent Enabling Collaborative Dialogues between a User and a Conversational GIS, 20th IEEE Int'l Conference on Tools with Artificial Intelligence (ICTAI 2008), Dayton, Ohio, USA.
45. Roth, R.E., MacEachren, A.M. and McCabe, C. 2009: A workflow learning model to improve geovisual analytics utility. Proceedings of the International Cartographic Conference, Santiago, Chile.
46. Koua, E.L., MacEachren, A., Turton, I., Pezanowski, S., Tomaszewski, B. and Frazier, T. 2009: Conceptualizing a User-Support Task Structure for Geocollaborative Disaster Management Environments. In Walle, B.V.d., Hiltz, R. and Turoff, M., editors, Information Systems for Emergency Management, Armonk NY: M.E. Sharpe, 254-278.
47. Pike, W., MacEachren, A.M. and Yarnal, B. 2009: Infrastructure for collaboration. In Yarnal, B., Polsky, C. and O'Brien, J., editors, Sustainable Communities on a Sustainable Planet: The Human-Environment Regional Observatory Project, Cambridge: Cambridge University Press, 34-58.
48. Zhang, X., Mitra, P., Jaiswal, A., Xu, S., MacEachren, A.M. and Klippel, A. 2009: Extracting route directions from webpages. Twelfth International Workshop on the Web and Databases (WebDB 2009) Providence, Rhode, Island, USA.
49. Zhang, X., Mitra, P., Klippel, A. and MacEachren, A.2010: Automatic Extraction of Destinations, Origins and Route Parts in Human Generated Driving Directions. GIScience 2010 – LNCS 6292, Zurich, Switzerland, 270-294.
50. Roth, R.E., Ross, K.S., Finch, B.G., Luo, W. and MacEachren, A.M. 2010: A user-centered approach for designing and developing spatiotemporal crime analysis tools In Purves, R. and Weibel, R., editors, *Extended Abstracts Volume, GIScience 2010*, Zurich, Switzerland: GIScience.
51. Tomaszewski, B. and MacEachren, A.M. 2010: Geo-Historical Context Support for Information Foraging and Sensemaking: Conceptual Model, Implementation, and Assessment. *IEEE Conference on Visual Analytics Science and Technology (IEEE VAST 2010)*, Salt Lake City, Utah, USA, pp. 139-146.

52. MacEachren, A.M., Jaiswal, A., Robinson, A.C., Pezanowski, S., Savelyev, A., Mitra, P., Zhang, X. and Blanford, J. 2011: SensePlace2: GeoTwitter Analytics Support for Situational Awareness. In Miksch, S. and Ward, M., editors, *IEEE Conference on Visual Analytics Science and Technology*, Providence, RI: IEEE, pp. 181-190.
53. Luo, W., A. M. MacEachren, P. Yin, and F. Hardisty. 2011. Spatial-Social Network Visualization for Exploratory Data Analysis. Paper read at 3rd ACM SIGSPATIAL International Workshop on Location-Based Social Networks (LBSN 2011), November 1, 2011, at Chicago, Illinois, USA.
54. Zhang, X., P. Mitra, A. Klippel, and A. M. MacEachren. 2011. Identifying Destinations Automatically from Human Generated Route Directions. Paper read at ACM-SIGSPATIAL Poster Paper, November 1-4 2011, at Chicago, IL.
55. Zhang, X., Qiu, B., Xu, S., Mitra, P., Klippel, A. and MacEachren, A.M. 2012: Disambiguating Road Names in Text Route Descriptions using Exact-All-Hop Shortest Path Algorithm. *European Conference on Artificial Intelligence (ECAI)*, Montpellier, France : IOS Press, 876-881.
56. Robinson, A.C., Savelyev, A., Pezanowski, S. and MacEachren, A.M. 2013: Understanding the Utility of Geospatial Information in Social Media. In Comes, T., Fiedrich, F., Fortier, S., Geldermann, J. and Yang, L., editors, *Proceedings of the 10th International ISCRAM Conference*, Baden-Baden, Germany: ISCRAM, 918-922.
57. Karimzadeh, M., Huang, W., Banerjee, S., Wallgrün, J.O., Hardisty, F., Pezanowski, S., Mitra, P. and MacEachren, A.M. 2013: GeoTxt: A Web API to Leverage Place References in Text 7th ACM SIGSPATIAL Workshop on Geographic Information Retrieval, Orlando, FL: ACM.
58. Blanford, J. I., Bernhardt, J., Savelyev, A., Wong-Parodi, G., Carleton, A. M., Titley, D. W. 2014. *Tweeting and Tornadoes*. Paper presented at the Proceedings of the 11th International ISCRAM Conference, University Park, Pennsylvania, USA.
59. Wallgrün, J.O., Karimzadeh, M., MacEachren, A.M., Hardisty, F., Pezanowski, S. and Ju, Y. 2014: Construction and First Analysis of a Corpus for the Evaluation and Training of Microblog/Twitter Geoparsers. In Purves, R. and Jones, C., editors, *GIR'14: 8th ACM SIGSPATIAL Workshop on Geographic Information Retrieval*, Dallas, TX: ACM.
60. Kim, E.-K. and MacEachren, A.M. 2014: An index for characterizing spatial bursts of movements: A case study with geo-located twitter data. In Ahearn, S.C., Buchin, M., Dodge, S., Miller, J.A. and Weibel, R., editors, *Workshop on Analysis of Movement Data, in conjunction with GIScience 2014*, Vienna, Austria.
61. Roth, R.E. and MacEachren, A.M. 2014: Geovisual Analytics & the Science of Interaction: A Case Study. In Andrienko, G., Andrienko, N., Dykes, J., Kraak, M.-J., Robinson, A. and Schumann, H., editors, *Workshop on GeoVisual Analytics: Interactivity, Dynamics, and Scale, in conjunction with GIScience 2014*, Vienna, Austria.
62. Savelyev, A. and MacEachren, A.M. 2014: Interactive, Browser-based Information Foraging in Heterogeneous Space-Centric Networks. In Andrienko, G., Andrienko, N., Dykes, J., Kraak, M.-J., Robinson, A. and Schumann, H., editors, *Workshop on GeoVisual Analytics: Interactivity, Dynamics, and Scale, in conjunction with GIScience 2014*, Vienna, Austria.
63. MacEachren, A.M. 2015: Visual Analytics and Uncertainty: Its Not About the Data. In Bertini, E. and Roberts, J.C., editors, *EuroVis Workshop on Visual Analytics (2015)*, Cagliari, Italy. DOI: 10.2312/eurova.2015110
64. Xin, Y., Simpson, M., Xu, Y., Sun, F., Linder, F., Liu, X., Savelyev, A. and MacEachren, A.M. 2016: Movers: Exploring Refugee Movement with Social Media Data. *Understanding Spatial Data (Big and Small) with Visual Analytics - SpatialVA, a workshop at the GIScience 2016 Conference*, Montreal, Canada: ICA Commission on Visual Analytics.
65. MacEachren, A.M., in press. Leveraging Big (geo) Data with (geo)Visual Analytics: Place as the next frontier. 2017. In: C. Zhou, F. Su, F. Harvey and J. Xu (Editors), *Spatial Data Handling in Big Data Era: Select Papers from the 17th IGU Spatial Data Handling Symposium 2016*. Advances in Geographic Information Science. Springer Nature Singapore Pte Ltd.

66. Chuprikova, E., MacEachren, A.M., Cron, J. and Meng, L. 2018: Visual Analytics-enabled Bayesian Network Approach to Reasoning about Public Camera Data. In Lawonn, K., Smit, N., Linsen, L. and Kosara, R., editors, *Eurographics Proceedings: EuroRV3: EuroVis Workshop on Reproducibility, Verification, and Validation in Visualization (2018)*, Brno, Czech Republic: The Eurographics Association.
67. MacEachren, A.M., Caneba, R., Chen, H., Cole, H., Domanico, E., Triozzi, N., Xu, F. and Yang, L. 2018: Is This Statement About A Place? Comparing two perspectives: *Short Paper. GIScience 2018*, Melbourne, Australia.
68. Yang, L., MacEachren, A.M. and Mitra, P. 2020: "Geographical feature classification from text using (active) convolutional neural networks." *2020 19th IEEE International Conference on Machine Learning and Applications (ICMLA). IEEE, 2020*

