

Dr. Barbara Pfeil Buttenfield

Department of Geography
Campus Box 260
University of Colorado
Boulder, Colorado 80309

Email babs@colorado.edu
drbabs14@gmail.com
Internet <http://greenwich.colorado.edu>
Voice 303.492.3618
FAX 303.492.7501

ORCID 0000-0001-5961-5809

RESEARCH INTERESTS

Geographic Information Science: data generalization and modeling, multi-scale geospatial databases, data harmonization and integration

Environmental Modeling: terrain modeling, dasymetric models, accuracy / error assessment in spatial data

Scientific visualization: topographic and thematic information design, representations of uncertainty, graphical interface design & usability evaluation

Spatial data infrastructures: socio-technical impacts of data production, delivery, access and use

TEACHING EXPERTISE

Cartography, Information Design and Uncertainty Representation
Geographic Information Science
Spatial Data Modeling and Multi-Scale Database Design

EDUCATION

Ph.D University of Washington, 1984, Geography
Thesis: Line Structure in Graphic and Geographic Space (Advisor: John C. Sherman)

M.A University of Kansas, 1979, Geography
Thesis: Grid Representations of Sketch Map Distortion (Advisor: George F. Jenks)

B.A Clark University, 1974, Geography

Training Programs:

U. Colorado Boulder Faculty Teaching Excellence Program (FTEP), Summer Institute (1998)

Environmental Systems Research Institute, Redlands, CA

2 day Python programming course (Aug 2006, Denver CO)

3 day Geodatabase v.8 training course (Dec 2003, Denver, CO)

4 day ArcInfo v.8 training course (March 2000, Boulder, CO)

1 day GIS Design training course (Nov 1998, Boulder, CO)

1 week Spatial Analyst training course (Jan. 1998, Boulder, CO)

1 week ARC/INFO training course (Dec. 1996, Boulder, CO)

1 week Avenue Programming course (Aug. 1996, Boulder, CO)

1 week training course on Expert Systems and GIS (1991, Redlands CA)

2 week ARC/INFO training course (1985, Madison, WI)

Conflict Management Skills for Women, Sterling VA

Six credit hour training course, certified by National Task Force on Continuing Education.
SkillPath Inc. (1994)

Defense Mapping Agency Aerospace Center, St. Louis, MO

12 week training in photogrammetry, photointerpretation, mapping, charting skills
(1978, St Louis, MO)

PROFESSIONAL AND EMPLOYMENT HISTORY

- 2018-pres. Parliamentarian, College of Arts & Sciences Faculty Council, University of Colorado-Boulder
- 2016-pres. Faculty Affiliate and Advisory Board Member, Rocky Mountain Census Research Data Center (RMRDC), University of Colorado – Boulder (a U.S. Census Secure Data Center)
- 2008- pres. Research Faculty Affiliate, USGS Center for Excellence in Geospatial Information Science (CEGIS)
- 2005 – 2007 Chair, College of Arts & Sciences Faculty Council, University of Colorado-Boulder
- 2003 – 2005 Associate Chair and Director of Graduate Studies, Department of Geography, University of Colorado-Boulder
- 2001 – pres. Professor, Department of Geography, University of Colorado-Boulder
Director, Meridian Research Lab
- 1997 Gäst-Professor, Institut für Kartographie, Universität Wien, Austria (summer semester)
- 1996 - 2001 Associate Professor, Department of Geography, University of Colorado-Boulder
- 1996 - 1997 Director, Ken Erickson Spatial Data Analysis Lab, University of Colorado-Boulder
- 1995 - 1998 Member of the Graduate Faculty, Department of Spatial Information Science and Engineering, University of Maine-Orono
- 1993 - 1994 Research Scientist, U.S. Geological Survey, National Mapping Division, Reston, Virginia (on sabbatical leave)
- 1991 - 1995 Associate Professor, Department of Geography, SUNY-Buffalo
- 1988 - 1996 Research Scientist, National Center for Geographic Information and Analysis (NCGIA)
- 1987 - 1991 Assistant Professor, Department of Geography, SUNY-Buffalo
- 1987 - 1990 Director, Geographic Information and Analysis Lab
Department of Geography, SUNY-Buffalo
- 1984 – 1987 Assistant Professor, Department of Geography, University of Wisconsin - Madison
- 1984-1987 Member Faculty Consortium on Land Records Modernization
Institute for Environmental Studies, University of Wisconsin
- 1982-1984 Acting Assistant Professor, Department of Geography
University of California - Santa Barbara
- 1981-1982 Staff Consultant for Computer Graphics, Center for Social Science
Computation and Research (CSSCR), University of Washington

- 1981 Instructor, Department of Geography, University of Washington
Graphics Programmer, Morgan-Fairchild Group, Seattle, Washington
- 1980 Research Assistant, redistricting project (R.L. Morrill, P.I.)
Department of Geography, University of Washington
- 1979-1980 Cartographic Aide, Bureau of the Census, Seattle Regional Office
- 1978-1979 Cartographer, Scientific Data Division,
Defense Mapping Agency Aerospace Center, St. Louis, Missouri
- 1978 Research Assistant, satellite image processing project (T.H. Lee Williams, P.I.),
Department of Geography, University of Kansas
- 1977 Research Assistant, health services project (R.T. Aangeenbrug, P.I.),
Department of Geography, University of Kansas
- 1975-1977 Teaching Assistant, Department of Geography, University of Kansas
- 1974-1975 Cartographic Artist, Kansas Applied Remote Sensing Lab,
Center for Research, University of Kansas

AWARDS AND HONORS

- 2014 Editor's Choice Award, *Demographic Research*
Ruther M, Maclaurin G, Leyk S, Buttenfield BP, and Nagle NN. 2013 Validation of Spatially
Allocated Small Area Estimates for 1880 Census Demography. *Demographic Research* 29
(22): 579-616. DOI: 10.4054/DemRes.2013.29.22
- 2013 Elected Fellow, University Consortium of Geographic Information Science (UCGIS)
- 2013 One of nine women cartographers whose career is highlighted in *Map Worlds: History of
Women in Cartography* by WC van den Hoonard. Wilfrid Laurier University Press.
- 2010 Top Four Short Papers GIScience Conference, Zurich, Switzerland.
Buttenfield, BP, Stanislawski, LV and Brewer, C.A. Multiscale Representations of Water:
Tailoring Generalization Sequences to Specific Physiographic Regimes. *GIScience Short
Paper Proceedings* http://aci.ign.fr/2010_Zurich/genemr2010_submission_11.pdf
- 2010 Elected to Membership in the Society of Women Geographers
- 2007 LEAP Research Fellow (NSF ADVANCE Program "Leadership Education for
Advancement and Promotion" at CU-Boulder) – Fall semester
- 2001 Inaugural Recipient National Award for GIScience Educator of the Year, University
Consortium for GIScience (UCGIS)
- 1999 Best Research Paper of the Year, Geoscience Information Society (affiliate of the
Geological Society of America)
Buttenfield, B. P. 1998 Looking Forward: Geographic Information Services
and Libraries in the Future. *Cartography and GIScience*, vol. 25(3): 161-171.

- 1997 Elected Fellow, American Congress on Surveying and Mapping
(Cartography and Geographic Information Society)
- 1975 Recipient Keuffel & Esser Fellowship in Surveying and Cartography

Invited Keynote Lectures

- 2013 12th Annual Symposium for GIS Day, University of Kansas – Lawrence
Science Literacy Boot Camp for Librarians Conference, Boulder Colorado
- 2011 USGS First National Conference on *The National Map*, Denver Colorado
- 2009 ESRI Southwest GIS User Group Annual Meeting, Pueblo, Colorado
- 2005 Reginald Golledge Distinguished Lecture, University of California – Santa Barbara
- 2004 John Treacy Memorial Lecture Scholar, University of Wisconsin-Madison
- 2001 First GIS and Bioinformatics Conference, Virginia Polytechnic University, Blacksburg, VA
- 2000 GIS in Education Conference, San Bernardino, California
Midwest States GIS Conference, Kansas City, Missouri
- 1999 State of Kentucky GIS Conference, Frankfort, Kentucky
- 1998 State of Michigan IMAGIN Conference (Improving Michigan’s Access to Geographic
Information Networks), Lansing, Michigan
- 1995 32nd Clinic on GIS and Libraries, University of Illinois, Urbana-Champaign
- 1994 National Geographic Society Conference on GIS and Education

COURSES TAUGHT

University of Colorado – Boulder (1996 – present)

- 3053 Cartography 1 - Visualization and Information Design
- 4053/5053 Cartography 2 - Dynamic Mapping: Animation and Hypermedia
- 4103/5103 GIS 1 Introduction to Geographic Information Science
- 4203/5203 GIS 2 Modeling Applications
- 4303/5303 GIS 3 Programming and Spatial Analysis
- 4503/5503 GIS Project Management (Spring 2016, Spring 2018)
- 4120 Special Topics: GIS and Spatial Databases (Spring, 1998)
- 5003 Elements of Geographic Information Systems
- 5113 Graduate Seminar in Geographic Information Science
Topics – Integrating Data Across Space and Time (Spring 2015)
Theoretical and Applied Research in GIScience (Spring 2006)
GeoVisualization and Knowledge Discovery (Spring 2004)
UCGIS Virtual Seminar (Fall 1997)
Empirical Research in Cartography and GIScience (Fall 1996)
- 5100/6180 GIS Geospatial Reading Seminar (Fall 2002; Spring 2003; Spring 2005)

State University of New York – Buffalo (1987 – 1995)

- 120 Maps and Mapping
- 381 Cartographic Design
- 485/551 Computer Cartography
- 487/557 Thematic Cartography
- 450/550 Advanced Topics in Cartographic Design
 - Topics (various years) -- Map Animation
 - Multimedia and GIS
 - Analytical Cartography
- 650 Graduate Seminar in Cartography
 - Topics -- Information Design for GIS (Fall, 1995)
 - Digital Libraries: Data Browsing and Access (Spring 1995)
 - GIS and Knowledge Representation (Spring 1993)
 - Formalizing Rules for Map Design (Spring 1991)
 - Human Factors in Cartography (Fall 1990)
 - Map Generalization (Spring 1989)

University of Wisconsin – Madison (1984 – 1987)

- 170 Map Reading and Interpretation
- 360 Quantitative Analysis in Geography
- 376 Analytical Cartography
- 570 Special Topics in Cartography - Graphical Analysis
- 576 Coordinate Systems and Map Transformations

University of California - Santa Barbara (1982 – 1984)

- 118A Introductory Cartography
- 118B Three-Dimensional Cartographic Representation
- 118C Cartographic Production
- 125 Introductory Computer Cartography
- 234 Special Topics: Cartographic Generalization
- 284 Computer Graphics Programming

University of Washington (1981)

- 258 Maps and Map Reading

MENTORING ACTIVITIES**Post-Doctoral Supervision**

- 2016 – 2017 Qiang, Yi (Ph.D. 2012, Geography, Ghent University, Belgium)
Currently Assistant Professor of Geography, University of Hawaii-Manoa
- 2012 – 2014 Ruther, Matthew H. (Ph.D. 2012 Sociology, University of Pennsylvania)
(co-supervised with Professor Stefan Leyk, Geography Dept, U. Colorado)
Currently Associate Professor of Urban and Public Affairs, University of Louisville and
Executive Director of the Kentucky State Data Center
- 1993 – 1995 Weber, Christopher (Ph.D. Geography, SUNY-Buffalo) Spatial database consultant and current
Music Director, Camerata di Sant' Antonio Symphonic String Ensemble, Buffalo NY

Graduate Student Supervision

Chair of the following Ph.D. Committees

Charisoulis, Georgios (ongoing) U. Colorado - Boulder (entered the program Fall 2016)

Modeling Renewable Energy Use and Facility Location

Comprehensive Exams written March 2019; oral defense 15 April 2019

Dissertation Proposal Defense scheduled April 2020

Guler, Dogus (2019-2020) Faculty Mentor for visiting doctoral researcher on leave from
Department of Geomatics Engineering, Istanbul Technical University, Istanbul, Turkey

Location-Allocation Modelling of Biogas Anaerobic Digesters in Turkey

Ghandehari, Mehran 2018 U. Colorado – Boulder

Cross-Scale Analysis of Surface-Adjusted Measurements Variations in Digital Elevation Models

Dissertation defended 2 November 2018

Anderson-Tarver, Christophe 2015 U. Colorado - Boulder

*Crisis mapping the 2010 Earthquake in Haiti: Impact of Environmental Crises on Volunteered
Geographic Information Databases*

Dissertation defended 12 March 2015

Wendel, Jochen 2013 U. Colorado - Boulder

Explicit and Implicit Indexing Schemas and Organizational Frameworks for Multiple Data Types

Dissertation defended 6 June 2013

Currently Data Scientist at Karlsruhe Institute of Technology, Germany

Viger, Roland 2011 U. Colorado - Boulder

Reasoning About Geoprocessing Concepts Using Implicit Keywords

Dissertation defended 17 May 2011

Currently Senior Research Hydrologist, USGS - Denver

Hamerlinck, Jeffrey 2010 U. Colorado - Boulder

Planning Support Systems Implementation in Rural Local Government

Dissertation defended 18 November 2010

Currently Director, University of Wyoming Geographic Information Science Center

(Did not recruit doctoral students while serving in Department-, College- and Campus-level faculty
governance and administrative positions)

Tsou, Ming-Hsiang 2000 U. Colorado-Boulder

Dynamic Architecture for Distributing GIS Services

Dissertation defended 12 July 2000

Currently Professor of Geography and Director, Center for Human Dynamics in the Mobile Age
San Diego State University

Fabrikant, Sara 2000 U. Colorado-Boulder

Spatial Metaphors for Browsing Large Data Archives

Dissertation defended 14 July 2000

Currently Professor and Head of Department of Geography, University of Zurich, Switzerland

Skupin, Andre 1998 SUNY-Buffalo
Organizing and Visualizing Hypermedia Information Spaces
Dssertation defended 17 August 1998
Currently Professor of Geography and Co-Director, Center for Information Convergence and
Strategy, San Diego State University

Plewe, Brandon 1997 SUNY-Buffalo
Cartographic and GIS Representations of Gradation
Dissertation defended 24 March 1997
Currently Associate Professor of Geography, Brigham Young University

Leitner, Michael 1996 SUNY-Buffalo
The Impact of Data Quality Displays on Spatial Decision Support
Dissertation defended 14 October, 1996
Currently Professor, Department of Geography and Anthropology, Louisiana State University

Weber, Christopher 1993, SUNY-Buffalo
Sonic Enhancement of Map Information: Experiments Using Harmonic Intervals
Dissertation defended 28 October 1993
Currently a DBMS consultant in Buffalo, NY and Music Director, Camerata di Sant' Antonio
Symphonic String Ensemble, Buffalo NY

Wu, C. Victor 1993, SUNY-Buffalo
Object-Based Queries on Spatial Data Quality
Dissertation defended 16 August 1993
Currently GIS and Asian Studies faculty at California State University – Sacramento

Saga, Sven 1992-1993, SUNY-Buffalo
Scale-Dependence and Map Generalization Algorithms
Supervised PhD program academic year 1992 - 1993 while he was on leave from U. Trondheim
Currently Research Scientist, Norwegian Mapping Authority

Supervised Master's degrees (Colorado), defense date in parentheses

Tyler, Katie (will enter the program August 2020)

Carlson, Kate (entered the program August 2019)
Visual Analytics for Spatiotemporal Uncertainty (working title)

Sauer, Dietmar (April 2015) Automated Selection of Primary Paths in Stream Networks
(Foreign Exchange student (degree conferred by Karlsruhe University, Germany;
working in Boulder) co-advised with Heinz Saler)

Stauffer, Andrew (Nov 2013) Impacts of Iterative Filtering and Resampling on Resolution of
Digital Terrain Models

Gleason, Michael (Nov 2012) Filtering T-LIDAR Point Clouds for DEM Interpolation

Uhl, Johannes (Aug 2011) Limiting and Related Variables for Dasymetric Analysis of
(Foreign Exchange student U.S. Census Demography (degree conferred by Karlsruhe
working in Boulder) University, Germany; co-advised with Heinz Saler)

Parsons, Mark Anderson-Tarver, Chris	(Sept 2010) (Feb 2010)	Data Infrastructures for Cryospheric Science Communities Generalizing a Swamp-Marsh Database Using Texture
Yamashita, Kiyoshi	(April 2008)	Spatial and Aspatial Prediction Methods for Modeling Urban Fire Risk
Ballagh, Lisa	(April 2007)	Validation of Sea Ice Data by Sparse Interpolation (co-supervised w/ Roger Barry)
Kern, Robert Hultgren, Torrin	(May 2005) (May 2005)	Symbol Design for Mapping Uncertainty About Wildland Fires Map Algebra for Areal Interpolation (co-supervised w/ Jeremy Mennis)
Heithoff, Erin Petrik, Kevin	(Dec 2002) (May 2002)	National Atlas Design on the Internet Internet-Based GIServices in College Classrooms
Huff, Russell	(Oct 2001)	Data Models for Temporal Data Handling in GIS
Rock, Michael Cameron, Dick	(Nov 2000) (Feb 2000)	Modeling User Navigation Through a Digital Library Sensitivity of Forest Fragmentation to Ecological Scale
Gayon, Tina Norman, Lamont	(Dec 1998) (Jan 1998)	Geographic Information and Technology in Public Libraries GIS Expert System to Model Ponderosa Pine Diffusion

Supervised Master's degrees (Buffalo)