### **Papers Submitted to Refereed Outlets**

1. Fan Lei, A. F., Alan M. MacEachren, Ross Maciejewski. submitted. GeoLinter: A Linting Framework for Choropleth Maps.

### **Book chapters & Essays (not refereed)**

1. MacEachren, A.M., (in collaboration with, Battenfield, B., Campbell, J., DiBiase, D. and Monmonier, M., 1992. Visualization. In: R. Abler, M. Marcus and J. Olson (Editors), *Geography's Inner Worlds: Pervasive Themes in Contemporary American Geography*. Rutgers University Press, New Brunswick, NJ, pp. 99-137. **(invited)**
2. DiBiase, D., Reeves, C., Krygier, J., MacEachren, A.M., von Weiss, M., Sloan, J. and Detweiler, M., 1994. Multivariate display of geographic data: Applications in earth system science. In: A.M. MacEachren and D.R.F. Taylor (Editors), *Visualization in Modern Cartography*. Modern Cartography. Pergamon, Oxford, UK, pp. 287-312.
3. MacEachren, A.M., 1994. Time as a Cartographic Variable. In: H. Hearnshaw and D. Unwin (Editors), *Visualization in GIS*. John Wiley & Sons, London, pp. 115-130. **(invited)**
4. MacEachren, A.M., 1994. Visualization in modern cartography: Setting the Agenda. In: A.M. MacEachren and D.R.F. Taylor (Editors), *Visualization in Modern Cartography*. Pergamon, Oxford, UK, pp. 1-12.
5. MacEachren, A.M., Bishop, I., Dykes, J., Dorling, D. and Gatrell, A., 1994. Introduction to advances in visualizing spatial data. In: H. Hearnshaw and D. Unwin (Editors), *Visualization in Geographical Information Systems*. John Wiley & Sons, London, pp. 51-59. **(invited)**
6. Brewer, C.A., MacEachren, A.M. and Pickle, L.W., 1995. Evaluation of map color schemes for the NCHS mortality atlas. In: L.W. Pickle and D.J. Herrmann (Editors), *Cognitive Aspects of Statistical Mapping*. Centers for Disease Control, National Center for Health Statistics, Washington, D. C., pp. 191-200. **(invited)**
7. Pike, W., MacEachren, A.M. and Yarnal, B. 2009: Infrastructure for collaboration. In Brent Yarnal, C.P., and James O'Brien, editor, *Sustainable Communities on a Sustainable Planet: The Human-Environment Regional Observatory Project*, Cambridge: Cambridge University Press, 34-58.
8. Xu, S., Jaiswal, A., Zhang, X., Klippel, A., Mitra, P. and MacEachren, A. 2010: From Data Collection to Analysis - Exploring Regional Linguistic Variation in Route Directions by Spatially-Stratified Web Sampling *Proceedings of the Workshop on Computational Models of Spatial Language Interpretation at Spatial Cognition 2010*, Mt. Hood/Portland, Oregon, USA, 49-52.
9. MacEachren, A. M. in press. Geo-birding: Filling in the data gaps. *Pennsylvania Birds*.

### **Papers in Proceedings of National and International Meetings**

1. MacEachren, A.M., 1982. Choropleth map accuracy: characteristics of the data, Technical Papers of ACSM, Denver, March 14-20, pp. 512-521.
2. MacEachren, A.M., 1982. Thematic map accuracy: The influence of enumeration size and compactness, Technical Papers, American Congress on Surveying and Mapping. ACSM, pp. 512-521.



3. MacEachren, A.M., 1989. Learning a city using an interactive map: A comparison of route, landmark, and region based learning, Proceedings of the 14th World Conference of the International Cartographic Association, Budapest, Hungary, pp. microfiche only.
4. DiBiase, D., Krygier, J., Reeves, C., MacEachren, A.M. and Brenner, A., 1991. Animated Cartographic Visualization in Earth System Science, Proceedings, 15th International Cartographic Conference. Proceedings. ICA, Bournemouth, England, 23 Sept. - 1 Oct., 1991, pp. 223-232.
5. MacEachren, A.M., 1991. Visualization quality and the representation of uncertainty. NCGIA Specialist Meeting: Initiative 7, Visualization of Data Quality, Orono, Maine: NCGIA.
6. DiBiase, D., Reeves, C., MacEachren, A.M., Krygier, J., von Wyss, M., Sloan, J. and Detweiller, M., 1993. A map interface for exploring multivariate paleoclimate data, Proceedings, Auto-Carto 11. ASPRS & ACSM, Minneapolis, MN, 30 Oct. - 1 Nov., pp. 43-52.
7. MacEachren, A.M., Howard, D., von Wyss, M., Askov, D. and Taormino, T., 1993. Visualizing the health of Chesapeake Bay: An uncertain endeavor, Proceedings, GIS/LIS '93. ACSM & ASPRS, Minneapolis, MN, 2-4 Nov., 1993, pp. 449-458.
8. Howard, D. and MacEachren, A.M., 1995. Constructing and evaluating an interactive interface for visualizing reliability, Proceedings of the 17th International Cartographic Conference. International Cartographic Association, Barcelona, Spain, September 3-9.
9. MacEachren, A.M., 1995. Approaches to truth in geographic visualization, Auto-Carto 12, Proceedings. American Congress on Surveying and Mapping, Charlotte, NC, February 28-March 2, pp. 110-118.
10. MacEachren, A.M., Brewer, C.A. and Pickle, L., 1995. Mapping health statistics: Representing data reliability, Proceedings of the 17th International Cartographic Conference. International Cartographic Association, Barcelona, Spain, September 3-9.
11. Brewer, C.A. and MacEachren, A.M., 1997. Evaluation of map color schemes for the NCHS mortality atlas, Proceedings, International Symposium on Computer Mapping in Epidemiology, Tampa, FL, February 12-15, 1995, pp. 14-20.
12. Edsall, R.M., Kraak, M.-J., MacEachren, A.M. and Peuquet, D.J., 1997. Assessing the effectiveness of temporal legends in environmental visualization, GIS/LIS '97. ASPRS/ACSM/AAG/URISA/AM-FM/APWA, Cincinnati, OCT. 28-30, pp. 677-685.
13. Haug, D., MacEachren, A.M., Boscoe, F., Brown, D., Marrara, M., Polsky, C. and Beedasy, J., 1997. Implementing exploratory spatial data analysis methods for multivariate health statistics, Proceedings of GIS/LIS '97. AAG, Cincinnati, OH, Oct. 28-30, 1997, pp. 205-212.
14. Kraak, M.-J., Edsall, R. and MacEachren, A.M., 1997. Cartographic animation and legends for temporal maps: Exploration and or interaction, 18th International Cartographic Conference. ICA, Stockholm, June 23-27, 1997, pp. 253-262.
15. MacEachren, A.M., Polsky, C., Haug, D., Brown, D., Boscoe, F., Beedasy, J., Pickle, L. and Marrara, M., 1997. Visualizing spatial relationships among health, environmental, and demographic statistics: interface design issues, Proceedings, 18th International Cartographic Conference. ICA, Stockholm, June 23-27, pp. 880-887.
16. Qian, L., Wachowicz, M., Peuquet, D. and MacEachren, A., 1997. Delineating operations for visualization and analysis of space-time data in GIS, GIS/LIS '97. ASPRS/ACSM/AAG/URISA/AM-FM/APWA, Cincinnati, OCT. 28-30, pp. 872-877.
17. Harrower, M. and MacEachren, A.M., 1998. Exploratory Data Analysis and map animation: Using temporal brushing and focusing to facilitate learning about global weather, paper presented at the International Cartographic Association Commission on Visualization Workshop, Warsaw, Poland, May 21-23, 1998; published on the Commission web site at: [www.geovista.psu.edu/VisEarth/papers.html](http://www.geovista.psu.edu/VisEarth/papers.html).
18. MacEachren, A.M. and Visualization, a.I.C.o., 1998. VISUALIZATION — Cartography for the 21st century, Proceedings of the 7th Annual Conference of Polish Spatial Information Association. Polish Spatial

Information Association, May 19-21, Warsaw, Poland, pp. 287-296 (also: [www.geog.psu.edu/ica/icavis/poland1.html](http://www.geog.psu.edu/ica/icavis/poland1.html)).