Rooney, Paul	(Aug 1997)	Geography 2000 Standards in an Inner City Magnet School Curriculum (co-advised w/ Jim McConnell)
Janak, Jeff Ricci, Victor	(Jan 1996) (Jan 1996)	Rules for Automatic Generalization of Vector Map Data Legal Impediments to the Structure of Digital Information
Tsou, Ming H. Kracker, Laura Kick, John Plewe, Brandon Parkansky, Steven	(Dec 1995) (Oct 1995) (Aug 1995) (Jan 1995) (Jan 1995)	Object-Oriented Tools for Spatial Data Browsing Analyzing Inconsistencies in Wetlands Mapping Using GIS Refinement of Soils Model Parameters Using GIS The GEOWEB Project: Map Tiling for Distributed Data Digital Basemap Registration for Natural Gas Wellsites
Wieshofer, Markus Gorski, Jill	(May 1994) (June 1994)	Dynamic and Temporal Aspects of GIS Evaluating US/Canadian Census TIGER Prototype Datasets (co-advised w/ Jim McConnell)
Fly, Paul Leitner, Michael Schwartz, Paul	(Jan 1993) (Mar 1993) (Aug 1993)	Hypermedia and Ethics in Cartography Multi-Scale Inventory of a Topographic Map Series Digital Typography in Cartographic Design
Carey, David McKinney, Jim Solyka, Nicole Wright, Geoff	(May 1992) (Jan 1992) (Jan 1992) (Jan 1992)	Use of Federal Digital Data Products with ARC/INFO Evaluation of Visual Tools for Location Modeling Comparing Raster and Vector GIS with Digital Terrain GIS Adoption in Third World Village Planning

Kress, Tom	(Nov 1991)	Visualization of Spatial Data Quality
Fico, Frank	(Aug 1991)	Generalization of the Digital Chart of the World
Weber, Chris	(Jan 1991)	Map Animation of Climatic Change
Willer, David	(Sept 1990)	A Spatial Decision Support System for Bank Location
Jasinski, Marcin	(Jan 1990)	Comparing Complexity Measures for Cartographic Lines
DeLotto, Joseph	(Aug 1989)	The Role of Scale in Automated Terrain Classification
Wu, C. Victor	(Aug 1989)	Verification of Rules for Cartographic Name Placement

Supervised Master's degrees: (Wisconsin)

Baures, Jamie	(June 1987)	A Raster Line Generalization Algorithm
Ries, Thomas	(June 1987)	Profile Identification Tasks on Contour Displays
Leonard, Jeff	(June 1987)	An Equal-Value Perceptual Gray Scale for Laser Printers

Member of the following Doctoral Committees

- Jaffe, Sarah (ongoing) *Human Wildlife Conflicts in the Colorado Front Range*
Department of Environmental Studies, University of Colorado-Boulder
Advisor – Carol Wessman
Comprehensive Exams completed 2019
- Mommandi, Wagma (ongoing) *Student Access to Charter Schools in Denver, Colorado*
School of Education, University of Colorado-Boulder
Advisor – Michelle Moses
Proposal Defense scheduled for 2020
- Chapman, Theresa (ongoing) *Mountain Pine Beetle and Fire Influence on Regeneration of Lodgepole Pine in Northern Colorado*
Dept. Geography, University of Colorado- Boulder
Supervisor – Tom Veblen
Proposal Defended 6 May 2013; Defense Planned for 2020
Currently GIS Project Manager, The Nature Conservancy
- Rodman, Kyle (2019) *Forest Change and Post-Fire Response in the Southern Rocky Mountains*
Department of Geography, University of Colorado-Boulder
Advisor – Tom Veblen
Dissertation defense May 2019
- Uhl, Johannes (2019) *Machine Learning and Recognition Approaches to Improve and Extend Multi-Temporal Built-up land Layers*
Department of Geography, University of Colorado-Boulder
Advisor – Stefan Leyk
Dissertation defense April 2019
Currently Postdoctoral Researcher, University of Colorado-Boulder
- Cunningham, Angela (2019) *Community Impacts on WWI Veterans in Denver Colorado*
Department of Geography, University of Colorado-Boulder
Advisor – Bill Travis
Defended 10 January 2019
Currently Post-doctoral researcher, Centre for Contemporary and Digital History,
University of Luxembourg

- Amante, Christopher (2018) *Spatiotemporal Uncertainty of Sea Level Rise Inundation Modeling*
 Department of Geography, University of Colorado-Boulder
 Advisor – Waleed Abdalati
 Dissertation Defense April 2018
 Currently Research Data Scientist, NOAA, Boulder Colorado
- MacFerrin, Michael (2017) *Arctic Sea Ice Thickness Estimation from Satellite Altimetry*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Waleed Abdalati; Defended 27 Nov 2017
- Zoraghein, Hamidreza (2017) *Spatiotemporal Population Modeling Based on Refined Areal Interpolation*
 Department of Geography, University of Colorado-Boulder
 Advisor – Stefan Leyk; Dissertation Defended June 2017
 Currently research associate are the Population Council in New York City
- Norlund, Petra (did not finish) *GIS Modeling of Childhood Diarrhea in Mexico*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Stefan Leyk
 Proposal Defended 9 December 2013; dropped out of the program May 2017
- Tuff, Ty (2016) *Relative Motion as an Ecological Mechanism for Seasonal Bird Migration*
 Department of Ecological and Evolutionary Biology, U. Colorado-Boulder
 Supervisor – Brett Melbourne
 Currently independent researcher, St. Louis MO
- Petchprayoon, Pakorn (2015) *Climate Change Impact on Surface Energy Balance of Lake Huron*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Peter Blanken
 Currently Research Scientist for the Myranmar Government
- Smith, Jeremy (2012) *Tree Mortality and Climate Variation in Colorado Front Range*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Tom Veblen
 Currently Associate Professor at University of Nevada - Reno
- Bevc, Christine (2010) *Spatial Modeling of Social Networks and Social Services in New York City During and After September 11, 2001*. Dept. Sociology, U. Colorado-Boulder
 Supervisor: Kathleen Tierney Currently Research Associate, Preparedness and Emergency Response Research Center, University of North Carolina Chapel-Hill
- James, Katherine (2010) *Arsenic Contamination, Drinking Water and Birth Rates in Commerce City, CO*
 Department Preventative Medicine and Biometrics, U. Colorado-Health Sciences
 Supervisor - Jim Ruttenber (deceased)
 Currently Assistant Professor Family Medicine, Univ. Colorado Denver (Anschutz)
- Sonia Talwar (2008) *Spatial Dimensions of Science and Technology Studies: Exploring Roles for GIS and Interactive Social Research*
 Department of Geography, University of British Columbia, Vancouver, BC
 Supervisor – John Robinson
 Currently Research Scientist, Natural Resources Canada

- Galadari, Abdullah (2008) *Modeling Costs for Alternative Transportation*
 Department of Civil Engineering, Univ. Colorado - Denver
 Supervisor – Bruce Janson Currently Assistant Professor Engineering Systems
 and Management, Masdar Institute of Science and Technology, Abu Dhabi
- Vidal, Arwen (2008) *Postulating Planetary Hydrology on Mars*
 Department of Geology, University of Colorado- Boulder
 Supervisor – Karl Mueller
- Steiniger, Stefan (2007) *Enabling Pattern-Aware Automated Map Generalization*
 Department of Geography, University of Zurich, Switzerland
 Supervisor – Robert Weibel. Currently Research Associate of Transportation
 Engineering, Pontifica Universidad Catolica de Chile
- Witmer, Frank (2006) *Effects of War on Landuse/Landcover Change in Northeast Bosnia*
 Department of Geography, University of Colorado- Boulder
 Supervisor – John O’Loughlin
 Currently Assistant Professor of Computer Science, University of Alaska
- Hope, Susannah (2005) *Decision Making Under Spatial Uncertainty*
 Department of Applied Science, University of Melbourne, Australia
 Supervisor – Gary Hunter
- Janke, Jason (2004) *Rock Glaciers in the Front Range: An Analysis of Distribution, Topoclimatic
 Variables, Permafrost, and Flow*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Nel Caine
 Currently Professor Earth and Atmospheric Sciences, Metro State University, Denver
- Platt, Rutherford (2004) *Wildfire Mitigation and Ecological Restoration in the Wildland-Urban Interface*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Tom Veblen
 Currently Chair Environmental Studies Dept, Gettysburg College, Pennsylvania
- Sheriff, Rosemary (2004) *Historic Range of Variability of Ponderosa Pine in the Northern Colorado Front
 Range: Past Fire Types and Fire Effects*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Tom Veblen
 Currently Chair, Geography, Humboldt State University, California
- Liu, Fengjing (2004) *Hydrological Controls on Streamflow Chemistry in Alpine Catchments*
 Institute of Arctic and Alpine Research, University of Colorado- Boulder
 Supervisor – Mark Williams
- McLean, Mark (2003) *Spatial Pattern in the Understory: Disturbance Legacy and Environmental Variation*
 Department of Geography, University of Colorado- Boulder
 Supervisor – Susan Beatty
- Reinke, Karin J. (2002) *Communicating Thematic Uncertainty in Spatial Databases*
 Department of Geography, University of Melbourne, Australia
 Supervisor Gary Hunter

- Kulakowski, Dominik (2002) *Interactions among Natural Disturbances in Subalpine Forests in Northwestern Colorado*. Department of Geography, University of Colorado- Boulder
Supervisor – Thomas T. Veblen
Currently Professor Geography, Clark University, Worcester Massachusetts
- Cossman, Ron (2001) *Secular Trends and Spatial Clusters of Inequality in U.S. Metropolitan Areas, 1970 to 1990* Department of Geography, University of Colorado- Boulder
Supervisor – James O. Huff Currently Associate Research Professor and Director,
Social Science Research Center, Mississippi State University
- Little, Jani (2000) *Segregation in U.S. Major Metropolitan Areas*
Department of Geography, University of Colorado- Boulder
Supervisor – Andrei Rogers
Currently Senior Research Associate, Institute of Behavioral Sciences, CU
- Antle, Alissa (2000) *Interactive Visualization Tools for Spatial Data and Metadata*
Department of Geography, U. British Columbia, Victoria Canada
Supervisor Brian Klinkenberg
- Kerski, Joseph (2000) *Implementation of GIS Technology and Methods in Secondary Education*
Department of Geography, University of Colorado- Boulder
Supervisor – A. David Hill (deceased)
Currently Education Manager, Envir. Systems Research Institute (ESRI)
- Davinroy, Tom (2000) *Biogeochemical processes and hydrologic characteristics of alpine talus*
Department of Geography, University of Colorado- Boulder
Supervisor – Mark Williams
- Solem, Michael (2000) *Adoption of the Internet in U.S. College Geography*
Department of Geography, University of Colorado- Boulder
Supervisor – A. David Hill (deceased)
Currently Educational Affairs Director, Assn. American Geographers (AAG)
- Deakin, Ann (1996) *Impact of the 1994 Northridge Earthquake on Los Angeles Motorists*
Department of Geography, SUNY-Buffalo
Supervisor – David Mark
- Gluck, Myke (1996) *Communication and International Development*
Department of Geography, Syracuse University
Supervisor – Michael Nilan
- Hassen, Khaled (1995) *Reference Grid: A Tool for Viewing Positional Accuracy of Spatial Data*
Department of Spatial Information Engineering, University of Maine
Supervisor – Kate Beard
- Zhan, Feibing (1994) *Spatio-Temporal Location Models of Mobile Trading and the Organization of Periodic Market Places*
Department of Geography, SUNY-Buffalo
Supervisor – David Mark
- Gould, Michael (1993) *Map Use, Spatial Decision-Making, and Spatial Language in English and Spanish*
Department of Geography, SUNY-Buffalo. Supervisor – David Mark
Director Education Industry Solutions, Envir. Systems Research Institute (ESRI)

- Gluck, Myke (1992) *User Interfaces for Geographical Information Systems*
School of Information Studies, Syracuse University
Supervisor – Michael Eisenberg
- Langran, Gail (1989) *Temporality in Geographic Information Systems*
Department of Geography, University of Washington
Supervisor – Nick Chrisman
- Mower, James (1988) *The Selection, Implementation and Evaluation of Heuristics for Automated Cartographic Name Placement*
Department of Geography, SUNY-Buffalo
Supervisor – David Mark
Currently Professor of Geography, State University of New York at Albany
- Beard, M. Kate (1987) *Multiple Maps from a Detailed Data Base: A Scheme for Automated Generalization*
School of Land Resources, University of Wisconsin-Madison
Supervisor – Nick Chrisman
Currently Professor Computing and Information Science, University of Maine

Member of the following Masters Committees (only completed degrees are listed)

- Tuccillo, Joseph U. Colorado – Boulder – Geography (defended May 2015)
Principal Advisor – Seth Spielman
- Bock, Andrew U. Colorado – Boulder – Geography (defended November 2010)
Principal Advisor – Stefan Leyk
- Motta, David U. Colorado – Boulder – Computer Science (defended April 2008)
Principal Advisor – Tamara Sumner
- Petchprayoon, Pakorn U. Colorado – Boulder – Geography (defended January 2008)
Principal Advisor – Peter Blanken
- Krasnow, Kevin U. Colorado – Boulder – Geography (defended April 2007)
Principal Advisor – Tom Veblen
- Holmberg, Molly U. Colorado – Boulder – Geography (defended April 2007)
Principal Advisor – Ken Foote
- Bauman, Vanessa U. Colorado – Boulder – Geography (defended April 2004)
Principal Advisor – Ken Foote
- Viger, Roland U. Colorado – Boulder – Geography (defended May 2004)
Principal Advisor – Jeremy Mennis
- Witmer, Frank U. Colorado – Boulder – Geography (defended May 2003)
Principal Advisor – John O’Loughlin
- Haessig, Jennifer U. Colorado-Boulder Museum Studies (defended March 2003)
Supervisor - Linda Cordell

Sibold, Jason	U. Colorado – Boulder – Geography (defended April 2001) Principal Advisor – Tom Veblen
Platt, Rutherford	U. Colorado – Boulder – Geography (defended May 2001) Principal Advisor – Jim Huff
James, Katherine	U. Colorado - Denver - Preventative Medicine and Biometrics (M.S. Public Health - defended June 2000) Principal Advisor - Jim Ruttenber (deceased)
Bialecki, Adam	U. Colorado – Boulder – Geology (defended October 1997) Principal Advisor - Karl Mueller
Rokoske, Keith	U. Colorado-Boulder (defended May 1997) Principal Advisor - Mark Kumler
Talbot, Paul	U. Colorado-Boulder Geography (defended April 1996) Supervisor - John O'Loughlin

Graduate Recruitment from Federal Agencies: (funded by agencies, working toward degrees)

Sven Arve Saga (1992)	Norwegian Federal Mapping Agency, Trondheim, Norway
John Kick (1991)	USDA Natural Resources Conservation Service
David Carey (1990)	Defense Mapping Agency (DMA)
Frank Fico (1990)	DMA (1 yr. Funding DMA Long Term Instruction Program)
Thomas Kress (1990)	DMA (1 yr. Funding DMA Long Term Instruction Program)
Michael Mulligan (1990)	DMA (1 yr. Funding DMA Long Term Instruction Program)

Undergraduate Student Mentoring

Supervised Undergraduate Honor's Thesis (Colorado)

Sycuro, Jesse	Mar 2000	Spatial Error Propagation and Production in GIS
---------------	----------	---

Member of Undergraduate Honor's Thesis (Colorado)

Krueger, Rachel	April 2015	Sedimentology of the Codell Sandstone in Northern Colorado (Geology, David Budd Advisor)
Meluso, Anthony	April 2015	Reinvention: A Spatial History of Westwood [Colorado] (Geography, Bill Travis Advisor)
Erin Arnold	April 2010	Effects of Area and Isolation on <i>Bartonella</i> Species Richness in Black-Tailed Prairie Dog (<i>Cynomys ludovicianus</i>) Colonies (Ecology and Evolutionary Biology, Andrew Martin Advisor)

Supervised Undergraduate Research Assistant (Colorado)

Meg Brantley	June-August 2016	Surface-Adjusted Distance Metrics for Terrain Analysis (funded by CU Grand Challenge "Earth Lab")
--------------	------------------	--

Undergraduate Teaching Interns:

Each semester I invite undergraduate majors who have completed one of the lab courses (Cartographic Design or Introductory GIScience or GIS Modeling) to work the following semester as undergraduate teaching interns. This gives extra assistance for students enrolled in the course, and gives the teaching interns additional experience in problem-solving in a GIS environment. Some of these students are working towards teaching careers and this provides an opportunity for in-service learning.

2020 Spring Semester	GEOG 4103 (GIS Spatial Analytics)	Matt Arnold, Buddy Collins, Hannah Walters
2019 Spring Semester	GEOG 4103 (GIS Spatial Analytics)	Zehra Cheatham, Angela Gonzalez, Will Keenan
2018 Fall Semester	GEOG 4103 (Intro. GIScience)	Britton Sears, Ryno DeVilliers, Dylan Murphy
	GEOG 4203 (GIS Modeling)	Calvin Lietz
Spring Semester	GEOG 4103 (Intro. GIScience)	Brian Lane, Yvonne Krumrey, Calvin Lietz
2017 Fall Semester	GEOG 3053 (Cartographic Design)	Taylor Chouinard, Brian Schleckser, Brian Lane, Katie Gannon
Spring Semester	GEOG 3053 (Cartographic Design)	Andrew Tripp, Reid Blankenship, Claudia Shealy
2016 Fall Semester	GEOG 3053 (Cartographic Design)	Kelsey Rodriguez, Ben Shipley, Mackenzie Johnson
	GEOG 4103 (Intro. GIScience)	Blake Bullard, Nick Venzke, Nick Whittemore
Spring Semester	GEOG 4103 (Intro. GIScience)	Caitlin McShane, Josh Patterson, Kate Gregory, Meg Brantley
	GEOG 3053 (Cartographic Design)	Brooke Long, Josh Temes, Meg Brantley, Pete Albertson
2015 Fall Semester	GEOG 4103 (Intro. GIScience)	Kate Gregory, Emily Gulick, Jesse Nestler
	GEOG 3053 (Cartographic Design)	Brett Heitshusen, Garrick Northup, Brent Denys, Andy Eaman
Spring Semester	GEOG 4103 (Intro. GIScience)	Molly Graber, Anthony Meluso, Hannah Smith
	GEOG 3053 (Cartographic Design)	Caitlin McShane, Anthony Stone
2014 Fall Semester	GEOG 4103 (Intro. GIScience)	Luke Schmitt, Patrick Sine
	GEOG 3053 (Cartographic Design)	Jenny Bloom
Spring Semester	GEOG 4103 (Intro. GIScience)	Costa Raptis, Will Rempel
	GEOG 3053 (Cartographic Design)	Eva Adler, Jenny Bloom, Mackenzie Boshier
2013 Fall Semester	GEOG 3053 (Cartographic Design)	Jessica Bobeck, Will Rempel
Spring Semester	GEOG 3053 (Cartographic Design)	Bryan Hankinson, Whit Willson
2012 Fall Semester	GEOG 3053 (Cartographic Design)	Michal Fagrelus, Dan Snyder
Spring Semester	GEOG 3053 (Cartographic Design)	Alex Miller, Lisa Weber, Ben Bellman

2011		
Fall semester	GEOG 3053 (Cartographic Design) GEOG 4103 (Intro. GIScience)	Robert Arntz, Thomas Lees Joanna Pearce, Denise Yogerst
Spring semester	GEOG 3053 (Cartographic Design) Lab Exercise Conversion to Arc 10	Tom Brennan, Nathan Martin Marc Miller, Nate Diaz
2010		
Fall semester	GEOG 3053 (Cartographic Design)	Tomas Pilius
Spring semester	GEOG 3053 (Cartographic Design) GEOG 4103 (Intro. GIScience)	Mike Laxer, Nick Ray Theo Spinelli
2009		
Fall semester	GEOG 3053 (Cartographic Design)	Julie Cuypers, Julie Hayes
Spring semester	GEOG 3053 (Cartographic Design)	Stacy Smith
2008		
Fall semester	GEOG 4103 (Intro. GIScience)	Alex Durant
Spring semester	GEOG 4103 (Intro. GIScience)	Janel Day
2005 - 2007	Reduced Teaching Load due to Administrative Duties	
2004		
Fall semester	GEOG 4103 (Intro. GIScience)	Anna Milan, Josh Magarek
Spring semester	GEOG 4103 (Intro. GIScience)	Luke Zukiewicz
2003		
Fall semester	GEOG 4103 (Intro. GIScience)	Miranda Lavrakis
Spring semester	GEOG 4103 (Intro. GIScience)	Luke Zukiewicz

PUBLICATIONS

(* student co-authors; ^Ωpostdoctoral co-authors)

Books

- 2004 Bishop, A, Van House, N, and Buttenfield, BP. (Eds.) *Digital Library Use: Social Practice in Design and Evaluation*. Cambridge, Mass.: MIT Press
- 1991 Buttenfield, BP and McMaster, R.B. (Eds.) *Map Generalization: Making Rules for Knowledge Representation*. New York: Longman. (1st Printing, 1991; 2nd Printing 1994 Longman Scientific; 3rd printing 1999 Internet-Print-on-Demand: Wiley & Sons)

Articles in Refereed Journals

- 2020 Parr DA and Buttenfield BP. The Effectiveness and Perceptions of GPS Field Exercises in Higher Education. Manuscript in preparation for submission to *Journal of Geography in Higher Education*.
- 2020 *Guler, D, *Charisoulis G, Buttenfield BP, and Yomralioglu T. Suitability Modeling and Sensitivity Analysis for Renewable Energy Facilities in Turkey. *Renewable and Sustainable Energy Reviews* (under review; submitted February 2020)
- 2020 Stanislawski, LV, Wolock DM, and Buttenfield, BP. A flow accumulation model to estimate 1:24,000-scale hydrographic drainage patterns. In preparation for submission to *Water Resources Journal*.

- 2019 ^ΩQiang Y, Buttenfield BP and Joseph M. Systematic Evaluation of Surface-Adjusted Distance measurements Using an HPC-Enabled Monte Carlo Simulation. Manuscript submitted to *Geographical Analysis*. August 2019 (conditionally accepted December 2019; under revision).
- 2019 Buttenfield BP, ^ΩQiang Y, *Ghandehari M and *Charisoulis G. The Earth is Not Flat: Surface-Adjusted Terrain Metrics to Refine Geospatial Models. *Cartography and Geographic Information Science*, Special Issue for the U.S. National Report: 47-50.
- 2019 Kronenfeld BJ, Stanislawski LV, Buttenfield BP, and Brockmeyer T. Simplification of Polylines by Segment Collapse: Minimizing Areal Displacement While Preserving Area. *International Journal of Cartography* <https://doi.org/10.1080/23729333.2019.1631535> .
- 2019 *Ghandehari, M, Buttenfield BP, and Farmer CJQ. Comparing the Accuracy of Interpolated Terrain Elevations Across Spatial Resolution. *International Journal of Remote Sensing* 40(13): 5025-5049. <https://doi.org/10.1080/01431161.2019.1577581>
- 2018 Stanislawski LV, Finn MP, and Buttenfield BP. Classifying Physiographic Regimes on Terrain and Hydrologic Factors for Adaptive Generalization of Stream Networks. *International Journal of Cartography*: 1-17. <http://dx.doi.org/10.1080/23729333.2018.1443759>
- 2017 Stanislawski LV, Liu Y, Wendel J, and Buttenfield BP. An Open Source Solution to High Performance Processing for Extracting Surface Water Drainage Networks from Diverse Terrain Conditions. *Cartography and GIScience* 45(4): 319-328. <http://dx.doi.org/10.1080/15230406.2017.1337524>
- 2017 ^ΩRuther MH, Leyk S, and Buttenfield BP. Deriving Small Area Mortality Estimates Using a Probabilistic Reweighting Method. *Annals, American Association of Geographers* 107(6):1299-1314. <http://dx.doi.org/10.1080/24694452.2017.1320213>
- 2017 *Stum, AK, Buttenfield BP, and Stanislawski LV. Partial Polygon Pruning of Hydrographic Features in Automated Generalization. *Transactions in GIScience*: 21(5): 1061-1078 <https://doi.org/10.1111/tgis.12270>
- 2016 *Zoraghein H, Leyk S, ^ΩRuther M, and Buttenfield BP. Exploiting Temporal Information in Parcel Data to Refine Small Area Population Estimates. *Computers Environment and Urban Systems* 58(July): 19-28. DOI: <http://dx.doi.org/10.1016/j.compenvurbsys.2016.03.004>
- 2016 *Wendel J, Buttenfield BP, and Stanislawski LV. An Evaluation of Unsupervised and Supervised Learning Algorithms for Clustering Landscape Types in the United States. *Cartography and GIScience* 43(3): 233-249. DOI:10.1080/15230406.2015.1067829
- 2015 Stanislawski LV, Falgout, J and Buttenfield BP. Automated Extraction of Natural Drainage Density Patterns for the Conterminous United States through High Performance Computing. *The Cartographic Journal* 52(2): 185-192.
- 2015 Stanislawski LV, Buttenfield BP, and Doumbouya A. A Rapid Approach for Automated Comparison of Independently Derived Stream Network Data. *Cartography and GIScience* 42(5): 435-448. DOI:10.1080/15230406.2015.1060869
- 2015 Buttenfield BP, ^ΩRuther MH, and Leyk, S. Exploring the Impact of Dasymetric Refinement on Spatiotemporal Small Area Estimates. *Cartography and GIScience* 42:5, 449-459. DOI: 10.1080/15230406.2015.1065206

- 2015 ^ΩRuther MH, Leyk S. and Buttenfield BP. Comparing the Effects of an NLCD-Derived Dasymetric Refinement on Estimation Accuracies for Multiple Areal Interpolation Methods. *GIScience and Remote Sensing* 52(2):158-178. DOI: 10.1080/15481603.2015.1018856
- 2014 *James, KA, Meliker, JR, Buttenfield, BP, Byers, T, Ozerbe, GO, Hokanson, JE, and Marshall, JA. Predicting Arsenic Concentrations in Groundwater of San Luis Valley: Implications for Individual Level Lifetime Exposure Assessment. *Environmental Geochemistry and Health* 36: 773-782; <http://dx.doi.org/10.1007/s10653-014-9595-6> .
- 2014 Leyk, S, ^ΩRuther, MH, Buttenfield, BP, Nagle, NN and *Stum, AK. Modeling Residential Developed Land in Rural Areas: A Size-Restricted Approach Using Parcel Data. *Journal of Applied Geography* 47: 33-45. <http://dx.doi.org/10.1016/j.apgeog.2013.11.013>
- 2014 Nagle NN, Buttenfield BP, Leyk S and Spielman SE. Dasymetric Modeling and Uncertainty. *Annals of the Association of American Geographers*, 104(1): 80-95 <http://dx.doi.org/10.1080/00045608.2013.843439>
- 2013 ^ΩRuther, M, *Maclaurin, G, Leyk, S, Buttenfield, BP, and Nagle, NN. Validation of Spatially Allocated Small Area Estimates for 1880 Census Demography. *Demographic Research* 29 (22): 579-616. <http://dx.doi.org/10.4054/DemRes.2013.29.22> Editor's Choice Award
- 2013 Brewer, CA, Stanislawski, LV, Buttenfield, BP, *Sparks, K, *McGilloway, J and *Howard, MA. Automated Thinning of Road Networks and Road Labels for Multiscale Design of *The National Map* of the United States. *Cartography and Geographic Information Science* 40(4): 259-270. DOI: 10.1080/15230406.2013.799735
- 2013 Leyk, S, Buttenfield, BP, Nagle, NN, and *Stum, AK. Establishing Relationships between Parcel Data and Land Cover for Small Area Estimation. *Cartography and Geographic Information Science* 40(4): 305-315, DOI: 10.1080/15230406.2013.782682
- 2013 Leyk, S, Buttenfield, BP and Nagle, NN. Modeling Ambiguity in Census Microdata Allocations to Improve Demographic Small Area Estimates. *Transactions in Geographic Information Science* 17(3): 406-425. DOI: 10.1111/j.1467-9671.2012.01366.x/pdf
- 2013 Leyk, S, Nagle, NN and Buttenfield, BP. Maximum Entropy Dasymetric Modeling for Demographic Small Area Estimation Under Uncertainty. *Geographical Analysis* 45(3): 285-306
- 2011 Buttenfield, BP, Stanislawski, LV and Brewer, CA. Adapting Generalization Tools to Physiographic Diversity for the USGS National Hydrography Dataset. *Cartography and GIScience* 38(3): 289-301
- 2011 Stanislawski, LV and Buttenfield, BP. Hydrographic Generalization Tailored to Dry Mountainous Regions. *Cartography and GIScience* 38(2): 117-125
- 2011 *Anderson-Tarver C, Leyk S, Buttenfield BP. Fuzzy Modeling of Geometric Textures for Identifying Archipelagos in Area-Patch Generalization. *Cartography and GIScience* 38(2): 137-146
- 2010 Brewer, CA and Buttenfield, BP. Mastering Map Scale: Balancing Workloads Using Display and Geometry Change in Multi-Scale Mapping. *Geoinformatica* 14(2):221-239 DOI 10.1007/s10707-009-0083-6

- 2009 *Wendel, J, Buttenfield, BP, and *Smith, J. Spatializing a GIS Software Toolbox. *Kartographische Nachrichten* 5: 257-263
- 2007 Brewer, CA, and Buttenfield, BP. Framing Guidelines for Multi-Scale Map Design Using Databases at Multiple Resolutions. *Cartography and GIScience* 34(1): 3-15
- 2002 *Tsou, MH, and Buttenfield, BP. A Dynamic Architecture for Distributed Geographic Information Services. *Transactions in GIS* 6(4): 355- 381
- 2002 Buttenfield, BP and Reitsma, R. Loglinear and Multidimensional Scaling Models of Digital Library Use. *International Journal of Human-Computer Systems* 57: 101-119
- 2001 *Fabrikant, SI and Buttenfield, BP. Formalizing Semantic Spaces for Information Access. *Annals, Association of American Geographers*, 91(2): 263–280
- 2000 *Leitner, M and Buttenfield, BP Guidelines for the Display of Attribute Certainty. *Cartography and GIScience* 27(1): 3-14
- 1999 Harvey, F, Buttenfield, BP and Lambert, SC. Integrating Geodata Infrastructures from the Ground Up. *Photogrammetric Engineering and Remote Sensing*, Special Issue on GIS and Local Government (James Merchant, Ed.): 1287-1291
- 1999 Buttenfield, BP. Usability Evaluation of Digital Libraries. *Science and Technology Libraries*, 17(3/4): 39-59
- 1998 Buttenfield, BP. Looking Forward: Geographic Information Services and Libraries in the Future. *Cartography and GIScience* 25(3): 161-171
<http://dx.doi.org/10.1559/152304098782383124>
- 1997 Buttenfield, BP Talking in the Tree House: Communication and Representation in Cartography. *Cartographic Perspectives*, 27(1): 20-23
- 1996 *Zhan, F and Buttenfield, BP Multi-Scale Representations of Digital Cartographic Lines. *Cartography and GIScience*, 23(4): 206 – 228
- 1995 *Leitner, M and Buttenfield, BP. Acquisition of Procedural Cartographic Knowledge by Reverse Engineering. *Cartography and GIScience*, 22(3): 232-241
- 1995 *Zhan, F and Buttenfield, BP. Knowledge-Based Selection of Map Design Symbols. *International Journal of Geographic Information Systems*, 9(3): 293-315
- 1995 DeCola, L and Buttenfield, BP. Multiscale Mapping for the NSDI: Data Modeling and Representation. *International Journal for Geomatics*, 9(3): 6-9
- 1994 Buttenfield, BP. Representing Spatial Data Quality. *Cartographica*, vol.30(2/3): 1-7
- 1994 Buttenfield, BP and *Weber, CR Proactive Graphics for Exploratory Visualization of Biogeographical Data. *Cartographic Perspectives*, 19(3): 8-18
- 1994 Kottman, C. and Buttenfield, BP. Standards for Spatial Data Use: Similes Improve Understanding. *Cartography and GIScience*, 21(3): 140-144

- 1994 *Wu, C.V. and Buttenfield, BP. Spatial Data Quality and its Evaluation. *Computers, Environment and Urban Systems*, 18(3): 153-165
- 1993 *Weber, CR and Buttenfield, BP. A Cartographic Animation of Average Yearly Surface Temperatures for the 48 Contiguous United States: 1897-1986. *Cartography and GIS*, 20(3): 141-150
- 1992 Weibel, WR and Buttenfield, BP. Improvement of GIS Graphics for Analysis and Decision-Making. *International Journal of Geographic Information Systems*, 6(3): 223-245
- 1992 Buttenfield, BP. An Analysis of American Cartographic Association (ACA) Membership Survey Responses. *Cartography and GIScience*, 19(1): 48-51
- 1990 *Wu, CV and Buttenfield, BP. Reconsidering Rules for Point Feature Name Placement. *Cartographica*, 27(4): 10-27
- 1989 Buttenfield, BP. Scale-Dependence and Self-Similarity in Cartographic Lines. *Cartographica*, 26(1): 79-100
- 1989 *Leonard, JJ and Buttenfield, BP. An Equal Value Gray Scale for Laser Printer Output. *The American Cartographer*, 16(2): 97-109
- 1987 Buttenfield, BP. Automatic Identification of Cartographic Lines. *The American Cartographer*, 14(1): 7-20. DOI 10.1559/152304087783875372
- 1986 Buttenfield, BP. Comparing Distortion on Sketch Maps and MDS Configurations. *Professional Geographer* 38(3): 238-246
- 1985 Buttenfield, BP. Treatment of the Cartographic Line. *Cartographica*, 22(2): 1-26

Book Chapters

- 2020 Buttenfield BP. GIScience. Invited Chapter for Rey S and Franklin R (Eds) *Handbook of Spatial Analysis in the Social Sciences*. New York: Edward Elgar. (In preparation for submission May 1 2020)
- 2020 Buttenfield BP. Cartographic Modeling. Chapter in preparation for submission to Wilson J (ed.) *Geographic Information Science and Technology Body of Knowledge (GIS&T BoK)*. To be published by ScholarOne and maintained by University Consortium of Geographic Information Science (<https://gistbok.ucgis.org>) (invited submission).
- 2019 Buttenfield BP, Stanislawski LV, Kronenfeld BJ and Shavers E. The 4th Paradigm in Generalization and Multiple Representation: Modernizing the National Geospatial Data Infrastructure. Invited Chapter for Werner M and Chiang YY (Eds) *Handbook of Big Geospatial Data*. Berlin: Springer Verlag (in press).
- 2015 Buttenfield BP. Representing Uncertainty and Reliability. In: Monmonier, M.S. (ed.) *Cartography in the Twentieth Century*, Volume Six of the *History of Cartography* (Edney, M, Woodward, D. and Harley, B. (series eds.). Madison, WI: University of Wisconsin Press: 1642-1644. Invited submission.