19. Harrower, M., Griffin, A. and MacEachren, A.M., 1999. Temporal focusing and temporal brushing: assessing their impact in Geographic Visualization, 19th International Cartographic Conference, Aug. 14-21, 1999, Ottawa, CD.
20. MacEachren, A.M., Kraak, M.-J. and Verbree, E., 1999. Cartographic issues in the design and application of geospatial virtual environments, 19th International Cartographic Conference, Aug. 14-21, 1999, Ottawa, pp. 108-116.
21. Fuhrmann, S. and MacEachren, A.M., 2001. Navigation in desktop geovirtual environments: Usability assessment, 20th International Cartographic Conference. ICA, Beijing, China, August 6-10, 2001, pp. 2444-2453.
22. Hardisty, F., MacEachren, A.M., Gahegan, M., Takatsuka, M. and Wheeler, M., 2001. Cartographic Animation in Three Dimensions: Experimenting with the Scene Graph, 20th International Cartographic Conference. ICA, Beijing, China, August 6-10, 2001, pp. 2810-2817.
23. Haug, D., MacEachren, A.M. and Hardisty, F., 2001. The challenge of analyzing geovisualization tool use: Taking a visual approach, 20th International Cartographic Conference. ICA, Beijing, China, August 6-10, 2001, pp. 3119-3128.
24. MacEachren, A.M., Brewer, I. and Steiner, E., 2001. Geovisualization to mediate collaborative work: tools to support different-place knowledge construction and decision-making, 20th International Cartographic Conference. ICA, Beijing, China, August 6-10, 2001, pp. 2533-2539.
25. Steiner, E., MacEachren, A. M., & Guo, D. 2001, Developing and assessing light-weight data-driven exploratory geovisualization tools for the web. *Workshop on Geovisualization for the Web*, Taupo, New Zealand, April 30 - May 3, 2001.
26. Fuhrmann, S., Brewer, I., & MacEachren, A. M. 2003, Collaborative emergency management with multimodal GIS. *ESRI User Conference*.
27. MacEachren, A. M., Brewer, I., Cai, G., & Chen, J. 2003, Visually-Enabled Geocollaboration to Support Data Exploration and Decision-Making. *International Cartographic Conference*, Durban, South Africa. pp. 394-400
28. MacEachren, A. M. & Cai, G. 2003, Geocollaboration for decision-making: Visual mediation to enable human-system and human-human dialogue. *International Advanced Workshop on Virtual Geographic Environments and Geocollaboration*, The Chinese University of Hong Kong, December 15-16, 2003.
29. Dai, X., Guo, D., MacEachren, A., Zhou, B., Chen, J., & Macgill, J. 2004, Web-Based Collaborative Tools for Geospatial Data Exploration. *Proceedings of the 5th National Conference for Digital Government Research*, Seattle, WA, May 23-26, 2004.
30. Fuhrmann, S., Crawford, S., MacEachren, A. and Bhowmick, T. 2004, Publishing geographic and statistical online learning activities for middle school children. *Proceedings of the 5th National Conference for Digital Government Research*, Seattle, WA, May 23-26, 2004.
31. MacEachren, A. M., Cai, G., Fuhrmann, S., McNeese, M., & Sharma, R. 2004, GeoCollaborative Crisis Management (GCCM): Building better systems through advanced technology and deep understanding of technology-enabled group work. *Project Highlights Abstract, Proceedings, 5th Annual NSF Digital Government Conference*, Seattle, WA, May 23-26, 2004.
32. MacEachren, A. M., Carr, D., and Scott, D. 2004, Collaborative Research: Quality graphics for federal statistical summaries – results. Project Highlights, 5th Annual NSF Digital Government Conference, Los Angeles, CA, May 23-26, 2004.
33. Cai, G., MacEachren, A. M., Sharma, R., Brewer, I., Fuhrmann, S., & McNeese, M. 2005, Enabling GeoCollaborative crisis management through advanced information technologies. *Demonstration Description, Proceedings, 6th Annual NSF Digital Government Conference*, Atlanta, GA, May 15-18, 2004, pp. 227-228.

34. MacEachren, A. M., Carr, D., & Scott, D. 2005, Project Highlight: Quality Graphics for Statistical Summaries. *6th Annual National Conference on Digital Government Research: Emerging Trends*, Atlanta, GA, May 15-18, 2005, pp. 175-176.
35. MacEachren, A. M., Fuhrmann, S., McNeese, M., Cai, G., & Sharma, R. 2005, Project Highlight: GeoCollaborative Crisis Management. *6th Annual National Conference on Digital Government Research: Emerging Trends*, Atlanta, GA, May 15-18, 2005, pp. 114-115.
36. Weaver, C., Peuquet, D., & MacEachren, A. M. 2005, STNexus: An Integrated Database and Visualization Environment for Space-Time Information Exploitation. *ARDA Fall PI Meeting*, Orlando, FL, Nov. 29 - Dec. 2.
37. Tomaszewski, B. M., MacEachren, A. M., Pezanowski, S., Liu, X., & Turton, I. 2006, Supporting Humanitarian Relief Logistics Operations through Online Geocollaborative Knowledge Management. *Proceedings of The National Conference on Digital Government Research, dg.o2006, demo description*, San Diego, CA, USA, May 21-24, 2006, pp. 358-359.
38. MacEachren, A. M., Cai, G., McNeese, M., Sharma, R., & Fuhrmann, S. 2006, GeoCollaborative Crisis Management: Designing Technologies to Meet Real-World Needs. *7th Annual National Conference on Digital Government Research: Integrating Information Technology and Social Science Research for Effective Government*, San Diego, CA, May 21-24, 2006, pp. 71-72.
39. Simpson, B., Giles, L. and MacEachren, A., 2007. GeoDiscoverer: A Search Engine to Integrate Social Networks With Geospatial Information. *Raytheon Technology Today* (4): 12-13.
40. Roth, R.E., Finch, B.G., Blanford, J.I., Klippel, A., Robinson, A.C. and MacEachren, A.M. in press: The card sorting method for map symbol design. *AutoCarto 2010*, Orlando, FL: ASPRS.
41. Xu, S., Klippel, A., MacEachren, A.M., Mitra, P., Turton, I., Zhang, X. and Jaiswal, A. 2010: Exploring regional variation in spatial language - a case study on spatial orientation with spatiallystratified web-sampled documents. In Rapp, D.N., editor, *Spatial Cognition 2010. Poster Presentations (SFB/TR 8 Report No. 024-07/2010)*: Bremen / Freiburg, 91-94.
42. Xu, S., Jaiswal, A., Zhang, X., Klippel, A., Mitra, P. and MacEachren, A. 2010: From Data Collection to Analysis - Exploring Regional Linguistic Variation in Route Directions by Spatially-Stratified Web Sampling *Proceedings of the Workshop on Computational Models of Spatial Language Interpretation at Spatial Cognition 2010*, Mt. Hood/Portland, Oregon, USA, 49-52.
43. MacEachren, A.M., Robinson, A.C., Jaiswal, A., Pezanowski, S., Savelyev, A., Blanford, J. and Mitra, P. 2011: Geo-Twitter Analytics: Applications in Crisis Management. *25th International Cartographic Conference*, Paris, France.
44. Stevens, J.E., Robinson, A.C. and MacEachren, A.M. 2013: Designing Map Symbols for Mobile Devices: Challenges, Best Practices, and the Utilization of Skeuomorphism. *Proceedings of the International Cartographic Conference*, Dresden, Germany.
45. Kim, E.-K. and MacEachren, A.M. 2013: Quantifying Magnitude of Change for Animated Maps (Poster Abstract). *Proceedings of the International Cartographic Conference*, Dresden, Germany.
46. Robinson, A., Pezanowski, S., Stevens, J., Mullins, R., Blanford, J., Bianchetti, R. and MacEachren, A.M. 2013: Sharing and Discovering Map Symbols with SymbolStore.org. *Proceedings of the International Cartographic Conference*, Dresden, Germany.
47. Kim, E.-K. and MacEachren, A.M. 2014: Movement Regularity Analysis using Geo-Located Twitter Data (Extended Abstract for Poster). *GIScience 2014*, Vienna, Austria.
48. MacEachren, A.M. 2014: Place Reference in Text as a Radial Category: A Challenge to Spatial Search, Retrieval, and Geographical. *2014 Specialist Meeting — Spatial Search*, Santa Barbara, CA: UCSB Center for Spatial Studies.
49. MacEachren, A.M. 2015: Distributed Cognition: A Conceptual Framework for Understanding Map-based Reasoning. *International Cartographic Conference*, Rio de Janeiro, Brazil: ICA.

## **Commentaries/Reviews/Bibliographies/Published Reports**

1. Review of *The Mapmakers*, *The American Cartographer*, Vol. 9, No. 2, 1982, pp. 188-190.
2. Review of *Thematic Maps: Their Design and Production*, *The Amer. Carto.*, 11(2), 1984, pp. 173-175.
3. Report on the Cartography Specialty Group of the Association of American Geographers, **invited** contribution to the *U.S. National Report to ICA, 1984*, special issue of *The American Cartographer*. Supplement to Vol. 11, 1984, p. 71.
4. Review of *Introductory Cartography*, *The Professional Geographer*, Vol. 37, 1985, p. 109.
5. Part II, section 5, *Cartography*, **invited** contribution to *A Geographical Bibliography for American College Libraries*, Association of American Geographers and the National Geographic Society, 1985, pp. 34-45.
6. Review of *Technological Transition in Cartography*, *The American Cartographer*, 13, 3, 1986, pp. 276-277.
7. Review of *The State of the Nation: An Atlas of Britain in the Eighties*, *Cartographica*, 1987, 24(3): pp. 113-115.
8. Review of *Principles of Geographical Information Systems for Land Resource Assessment*, *The Professional Geographer*, 1988, 40(2):249-250.
9. Review of *Art and Cartography: Six Historical Essays*, *Geographical Review*, 1988, 78(4): 451-453.
10. Review of *Cartographical Innovations: An International Handbook of Mapping Terms to 1900*, *American Cartographer*, 1989, 16(1):51-52.
11. SYSTAT - An IBM Based Statistical Analysis Package (software review) *Cartographic Perspectives* (Winter, 1989/90) (Mark Leitzell and Alan M. MacEachren)
12. Commentary on: How map designers can represent their ideas in thematic maps, by Takuya Y., Yutaka K., and Tateyuki T. *The Visual Computer*, 1:174-184. *Cartographic Perspectives*, 1989, 1, 1, 15-16.
13. Commentary on: Chemical Cartography: finding the keys to the kinetic labyrinth, by G.W. Flynn *Science*, 246 (24 Nov.) 1009-1015. *Cartographic Perspectives*, 1990, 1, 4, 19.
14. Review of *A Skills Atlas of Western Sydney*, *Cartographica*, 1991, 28(2): 117-118.
15. *The Cartography and Spatial Representation Traditions at Penn State*, **invited** essay for the U.S. National Report to the International Cartographic Association, *Cartography & GIS*, 1991, 18(3): 192-197
16. Review of *Landscape Ecology and GIS*, *Cartographica*, 1995.
17. ICA: An opportunity for U. S. cartographers, (1st author with Jon Kimerling), *ACSM Bulletin*, No. 163, September/October, 1996.
18. Note 44. Research agenda for visualization, in Brewer, Guest Editor, 1999 U.S. National Report to the International Cartographic Association, *Cartography and Geographic Information Science*, 26(3): 217
19. Hirtle, S. and MacEachren, A.M., 2000. Cognitive models of dynamic geographic phenomena and their representations, NCGIA, Santa Barbara.
20. MacEachren, A.M., Gahegan, M., Takatsuka, M. and Haug, D., 2000. New Vistas in Geo-Representation and Understanding. *Geoinformatics*, 3: 32-34.
21. MacEachren, A.M. and Pezanowski, S. 2009: Geovisualization: Leveraging the Opportunities of Geographic Information. *Adobe Developer Connection Education Developer Center: Articles from educators*: Adobe.
22. Yang, L., MacEachren, A.M. and Mitra, P. 2020: Geographical feature classification using convolutional neural networks (CNNs) and active CNNs. *aXriv*.

## **Newsletters**

Editor of *CGS Newsletter* (newsletter of the Cartography Specialty Group, Association of American Geographers), 4(2), 1984, 9 p.; 4(3), 1984, 7 p.; 5(1), 1985, 11

### **Ph.D. dissertation**

Alan M. MacEachren, *Communication Effectiveness of Choropleth and Isopleth Maps: The Influence of Visual Complexity*, PhD dissertation, University of Kansas

### **M.A. Thesis**

Alan M. MacEachren, *Cognitive Distance in the Urban Environment*, MS thesis, University of Kansas

### **PRESENTATIONS (NOT LISTED UNDER PROCEEDINGS CATEGORIES ABOVE)**

- MacEachren, A.M. and Marotz, G., 1975. Process Studies in Urban Climatology, Kansas Academy of Science, Manhattan, KS.
- MacEachren, A.M., 1977. Intra-Urban Distance Cognition, Annual Meeting of the Association of American Geographers, Salt Lake City, UT.
- MacEachren, A.M., 1977. Intra-Urban Distance Cognition, American Congress on Surveying and Mapping, Fall Technical Meeting, Little Rock, AR.
- MacEachren, A.M., 1979. Relative Communication Effectiveness of Choropleth and Isopleth Maps, Annual Meeting of the Association of American Geographers, Phila., PA.
- MacEachren, A.M., 1980. The Development of National Surveys, **invited** lecture for the VPI&SU Student Chapter of the American Congress on Surveying and Mapping.
- MacEachren, A.M., 1981. Enumeration Unit Compactness and Choropleth Map Accuracy, Annual Meeting of the Association of American Geographers, Los Angeles, CA.
- MacEachren, A.M., 1982. Computer-Assisted Cartography: An Integration of Teaching and Research, **invited** paper at the Seminar in Computer Graphics and Remote Sensing, Department of Geography, UNC - Greensboro.
- MacEachren, A.M., 1982. Enumeration Unit Characteristics and Thematic Map Accuracy, Annual Meeting of the Association of American Geographers, San Antonio, TX.
- MacEachren, A.M., 1983. Selection and Organization of Data: Neglected Topics in Cartographic Education, Annual Meeting of the American Congress on Surveying and Mapping, Washington, D.C.
- MacEachren, A.M. and Johnson, G.B., 1983. The Strip Map: A Unique Form of Symbolization, Annual Meeting of the Association of American Geographers, Denver, CO.
- MacEachren, A.M., 1984. Digital Database Development Across the United States, **invited** paper Presented at the Annual Meeting of the North American Cartographic Information Society, Pittsburgh, PA.
- MacEachren, A.M. and Davidson, J.V., 1984. Isometric Maps From Digital Data: Grid Resolution Considerations, Annual Meeting of the Association of American Geographers, Washington, D.C.
- MacEachren, A.M., 1985. Evolving Technologies for Digital Mapping: Implications for Cartographic Theory and Practice, **invited** paper presented at the ACSM/ASP Workshop on Digital Mapping, Denver, CO.
- MacEachren, A.M., 1985. Map Use Instruction: Measurement of Geographic Features and Associations, Annual Meeting of the Association of American Geographers, Detroit, MI.
- MacEachren, A.M., 1986. Maps of Region Attributes: Impact on Spatial Components of Regional Images, Annual Meeting of the Association of American Geographers, Minneapolis, MN.
- MacEachren, A.M., 1986. Strip Format Maps, Annual Meeting of the North American Cartographic information Society, Philadelphia, PA.
- MacEachren, A.M., 1987. Locational and Attribute Components of Regional Images, Annual Meeting of the Association of American Geographers, Portland, OR.
- MacEachren, A.M., 1988. Theory and Method for Studying Spatial Knowledge Acquisition, Annual Meeting of the Association of American Geographers, Phoenix, AZ.
- MacEachren, A.M., 1989. Animated Maps of Aggregated Data: Conceptual and Practical Problems, Annual Meeting of the North American Cartographic Information Society, Ann Arbor, Michigan.
- MacEachren, A.M., 1990. Efficiency and Effectiveness of Map Learning Strategies Using Segmentation, Annual Meeting of the Association of American Geographers, Toronto, Canada.

- MacEachren, A.M., 1990. Strip Maps, **invited** paper presented of the Annual Meeting of the Special Libraries Association, Pittsburgh, Pennsylvania.
- MacEachren, A.M., DiBiase, D., Krygier, J., Reeves, C. and Brenner, A., 1991. An Elementary Approach to Cartographic Visualization, video presentation at the Annual Meeting of the Association of American Geographers, Miami, FL.
- MacEachren, A.M., 1992. Animating Static Maps, Association for Geographic Information Workshop on Visualization in GIS, Loughborough, England.
- MacEachren, A.M., 1992. Visualization of Data Uncertainty, Annual Meeting of the Association of American Geographers, San Diego, CA.
- MacEachren, A.M., 1992. Visualization Quality and the Representation of Uncertain Information, Eighth Annual EPA Conference on Statistics, Philadelphia, PA.
- MacEachren, A.M., 1993. Map Animation: The Dynamic Variables Extended, 13th Annual Meeting of the North American Cartographic Information Society.
- MacEachren, A.M., 1993. Mental Categories and Knowledge Schema in Map Comprehension, Annual Meeting of the Association of American Geographers, Atlanta, GA.
- MacEachren, A.M., 1993. A Semiotic Approach to Space-Time Representation, International Cartographic Association Working Group Meeting on Time in GIS, Delft, The Netherlands.
- MacEachren, A.M. and Howard, D., 1993. Visualizing the Health of Chesapeake Bay: Constructing and Interactive Interface, 13th Annual Meeting of the North American Cartographic Information Society.
- MacEachren, A.M., 1994. Truth in Geographic Visualization, **invited** presentation at the Department of Geography, University of Hawaii.
- MacEachren, A.M., 1994. Truth in Geographic Visualization: Tools for Representing Uncertainty, Department of Geography, University of Minnesota.
- MacEachren, A.M. and Brewer, C., 1994. Geographic Visualization: Understanding Map Reliability and Making Reliable Maps, **invited** presentation at the Department of Health & Human Services, National Center for Health Statistics, Hyattsville, MD.
- MacEachren, A.M. and Cupp, J., 1994. Chorodot Symbolization: A Comparison with Traditional Maps, 14th Annual Meeting of the North American Cartographic Information Society, Ottawa, Canada.
- MacEachren, A.M. and Kraak, M.-J., 1994. Visualization of spatial data's temporal component, 6th International Symposium on Spatial Data Handling, Edinborough, Scotland.
- MacEachren, A.M., 1995. Geo-Referenced Data: Grappling With Multiple Variables And Variable Reliability, **invited** presentation, Population Research Institute.
- MacEachren, A.M., 1995. How Visualization and Multimedia are Extending Conceptions of Map Use, Annual Meeting of the Association of American Geographers.
- MacEachren, A.M., 1995. Mapping Health Statistics: Representing Data Reliability, **invited** presentation at the Department of Health & Human Services, National Center for Health Statistics, Hyattsville, MD.
- MacEachren, A.M., 1995. Scientific Visualization: Should we believe what we see?, **invited** presentation at the Department of Geography, Syracuse University.
- MacEachren, A.M., Brewer, C. and Pickle, L., 1995. Representing Uncertainty on Statistical Maps, **invited** presentation at the Joint Statistical Meeting, American Statistical Association.
- MacEachren, A.M., 1996. Cartography for the 21st Century, **invited** presentation in Presidential Plenary Session, , Annual Meeting of the Association of American Geographers, Charlotte, NC.
- MacEachren, A.M., 1996. Reliability and Truth in Scientific Visualization, **invited** presentation at the Department of Geography, University of California, Santa Barbara.
- MacEachren, A.M., Brewer, C. and Pickle, L., 1996. Assessing methods for depicting data reliability on mortality maps, Annual Meeting of the Association of American Geographers, Charlotte, NC.
- MacEachren, A.M., 1997. Exploratory Georeferenced Visualization: concepts, applications, reliability & truth, **invited** presentation at the Institute for Visualization and perception Research, Lowell.
- Edsall, R., MacEachren, A.M. and Kraak, M.-J., 1998. The use of temporal legends by users of interactive visualization systems, Annual Meeting of the Association of American Geographers.