- 2014 Stanislawski, LV, Buttenfield, BP, *Bereuter, P, Savino, S and Brewer CA. Generalization Operators. Chapter 6 in: Burghardt, D, Duchêne, C and Mackaness, WA. (Eds.) *Abstracting Information in a Data Rich World: Methodologies and Applications of Map Generalization*. Berlin: Springer Lecture Notes in Geoinformation and Cartography: 157-195. DOI 10.1007/978-3-319-00203-3
- 2014 Duchêne C, Baella B, Brewer CA, Burghardt D, Buttenfield BP, Gaffuri J, Kauferle D, Lecordix F, Maugeais E, Nijhuis R, Pla M, Post M, Regnauld N, Stanislawski LV, Stoter J, Toth L, Urbanke S, van Altena V, Wiedemann A. Generalization in Practice Within National Mapping Agencies. Chapter 11 in: Burghardt, D, Duchêne, C and Mackaness, WA. (Eds.) *Abstracting Information in a Data Rich World: Methodologies and Applications of Map Generalization*. Berlin: Springer Lecture Notes in Geoinformation and Cartography: 329-391. DOI 10.1007/978-3-319-00203-3
- 2013 Buttenfield, BP. Whatever Happened to the Statistical Solid? Chapter 9 in: Barry Wellar (Ed.) *AutoCarto Six Retrospective*. Ottawa, Canada: Information Research Board: 71-78. http://www.wellar.ca/wellarconsulting/AutoCarto_Six_Retrospective.pdf
- 2006 Edsall, R, Buttenfield, BP, Andrienko, G and Andrienko, N. Interactive Maps for Exploring Spatial Data. In Madden, M. (ed.) *2006 Manual of GIS*. Washington DC: American Society for Photogrammetry and Remote Sensing
- 2004 Yuan, M, Buttenfield, BP, Gahegan, M, and Miller, H. Geospatial Data Mining and Knowledge Discovery. Chapter 14 in: McMaster, R.B. and Usery, E. L. *A Research Agenda for Geographic Information Science*. New York: CRC Press
- 2004 Buttenfield, BP. Allometric Models of Knowledge Accumulation. In: Baillie, C, Dunn, E and Zheng, Y. (Eds.) *Traveling Facts: The Social Construction, Distribution and Accumulation of Knowledge*. St. Martin's Press <http://www.colorado.edu/geography/babs/papers/allometry.html>
- 2003 Van House, N Bishop, A and Buttenfield, BP. Digital Libraries as Sociotechnical Systems. In: Bishop, A, Buttenfield, BP and Van House, N. (Eds.) *Digital Library Use: Social Practice in Design and Evaluation*. Cambridge, Mass.: MIT Press: 1-21
- 2000 Buttenfield, BP. Visualizing Ecological Uncertainty. Chapter 6 in Hunsaker, C, Goodchild, M.F, Friedl, M. and Case, T. (Eds.) *Uncertainty in Spatial Data for Ecological Analyses*. New York: Springer-Verlag: 115-132. <http://www.colorado.edu/geography/babs/papers/nceas.html>
- 1999 Beard, MK and Buttenfield, BP. Detecting Errors by Graphical Methods. Chapter 15 in Longley, Goodchild, Maguire and Rhind (Eds) *Geographical Information Systems: Principles, Techniques, Management and Applications*. London: Longman: 219-233
- 1997 McMaster, RB and Buttenfield, BP. Formalizing Cartographic Knowledge. In: Craglia, M. and Couclelis, H. (Eds) *Geographic Information Research: Bridging the Atlantic*. London: Taylor and Francis: 205-223
- 1996 Buttenfield, BP. Scientific Visualization for Environmental Modeling: Interactive and Proactive Graphics. In: Goodchild, MF, Steyaert, LT, Parks, BO, Johnston, C, Maidment, D, Crane, M and Glendenning, S. (Eds.) *GIS and Environmental Modeling*. Fort Collins, CO: GIS World Books: 463-469

- 1996 Buttenfield, BP. GIS and Digital Libraries: Issues of Size and Scalability. In Smith, L.C. and Gluck, M. (eds.) *GIS and Libraries: Patrons, Maps and Spatial Data*. Champaign-Urbana: University of Illinois Press: 69-80
- 1996 Kumler, MP and Buttenfield, BP. Gender Differences in Map Reading Abilities: What Do We Know? What Can We Do? To appear in Wood, C. H. and Keller, C.P. (Eds.) *Cartographic Design: Theoretical and Practical Perspectives*. Toronto: John Wiley and Sons: 125-137
- 1995 Buttenfield, BP. Object-Oriented Map Generalization: Modeling and Cartographic Considerations. In: Muller, J.C, Lagrange, J.P. and Weibel, R (Eds.) *GIS and Generalization: Methodology and Practice*. London: Taylor and Francis, GISDATA Series volume 1: 91-105
- 1993 Buttenfield, BP and *Weber, CR. Visualization and Hypermedia in GIS. Invited Chapter in Medyckyj-Scott, D. and H. Hearnshaw, (Eds.) *Human Factors in Geographic Information Systems*. London: Belhaven Press: 136-147
- 1993 Goodchild, MF, Buttenfield, BP, and Wood, J. Issues of Data Validity. In Hearnshaw, HM and Unwin, DJ. (Eds.) *Visualization in Geographic Information Systems*. London: Belhaven Press: 141-149
- 1993 Buttenfield, BP and Beard, MK. Graphic and Geographic Components of Data Quality. In Hearnshaw, HM and Unwin, DJ (Eds.), *Visualization in Geographic Information Systems*. London: Belhaven Press: 150-157
- 1992 MacEachren, AE, Buttenfield, BP, Campbell, JC, DiBiase, D and Monmonier, MS Visualization. In: Abler, RA, Olson, JM and Marcus, NG. *Geography's Inner World*. New Brunswick, NJ: Rutgers University Press: 99-137
- 1991 Buttenfield, BP. A Rule for Describing Line Feature Geometry. In Buttenfield, BP and McMaster, R.B. (Eds.) *Map Generalization: Making Rules for Knowledge Representation*. London: Longman: 150-171
- 1991 Buttenfield, BP and Mackaness, WA Visualization. In *GIS: Principles and Applications*. (Eds. MacGuire, D, Goodchild, MF and Rhind D.) London: Longman Publishers Ltd, Volume 1, Chapter 28: 427-443
- 1991 Buttenfield, BP and Mark, DM. Expert Systems in Cartographic Design. In: Taylor, DRF (Ed.) *Geographic Information Systems: The Microcomputer and Modern Cartography*. Oxford: Pergammon Press: 129-150
- 1983 Buttenfield, BP, Introduction to Data Handling. Chapter 1 in Part IV of Buttenfield, BP and Kohlenberg, EG (Eds). *DATAMAN: Guide to Computer-Assisted Data Analysis at the University of Washington*. Seattle: Center for Social Science Computation and Research: 1-9
- 1983 Buttenfield, BP, Data Representation. Chapter 2 in Part IV of Buttenfield, BP and Kohlenberg, EG (Eds.) *DATAMAN: Guide to Computer-Assisted Data Analysis at the University of Washington*. Seattle: Center for Social Science Computation and Research: 10-45

Commentary

- 2019 Buttenfield BP and Kelly SM. Teaching Best Practices Is a Must. Redlands, CA: ESRI ArcNews Fall 2019 issue: 29 (invited submission).

- 1998 Buttenfield. BP. John Clinton Sherman: In Memoriam. *Cartography and GIScience*, 25(3): 188-190
- 1997 Buttenfield. BP. Why Don't We Do It on the Web? Distributing Geographic Information via the Internet. *Transactions in GIS*, Invited Editorial 2(1): 3-7
- 1997 Buttenfield. BP. The Future of the Spatial Data Infrastructure: Delivering Geospatial Data. *GeoInfo Systems*, June 1997: 18-21
- 1996 Buttenfield. BP. Surveying the Future: Interview on Cartography and the Future, *ACSM Bulletin*, No. 160, March, 1996: 23-26
- 1994 Wortman, K and Buttenfield, BP. Standards. *Cartography and GIScience*, Preface to Special Issue on Spatial Data Standards, 21(3): 131
- 1993 Buttenfield, BP. Representing Data Quality. *Cartographica*, Introduction to Special Issue on Mapping Data Quality (BP Buttenfield, Guest Editor), 30(2/3): 1-7
- 1993 Buttenfield, BP. Review and Commentary on Cartographic Papers Presented at the New Orleans ACSM Meeting. *ACSM Bulletin*, No. 142, March
- 1992 Buttenfield, BP. Quality and Availability of Spatial Information: Cartography and the Year in Review. *ACSM Bulletin*, No. 135, January: 30-33

Refereed Conference Proceedings

- 2020 Guler D, Charisoulis G, Buttenfield BP, and Yomralioglu T. Biomass Facility Suitable Location Selection with Open-Source GIS and MCDM. *Annual Meetings of the Association of American Geographers Energy Specialty Group Research Competition*, Denver CO, 6-10 April 2020 (submitted January 2020; meeting cancelled due to COVID-19 outbreak)
- 2019 *Deng JX, Kronenfeld BJ, Buttenfield BP and Stanislawski LV. Alternate Definitions of Linear and Areal Displacement Between Polylines: The Plot Thickens. *Proceedings 21st ICA Workshop on Automated Generalization and Multiple Representation*, Tokyo Japan July 2019.
- 2019 Stanislawski LV, Buttenfield BP, Kronenfeld BJ and Shavers EJ. Scale-Specific Metrics for Adaptive Generalization and Geomorphic Classification of Stream Features. *Proceedings ICA Workshop on Abstraction, Scale, and Perception*, Tokyo Japan July 2019.
- 2019 Stanislawski LV, Buttenfield BP, Kronenfeld BJ, and Shavers EJ. Automated Geomorphic Classification of River Systems for Adaptive Generalization of Stream Features. *Proceedings 29th International Cartographic Congress (ICC2019)*, Tokyo Japan, July 2019.
- 2018 ^ΩQiang, Y, Buttenfield BP, Lam NS-N, and Van de Weghe N. Novel Models for Multi-Scale Spatial and Temporal Analyses. *Proceedings 10th International Conference on Geographic Information Science (GIScience 2018)* Melbourne Australia, 28-31 August 2018 LIPIcs Vol. 114, DOI: [10.4230/LIPIcs.GISCIENCE.2018.55](https://doi.org/10.4230/LIPIcs.GISCIENCE.2018.55).
<http://drops.dagstuhl.de/opus/volltexte/2018/9383/pdf/LIPIcs-GISCIENCE-2018-55.pdf>

- 2018 *Ghandehari M and Buttenfield BP. Slope-Adjusted Surface Area Computations and Error Propagation in Digital Terrain. *Proceedings of Geomorphometry 2018*, Boulder Colorado, August 2018. PeerJ Preprints 6:e27068v1 <https://doi.org/10.7287/peerj.preprints.27068v1>
- 2018 Kronenfeld, BJ, Stanislawski, LV, *Brockmeyer T and Buttenfield BP. Area-Preserving Simplification of Polygon Features. *Proceedings 22nd International Research Symposium on Computer-Based Cartography and GIScience (AutoCarto2018)*, Madison Wisconsin, 21-24 May 2018: 74-75. <https://www.ucgis.org/assets/docs/AutoCarto-UCGIS%202018%20Proceedings.pdf>
- 2018 Stanislawski LV, Kronenfeld BJ, Buttenfield BP, and *Brockmeyer T. Generalizing Linear Stream Features to Preserve Sinuosity for Analysis and Display: A Pilot Study in Multi-Scale Data Science. *Proceedings 22nd International Research Symposium on Computer-Based Cartography and GIScience (AutoCarto2018)*, Madison Wisconsin, 21-24 May 2018: 111-119. <https://www.ucgis.org/assets/docs/AutoCarto-UCGIS%202018%20Proceedings.pdf>
- 2017 Stanislawski LV and Buttenfield BP. Preserving Line Sinuosity in Hydrographic Feature Simplification. *Proceedings 20th ICA Workshop on Automated Generalization and Multiple Representation*, Washington, DC, 1-2 July 2017
- 2017 *Ghandehari M, Buttenfield BP, and Farmer CJQ. Cross-Scale Analysis of Sub-Pixel Variations in Digital Elevation Models. In: Peterson MP (Ed.) 2017 *Advances in Cartography and GIScience: Selections from the International Cartographic Conference 2017*. Berlin: Springer: Part VI, 359-373
- 2017 Stanislawski LV, Buttenfield BP, Liu Y, and Wendel J. High Performance Processing to Enhance the National Hydrography Dataset with Lidar-Derived Drainage Lines. *Proceedings 28th International Cartographic Congress (ICC2017)*, Washington D.C., July 2017
- 2016 Buttenfield BP, *Ghandehari M, Leyk S, Stanislawski LV, *Brantley ME and Qiang, Y. Measuring Distance “As the Horse Runs”: Cross-Scale Comparison of Terrain-Based Metrics. *Proceedings GIScience 2016* Montreal, Canada, <https://doi.org/10.21433/B3118rh987cz>
- 2016 *Tuccillo JV and Buttenfield BP. Model-Based Clustering of Social Vulnerability to Urban Extreme Heat Events. *Proceedings GIScience 2016* September, Montreal, Canada (long paper). Springer: 9927: 114-129 http://dx.doi.org/10.1007/978-3-319-45738-3_8
- 2016 *Zoraghein H, Leyk S, and Buttenfield BP. Building Consistent Multi-temporal Population Data at Fine Resolution through Spatially Refined Areal Interpolation. *Proceedings GIScience 2016* Montreal, Canada, Sept <http://escholarship.org/uc/item/89x537cr?view=search>
- 2016 Stanislawski LV, Wendel J, and Buttenfield BP. Open Source Concurrent Processing to Extract Drainage Channels from Diverse Terrain Conditions. *Proceedings AutoCarto2016*, Albuquerque New Mexico, September 2016
- 2016 *Zoraghein H, Leyk S, Buttenfield BP, and Ruther M. Spatio-temporal Small Area Analysis for Improved Population Estimation Based on Advanced Dasymmetric Refinement. *Proceedings AutoCarto2016*, Albuquerque New Mexico, September 2016
- 2016 Stanislawski LV, Liu Y, Buttenfield, BP, Survila K, Wendel J and Okok A. High Performance Computing to Support Multiscale Representation of Hydrography for the Conterminous United States. *Proceedings 19th ICA Workshop on Automated Generalisation for On-Demand*

Mapping, Helsinki, Finland, 14 June 2016

http://generalisation.icaci.org/images/files/workshop/workshop2016/genemr2016_paper_07.pdf

- 2016 ^ΩRuther, M, Leyk S, Buttenfield BP. Deriving Small Area Mortality Estimates Using a Probabilistic Reweighting Method. *Proceedings, Population Association of America Annual Meeting (PAA2016)*, Washington DC, 31 March – 2 April, Paper #3175
- 2015 Stanislawski, LV, Falgout J, and Buttenfield BP. Automated Extraction of Natural Drainage Density Patterns for the Conterminous United States through High Performance Computing. *Proceedings 27th International Cartographic Congress (ICC2015)*, Rio de Janeiro, Brazil, 23-28 August
- 2015 Stanislawski, LV, Buttenfield BP, * Raposo P, Cameron M, and Falgout J. Synoptic Evaluation of Scale Dependent Metrics for Hydrographic Line Feature Geometry. *Proceedings, 18th ICA Workshop on Generalization and Multiple Representations*, Rio de Janeiro, Brazil, 21-22 August
- 2015 *Zoraghein H, Leyk S, ^ΩRuther MH and Buttenfield BP. Deriving Spatially Refined Consistent Small Area Estimates over Time Using Cadastral Data. *Proceedings GeoComputation 2015*, Dallas Texas, May
- 2014 Buttenfield BP, ^ΩRuther MH, and Leyk S. Comparing Temporal Small Area Estimates With and Without Prior Dasymetric Refinement. *Proceedings, AutoCarto2014*, Pittsburgh, PA, 6-8 October
- 2014 *Stum AK, Buttenfield BP, and Stanislawski LV. Partial Polygon Pruning for National Hydrography Features Using Standards Based Constraints. *Proceedings, Auto-Carto 2014*, Pittsburgh PA, 6-8 October
- 2014 Stanislawski LV, Buttenfield BP, and Doumbouya A. Adding Value to the United States National Hydrography Dataset Through Automated Comparison with Elevation Derived Channels. *Proceedings, Auto-Carto 2014*, Pittsburgh PA, 6-8 October
- 2014 Leyk S, Buttenfield BP, and ^ΩRuther, MH. Dasymetric Refinement for Improved Temporal Small Area Analysis. *Proceedings, GIScience 2014*, Vienna, Austria, 23-26 September
- 2014 Stanislawski LV, Doumbouya AT, and Buttenfield BP. Hydrologically Consistent Pruning of the High Resolution National Hydrography Dataset to 1:24,000 Scale. *Proceedings American Water Resources Association Conference on GIS and Water Resources*, Salt Lake City Utah May
- 2013 Buttenfield, BP, Stanislawski, LV, *Anderson-Tarver, C, and *Gleason, MJ. Alternate Methods for Automatic Selection of Primary Paths through Braided Hydrographic Networks. *Proceedings, 16th ICA Workshop on Generalization and Multiple Representations*, Dresden Germany, 23-24 August 2013
- 2013 Buttenfield, BP, Stanislawski, LV, *Anderson-Tarver, C and *Gleason, MJ. Automatic Enrichment of Stream Networks with Primary Paths for Use in the United States National Atlas. *Proceedings, 26th International Cartographic Congress*, Dresden, Germany, August 2013
- 2013 Stanislawski, LV, Buttenfield, BP, Brewer, CA and *Anderson-Tarver, C. Integration Metrics for Cartographic Generalization: Assessment of 1:1,000,000 Scale Hydrography and Terrain. *Proceedings, 26th International Cartographic Congress*, Dresden, Germany, August 2013
http://generalisation.icaci.org/images/files/workshop/workshop2013/genemappro2013_submission_15.pdf

- 2013 Leyk, S, ^ΩRuther, M, Buttenfield, BP, and Nagle, NN. Identifying Residential Land in Rural Areas to Improve Dasymetric Mapping. *Proceedings, 26th International Cartographic Congress*, Dresden, Germany, August 2013
- 2013 Brewer, CA, Stanislawski, LV, and Buttenfield, BP. Labeling Through Scale Using Hierarchies of Thinned Road Networks for Design of *The National Map* of the United States. *Proceedings, 26th International Cartographic Congress*, Dresden, Germany, August 2013
- 2013 ^ΩRuther, M, *Maclaurin, G, Leyk, S, Buttenfield, BP, and Nagle, NN. Validating Small Area Population Estimates Using Historical Census Data. *Proceedings, Population Association of America Annual Meeting*, New Orleans, LA, April <http://paa2013.princeton.edu/papers/130471> (abstract is titled “A First Validation of Demographic Small Area Estimates”)
- 2012 Nagle, NN, Buttenfield, BP, Leyk, S, and Spielman, SE. An Uncertainty-Informed Penalized Maximum Entropy Dasymetric Model. *GIScience 2012 Short Paper Proceedings*, Columbus Ohio, September
- 2012 Stanislawski, LV, Doumbouya, AT, Miller-Corbett, CD, Buttenfield, BP and Arundel-Murin, ST. Scaling Stream Densities for Hydrologic Generalization. *GIScience 2012 Short Paper Proceedings*, Columbus Ohio, September
- 2012 Stanislawski, LV, Briat, MO, Punt, E, *Howard, M Brewer, CA, and Buttenfield, BP. Density Stratified Thinning of Road Networks to Support Automated Generalization for *The National Map*. *Proceedings, 15th Workshop, International Cartographic Association Commission on Generalisation and Multiple Representation*, Istanbul, Turkey, September http://generalisation.icaci.org/images/files/workshop/submissions2012/genemr2012_session5_sub1.pdf
- 2012 Leyk, S, Buttenfield, BP, Nagle, NN and *Stum, AK Landcover Data to Derive Related Ancillary Variables for Dasymetric Modeling. *Proceedings, Auto-Carto 12*, Columbus, Ohio, September
- 2012 *Stauffer, AJ, Buttenfield, BP, and Stanislawski, LV. Effects of Generalization on DEM Resolution. *Proceedings, Auto-Carto 12*, Columbus, Ohio, September
- 2012 Stanislawski, LV, *Raposo, P, *Howard, M and Buttenfield, BP. Automated Metric Assessment of Line Simplification in Humid Landscapes. *Proceedings, Auto-Carto 12*, Columbus, Ohio, September
- 2012 Brewer, CA, Stanislawski, LV, Buttenfield, BP, *Sparks, K and *Howard, M Thinned Road Networks for Multiscale Design of *The National Map* of the United States. *Proceedings, Auto-Carto 12*, Columbus, Ohio, September
- 2012 *Anderson Tarver, C, *Gleason, MJ, Buttenfield, BP, and Stanislawski, LV. Automated Centerline Delineation to Enrich the National Hydrography Dataset. *Proceedings GIScience 2012: 7th International Conference, GIS 2012*. In N, Xiao, M.P. Kwan, M. Goodchild, and S. Shekhar (eds). Lecture Notes in Computer Science. Springer LNCS 748: 15-28. DOI: 10.1007/978-3-642-33024-7
- 2012 *James, K, Meliker, JR, Buttenfield, BP, Byers, T, Zerbe, G, Hokanson, J, and Marshall, J. Using Geographic Information Systems to Predict Arsenic Concentrations in Groundwater of San Luis Valley, Colorado. *Geological Society of America Abstracts with Programs*, 44(6): 12. 64th Annual Meeting Geologic Society of America Rocky Mountain Section, Albuquerque, N.M, May