- MacEachren, A.M., 1998. Constructing knowledge through geographic visualization: Developing methods and considering validity, **invited** presentations at the Department of Geography, University of Oregon and the Department of Geosciences, Oregon State University.
- MacEachren, A.M., 1998. Designing and testing an environment for visualization of spatio-temporal health statistics, **invited** presentation, Department of Geoinformatics, University of Munster.
- MacEachren, A.M., 1998. Geographic Representation and Visualization, **invited** presentation, U.S. Geological Survey, National Mapping Division Research Retreat, Denver, CO.
- MacEachren, A.M., 1998. Geographic Representations: Reliability and truth in geographic visualization, **invited** presentation in the Bertrand Library Knowledge & Information series, Bucknell University.
- MacEachren, A.M., 1998. Integrating geographic visualization with knowledge discovery in database methods: a case study, **invited** presentation, Department of Cartography & Visualization, Division of Geoinformatics, ITC, Enschede, The Netherlands.
- MacEachren, A.M., 1998. Interactive visualization for exploring spatio-temporal health data: developing and assessing methods, **invited** presentation at the Population Research Institute, Penn State.
- MacEachren, A.M., Boscoe, F. and Haug, D., 1998. Spatiotemporal analysis of health data: Designing an Interactive GeoVisualization environment, Annual Meeting of the Association of American Geographers.
- MacEachren, A.M. and Harrower, M., 1998. Linear and cyclic temporal legends: assessing the impact of legend design in geographic visualization, ICA Commission on Visualization Workshop, Warsaw, Poland.
- MacEachren, A.M., Haug, D. and Bosco, F., 1998. Designing dynamic mapping tools for exploring health statistics, 1st International Health Geographic Conference, Baltimore Maryland.
- Wachowicz, M. and MacEachren, A.M., 1998. Spatiotemporal data visualization support for knowledge construction, Annual Meeting of the Association of American Geographers.
- MacEachren, A.M., 1999. Exploring geo-data spaces: The search for meaning, **invited** keynote address, GeoComputation '99, Mary Washington College, Fredericksburg, VA.
- MacEachren, A.M., 1999. Virtual and collaborative environments for visualizing environmental data, **invited** presentation at the Workshop on Visualization for Community Development, Rutgers University.
- MacEachren, A.M., 1999. Virtual Environments for Exploring Geospatial Information, **invited** presentation, University of Iowa.
- MacEachren, A.M., 1999. Visualization: Contemporary challenges and future prospects, **invited** panelist, Annual Meeting of the Association of American Geographers, Honolulu, HI.
- MacEachren, A.M., Edsall, R., Haug, D., Baxter, R., Otto, G., Masters, R., Fuhrmann, S. and Qian, L., 1999. Exploring the Potential of Virtual Environments for Geographic Visualization, Annual Meeting of the Association of American Geographers, Honolulu, HI.
- MacEachren, A.M., Gundrum, J., Brewer, I., Abdo, H., Otto, G., Griffin, A. and Takatsuka, M., 1999. Collaborative GeoVirtual environments to facilitate environmental management: Prototype Internet 2 applications, **invited** presentation at WebGIS '99, Penn State University.
- Brewer, I., Gundrum, J., Abdo, H., Griffin, A., MacEachren, A.M., Otto, G. and Takatsuka, M., 2000. Building a Multiuser Collaborative Geographic Visualization Environment, Annual Meeting of the Association of American Geographers, Pittsburgh, PA.
- MacEachren, A.M., 2000. Cartographic Visualization and Virtual Environments: Potential and Challenges, **invited** presentation to the Melbourne Mapping Sciences Association, Royal Melbourne Institute of Technology.
- MacEachren, A.M., 2000. Geocollaboration: Visual support for human-map and map-mediated human-human dialogue, **invited** presentation, Leeds, Department of Computer Science, Leeds.
- MacEachren, A.M., 2000. Geovisualization (and geocollaboration) to support science, policy, education, and information access, **invited** presentation, NSF Digital Government Program, Geospatial Sciences Workshop, National Science Foundation.
- MacEachren, A.M., 2000. GeoVisualization for environmental data analysis, learning, and decision making, **invited** presentation at the Queensland Institute of Technology.
- MacEachren, A.M., 2000. Map facilitated knowledge building: Seeing, understanding, and collaborating, **invited** presentation at AFCEA/DISA/NIMA Mapping Tools in the DII COE, McLean, VA.

- MacEachren, A.M., 2000. Representations to Mediate Geospatial Collaborative Reasoning: A Cognitive-Semiotic Perspective. In: M. Anderson, P. Chang and V. Haarslev (Editors), **invited** keynote address, First International Conference, Diagrams 2000. Springer, Edinburgh, Scotland, pp. 1.
- MacEachren, A.M. and Brewer, I., 2000. Collaborative Geographic Visualization: Enabling shared understanding of environmental processes, Annual Meeting of the Association of American Geographers, Pittsburgh, PA.
- MacEachren, A.M., 2001. Color schemes and color selection/ classification tools in GeoVISTA Studio, **invited** presentation, AT&T Shannon Research Laboratory.
- MacEachren, A.M., 2001. Geocollaboration: Rethinking design of visual information access and analysis tools to support group work, **invited** presentation, AT&T Shannon Research Laboratory.
- MacEachren, A.M., 2001. Geovisualization: Developing exploratory environments and understanding their use, **invited** presentation, AT&T Shannon Research Laboratory.
- MacEachren, A.M., 2001. Geovisualization to support exploration, analysis, and synthesis: Cognitive-semiotic foundations, **invited** presentation, Battelle-Pacific Northwest National Laboratory.
- MacEachren, A.M., 2001. Human-Centered GIScience: Research activities at Penn State, **invited** presentation, RMIT, Melbourne, Australia.
- MacEachren, A.M., 2001. New Directions in Geovisualization: Designing natural geoinformation access and analysis tools to support group work, **invited** keynote presentation, GeoCart'2001: Visualising New Zealand in the New Data Environment, Wairakei Resort.
- MacEachren, A.M., 2001. Spatiotemporal Information Representation and Collaborative Work, **invited** presentation, Battelle-Pacific Northwest National Laboratory.
- MacEachren, A.M., Edsall, R. and Hardisty, F., 2001. Geospatial information analysis & dissemination: Building dynamic geo-graphics and understanding their use, Digital Government Quality Graphics team meeting, Bureau of Labor Statistics.
- Steiner, Erik, Alan M. MacEachren, and Diansheng Guo. Developing and Assessing Light-Weight Data-Driven Exploratory Geovisualization Tools for the Web. Paper presented at the Workshop on Geovisualization for the Web, Taupo, New Zealand, April 30 - May 3, 2001 2001.
- MacEachren, Alan M. New Directions in Geovisualization: Designing Natural Geoinformation Access and Analysis Tools to Support Group Work. **invited** keynote presented at the GeoCart'2001, Taupo, New Zealand, 30 April - 2 May 2001.
- MacEachren, Alan M. ICA Commission on Visualization & Virtual Environments Geovisualization Research Agenda. **invited** paper presented at the UCGIS Summer Assembly, Buffalo, New York, June 20-24 2001 2001.
- MacEachren, Alan M. Geovisualization: Delineating a Research Agenda ... and Addressing the Challenges. **invited** paper presented at the Geovisualization: euroconference on methods to define geovisualization contents for users needs (EURESCO Conference), Albufeira (Algarve) Portugal, March 09-14, 2002 2002.
- MacEachren, A. M., Cai, G., Sharma, R., Fuhrmann, S., Rauschert, I., Boelli, L., & Jung, N. 2002, Approaching a New Multimodal GIS-Interface. **invited** presentation *NIMA On the Horizon Series*, USGS, Reston, Jan. 8, 2003.
- MacEachren, A. M. 2002, Geovisualization: Developing Exploratory Environments and Understanding Their Use. (**invited** presentation) *Department of Geography, Ohio State*, Jan. 17, 2002.
- MacEachren, A. M. 2002, Geovisualization: Delineating a Research Agenda ... and addressing the challenges. (**invited** keynote) *Geovisualization: euroconference on methods to define geovisualization contents for users needs (EURESCO Conference)*, Albufeira (Algarve) Portugal, March 09-14, 2002.
- MacEachren, A. M., Cai, G., Sharma, R., Fuhrmann, S., Rauschert, I., & Boelli, L. 2002, GeoVISTA Center: Accessing geoinformation and designing interfaces to geoinformation technologies. *Keystone Alliance Homeland Security Research Alliance Summit (a collaboration among Penn State University, University of Pittsburgh, University of Pennsylvania, and Carnegie Mellon University)*, Penn State University Park, April 28, 2003.
- MacEachren, A. M. 2002, GeoVISTA Center activities relevant to WEISGEI. **invited** presentation at *Working Meeting on Integrated Global Emissions Network*, NSF Access Center, Arlington, VA, July 15, 2002.
- MacEachren, A. M. 2002, Defining a Research Agenda for Geovisualization. (**invited** presentation) *Joint Statistical Meetings*, New York, NY, August 15, 2002.