- 2011 Buttenfield, BP, Stanislawski, LV and Brewer, CA. A Comparison of Star and Ladder Strategies for Intermediate Scale Processing of USGS National Hydrography Dataset. *Proceedings, 14th Workshop of the International Cartographic Association Commission on Generalisation and Multiple Representation*, Paris France, July 2011
- 2011 Stanislawski, LV and Buttenfield, BP. A Raster Alternative for Partitioning Line Densities to Support Automated Cartographic Generalization. *Proceedings, 25th International Cartographic Congress*, Paris France, July 2011
- 2011 *Anderson-Tarver, C, and Buttenfield, BP, Stanislawski, LV and Koontz, J. Automated Delineation of Stream Centerlines for the USGS National Hydrography Dataset. *Proceedings 25th International Cartographic Congress: Advances in Cartography and GIScience* Paris France, Vol 1, Lecture Notes in Geoinformation and Cartography: 409-423
- 2011 *Wendel, J and Buttenfield, BP. Flexible Characterization of Cartographic Generalization Resources for an Online Self-Organizing Catalog. *Proceedings 25th International Cartographic Congress*, Paris France, 3-8 July 2011
- 2011 Brewer, CA, Buttenfield, BP, and Stanislawski, LV. Choosing Between Geometry Change and Display Change for Multiscale Mapping: The Role of Elimination in Design. *Proceedings, 14th Workshop of the International Cartographic Association Commission on Generalisation and Multiple Representation*, Paris France, July 2011
- 2010 Stanislawski, LV and Buttenfield, BP. Hydrographic Feature Generalization in Dry Mountainous Terrain. *Proceedings, AutoCarto 2010*, Orlando FL, November
- 2010 *Anderson-Tarver, C, Leyk, S and Buttenfield, BP. Identifying Vector Feature Textures Using Fuzzy Sets. *Proceedings, AutoCarto 2010*, Orlando FL, November
- 2010 Brewer, CA, *Hanchett, CL, Buttenfield, BP and Usery, EL. Performance of Map Symbol and Label Design with Format and Display Resolution Options Through Scale for The National Map. *Proceedings, AutoCarto 2010*, Orlando FL, November
- 2010 *Hamerlinck, JD and Buttenfield, BP. Evaluating Planning Support Technology Implementation in Local Government Planning. *Proceedings Association of Collegiate Schools of Planning 51st Annual Conference*, Minneapolis Minnesota, October
- 2010 Buttenfield, BP, Stanislawski, LV and Brewer, CA. Multiscale Representations of Water: Tailoring Generalization Sequences to Specific Physiographic Regimes. *GIScience 2010 Short Paper Proceedings*, Zurich, Switzerland, September
http://www.colorado.edu/geography/babs/webpage/publications/GIScience2010_Buttenfield_etal.pdf
- 2010 *Wendel, J and Buttenfield, BP. Formalizing Guidelines for Building Self-Organizing Maps. *GIScience 2010 Short Paper Proceedings*, Zurich, Switzerland, September. http://www.colorado.edu/geography/babs/webpage/publications/GIScience2010_Wendel_Buttenfield.pdf
- 2010 Stanislawski, LV, Buttenfield, BP and Samaranyake, VA. Automated Metric Assessment of Hydrographic Feature Generalization Through Bootstrapping. *Proceedings, 13th International Cartographic Association Symposium on Multiple Representations and Map Generalization*, Zurich Switzerland, September
http://generalisation.icaci.org/images/files/workshop/workshop2010/genemr2010_submission_11.pdf

- 2010 Leyk, S, Buttenfield, BP and Nagle, NN. Uncertainty in Demographic Small Area Estimates. *Proceedings 9th International Symposium on Spatial Accuracy Assessment (Accuracy 2010)*, Leicester, UK, July
http://www.colorado.edu/geography/babs/webpage/publications/Accuracy2010_Leyk_etal.pdf
- 2010 Nagle NN, Buttenfield BP and Leyk S. Estimating Spatially-Explicit Microdata by Using Data from Small Area Statistics and Public-Use Microdata: A New Method. *Proceedings of the 49th Annual Meeting of the Western Regional Science Association (WRSA)*, February 21-24, 2010, Sedona, AZ
- 2009 Brewer, CA, Buttenfield, BP, and Usery, EL. Evaluating Generalizations of Hydrography in Differing Terrains for *The National Map* of the United States. *Proceedings, International Cartographic Conference*, Santiago, Chile, November
http://www.personal.psu.edu/cab38/ScaleMaster/Brewer_etal_ICC2009_paper_Nov2009.pdf
- 2009 Stanislawski, LV, Buttenfield, BP, Finn, MP and Roth, K. Stratified Database Pruning to Support Local Density Variations in Automated Generalization of the United States National Hydrography Dataset. *Proceedings, International Cartographic Association Conference*, Santiago, Chile, November http://carto-research.er.usgs.gov/generalization/pdf/StatifedPruning_StanislawskiButtenfieldFinnRoth_ICC2009.pdf
- 2008 *Wolf, EB and Buttenfield, BP. Dimensional Collapse and Airports in Multi-Scale Mapping. *Proceedings, AUTO-CARTO 2008*, Shephardstown, West Virginia, September
http://www.cartogis.org/docs/proceedings/2008/wolf_butenfield.pdf
- 2008 *Wendel, J, Buttenfield, BP, *Viger, R, and *Smith, J. Characterizing Hydrology Commands: Spatialization with SOM Mapping. *Proceedings, GIScience 2008*, Park City Utah, September
- 2007 Buttenfield, BP and Frye, C. Re-Thinking Best Practices in Cartographic Data Capture and Modeling. *Proceedings, 23rd International Cartographic Association Conference*, Moscow, Russia, August
http://www.colorado.edu/geography/babs/webpage/publications/ICC2007_Buttenfield_Frye.pdf
- 2007 Buttenfield, BP and *Wolf, EB. ‘The Road the River Should Always Cross at the Bridge’ Problem: Establishing Internal and Relative Topology in a Multi-Resolution Data Base. *Proceedings, International Cartographic Association Symposium on Multiple Representations and Map Generalization*, Moscow, Russia, August
http://aci.ign.fr/BDpubli/moscow2007/Buttenfield_ICA_Workshop_2007.pdf
- 2007 Brewer, CA, Buttenfield, BP, Frye, C and *Acosta, J. Multi-Scale Mapmaking from Multiple Database Resolutions and for Multiple Map Purposes. *Proceedings, 23rd International Cartographic Association Conference*, Moscow, Russia, Augus.
http://www.personal.psu.edu/cab38/ScaleMaster/ICC2007_paper_Brewer_Buttenfield_Frye_Acosta_May31_07.pdf
- 2006 Buttenfield, BP. The Fallacy of the “Golden Feature in MRDBs: Data Modeling Versus Integrating New Anchor Data. *Proceedings, International Cartographic Association Symposium on Multiple Representations and Map Generalization*, Vancouver, Washington
<http://aci.ign.fr/Portland/paper/ICA2006-Buttenfield.pdf>

- 2006 Brewer, CA and Buttenfield, BP. Mastering Map Scale: Formalizing Guidelines for Multi-Scale Map Design. *Proceedings, AUTO-CARTO 2006*, Vancouver, Washington
http://www.cartogis.org/docs/proceedings/2006/brewer_buttenfield.pdf
- 2005 Buttenfield, BP and *Hultgren, T. Managing Multiple Representations of “Base Carto” Features: A Data Modeling Approach. *Proceedings, AUTO-CARTO 2005*, Las Vegas, NV
<http://www.cartogis.org/docs/proceedings/2005/buttenfield.pdf>
- 2005 Buckley, A, Buttenfield, BP, Frye, C and *Hultgren, T. An Information Model for Maps: Cartographic Production from GIS Databases. *Proceedings, International Cartographic Association Conference*, Á Caruna, Spain, July 2005
- 2002 Buttenfield, BP. Transmitting Vector Geospatial Data Across the Internet Progressively. *Proceedings, Second International GIScience Conference (GIScience 2002)*, Boulder Colorado, September 2002: 51-64
- 2000 Buttenfield, BP and *Cameron, DR. Scale Effects and Attribute Resolution in Ecological Modeling. *Proceedings GIS/EM4, 4th International Conference on Integrating Geographic Information Systems and Environmental Modeling*, September 2-8, 2000, Banff, Alberta, Canada. Boulder, Colorado: University of Colorado, Cooperative Institute for Research in Environmental Science. <http://www.colorado.edu/research/cires/banff>
- 1999 Buttenfield, BP and *Tsou, MH. Distributing an Internet-Based GIS to Remote College Classrooms. *Proceedings, ESRI User Conference*, San Diego, California, July 1999. Also on the Web at <http://greenwich.colorado.edu/babs/esri/p634.htm>
- 1999 Buttenfield, BP. Sharing Vector Geospatial Data on the Internet. *Proceedings, 18th Conference of the International Cartographic Association*, August 1999, Ottawa, Canada, Section 5: 35-44
Also on the Web at <http://greenwich.colorado.edu/babs/ottawa/ottawa.htm>
- 1999 Reitsma, R and Buttenfield, BP. Inductive Explorations of Information Space Geography. *Proceedings, Americas Conference on Information Systems (AMCIS)*, Milwaukee, WI, July
- 1998 *Tsou, MH and Buttenfield, BP. Client/Server Components and Metadata Objects for Distributed Geographic Information Services. *Proceedings, GIS/LIS '98*, Fort Worth, TX, November, 1998: 590-599
- 1998 Buttenfield, BP. Making the Case for Distributed Geolibraries. *Proceedings, Conference on Distributed Geolibraries*. Washington, DC: National Academy of Sciences, Mapping Science Committee, 15-16 June, 1997
- 1998 *Tsou, MH and Buttenfield, BP. An Agent-Based, Global User Interface for Distributed Geographic Information Services. *Proceedings 7th International Symposium on Spatial Data Handling*, Vancouver, British Columbia, July, 1998: 603 – 612
- 1997 *Fabrikant, SI and Buttenfield, BP. Envisioning User Access to a Large Data Archive. *Proceedings, GIS/LIS '97*, Cincinnati, Ohio, 27-29 November, 1997: 686-692
- 1997 *Smith, A and Buttenfield, BP. Georeferencing Historical Photographs for a Digital Library. *Proceedings, GIS/LIS '97*, Cincinnati, Ohio, 27-29 Nov, 1997: 340-344

- 1997 Buttenfield, BP. Delivering Maps to the Information Society: A Digital Library for Cartographic Data. *Proceedings, 17th Conference of the International Cartographic Association*, June 1997, Stockholm, Sweden: 1409 – 1416
- 1997 *Leitner, M and Buttenfield, BP. Cartographic Guidelines for Visualizing Attribute Accuracy. *Proceedings, AUTO-CARTO 13*, Seattle, WA, April, 1997: 184-194
- 1997 *Skupin, A and Buttenfield, BP. Spatial Metaphors for Display of Information Spaces. *Proceedings, AUTO-CARTO 13*, Seattle, Washington, April, 1997: 116-125
- 1996 Buttenfield, BP and Larson, S. Building a Digital Library for Earth System Science: The Alexandria Project. *Proceedings Geological Society of America Meetings*, Denver Colorado, November 1996: 23-27
- 1996 Buttenfield, BP and Goodchild, MF. The Alexandria Digital Library Project: Distributed Library Services for Spatially Referenced Data. *Proceedings, GIS/LIS '96*, Denver, Colorado, November 1996: 76-84
- 1996 *Leitner, M and Buttenfield, BP. The Impact of Data Quality Displays on Spatial Decision Support. *Proceedings, GIS/LIS '96*, Denver, Colorado, November 1996: 882-894
- 1996 *Skupin, A and Buttenfield, BP. Spatial Metaphors for Visualizing Very Large Data Archives. *Proceedings, GIS/LIS '96*, Denver, Colorado, November 1996: 607-617
- 1996 *Tsou, MH and Buttenfield, BP. A Direct Manipulation Interface for Geographical Information Processing. *Proceedings 6th International Symposium on Spatial Data Handling*, Delft, The Netherlands, August 1996: 13B.37 – 13B.47
- 1996 Buttenfield BP and McLafferty, S. Spatial Data in the Classroom: A Vision for Education. *Proceedings, Conference on The Future of Spatial Data and Society*. Washington, DC: National Academy of Sciences, Mapping Science Committee, and Federal Geographic Data Committee, 24-25 April, 1996. Paper on the Web at <http://greenwich.colorado.edu/babs/>
- 1996 Buttenfield, BP and Kumler, MP. “Tools for Browsing Environmental Data: The Alexandria Digital Library Interface.” *Proceedings 3rd International Conference on Integrating Geographic Information Systems and Environmental Modeling*. Santa Fe, New Mexico, January 21-26, 1996 (no page numbers). Paper on the Web at http://www.ncgia.ucsb.edu/conf/santa_fe_cd-rom/sf_papers/buttenfield_babs/babs_paper.html
- 1995 Buttenfield, BP. Scientific Visualization for Environmental Modeling: Interactive and Proactive Graphics. *Proceedings, 2nd International Conference on Integrating GIS and Environmental Modeling*, 26-30 September, Breckenridge, Colorado (no page numbers)
- 1995 Buttenfield, BP. User Evaluation for the Alexandria Digital Library Project. *Proceedings, “How We Do User-Centered Design and Evaluation of Digital Libraries: A Methodological Forum.”* Allerton, Illinois: Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign. <http://edfu.lis.uiuc.edu/allerton/95/s2/buttenfield.html>
- 1995 Buttenfield, BP. Generalization and Scalability of Digital Libraries. Closing Keynote Address, *Proceedings 32nd Annual Clinic of Library Applications of Data Processing*, 1-4 April, Champaign-Urbana, Illinois

- 1995 Buttenfield, BP. Evaluating User Requirements for a Digital Library Testbed. *Proceedings, AUTO-CARTO 12*, Charlotte, North Carolina, 27 February – 1 March: 207-214. Also on the World Wide Web at <http://www.odyssey.maine.edu/gisweb>
- 1995 *Weber, CR, Buttenfield, BP and Jelinski, DL. A Case Study for Hypermedia Cartography: Radial Growth in Trembling Aspen at Waterton Lakes National Park. *Proceedings, AUTO-CARTO 12*, Charlotte, North Carolina, 27 February – 1 March: 32-40
- 1994 Buttenfield, BP. Visualization in Geographic Education. *Proceedings First Annual Conference on Education and GIS*, sponsored by National Science Foundation and National Geographic Society, 24-27 January, 1994, Washington DC
- 1994 DeCola, L and Buttenfield, BP. Multiscale Mapping for the NSDI: Data Modeling and Representation. *Proceedings, GIS/LIS '94*, Phoenix, Arizona, 25-27 October 1994: 870-880
- 1994 *Leitner, M. and Buttenfield, BP. Acquisition of Prototype Rules for Automated Map Generalization. *Proceedings, Second International Conference on GIS*, Salzburg, Austria, 6-8 July 1994: 419-428.
- 1994 *Leitner, M and Buttenfield, BP. Representation of Data Quality in the Digital Cartographic Process. *Proceedings, Second International Conference on GIS, Salzburg*, Austria, 6-8 July 1994: 429-433.
- 1993 Buttenfield, BP. Proactive Graphics for GIS: Prototype Tools for Query, Modeling and Display. *Proceedings AUTO-CARTO 11*, Minneapolis, Minnesota, 30 Oct - 1 Nov: 377-385
- 1993 Buttenfield, BP. Research Agenda for Formalizing Cartographic Knowledge. *NCGLA Research Initiative 8 Specialist Meeting*, Buffalo New York, 24-27 October 1993
- 1993 Buttenfield, BP. Scientific Visualization for Environmental Modeling: Interactive and Proactive Graphics. *Proceedings, 2nd International Conference on Integrating GIS and Environmental Modeling*, 26-30 September, Breckenridge, Colorado
- 1993 *Leitner, M and Buttenfield, BP. The Dasymeric Technique: A Cartographic Approach to Map Overlay. *Proceedings, 1st International Conference on GIS, Salzburg*, Austria, July 1993: 89-96
- 1993 Dutton, G and Buttenfield, BP. Scale Change Via Hierarchical Coarsening: Cartographic Properties of Quaternary Triangular Meshes. *Proceedings, 16th Conference of the International Cartographic Association*, 3-8 May 1993, Cologne, Germany, vol. 2: 847-862
- 1993 Buttenfield, BP. Formalizing Rules for Gray Tone Selection in Computer Mapping. *Proceedings, ACSM/ASPRS Annual Convention*, 16-18 February, New Orleans, Louisiana, vol.1: 52-61
- 1992 Beard, MK and Buttenfield BP. Spatial, Statistical, and Graphical Dimensions of Data Quality. *Proceedings, Visualization '92 Conference*, College Station Texas, March 19-21
- 1991 Buttenfield, BP, *Weber, CR, *Leitner, M, *Phelan, JJ, *Rasmussen, DM, and *Wright, GR. How Does a Cartographic Object Behave? Computer Inventory of Topographic Maps. *Proceedings, GIS/LIS '91*, Atlanta, Georgia, November 1991, vol. 2: 891-900
- 1991 Mackaness, WA and Buttenfield, BP. Incorporating Time in Geographic Process: A Framework for Analyzing Process in GIS. *Proceedings 15th Conference of the International Cartographic Association*, Bournemouth England September, 1991, vol. 2: 565-574