- Griffin, A. L. & MacEachren, A. M. 2002, An empirical investigation of expert use of interactive visual computing tools in a geographic simulation model. *GIScience 2002*, Boulder, CO, September 25-28, 2002.
- MacEachren, A. M. & Gahegan, M. 2002, (**invited** presentation) Multi-user tools to explore the development of categories among field scientists and image analysts. *NIMA/NURI '02 Symposium*, Reston Virginia, July 16-17, 2002.
- MacEachren, A. M. 2002, Visual methods and tools to support analysis and dissemination of federal geospatial statistics. **invited** presentation at the *Human-Computer Interaction Laboratory, University of Maryland*, College Park, Maryland, July 18, 2002.
- MacEachren, A. M. & Gahegan, M. 2002, Component-based development of geospatial visualization and analysis applications with GeoVISTA Studio. (**invited** presentation) *Spatial Statistics: Integrating Statistics, GIS, and Statistical Graphics*, Seattle, Washington, October 17-19, 2002.
- MacEachren, A. M. 2003, Geovisualization and Spatial Analysis of Cancer Data. **invited** presentation. *UCGIS Winter Meeting*, Washington, D.C., Feb. 12, 2003.
- MacEachren, A. M., Pike, B., Yu, C., Ahlqvist, O., & Brewer, I. 2003, HERO Geocollaboratory. *Annual Meeting of the Association of American Geographers*, New Orleans, March 5 -8, 2003.
- MacEachren, A. M. 2003, GIScience & technology: Enabling productive work in environmental science, policy, and management. **invited** panel presentation at *Digital Government 2003*, Boston, May 19-21, 2003.
- Lengerich, E. J., MacEachren, A. M., Hopley, J., Macgill, J., Parrott, R., & McGarrity, T. J. 2004, A Model GIS/Atlas for Com-prehensive Cancer Control. *Association of American Geographers Annual Meeting*, Denver, CO.
- MacEachren, A. M. 2004, Visually-enabled Geocollaboration: Collaborative visualization and visually mediated group work. **invited** presentation *EuroConference on Methods to Support Interaction in Geovisualization Environments*, Kolydari, Greece, 13-17 March, 2004.
- Cai, G., Bolelli, L., MacEachren, A. M., Sharma, R., Fuhrmann, S., & McNeese, M. 2004, GeoCollaborative Crisis Management: Using Maps to Mediate EOC-Mobile Team Collaboration. Demo: *5th Annual NSF Digital Government Conference*, Los Angeles, CA, May 23-26, 2004.
- MacEachren, A. M., Carr, D., & Scott, D. 2004, Collaborative Research: Quality graphics for federal statistical summaries – results. Project Highlights, *5th Annual NSF Digital Government Conference*, Los Angeles, CA, May 23-26, 2004.
- MacEachren, A. M., Cai, G., Fuhrmann, S., McNeese, M., & Sharma, R. 2004, GeoCollaborative Crisis Management (GCCM): Building better systems through advanced technology and deep understanding of technology-enabled group work. Project Highlights, *5th Annual NSF Digital Government Conference*, Los Angeles, CA, May 23-26, 2004.
- Cai, G., MacEachren, A. M., Sharma, R., Brewer, I., Fuhrmann, S., & McNeese, M. 2005, Enabling GeoCollaborative crisis management through advanced information technologies. Demonstration Description, Proceedings, *6th Annual NSF Digital Government Conference*, Atlanta, GA, May 15-18, 2004.
- Chen, J., Guo, D., & MacEachren, A. 2005, Space-Time-Attribute Analysis and Visualization of U.S. Company Data. *Symposium on Information Visualization*, Compendium Volume, Minneapolis, MN, Oct. 23-25.
- Lengerich, E. J., Wu, J., MacEachren, A., Hopley, J., Parrott, R., McGarrity, T., & Kluhsman, B. 2005, Relative Incidence of Cancer within the Colon in a Population with a Historically High Incidence Rate. *29th Annual Meeting, American Society of Preventive Oncology*, San Francisco, March 13–15, 2005.
- MacEachren, A. M., Fuhrmann, S., McNeese, M., Cai, G., & Sharma, R. 2005, Project Highlight: GeoCollaborative Crisis Management. *6th Annual National Conference on Digital Government Research: Emerging Trends*, Atlanta, GA, May 15-18, 2005.
- MacEachren, A. M., Carr, D., & Scott, D. 2005, Project Highlight: Quality Graphics for Statistical Summaries. *6th Annual National Conference on Digital Government Research: Emerging Trends*, Atlanta, GA, May 15-18, 2005.
- Peuquet, D. J. & MacEachren, A. M. 2005, STNexus: An Integrated Database and Visualization Environment for Space-Time Information Exploitation. *ARDA PIs Meeting*, Orlando, FL, November 29, 2005 - December 2, 2005.

- Weaver, C., Peuquet, D., & MacEachren, A. M. 2005, STNexus: An Integrated Database and Visualization Environment for Space-Time Information Exploitation. *ARDA Fall PI Meeting*, Orlando, FL, Nov. 29 - Dec. 2.
- MacEachren, A. M. 2006, Adding geo to visual analytics. **invited** panel presentation at the *IEEE Symposium on Visual Analytics Science and Technology 2006*, Baltimore, MD, October 31 - November 2, 2006.
- MacEachren, A. M. 2006, Anticipating and Responding to Unexpected Events: Supporting Real-World Geo-Information Exploration. UCGIS Winter Meeting 2006, Washington, DC, February 8-10, 2005.
- MacEachren, A. M., Cai, G., McNeese, M., Sharma, R., & Fuhrmann, S. 2006, GeoCollaborative Crisis Management: Designing Technologies to Meet Real-World Needs. *7th Annual National Conference on Digital Government Research: Integrating Information Technology and Social Science Research for Effective Government*, San Diego, CA, May 21-24, 2006.
- MacEachren, A. M. & Team, t. N. 2006, Knowledge-enabled Visual Analytics: leveraging location, enabling collaboration, linking analysis with response. *VAC Consortium Meeting*, Stanford University, Palo Alto, CA, May 23-24, 2006.
- Tomaszewski, B. M., MacEachren, A. M., Pezanowski, S., Liu, X., & Turton, I. 2006, Supporting Humanitarian Relief Logistics Operations through Online Geocollaborative Knowledge Management. *The National Conference on Digital Government Research, dg.o2006*, San Diego, CA, USA, May 21-24, 2006.
- Peuquet, D. J. & MacEachren, A. M. 2006, STNexus: An Integrated Database and Visualization Environment for Space-Time Information Exploitation - June, 2006. *ARDA PIs Meeting*, Washington, DC, June 13 – June 15, 2006.
- MacEachren, A. M., Pezanowski, S., Liu, X., & Tomaszewski, B. 2006, Concept maps  $\leftrightarrow$  Geographic maps: combining knowledge with space + time. *Workshop on geovisualization and visual analytics*, Vancouver, WA, June, 25, 2006.
- MacEachren, A. M. 2006, Knowledge-enabled Visual Analytics: leveraging location, enabling collaboration, linking analysis with response. **invited** presentation at *Pacific Northwest National Laboratory*, Richland, WA, June, 30, 2006.
- Peuquet, D. J. & MacEachren, A. M. 2006, STNexus: An Integrated Database and Visualization Environment for Space-Time Information Exploitation - Nov., 2006. *ARDA PIs Meeting*, Orlando, FL, Nov. 27-Dec. 1, 2006.
- MacEachren, A. M., Weaver, C., and NEVAC Team, 2007, Knowledge-enabled Visual Analytics: leveraging location and enabling collaboration, presentation at NVAC/RVAC workshop, University of North Carolina-Charlotte, March 1, 2007, Charlotte, NC.
- MacEachren, A. M. 2007. Geotemporal information discovery, **invited** presentation at the First Annual DHS University Network Summit on Research and Education, March 16, 2007, Washington, DC.
- MacEachren, A. M. 2007, Collaborative geovisual analytics, Annual Meeting of the Association of American Geographers, April 19, 2007, San Francisco, CA.
- MacEachren, A. M. 2007, Geovisual analytics, methods and tools, **invited** presentation at the NY/NJ Port Authority, May, 7, 2007, New York, NY.
- MacEachren, A. M. and NEVAC Team, Knowledge-enabled Visual Analytics: leveraging location and enabling collaboration, presentation at the fall RVAC Workshop, May 14-16, Bellevue, WA.
- MacEachren, A. M. 2007, Geovisualization: Finding patterns and relations in information, **invited** presentation for the GIS Special Interest Group @ Stanford, October 4th, 2007, Stanford Humanities Center, Stanford University.
- MacEachren, A. M., Klippel, A., and Mitra, P. 2007, Geographic Contextualization for Accounts of Movement (GeoCAM): Representing, extracting, mapping, and interpreting movement references in text, presentation at NGA Academic Research Symposium, Sept 12-14, 2007, Washington, DC.
- MacEachren, A. M. and the NEVAC Team 2007, NEVAC: Research, Impacts, Challenges, presentation at the fall RVAC Workshop, PNNL, Richland, WA.
- MacEachren, A. M. 2008. Geographic Visualization: It's not what it appears to be. presentation at Visualization in the World Symposium, University of North Carolina, Charlotte, April 24-25, 2008
- MacEachren, A. M., Alex Klippel, and Prasenjit Mitra, 2008. Geographic Contextualization for Accounts of Movement (GeoCAM) – and related topics, presentation at Text-to-Sketch Workshop, Homestead, VA, August 18-19, 2008.