- 1991 Buttenfield, BP. Visualizing Cartographic Metadata. *Proceedings, NCGIA Specialist Meeting on Visualizing the Quality of Spatial Data*, June 1991, Castine, Maine: 19-28
- 1991 Buttenfield, BP and Beard, MK. Visualizing the Quality of Spatial Information. *Proceedings, AUTO-CARTO 10*, Baltimore, Maryland, March, 1991 vol. 6: 423-427
- 1990 Buttenfield, BP and *Ganter, JH. Visualization and GIS: What Should We See? What Might We Miss? *Proceedings, 4th International Symposium on Spatial Data Handling*, Zurich Switzerland, July 1990, vol. 1: 307-316
- 1990 Mark, DM, Buttenfield, BP, Calkins, HW, Goodchild, MF, and Onsrud, H. Geographical Research Findings at NCGIA During Year 1: Summary and Implications for GIS. *Proceedings, Canadian National Conference on Geographical Information Systems: Challenge for the 90's*. Ottawa, Canada, 5 – 9 March: 1145-1160
- 1989 Buttenfield, BP. Texture and Value Relations of Computer-Generated Gray Tones. *Proceedings, International Cartographic Association Conference*, Budapest, Hungary, August 1989: 458
- 1988 Weibel, WR and Buttenfield BP. Map Design for Geographic Information Systems. *Proceedings, Third International Geographical Information Systems Symposium (GIS/LIS 88)*, November 1988, Baltimore, MD. Vol.1: 350-359
- 1988 Mark, DM and Buttenfield, BP. Expert System for Cartographic Design. *Proceedings, 8th International Workshop on Expert Systems and Their Applications*, vol. 2: 413-425
- 1987 *Langran, GL and BP. Buttenfield, Formatting Geographical Data to Enhance Manipulability. *Proceedings, AUTO-CARTO 8*: 201-210
- 1986 Buttenfield, BP. Digital Definitions of Scale-Dependent Structure. *Proceedings, AUTO-CARTO LONDON*, vol.1: 497-506
- 1983 Buttenfield, BP. Topology and the Concept of the Statistical Solid. *Proceedings, AUTO-CARTO 6*, vol.1: 323

Monographs

- 2013 Clarke, K, Anselin, L, Bayen, AM, Black, GC, Buttenfield, BP, Carley, KM, Jensen, JR, Langley, RB, Mikhail, EM, Shekar, S, Solem, MN, Stephan, P, Yuan, M, Zyda, MJ. *Future U.S. Workforce for Geospatial Intelligence*. National Research Council Monograph. Washington, D.C.: National Academy Press
- 2005 Clarke, K, Buttenfield, BP, Armstrong, MA, Bhudendhra, B, Gahegan, M, Jackson, M, Shakar, S and Tucker, C. *Priorities for Geospatial Science Research at the National Geospatial Intelligence Agency*. National Research Council Monograph. Washington, D.C.: National Academy Press
- 2002 Graf, W, Buttenfield, BP, Harden, CP, Jensen, J, Malanson, GP, MacDowell, PF, McLafferty, S, Psuty, NP, Vaux, HJ. *Research Priorities in Geography for the U.S. Geological Survey*. Washington, D.C.: National Research Council Monograph. Washington, D.C.: National Academy Press

- 2000 Yuan, M, Buttenfield, BP, Gahegan, M, and Miller, H. *Geospatial Data Mining and Knowledge Discovery. UCGIS White Paper*, accepted by Council vote June 2000, Washington: DC. Available on the Web at <http://www.ucgis.org/emerging/gkd.pdf>
- 1999 Goodchild, MF, Buttenfield, BP, Adler, P, Krygiel, A, Onsrud, H, and Kahn, R. *Distributed Geolibraries*. National Research Council Monograph. Washington, D.C.: National Academy Press, 119 pp
- 1997 Mackaness, WA, Weibel, R and Buttenfield, BP. *Research Progress in Map Generalization*. Santa Barbara, California: *NCGIA Technical Report 97-3*. 17 pp. Also available on the Web at <http://www.geo.unizh.ch/ICA/>
- 1997 Buttenfield, BP and Hill, L. *Alexandria Design Review Workshop: Report on the Second Meeting*. Santa Barbara, California: *Technical Report*, Alexandria Digital Library Project, March 1997. 41 pp. <http://alexandria.sdc.ucsb.edu/public-documents/papers/adr2/>
- 1997 National Research Council Mapping Science Committee, Sugarbaker, LA, Chair, *The Future of Spatial Data and Society: Summary of a Workshop*. Washington, D.C.: National Academy Press . 67 pp
- 1996 Basili, V, Buttenfield, BP, Duncan, G, Jacobs, GA, Guckenhiemer, J, McRae, GJ, Paynter, HM, Pregibon, D, Starr, SL, and Zadeh, L. *Machinery for Predictability of Complex Systems*. Arlington, VA: National Science Foundation, Division of Mathematical Sciences, Strategic Activities and Special Projects (Al Thaler, Program Director)
- 1996 Buttenfield, BP and *Dibble, C. *NCGIA Research Initiative 8, Formalizing Cartographic Knowledge: Scientific Report for Specialist Meeting*. Santa Barbara, California: *NCGIA Technical Report 95-15*. 39 pp
- 1995 National Science Foundation Panel *Connecting and Collaborating: Issues for the Sciences*. Arzberger, P and Maisel, M (Eds.) Workshop sponsored by the National Science Foundation (NSF) and held at Scripps Institution of Oceanography, University of California, San Diego, June 22-24, 1995. (http://www.sdsc.edu/projects/CC/Paper/white_paper.html)
- 1995 National Research Council Mapping Science Committee, Sugarbaker, LA, Chair, *Data Foundation for the National Spatial Data Infrastructure*. Washington, D.C.: National Academy Press. 50 pp
- 1994 National Research Council Mapping Science Committee, Sugarbaker, LA, Chair, *Promoting the National Spatial Data Infrastructure Through Partnerships*. Washington, D.C.: National Academy Press. 112 pp
- 1994 Beard, MK, Buttenfield, BP and Mackaness, WA. *Closing Report for NCGIA Research Initiative 7: Visualizing the Quality of Spatial Information*. Santa Barbara, California: *NCGIA Closing Report*. 32 pp
- 1994 Mackaness, WA, Beard, MK, and Buttenfield, BP. *Bibliography on Visualizing Spatial Data Quality*. Santa Barbara, California: *NCGIA Technical Report*. 45 pp
- 1993 National Research Council Mapping Science Committee, Bossler, JD, Chair, *Toward a Coordinated Spatial Data Infrastructure for the Nation*. Washington, D.C.: National Academy Press. 171 pp

- 1993 Buttenfield, BP. Closing Report for NCGIA Research Initiative 3: Multiple Representations. Santa Barbara, California: *NCGIA Technical Report 93-11*. 26 pp
- 1991 Beard, MK, Buttenfield, BP and Clapham, SB. *Scientific Report for Specialist Meeting on NCGIA Research Initiative 7, Visualizing the Quality of Spatial Information*. Santa Barbara, California: *NCGIA Technical Report 91-26*. 170 pp
- 1991 Buttenfield, BP, *Weber, CR, *MacLennan, M and *Elliott, JD. *Bibliography on Animation of Spatial Data: A Guide to Literature, Video and Movie Media*. Santa Barbara, California: *NCGIA Technical Report 91-22*. 33 pp
- 1990 *DeLotto, JS, Buttenfield, BP and Broome, F., *NCGIA/U.S. Census Multiple Representations Data Set Pilot Project: Lee County, Florida*. Santa Barbara, California: NCGIA Report 90-4. 35 pp
- 1989 Buttenfield, BP, *DeLotto, JS, and *McKinney, JV. *Bibliography on Multiple Representations*. Santa Barbara, California: NCGIA Report 89-11. 47 pp
- 1989 Buttenfield, BP and *DeLotto, JS. *Scientific Report for Specialist Meeting on NCGIA Initiative 3, Multiple Representations*. Santa Barbara, CA: *NCGIA Report 89-3*. 87 pp
- 1984 Buttenfield, BP et al. (31 authors), *Land Records Modernization: Centers of Excellence from a Wisconsin Perspective*. Madison, Wisconsin: *University of Wisconsin Land Information Report No. 2*. 33 pp
- 1983 Buttenfield, BP and Kohlenberg, EG (Eds). *DATAMAN: Guide to Computer-Assisted Data Analysis at the University of Washington*. Seattle: Center for Social Science Computation and Research. 115 pp

Invited Lectures and Colloquia

- 2019 Technology, Cybersecurity and Policy Program, College of Engineering, University of Colorado - Boulder
- 2016 School of Geographical Science and Urban Planning, Arizona State University
- 2015 University Consortium for GIScience (UCGIS) Annual Assembly
- 2013 GIS Day Symposium, University of Kansas, Lawrence
Science Literacy Boot Camp for Librarians Conference, Boulder Colorado
- 2011 USGS First National Map Users Conference, Denver Colorado
- 2010 Department of Geography, Penn State University
<http://e-education.mediasite.com/mediasite/Viewer/?peid=7fe32293be1a445f98418f9b274a1fb4>
Generalization and Data Integration. University of Zurich, Switzerland
http://ica.ign.fr/2010_Zurich/slides/2010-ICAWSGene-Invited-Buttenfield.pdf
- 2009 ESRI Southwest Users Group Conference

- 2006 Department of Geography, University of Colorado
 Department of Geography, Simon Fraser University, Vancouver Canada
 USGS, Denver, Colorado
 National Snow and Ice Data Center, University of Colorado-Boulder
 Department of Geography, University of Arizona
- 2005 Department of Geography, U. California – Santa Barbara
 Western Association of Map Libraries Annual Meeting, Boulder Colorado
- 2004 Department of Geography, University of Wisconsin-Madison
 Invited Speaker, 29th Workshop on Hazards Research and Applications, Boulder Colorado
 USGS GIScience 2004, Denver, Colorado
 GEOIDE invited week-long lecture series on Cartography and Geospatial Information Design,
 Carleton University, Ottawa, Canada
- 2003 (with Joel Morrison) Invited Workshop on Cartographic Visualization, GIS-T 2003
 (Annual Conference of State Transportation Agencies), Colorado Springs, CO
 Department of Geosciences, University of Oregon (AAG Visiting Scholar Program)
 Department of Geography, Oregon State University (AAG Visiting Scholar Program)
- 2002 National Center for Atmospheric Research, Boulder Colorado
 National Geography Faculty Development Alliance, Boulder Colorado
 CSISS Summer Institute, University of California Santa Barbara
- 2001 Teaching with Technology Program, University of Colorado
 CSISS Summer Institute, University of California Santa Barbara
- 2000 ICA Workshop on Internet Cartography, Knoxville, Tennessee
 Internet-based GIS for the Rest of Us: The ATLAS Project, EDUCAUSE, Nashville
- 1999 Department of Geography, University of Colorado
 Department of Geography, University of Georgia
 FGDC National Geodata Forum, Washington D.C.
- 1998 Information Science Department, University of Colorado Business School
- 1997 Spatial Data and Visualization Center, University of Wyoming
 National Snow and Ice Data Center (NSIDC)
 Institut für Geomatik und Geoinformation, Technische Universität Wien
 Institut für Geographie, Universität Wien
 Department of Geography, University of California – Santa Barbara
- 1995 Information Technology Lecture Series, University of Missouri-Columbia
 Department of Geography, University of Washington, Seattle
 Department of Geography, University of Colorado-Boulder
 Department of Geography, State University of New York at Buffalo
- 1994 Department of Geography, University of Minnesota-Minneapolis
 Department of Geography, University of Maryland-College Park
 Department of Geography and Earth Science, George-Mason University
- 1993 Department of Geography, University of Zurich, Switzerland
 USGS National Mapping Division Fortnightly Seminar Series, Reston VA
 International Cartographic Assn. Working Group on Generalization, Cologne, Germany

- 1992 Department of Geography, University of Leicester, UK
Department of Communication, SUNY-Buffalo
- 1989 Department of Geography, University of Washington
Department of Geography, Syracuse University
Battelle Research Institute, Seattle, Washington
National Geodetic Survey, NOAA, Rockville Maryland
- 1988 Department of Geography, Kent State University
Faculty of Social Sciences Teaching Assistant Workshop, SUNY-Buffalo
- 1987 Department of Geography, University of South Carolina
Department of Geography, University of North Carolina
- 1986 Land Resources Program, University of Wisconsin
- 1985 Wisconsin State Historical Society, Madison, Wisconsin
- 1984 Department of Geography and Urban Planning, Rutgers University
Department of Geography, University of Colorado-Boulder
Department of Geography, University of Wisconsin-Madison
- 1982 Department of Psychology, University of Washington
Department of Geography, University of California – Santa Barbara

Conference Presentations Not Published in Proceedings or Journal Articles

- 2020 *Carlson, K, Bутtenfield BP, and Qiang Y. Integrating Visualizations of Spatial and Temporal Uncertainty. *Annual Meetings of the Association of American Geographers*, Denver CO, 6-10 April 2020. (Meeting cancelled due to COVID-19 outbreak)
- 2020 *Charisoulis G, Bутtenfield BP and *Guler, D. Location Allocation Modelling for Renewable Technologies in the Face of Uncertainty. *Annual Meetings of the Association of American Geographers*, Denver CO, 6-10 April 2020. (Meeting cancelled due to COVID-19 outbreak)
- 2020 *Guler D, *Charisoulis G, Bутtenfield BP, and Yomralioglu T. Biomass Facility Suitable Location Selection with Open-Source GIS and MCDM. *Annual Meetings of the Association of American Geographers*, Denver CO, 6-10 April 2020. (Meeting cancelled due to COVID-19 outbreak)
- 2020 Stanislawski LV, Shavers EJ, Bутtenfield BP, and Kronenfeld BJ. Stream Meander Pattern Analysis of National Hydrography Flow Lines for Geomorphic Classification. *Annual Meetings of the Association of American Geographers*, Denver CO, 6-10 April 2020 (Meeting cancelled due to COVID-19 outbreak)
- 2020 Shavers, EJ, Stanislawski LV, Bутtenfield BP, and Kronenfeld BJ. Preserving Meander Bend Geometry Through Scale. *Symposium on Scale, Space and Resolution*, Arizona State University, February 2020.
- 2019 *Charisoulis G and Bутtenfield BP. Siting Anaerobic Digestion Facilities in the Face of Missing and Sparse Information. *GIS in the Rockies (GISITR_2020)*, Denver CO, 17-19 September 2019.

- 2019 Stanislawski LV, Brockmeyer T, Shavers E, Bittenfield BP and Kronenfeld BJ. Geomorphic Classification to Support Hydrographic Feature Extraction. *Annual Meetings of the Association of American Geographers*, Washington DC, 3-6 April 2019.
- 2017 Bittenfield BP, ^ΩQiang, Y, Farmer C. and *Ghandehari, M. Cross-Scale Analysis of Surface-Adjusted Elevation and Distance Measurements. *USGS-CEGIS Annual Research Meeting*, Rolla Missouri, 14 June
- 2017 ^ΩQiang, Y, Bittenfield BP, Joseph M, and Farmer CJQ. A Systematic Evaluation of Surface-Adjusted Distance Measurements Using an HPC-Enabled Monte Carlo Simulation. *Annual Meetings of the Association of American Geographers*, Boston, Massachusetts, 5-9 April 2017
- 2017 Stanislawski LV, Bittenfield BP, and Wendel J. Deriving a Surface-Water Drainage Network That the Terrain Can Support. *Annual Meetings of the Association of American Geographers*, Boston Massachusetts, 5-9 April 2017
- 2016 *Ghandehari M, Bittenfield BP, and Farmer CJQ. What if the Earth is Not Flat? Cross-Scale Analysis of Sub-Pixel Variations in Digital Elevation Models. Poster Presentation, *American Geophysical Union Annual Meeting*, San Francisco 12-16 December
- 2016 *Ghandehari M and Bittenfield, BP. Hydrologic Flow Accumulation Modeling Using Surface Area. *GIS in the Rockies Annual Meeting*, Denver Colorado 21-21 September
- 2016 Bittenfield BP, *Ghandehari M and *Brantley ME. Surface-Adjusted Distance Comparison for Multi-Scale Terrain Analysis. *USGS-CEGIS Annual Research Meeting*, Rolla Missouri, 29 June
- 2016 Stanislawski LV, Bittenfield BP and *Raposo P. Assessment of Hydrographic Line Feature Geometry to Support Multi-Scale Representation. *Annual Meetings of the Association of American Geographers*, San Francisco California, 29 March – 2 April
- 2015 Bittenfield BP and *Sauer D. Automatic Selection of a Scale-Appropriate UDA Threshold for Delineating Primary Paths through Stream Networks. *USGS-CEGIS (Ctr. For Excellence in Geospatial Science) Annual Research Meeting*, Rolla Missouri, 10 June 2015.
- 2015 Bittenfield BP. Data Integration and Data Science: Research Priorities for GIScience. *University Consortium for GIScience (UCGIS) Annual Assembly*, Alexandria VA, May 2015.
- 2015 *Ghandehari, M and Bittenfield BP. Density-Based Stream Network Extraction from Digital Elevation Models. Poster presentation, *10th Annual Hydrologic Sciences Research Symposium on Water*, Boulder, Colorado. First place award for Best Poster.
- 2013 Bittenfield, BP and Stanislawski, LV. Through the Looking Glass: Designing a Multi-Scale National Hydrographic Database. *12th Annual Symposium for GIS Day*, University of Kansas – Lawrence, November.
- 2012 Bittenfield, BP, *Gleason, MJ and *Anderson-Tarver, C. Automatic Delineation of Primary Channels through Braided Stream Networks for Cartographic Generalization. *North American Cartographic Information Society (NACIS 2012)*, Portland, Oregon, October.
- 2012 Bittenfield, BP, *Anderson-Tarver, C, *Gleason, MJ, and Stanislawski, LV. Level of Detail (LoD) Hydrography Databases for the USGS National Map. *USGS-CEGIS Annual Research Meeting*, Rolla Missouri, June.