- MacEachren, A. M., Alex Klippel, and Prasenjit Mitra, 2008. Geographic Contextualization for Accounts of Movement (GeoCAM), VAC Consortium Meeting, Richland, WA, Nov. 11-13, 2008.
- MacEachren, A. M., Alex Klippel, and Prasenjit Mitra. 2008. Geographic Contextualization for Accounts of Movement (GeoCAM), presentation at the NGS Annual Research Programs Symposium, Washington, D.C., Sept. 9-12, 2008
- MacEachren, A. M. 2008. GeoCollaborative Crisis Management: Overview, Progress, and Challenges, presentation at the Workshop on GeoCollaborative Crisis Management, Lanzhou University, Sept. 17-18, 2008.
- MacEachren, A.M. 2009. Geovisualization, geovisual analytics, spatial cognition, and spatial language, **invited** presentation at NSF Geo-Spatial and Geo-Temporal Informatics Workshop, Washington, DC, Jan. 8-9, 2009.
- MacEachren, A. M. 2009. Geographic visualization & analysis for public health, **Keynote** presentation at URISA GIS in Public Health Conference, Providence, RI, June 5-8, 2009.
- MacEachren, A. M. 2009. Geovisualization → Geovisual analytics for public health, **invited** Presentation to the CDC Analysis-Visualization-Reporting Webinar, July 17, 2009
- MacEachren, A. M. 2009. Grounding Geovisualization & ESDA Tool Design in Cartographic Theory, Practice, and Empirical Research, **invited** presentation at Joint Statistical Meeting, Washington, DC, Aug. 4-9, 2009
- Xu, S., Klippel, A., MacEachren, A., Mitra, P., Turton, I., Zhang, X., & Jaiswal, A. Exploring regional variation in linguistically encoded movement patterns - a case study. In Annual meeting of Association of American Geographers - Cognition, Behavior, and Representation III: Methods Las Vegas, U.S.A. 2009
- MacEachren, A. M., Klippel, A., Mitra, P. Jaiswal, A., Xu, S., Zhang, X., Turton, I., and Pezanowski, S . 2009. Progress on Geographic Contextualization for Accounts of Movement (GeoCAM), presentation at the NGS Annual Research Programs Symposium, Washington, D.C., Sept. 29-Oct. 2, 2009
- Robinson, AC (presenter), Roth, RE, and MacEachren, AM. 2009. Developing standards for map symbology. North American Cartographic Information Society (NACIS) 2009 . Sacramento, CA: October 9.
- MacEachren, A.M., Hardisty, F., and Stryker, M. 2009. GeoVISTA Center Exploratory Geovisualization & Visual Analytics Research & Development, **invited** presentation at NATO IST-085 Workshop on Visualizing Networks, University Park, PA, Oct. 7, 2009.
- Ross, KS, Roth, RE, Finch, BG, Luo, W, McCabe, CA, and MacEachren, AM. 2010. Web-based geovisualization and geovisual analytics to support crime analysis. Department of Homeland Security Summit. Washington, DC: March 9.
- MacEachren, A. M. Geovisual Analytics: Supporting visual reasoning with complex information, Annual Meeting of the AAG, April 14-18, 2010 – Washington, DC.
- Robinson AC (presenter), Roth, RE, McCabe, CA, Pezanowski, S. and MacEachren, AM. 2010. Challenges to standardizing map symbology. The 106th Annual Meeting of the Association of American Geographers. Washington, DC: April 17.
- Roth, RE (presenter), Ross, KS, Luo, W, Finch, BJ, and MacEachren, AM. 2010. A user-centered approach to extending spatiotemporal crime analysis tools. The 106th Annual Meeting of the Association of American Geographers. Washington, DC: April 15.
- Luo W, Blanford J, Hardisty F, MacEachren AM. 2010. A hierarchical framework to understand the characteristics of measles transmission. The 106th Annual Meeting of the Association of American Geographers. Washington, DC: April 15.
- Xu, S., Klippel, A., MacEachren, A., Mitra, P., Turton, I., Zhang, X., & Jaiswal, A. . Studying spatial language 2.0 - Analyzing motion-descriptive language by spatially stratified web sampling. In Annual meeting of Association of American Geographers - Geovisualization, Geovisual Analytics, Cognition, Behavior and Representation I: Navigation and Spatial Cognition, Washington D.C., U.S.A. 2010
- MacEachren, A. M. 2010. Geovisual Analytics for Crisis Management: Moving Beyond GIS. **invited keynote** at Information Systems for Crisis Response and Management (ISCRAM) 2010, May 2-5, 2010, Seattle, WA.
- MacEachren, A. M. 2010. Geovisual Analytics for Health, panel presentation at the Visual Analytics Community (VAC) Consortium Conference, Aug. 31 – Sept. 1, 2010, University of Maryland, College Park MD.
- Robinson AC (presenter), Pezanowski, S., Hardisty, F. Roth, RE, Blanford, JI, and MacEachren, AM. 2010. A web-based symbol store for sharing map symbology. North American Cartographic Information Society (NACIS). St. Petersburg, FL: October 15.

- MacEachren, A. M. 2011. Geoinformation foraging and sensemaking for disasters & pandemics: Fusing data through place-time glue, **Invited** presentation at US-Sweden Workshop: A Visualization and Analytics Approach to Flooding and Pandemics, March 27-28, 2011, Norrköping, Sweden.
- Guidero E (presenter), F Hardisty, RE Roth, A Klippel, AC Robinson, and AM MacEachren. 2011. Representing change using point symbols. The 107th Annual Meeting of the Association of American Geographers. Seattle, WA: April 15.
- Pezanowski S (presenter), AC Robinson, E Guidero, R Bianchetti, F Hardisty, J Blanford, RE Roth, and AM MacEachren. 2011. An interactive, web-based tool for discovering and sharing map symbols. The 107th Annual Meeting of the Association of American Geographers. Seattle, WA: April 15.
- Bianchetti, R.A., Blanford, J., Robinson, A., MacEachren, A. (2011) Critical Evaluation of International Emergency Management Symbolology. American Association of Geographers Annual Meeting, Seattle, WA, April 12-16.
- Luo W, Yin PF, Hardisty F, Blanford J, MacEachren AM. 2011. Spatial social network visual analytic tool. The 107th Annual Meeting of the Association of American Geographers. Seattle: April 15.
- MacEachren, A.M., Klippel, A., Mitra, P., Jaiswal, A., Xu, S., Zhang, X, Savelyev, A., Chen, Y., Pezanowski, S. (2011) Yearly Update: Geographic Contextualization for Accounts of Movement (GeoCAM), presentation at the NGS Annual Research Programs Symposium, Washington, D.C., Aug. 29-Sept. 2, 2011.
- MacEachren, A.M. (2011). Demonstration of GeoVISTA CrimeViz, VACCINE Annual Meeting, Purdue University, Sept. 12-13.
- MacEachren, A.M. (2011). Geovisual Analytics: Leveraging Geographic Information, **invited** presentation at Data Science & Epidemiology Workshop, Penn State University, Oct. 6-7.
- Bianchetti, R.A., Yang, J., Li, R., Blanford, J., Hardisty, F., Robinson, A., Klippel, A., MacEachren, AM. (2011) Comparing Cartographic Point Symbol Design with Card Sorting Methods. NACIS Annual Meeting. Madison, WI, October 23-28.
- Luo W, Yin PF, Hardisty F, MacEachren AM. 2012. Understanding How Dynamic Social Interaction Shapes the Space: A Geovisual Analytic Approach The 108<sup>th</sup> Annual Meeting of the Association of American Geographers. New York: Feb 24-28, 2012.
- Savelyev, A. Robinson, A.C., MacEachren, A.M. (2012) Analysis of Methods for Representing and Interacting with Qualitative Geographic Information. The 108<sup>th</sup> Annual Meeting of the Association of American Geographers. New York: Feb 24-28, 2012
- MacEachren, Alan M. (2012) Geovisual Analytics: Leveraging place-relevant data to support health and safety, Arthur Robinson Cartography Lecture (**invited**), Dept. of Geography, Ohio State University (4/12/2012)
- MacEachren, Alan M. (2012) Introduction to The Pennsylvania, State University GeoVISTA Center, & Department of Geography (**invited**), Center for Earth System Science Tsinghua University, May 24, 2012
- MacEachren, Alan M. (2012) Geovisualization → Geovisual Analytics: Visual-computational methods to reason about dynamic phenomena (**invited**), Chinese Academy of Sciences, May 25, 2012
- MacEachren, Alan M. (2012) Geovisualization to Geovisual Analytics: Visual Reasoning with Big & Messy Data GI Forum, **Invited Keynote** at Salzburg, Austria, July 5, 2012.
- MacEachren, Alan M. (2012) Panelist, GIScience | Cartography, (**invited**) at joint AutoCarto 2012 & GIScience 2012 panel, Sept. 18, 2012.
- MacEachren, Alan M. (2012) Extending Geovisualization to support health and safety, (**invited**) University of Zurich, Department of Geography, March 20, 2013.
- MacEachren, Alan M. (2013) Visualizing Uncertainty and Decision-Making, (**Invited Keynote**), Workshop on Uncertainty in decision making in a changing climate, University of Zurich, Department of Geography, March 21, 2013.
- MacEachren, Alan M. (2013) CyberGIS + Big Data Social Science: Grad Education & Training (**invited**), presentation at CyberGIS Symposium: panel on CyberGIS Education, Association of American Geographers Annual Meeting, April 9, 2013.
- MacEachren, Alan M. (2013) Moving forward: Reasoning about movement and other things dynamic, **Invited Keynote**, COST IC0903 MOVE Final Conference Sept 30th, Oct 1st, 2013 Technical University of Vienna, Vienna, Austria.