- 2012 *Stauffer, A and Buttenfield, B.P Iterative Filtering of DEMs and Effects on Hillshading. *USGS-CEGIS Annual Research Meeting*, Rolla Missouri, June.
- 2012 Stanislawski, LV, *Howard, M, Briat, MO, Punt, E, Brewer, CA and Buttenfield, BP. Density Stratified Thinning to Support Automated Generalization of Transportation. *USGS-CEGIS Annual Research Meeting*, Rolla Missouri, June.
- 2012 Stanislawski, LV, *Raposo, P, Howard, M and Buttenfield, BP. Automated Metric Assessment of Line Simplification in Humid Landscapes. *USGS-CEGIS Annual Research Meeting*, Rolla Missouri, June.
- 2012 *Wendel, J, Buttenfield, BP, and Stanislawski, LV. Comparison of Unsupervised Learning Algorithms for Physiographic Classification of U.S. Landscape Types. *Annual Meetings of the Association of American Geographers*, New York City, February.
- 2012 Nagle, NN, Buttenfield, BP and Leyk, S. Accounting for Uncertainty in Small Area Estimation with Random Effects. *Annual Meetings of the American Geographers*, New York City, February.
- 2011 *Gleason, MJ, Pitlick, J and Buttenfield, BP. Filtering Raw Terrestrial Laser Scanning Data for More Efficient and Accurate Use in Geomorphologic Modeling. *American Geophysical Union Annual Meetings*, San Francisco, CA, December.
- 2011 Buttenfield, BP. Automated Methods for Simplifying Surface Water Features: Flowlines, Waterbodies and Centerlines. *USGS Workshop on Cartographic Generalization and Concurrent Processing*, Rolla Missouri, October 17.
- 2011 Buttenfield, BP and *Gleason, MJ. Automatic Identification of Islands in the National Hydrography Dataset. *USGS Workshop on Cartographic Generalization and Concurrent Processing*, Rolla Missouri, October 17.
- 2011 Buttenfield, BP and Stanislawski, LV. Generalization for the National Map. *USGS-CEGIS Annual Research Meeting*, Rolla Missouri, June.
- 2011 Buttenfield, BP. Multiple Representations of Geospatial Data: A Cartographic Search for the Holy Grail? *The National Map 2011 Users Conference*, Denver Colorado, May.
- 2011 Leyk, S and Buttenfield, BP and Nagle, NN. Choosing Related Variables in Dasyetric Modeling to Refine Microdata Allocations. *Annual Meetings of the Association of American Geographers*, Seattle Washington, April.
- 2011 Nagle, NN, Leyk, S and Buttenfield, BP. Constructing Small Area Estimates with Uncertain Census Data. *Annual Meetings of the Association of American Geographers*, Seattle Washington, April.
- 2011 Nagle, NN, Buttenfield, BP and Leyk, S. Integrating Microdata with Census Summary Files. *ICC Census Working Group Workshop*, Seattle Washington, April.
- 2010 Brewer, CA, Buttenfield, BP and Uery, EL. Designing USGS Topographic Mapping for Multiscale Online Use. *ESRI User Conference*, San Diego CA, July. Also presented *International Cartographic Symposium on Cartography for Australasia and Oceania (GeoCart 2010)*, Auckland, New Zealand, September. http://www.personal.psu.edu/cab38/ScaleMaster/Brewer_ESRI-UC_Multiscale-Topo_July2010.pdf

- 2010 Buttenfield, BP, Stanislawski, LV, and Brewer, CA. Generalization to Support the National Map. *USGS-CEGIS Annual Research Meeting*, Denver CO, June.
- 2010 Brewer, CA, Buttenfield, BP and Stanislawski, LV. Progress on Electronic Topo Map Design Decisions. *USGS-CEGIS Annual Research Meeting*, Denver CO, June. http://www.personal.psu.edu/cab38/ScaleMaster/Brewer_Talk1_Overview-Topo_CEGIS-AllHands_June2010.pdf
- 2010 Brewer, CA, *Hanchett, CL Buttenfield, BP and Stanislawski, LV. Evaluation of Map Symbols by Screen Resolution and File Format through Scale. *USGS-CEGIS Annual Research Meeting*, Denver CO, June. http://www.personal.psu.edu/cab38/ScaleMaster/Brewer_Talk2_Eval-Multiscale-Topo_CEGIS-AllHands_June2010.pdf
- 2010 *Hammerlinck, JD and Buttenfield, BP. Planning Support System Implementation in Rural Local Governments. *Annual Meetings Association of American Geographers*, Washington D.C, April.
- 2010 *Wendel, J and Buttenfield, BP. Guidelines for Self-Organizing Maps. *Annual Meetings Association of American Geographers*, Washington D.C, April.
- 2010 *Anderson-Tarver, C and Buttenfield, BP. Generalizing a Swamp-Marsh Database Using Texture. *Annual Meetings Association of American Geographers*, Washington D.C, April.
- 2009 Nagle, NN, Buttenfield, BP and Leyk, S. Simulating Spatially Explicit Populations: Combining Public Microdata and Summary Files. Invited Presentation, *Geographic Information Science and Technology Series* Oak Ridge National Laboratory, , 13 November.
- 2009 Buttenfield, BP, Brewer, CA, and Usery, EL. Place Still Matters: Generalizing the National Hydrography Dataset by Local Terrain and Climate. *North American Cartographic Information Society (NACIS 29)*, Sacramento, California, October.
- 2009 Brewer, CA, Buttenfield, BP and Usery, EL. Designing The National Map Produced by USGS for Multi-Scale Online Use. *North American Cartographic Information Society (NACIS 29)*, Sacramento, California, October. http://www.personal.psu.edu/cab38/ScaleMaster/Brewer-et-al_NACIS_2009.pdf
- 2009 Buttenfield, BP, Stanislawski, LV and Brewer, CA. NHD Generalization and Multiscale Topographic Map Design. *USGS Center for Excellence Annual Research Meeting*, Rolla Missouri, August.
- 2009 *Wendel, J, Buttenfield, BP Anderson-Tarver, C and Brewer, CA. Cartographic Generalization by Physiographic Region. *Annual Meetings Association of American Geographers*, Las Vegas, Nevada, April.
- 2009 *James, K, Byers, T, Marshall, J, Meliker, JR, Zerbe, G, Buttenfield, BP and Hokanson, J. Association between arsenic exposure through drinking water and coronary heart disease and diabetes mellitus. *137th Annual Meeting of the American Public Health Association*, Philadelphia, PA 7-11 Nov 2009.
- 2008 Buttenfield, BP and Frye, C. Simplifying Hydrography by Shape and Texture. *North American Cartographic Information Society (NACIS 28)*, Missoula, Montana, October.
- 2008 Buttenfield, BP. Hydrographic Generalization: Problems to Solve for *The National Map*. *USGS Center for Excellence Annual Research Meeting*, Rolla Missouri.

- 2008 *Viger, R Battenfield, BP. Semantics for Integrating Hydrologic Models. *USGS Symposium on GIS Research*, USGS Headquarters, Reston Virginia, September.
- 2008 *Wendel, J, Battenfield, BP, *Viger, R and *Smith, J. Spatializing GIS Commands with Self-Organizing Maps. *Annual Meetings Association of American Geographers*, Boston, Massachusetts, April.
- 2007 *Ballagh, LM, Meier, WN, Barry, RA, and Battenfield, BP. Evaluating Derived Sea Ice Thickness Estimates from Two Remote Sensing Data Sets. *Annual Meeting of the American Geographical Union*, San Francisco, California, December.
- 2007 Battenfield, BP, Brewer, CA, Frye, C and Buckley, A. What is a Base Map? *North American Cartographic Information Society (NACIS 27)*, St. Louis Missouri, October.
- 2007 Brewer, CA, *Acosta, J, Battenfield, BP, and Frye, C. ScaleMaster characterization of types of design change through scale for mapping from multi-resolution databases. *North American Cartographic Information Society (NACIS 27)*, St. Louis Missouri, October.
http://www.personal.psu.edu/cab38/ScaleMaster/Brewer_NACIS_2007_ScaleMasterII.pdf
- 2007 *Wolf, EB and Battenfield, BP. A Hierarchical Vector Data Model for Distributed Geospatial Processing. *Annual Meetings Association of American Geographers*, San Francisco California, April 17-21, 2007.
- 2006 Battenfield, BP. Searching for the Golden Feature in MRDBs. *North American Cartographic Information Society (NACIS 26)*, Madison Wisconsin, October 20.
- 2006 Battenfield, BP. Filling in the DLG Gap: A Data Thesaurus Experiment. *USGS National Conference on GIS (GIS-2006)*, Denver, Colorado, March 18.
- 2005 Battenfield, BP. The Map in Your Mind: What Goes on *Before* You Make the Map. *North American Cartographic Information Society (NACIS 25)*, Salt Lake City October 13.
- 2005 Battenfield, BP and Buckley, A. Multi-Scale, Multi-Purpose Geodatabase Modeling. *ESRI User Conference*, San Diego California, July 14.
- 2005 Battenfield, BP and Mennis, J. Data Resolution as a Possible Bias in Association Rule Mining. *Annual Meetings Association of American Geographers*, Denver Colorado, April 8.
- 2005 Battenfield, BP. GeoVisualization and GIS Modeling for Earth Sciences. *Western Association of Map Libraries Annual Meeting*, Boulder Colorado, March 25.
- 2004 Battenfield, BP. Internal and Relative Topologies for Vector Geospatial Data. *Third International GIScience Conference (GIScience 2004)*, Maryland, October.
- 2004 Battenfield, BP. Strategies for Achieving a Multi-Scale, Multi-Purpose Geospatial Database Using a Relational Data Architecture. *North American Cartographic Information Society (NACIS 24)*, Portland, Maine, October.
- 2004 Battenfield, BP. GIS Technology and Barriers to Adoption in Wildland Fire Management Invited presentation, *29th Workshop on Hazards Research and Applications*, Boulder Colorado.
- 2004 Battenfield, BP. A Topologically Correct Multi-Resolution Vector Data Architecture. *USGS National Conference on GIS (GIS-2004)*, Denver, Colorado.

- 2002 Bутtenfield, BP. Transmitting GIS Vector Data on the Internet. *National Meetings, Association of American Geographers*, Los Angeles California, March 2002.
- 2001 Bутtenfield, BP and *Huff, R. GIS Data Models and the Representation of Time. *North American Cartographic Information Society (NACIS)*, Portland, Oregon, October, 2001.
- 2000 Bутtenfield, BP. Monitoring Student Use of GIS Exercises on the Internet. *ICA Commission Workshop on Maps and the Internet*, Knoxville Tennessee, October 11, 2000.
- 2000 Bутtenfield, BP. ATLAS Distance Learning Activities in Geography. *EDUCAUSE 2000*, Nashville, Tennessee, October 13, 2000.
- 2000 Bутtenfield, BP, *Tsou, MH, and *Petrik, K. GIS for the Rest of Us: Internet Delivery of Earth Science Class Exercises. *National Meetings, Association of American Geographers*, Pittsburgh, Pennsylvania, April 2000.
- 1999 Bутtenfield, BP. Monitoring Use of Online Services for Distance Learning. *Varenius Workshop "Transitions from Childhood to the Workforce"*, Santa Barbara California, 9-11 September.
- 1999 Bутtenfield, BP. Progressive Transmission of Vector Data on the Internet: A Cartographic Solution. *3rd Workshop on Progress in Automated Map Generalization*, Ottawa, Canada, 12-15 August.
- 1999 Bутtenfield, BP. Studying User Navigation Through a Web Site With Spatial Interaction Models. *National Meetings, Association of American Geographers*, Honolulu, Hawaii, March 1999.
- 1998 Bутtenfield, BP. Automated Metadata Collection for Historical Ground Photos. *GIS/LIS '98*, Fort Worth Texas, 11-15 November, 1998.
- 1998 Bутtenfield, BP. The Digital Map Library as a Moving Target: Evaluation of Technology and Knowledge. *North American Cartographic Information Society (NACIS 18)*, Milwaukee, Wisconsin, October, 1998.
- 1998 Bутtenfield, BP. Scale and Detail in the Cognition of Geographic Information. *NCGIA Varenius Meeting on Scale and Cognition*, Santa Barbara, California, 14-16 May 1998.
- 1997 Bутtenfield, BP. Metadata in Principle and in Practice. *GIS/LIS '97*, Cincinnati, Ohio, 27-29 November, 1997.
- 1997 Bутtenfield, BP. Cartographic Metaphors for Browsing Very Large Data Archives. Presented 17th Annual Meeting of the North American Cartographic Information Society (NACIS), Lexington, Kentucky.
- 1997 Bутtenfield, BP. Principles for Visual Representations of Metadata. *Symposium on the Accuracy of Ecological Data*, National Center for Ecological Analysis and Synthesis, Santa Barbara, California.
- 1997 Bутtenfield, BP. Map Design and Visualization. Invited Presentation, *UCGIS Annual Assembly*, Bar Harbor, Maine, June.
- 1997 Bутtenfield, BP. Encapsulated Operators for Processing Geographic Information. *Workshop on Progress in Automated Map Generalization*, Gaevle, Sweden, 19-21 June.

- 1996 Buttenfield, BP. The Human Component of an Internet Digital Map Library: Re-Thinking User Interface Evaluation. *North American Cartographic Information Society (NACIS 16)*, San Antonio, Texas, October.
- 1996 Buttenfield, BP. Self-Similarity and Scale-Dependence of Geographic Data. *NSF Workshop on Machinery for Predictability of Complex Systems*. Arlington, Virginia, September.
- 1996 Buttenfield, BP. GIS in Schools and Libraries. *URISA Annual Conference*, Salt Lake City Utah, July. (invited presentation)
- 1996 Buttenfield, BP. Visualizing Spatial Uncertainty *Second International Symposium on Spatial Accuracy Assessment*, Fort Collins, Colorado, May.
- 1996 Buttenfield, BP. Cartography in the Next Millennium: Interface Design and Evaluation. *American Society for Photogrammetry and Remote Sensing (ASPRS)*, Baltimore Maryland, April.
- 1996 Buttenfield, BP. Real-Time Transaction Logging for Interface Evaluation. *Digital Libraries '96* (Sponsor Association for Computing Machinery), Bethesda Maryland, March.
- 1995 Buttenfield, BP, *Weber, CR. *Tsou, MH. *Trawinski, P and *Ricci, V. Putting Cartography on the Internet: The Alexandria Digital Library Project. *Annual Meetings, North American Cartographic Information Society (NACIS)*, Wilmington North Carolina, 27 October.
- 1995 Buttenfield, BP. User Evaluation for the Alexandria Digital Library Project. *Thirty-Seventh Allerton Institute*, University of Illinois-Champaign-Urbana, 30 October.
- 1995 Buttenfield, BP. Formalizing Cartographic Knowledge: A Review of NCGIA Research Initiative 8. *International Workshop on Progress in Generalization*, Barcelona, Catalunya, Spain, 30 August – 2 September.
- 1995 Buttenfield, BP. Alexandria Digital Library Project. *Annual Meetings, Computer Human Interaction (CHI'95)*, Denver, Colorado, 10 May.
- 1995 Buttenfield, BP. Evaluating an Interface Design with Multimedia Tools. *Annual Meetings, Association of American Geographers*, Chicago, Illinois, March.
- 1995 Buttenfield, BP. User Evaluation of the Alexandria Digital Libraries Project. *Annual Meetings, Association of American Geographers*, Chicago, Illinois, March.
- 1995 Buttenfield, BP. Teaching Map Animation and Hypermedia Programming. *Annual Meetings, Association of American Geographers*, Chicago, Illinois, March.
- 1995 Buttenfield, BP. Challenges of Distributing Spatial Data on Internet. *AUTO-CARTO 12*, Charlotte, North Carolina, 27 February.
- 1994 Buttenfield, BP. Cartography and Visualization: Lessons Learned. *Annual Conference on Environmental Data*, Crystal City, Virginia, 8 June.
- 1994 Buttenfield, BP. Hypermedia and Interactive Visualization of Growth in Trembling Aspens. *Annual Meetings, Association of American Geographers*, San Francisco, California, April.

- 1994 Buttenfield, BP. Object-Oriented Map Generalization: Multi-Scale Representation of Digital Line Graph (DLG) Data. *Annual Meetings, Association of American Geographers*, San Francisco, California, April.
- 1994 Buttenfield, BP. A Data Model for Mapping at Multiple Scales. Presented Mid-Atlantic Association of American Geographers Meeting, Fort Meyer, Virginia, March.
- 1993 Buttenfield, BP. Formalizing Cartographic Knowledge: Prioritizing a Research Agenda. Invited Presentation, *16th International Cartographic Association Conference*, Cologne, Germany, May.
- 1993 Buttenfield, BP. Hypermedia and Sonification in GIS. *Annual Meetings, Association of American Geographers*, Atlanta, Georgia, April.
- 1992 Buttenfield, BP. Hypermedia Tools for Data Quality Displays. *Annual Meetings, Association of American Geographers*, San Diego, California, April.
- 1991 Buttenfield, BP. Rule Based Generalization of Topographic Maps. Invited Presentation *15th International Cartographic Association Meetings*, Bournemouth, UK, September.
- 1991 Buttenfield, BP. Automatic Scale-Changing and Rule-Based Systems *Canadian Cartographic Association Conference*, Buffalo, New York, June.
- 1990 Buttenfield, BP., Scale Dependence and Cartographic Behavior: Attaching Meaning to Objects” *GIS/LIS '90* Anaheim, California, November.
- 1988 Buttenfield, BP. Visualizing the Quality of Cartographic Data. *Third International Geographical Information Systems Symposium (GIS/LIS 88)*, San Antonio, Texas, November.
- 1988 Buttenfield, BP. The Geometry of Cartographic Lines. *Annual Meetings, Association of American Geographers*, Phoenix, Arizona, April.
- 1987 Buttenfield, BP. Sequential Versus Hierarchical Treatment of Cartographic Lines. *Annual Meetings, Association of American Geographers*, Portland, Oregon, April.
- 1984 Buttenfield, BP. An Automated Method for Cartographic Line Discrimination. *Annual Meetings, Association of American Geographers*, Washington, D.C., March.
- 1982 Buttenfield, BP. Re-Exploring the Graphic Essay: The Map as an Analytic Tool. *Annual Meetings, Association of American Geographers*, San Antonio, Texas.
- 1981 Buttenfield, BP. So How Do We Get At the Spatial Image? Comparison of Tangible Representations. *Annual Meetings, Assn American Geographers*, Los Angeles, California.
- 1978 Williams, THL and Buttenfield, BP. Land Cover, Land Use, and LANDSAT. *Kansas Academy of Science*, Lawrence, Kansas.
- 1978 Buttenfield, BP. Cartographic Representation of Health Service Areas. *Annual Meetings, American Congress on Surveying and Mapping*, Washington, D.C.
- 1978 Buttenfield, BP. Analysis of Sketch Map Distortion. *Annual Meetings, Association of American Geographers*, New Orleans, Louisiana.