- MacEachren, Alan M. (2013) Geo-Visual Analytics & ‘Big’ Data: Leveraging Geo-Information in Unstructured Data, Dept. of Geography Coffee Hour, Penn State University, Dec. 6, 2013.
- MacEachren, Alan M. (2014) Visually Enabled Geographical Reasoning, (**invited**) Seeing Knowing: Vision, Knowledge, Cognition, and Aesthetics, Berkeley, Sept. 6-7, 2014.
- MacEachren, Alan M. (2014) Perspectives on Uncertainty, Geovisualization, and Geographical Reasoning / Decision-making (**invited**), Perspectives on the visualization of uncertainty, NCG Commissie Geovisualisatie & ITC / Universiteit Twente, 9/16/2014.
- Savelyev, Alexander and MacEachren, Alan M. (2014), Interactive, Browser-based Information Foraging in Heterogeneous Space-Centric Networks, GeoVisual Analytics: Interactivity, Dynamics, and Scale, Workshop @ GIScience (23 September 2014, Vienna, AT).
- MacEachren, Alan M. (2014) Geovisualization, Uncertainty, Reasoning, and Decisions, **Invited Keynote**, 2nd Int. Workshop on Visually-Supported Reasoning with Uncertainty, at GIScience, 9/23/2014.
- MacEachren, Alan M. (2015) Geovisual Analytics as an Approach to Support Reasoning for Decisions (under uncertainty), Invited presentation, Presentation at the *Workshop on Supporting decision-making with geovisualization, integrating different perspectives for a better understanding and design*, HafenCity University, Hamburg, Germany, January 20th, 2015.
- MacEachren, Alan M. (2015) Supporting Reasoning in Geo-Visual Analytics: Cross-disciplinary Perspectives, **Invited Distinguished Lecture** at the Charlotte Visualization Center, College of Computing and Informatics, University of North Carolina Charlotte February 19, 2015
- MacEachren, Alan M. (2015) **Invited Presentation**, Coping with Place and Space Uncertainty vis Geovisualization, Department of Geography & Earth Sciences, College of Liberal Arts & Sciences, University of North Carolina Charlotte, Feb. 20, 2015.
- Kim, E.-K. and MacEachren, A.M. (2015) Spatial Bursts of Geo-Tweeting Behaviors in Geo-Located Twitter data. International Conference on Location-Based Social Media Data, Athens, GA: March 13-14, 2015.
- MacEachren, Alan M. (2016) Maps for policy / decision support: science to advocacy & the challenge of uncertainty, **invited presentation**, *SESYNC Pursuit on Climate Vulnerability Mapping Workshop* 17-19 Feb 2016, Annapolis, MD.
- Kim, E.-K. and MacEachren, A.M. 2015: Spatial Bursts of Geo-Tweeting Behaviors in Geo-Located Twitter data. International Conference on Location-Based Social Media Data, Athens, GA, March 13, 2015
- MacEachren, Alan M. (2016) Geovisual Analytics: Reimagining the “analytical” in GIScience, **Invited**: Waldo Tobler Distinguished Lecture in GIScience, Annual Meeting of the Association of American Geographers, March 31, 2016.
- MacEachren, Alan M. (2016) Leveraging Big (geospatial)Data with (geo)Visual Analytics, **Invited Keynote**: 17<sup>th</sup> International Symposium on Spatial Data Handling, Beijing, Aug. 18-20, 2016.
- MacEachren, Alan M. (2016) Geovisualization/Geovisual Analytics: Addressing the Cancer Burden, **Invited**: Conference on Geospatial Approaches to Cancer Control and Population Sciences, Sept. 12-14, 2016, NIH Campus, Bethesda MD
- MacEachren, Alan M. (2016) Making Space for Place in Spatial VA, **Invited Keynote**: SpatialVA – A GIScience 2016 Workshop on Understanding Spatial Data with Visual Analytics, Montreal, Canada, Sept. 27, 2016
- MacEachren, Alan M. (2016) The potential + issues of place-linked info for crisis management, **Invited** presentation at AAAS Workshop on Ethics of Location-Based Technologies in Crisis Situations, Nov. 4-5, 2016, Washington, DC
- MacEachren, Alan M. (2017) (re)Considering Bertin in the Age of Big Data and Visual Analytics, **Invited Presentation**, International Cartographic Conference, Washington, D.C., July 2-7, 2017.
- MacEachren, Alan M. (2017) (place-centric) (Geo)Visual Analytics & VGIScience, **Invited Keynote** at VGIScience Summer School, 11-15 September 2017 at TU, Dresden, Germany.
- MacEachren, Alan M. (2019) GeoVisual Analytics: Moving beyond cartographic communication to support for human reasoning with data at scale, **Invited Presentation**, Technical University of Munich, Jan. 21, 2019.
- MacEachren, Alan M. (2019) GeoVisual Analytics: Examples from Penn State GeoVISTA Center, **Invited Presentation**, Technical University of Munich, Jan. 23, 2019.

- MacEachren, Alan M. (2019) “lite” 5-Design Sheet Activity (modeled on ideas from Roberts, J.C., Headland, C.J. and Ritsos, P.D. 2017: Five Design-Sheets: Creative Design and Sketching for Computing and Visualisation. Springer), **Invited Tutorial**, Technical University of Munich, Jan. 25, 2019.
- MacEachren, Alan M. (2019) Principle 1: Do No Harm, **Invited presentation** in AAAS Workshop on Acutely Ethical: Principles and Guidelines on the Use of Location-Based Data in Crisis Situations, March, 20, 2019.
- MacEachren, Alan M. (2019) Principle 1: Do No Harm, **Invited presentation** in AAAS Webinar on Location-based Data in Crisis Situations, June, 24, 2019.
- MacEachren, Alan M. (2019) Ethics of Location-Based Data in Crisis Situations, International Cartographic Conference – Tokyo – July 15-20, 2019
- MacEachren, Alan M. (2019) Perspectives on Human-Centered Spatial Data Science, **Invited Presentation: Spatial Data Science Symposium**, UCSB, Dec. 9-11, 2019.

## PROFESSIONAL SERVICE/ASSOCIATIONS

### *Current Editorial positions:*

*Information Visualization*, Associate Editor, 2001-present

### *Recent Editorial position:*

*Computers, Environment & Urban Systems*, Editorial Board, 2008-2019

### *National Academy of Science / National Research Council*

Committee for the Workshop on Visualization of Uncertain Information (2004-2005)

Committee for the Workshop on Intersections between Geospatial Information and Information Technology (2001-2002).

Rediscovering Geography Committee, *member* (1993-1997)

### *National Visualization and Analytics Center* (Department of Homeland Security)

Member, Visual Analytics Science & Technology Panel

### *International Cartographic Association*

Commission on Visualization & Virtual Environments, *chair* (1999-05)

Commission on Visualization, *chair* (1995-99)

Map and Spatial Data Use Commission working group on visualization, *chair* (1993-95)

Advanced Technologies Commission working group on temporal mapping, *member* (1993-95)

### *IEEE*

*IEEE Transactions on Visualization & Computer Graphics*, Associate Editor, 2007-2011

Program Committee for the IEEE Symposium on Information Visualization (multiple years)

Area Chair for Geospatial Analytics at the IEEE Symposium on Visual Analytics Science and Technology (VAST) 2007

Program Co-Chair, IEEE VAST 2010 Conference

### *American Congress on Surveying and Mapping*

National Committee to the International Cartographic Association - *Chair* 1995-1999

National Committee to the International Cartographic Association - *member* 1990-95

**PI – National Science Foundation Grant** for: Travel of U.S. delegates to the 15th International Cartographic Conference, Bournemouth, England, March, 1991 - November, 1992.

**PI – National Science Foundation Grant** for: Travel of U.S. delegates to the 16th International Cartographic Conference, Cologne, Germany, March, 1993 - May, 1994.

Editorial Board of *The American Cartographer*, 1987-90

Editorial Board of *Cartography & GIS*, 1990-96

---

*Association of American Geographers*

Cartography Specialty Group - AAG *chairperson* (1984-1985), *vice-chair* (1983-84)

*North American Cartographic Information Society*

*Treasurer*, 1982-84

*Director*, 1984-86

*Chair* of Publication Committee, 1985-1990.

*Membership in other professional organizations*

Association of American Geographers

Cartography and Geographic Information Society

IEEE Computer Society

Canadian Cartographic Association

North American Cartographic Information Society

American Association for the Advancement of Science