- 1977 Buttenfield, BP. Manual Interpolation of Deformation Grids. *Annual Meetings, Association of American Geographers*, Salt Lake City, Utah.
- 1975 Buttenfield, BP. You Can't Get There From Here: A Methodology for Comparing Cognitive Maps. *Annual Meetings, American Congress on Surveying and Mapping*, Phoenix, Arizona.

GRANT SUPPORT

- 2019-2022 Cross-Scale Spatio-Temporal Modeling Using an Integrated Data Framework. \$ 350,000
NSF GSS 17-566 BCS Geography and Spatial Sciences
Project Period Sept 2019 – Sept 2022
Project Director Yi Qiang, U. Hawaii – Manoa; PI for U. Colorado subcontract - BP Buttenfield
Subcontract Amount \$178,790
- 2020-2022 Surface-Adjusted Distance, Area and Volume Metrics in Terrain-Based \$ 299,870
Strategic Natural Hazards Modeling
National Geospatial Intelligence Agency Academic Research Program (NARP-NURI)
Project Period May 2019 – April 2021 (Letter of Intent accepted; full proposal pending)
Project Director BP Buttenfield; co-PIs Kristy Tiampo and Mike Willis
- 2017- 2020 TRELIS-GS: Training and Retaining Leaders in STEM- Geospatial \$ 358,301
Sciences. National Science Foundation
Project Period October 2017 – September 2020
Project Directors MK Beard and L Ramasubramanian, co-PIs D Sinton,
BP Buttenfield, E. Wentz, K. Kemp, S. Battersby
- 2018-2021 Multi-Scale Hydrographic Data Modeling: Pattern Recognition in \$ 340,000
Geospatial Data Analytics
USGS Center for Excellence in GIScience (CEGIS) Faculty Affiliate Program
Project Period June 2018 – May 2021. (declined)
Project Director BP Buttenfield; co-PI BJ Kronenfeld, Eastern Illinois University
- 2019-2020 Location Modeling with Uncertain Information: Machine Learning Strategies \$ 49,980
for Siting a Renewable Energy Facility.
Univ. Colorado Innovative Seed Grant Program (declined)
Project Director BP Buttenfield
- 2018-2021 III: Small: Collaborative Research: Cross-Scale Spatio-Temporal Modeling \$ 495,938
Using an Integrated Triangle and Pyramid Framework
NSF 17-572 CISE/Information and Intelligent Systems (IIS) Core Programs
Project Period August 2018 – July 2021 (declined)
Project Director Yi Qiang, U. Hawaii – Manoa Proposal # 1816259;
PI for U. Colorado - Boulder BP Buttenfield Proposal # 1814850
- 2018-2021 What if the Earth is Not Flat? Surface Adjustment as a New Paradigm \$ 579,259
in Land Cover/Land Use Change Assessment (declined)
NASA ROSES NNH17ZDA001N-LCLUC (A.2)
Project Period 15 Jan 2018 – 14 Jan 2021
Project Director K Tiampo; co-PIs Farmer CJQ, Buttenfield BP, Leyk S, Tucker G.

2017-2020	University of Colorado Grand Challenge Project: SLIM Models for Big Data: Spatially-Local Integrated Modeling (declined) Project Period 1 Sept 2017 – 30 June 2020 Project Director CJQ Farmer, Buttenfield BP, Leyk S co-PIs	\$ 748,706
2017-2020	INFEWS/T3: Bioconversion of Organic Waste for Food, Energy and Water Security (BIOGAS FEWS) (declined) National Science Foundation CBET- Track 3 INFEWS Project Director ZJ Ren, Co-PIs BP Buttenfield, S. Cook, K. Halvorsen, R. Sidortsov	\$ 2,499,795
2017-2018	Earth Lab Grand Challenge: Integrating Human Settlement and Terrain Factors with Flooding and Landslide Hazard Models. Univ. Colorado Innovative Seed Grant Program (declined) Project Director BP Buttenfield	\$ 49,991
2017-2019	Assessment of Uncertainty in Terrain Surface Measurements for Natural Hazards Modeling. US Geological Survey John Wesley Powell Center Working Group Project (declined) Project Director BP Buttenfield; co-PIs K Tiampo, G Tucker, EL Usery	\$ 145,327
2017-2020	Surface-Adjustment as a New Paradigm in Terrain-Based Natural Hazards Modeling (Science and Engineering Research). W.M. Keck Foundation (declined) Project Period May 2017- April 2020 Project Director BP Buttenfield; co-PIs K Tiampo, S Leyk, G Tucker, C Farmer	\$ 1,000,000
2010-2016	Collaborative Research: Putting People in Their Place: Constructing a Geography for Census Microdata. National Science Foundation BCS-0961598. Project Period October 2010 – March 2016 Project Director BP Buttenfield; co-PI Stefan Leyk; PI for Tennessee NN Nagle	\$ 747,788
2008-2014	Generalization and Data Modeling for <i>The National Map</i> USGS Center for Excellence in GIScience (CEGIS) Faculty Affiliate Program Project Period July 2008 – June 2014. Award No. 04121HS029 Project Director BP Buttenfield	\$ 650,016
2008	Cartographic Enhancement for New-Generation Topographic Maps. US Geological Survey, National Geospatial Program Office (under the Cooperative Ecological Studies Unit Program) Project Period Jan –Dec 2008 Project Director BP Buttenfield	\$ 27,798
2007	GEOLEM: Integrating Geographic Information in Environmental Modeling Through Semantic Interoperability. U.S. Geological Survey, Center of Excellence for Geospatial Information Science (CEGIS). Project Director Roland Viger; Co-Investigator at CU-Boulder BP Buttenfield	\$ 27,946
2006	Data Modeling for Multi-Scale Mapping. Environmental Systems Research Institute (ESRI) Professional Services Agreement B6345-7 (continuation) Project Director BP Buttenfield	\$ 60,000
2005	Multiscale Geodatabase Design for Base Cartographic Data. Environmental Systems Research Institute (ESRI) Professional Services Agreement B6345-7 (continuation) Project Director BP Buttenfield	\$ 70,000

2005	Internal and Relative Topologies for Multi-Resolution Vector Data NSF Geography and Regional Science Proposal BCS-04-51509. Project Period 2005-2008. Project Director BP Buttenfield	\$ 179,400
2004	Development and Application of Temporal Map Algebra Concepts for Creation and Analysis of Multi-temporal Raster Composites. Mississippi State University, Proposal # 0704.40.1233B; Project Director BP Buttenfield.	\$ 40,000
2004	Database and Cartographic Tools for Multiscale Mapping. Environmental Systems Research Institute (ESRI) Professional Services Agreement B6345-7	\$ 30,000
2001	Progressive Transmission of Vector Data. (Project Director BP Buttenfield) The Niwot Ridge Long Term Ecological Research (LTER) Program 1998-2004: Alpine and Subalpine Ecosystems of the Colorado Front Range. NSF award DEB-98-10218.	\$ 13,360
2000	Time, GIS Models and Biological Data US Geological Survey, Biological Resources Division. (Project Director BP Buttenfield)	\$ 49,806
2000	GIS Models of Small Mammal Habitat University of Colorado Undergraduate Research Opportunities Program (UROP) (Project Director BP Buttenfield)	\$ 2,160
1998	Sensitivity of Ecological Models to Data Resolution (Project Director BP Buttenfield) The Niwot Ridge Long Term Ecological Research (LTER) Program 1998-2004: Alpine and Subalpine Ecosystems of the Colorado Front Range NSF award DEB-98-10218	\$ 61,592
1998	Distributing Geographic Information Systems for Environmental Applications Alliance for Technology, Learning, and Society (ATLAS) Project Director BP Buttenfield (no indirect costs assessed)	\$ 32,000
1996-1998	The Alexandria Project: Digital Libraries Initiative Proposal. Project Director for Colorado subcontract B. P. Buttenfield National Science Foundation (NSF IRI-94-11330) Project Director T.R. Smith	\$ 400,000
1995	Access to Large Image Archives: User Requirements Study and User Interface Design. Project Co-PI with M.F. Goodchild Lockheed Missiles and Space Company, Inc	\$ 68,600
1994-1996	The Alexandria Project: Digital Libraries Initiative Proposal. Project Director for Buffalo subcontract BP Buttenfield National Science Foundation (NSF IRI-94-11330) Project Director T.R. Smith	\$ 160,000
1993-1996	National Center for Geographic Information and Analysis Co-PI for SUNY-Buffalo subcontract with M. Batty, D.M. Mark National Science Foundation (SES 88- 10917 continuation) Project Director - M.F. Goodchild	\$ 1.3 million

1993	Digital Base Map Registration (Project Director BP Buttenfield) Empire Exploration (subsidiary of National Fuel Corp, NY State's natural gas utility)	\$ 22,723
1992	Constructing Digital Representations of the Buffalo Metropolitan Area Buffalo World University Games (Project Director BP Buttenfield)	\$ 42,635
1990	Resource Inventory and Soil Surveys Using Geographic Information Systems. (Project Director BP Buttenfield) USDA Soil Conservation Service	\$ 47,500
1989	Automating Cartographic Line Distinctions. US Geological Survey National Mapping Division. Project Director BP Buttenfield	\$ 39,071
1988	National Center for Geographic Information and Analysis Co-P.I. for SUNY-Buffalo subcontract with R.D.MacKinnon, D.M.Mark National Science Foundation (SES 88- 10917) Project Director DS.Simonett Total funding (UCSB, SUNY-Buffalo, U.Maine) \$ 5.5 million (5 years)	\$ 1.5 million
1988	Registration of Historic Maps and Charts Old Fort Niagara State Historical Museum Project Director BP Buttenfield	\$ 1,500
1988	Automated Methods for Cartographic Line Distinction SUNY Faculty of Social Sciences Research Development Fund	\$ 1,700
1987	Faculty Development Award New York State / United University Professions Professional Development Committee	\$ 750
1987	Automating Cartographic Distinctions Wisconsin Alumni Research Fund (money returned upon resignation from UW faculty)	\$ 18,000
1985	Map Animation Courseware (Project Director BP Buttenfield) IBM Trochos Grant Wisconsin matching funds	\$ 65,000 \$ 27,000
1985	Stochastic Modeling of Cartographic Lines Wisconsin Alumni Research Fund	\$ 15,000
1983	Interactive Graphical Analysis UCSB Instructional Improvement Grant	\$ 2,600

Conferences and Workshops Organized

2020	Managing and Resolving Conflicts: A Workshop For Women in Geospatial Science. Workshop organizers BP Buttenfield and L Ramasubramanian. <i>Annual Meetings of the Association of American Geographers</i> , Denver CO, 6-10 April 2020. (Conference cancelled due to COVID-19 outbreak)	
2018-2020	TRELIS-GS: Training and Retaining Leaders in STEM- Geospatial Sciences. National Science Foundation, 18-20 May 2018, Madison Wisconsin (1 st of 3 annual	\$ 358,301

Workshops). D Sinton, MK Beard, BP Buttenfield, L Ramasubramanian, E. Wentz, Karen Kemp, Sarah Battersby (also listed under Grant Support)

2010	GDI 2010: Generalization and Data Integration. USGS CEGIS Symposium, 20-22 June 2010, Boulder CO. Funding: USGS \$40k, ESRI \$10k	\$ 50,000
2005	International Summer Symposium on Graduate Research in Earth and Social Science. August, 2005, Boulder Colorado. Workshop funded by University of Vienna, Austria w/ US local hosts Geography Depts. at UCSB, Utah, CU-Boulder Project Director H. Prof. Wolfgang Kainz, U. Vienna	
2003	Knowledge Discovery and Data Visualization. University Consortium of Geographic Information Science Workshop funded by Advanced Research and Development Activities (ARDA), Washington DC 18-20 November 2003.	\$ 47,500
1997	Second Alexandria Design Review. National Science Foundation Digital Libraries Initiative, 19-21 February, Santa Barbara, CA	\$ 27,000
1995	First Alexandria Design Review. National Science Foundation Digital Libraries Initiative, 7-8 September, Leesburg, VA	\$ 25,000
1995	Progress in Map Generalization. NCGIA Research Initiative 8 European Closing Meeting, 30 Aug - 2 Sept, Barcelona, Catalunya, Spain co-sponsored by Int'l Cartographic Assn, Institut Geographique National (Paris), Canada Centre for Mapping, and NCGIA	\$ 30,000
1993	Formalizing Cartographic Knowledge NCGIA Research Initiative 8, 24-27 Oct, Buffalo, NY	\$ 26,000
1991	Visualizing the Quality of Spatial Information NCGIA Research Initiative 7, June 8-12, Castine, Maine	\$ 17,000
1990	Towards a Rule Base for Map Generalization April 12-15, Syracuse, NY Jointly funded by NCGIA - Buffalo and Dept Geography, Syracuse University	\$ 8,000
1990	Introduction to Geographic Information Systems New York State Public Employees Training Program March 5-7, SUNY - Buffalo GIA Lab	\$ 1,400
1989	Multiple Representations Specialist Meeting NCGIA Research Initiative 3, February 18-21, Buffalo, NY	\$ 10,600

Equipment Grants Received

1995	An Intergraph Center of Excellence Laboratory in the Mapping Sciences at the State University of New York at Buffalo Intergraph Corporation (two phases of donation) co-PI with C Brunskill and J Bis	\$ 138,000 \$ 102,000
1990	University Computing Services, SUNY-Buffalo Provost Office Ethernet Boards and Novell Networking software provided to support telecommunications in new department facility	\$ 20,450

1990	Proposal for an Electronic Research and Instructional Facility at the Buffalo Site of NCGIA (Phase 2) PRIME Computer co-PI with RD MacKinnon, PJ Densham, and HW Calkins	\$ 120,000
1989	Proposal for an Electronic Research and Instructional Facility at the Buffalo Site of NCGIA (Phase 1) SUN Microsystems co-PI with RDMacKinnon, PJ Densham, and HW Calkins	\$ 99,400

OTHER PROFESSIONAL ACTIVITY

Journal Editor

2019 - 2020	<i>ISPRS International Journal of Geo-Information</i> Guest Editor, Special Issue Generalization for Mapping, Modeling and Analytics Kronenfeld BJ, Buttenfield BP and Stanislawski LV.
1997	<i>Cartographic Perspectives</i> 27(1) Guest Editor, Special Issue: Festschrift for John C. Sherman
1994	<i>Cartography and Geographic Information Systems</i> 21(3) Guest Editor, Special Issue on Spatial Data Standards
1993 - 1996	<i>Cartography and Geographic Information Systems</i> Associate Editor
1993	<i>Cartographica</i> 30:2/3 Guest Editor, Special Issue on Mapping Data Quality

Editorial Boards

2019 – present	<i>International Journal of Geographic Information (IJGI)</i> International Society for Photogrammetry and Remote Sensing (ISPRS)
1999 - present	<i>Cartography and Geographic Information Systems</i> (Cartography and Geographic Information Society)
2008 - 2012	<i>URISA Journal</i> Urban and Regional Information Systems Association
2008 – 2010	<i>Cartographic Perspectives</i> North American Cartographic Information Society
2004 – 2007	<i>Cartographica</i> Canadian Cartographic Society
2001 – 2005	<i>Annals of the Association of American Geographers</i> (Methods, Models and Geographic Information Science)

- 2000 – 2004 *URISA Journal*
(Urban and Regional Information Systems Association)
- 1997 – 2001 *Cartographic Perspectives*
(North American Cartographic Information Society)
- 1996 – 1998 *Applied Geographic Studies* (Wiley and Sons, Inc.)
- 1995 – 2002 *Transactions on GIS*
(GeoInformation International, formerly Longman Scientific)
- 1994 – 2002 *West Indian Journal of Engineering*
(Council of Caribbean Engineering Organizations)
- 1991 – 1996 *Cartography and Geographic Information Systems*
(American Congress on Surveying and Mapping)
- 1991 – 1994 *AAG Resource Publication Series*
(Association of American Geographers)
- 1989 – 1997 *Computers, Environment and Urban Systems*
(Pergamon Press)

Leadership on National Committees

- 2017-2018 Convener and Chair, Census Science Advisory Committee (CSAC) Working Group on Administrative Records, U.S. Bureau of the Census
- 2004 - 2006 Chair, Association of American Geographers Data Standards Committee
- 1998 - 2002 Board of Directors, University Consortium for Geographic Information Science (UCGIS)
- 1996-1998 Chair, Strategic Planning Committee
University Consortium for Geographic Information Science (UCGIS)
- 1995-1996 President, American Cartographic Association (ACA)
(now the Cartography and Geographic Information Society - CaGIS)
- 1989 - 1991 Chair, Ad Hoc Committee on GIS, American Cartographic Association
- 1988 Chair, Nominating Committee, Association of American Geographers

Membership in National Committees

- 2016 – present Delegate for University of Colorado to
University Consortium for Geographic Information Science (UCGIS)
- 2016 - present Nominating Committee, UCGIS
Research Award Committee, UCGIS
Fellows Committee, UCGIS

2012 – 2019 Census Science Advisory Committee (CSAC), U.S. Bureau of the Census

2011- 2013 National Research Council Panel on the Future U.S. Workforce for Geospatial Intelligence

2011- 2015 2nd Delegate for University of Colorado to University Consortium for Geographic Information Science (UCGIS)

2007 - 2009 Board of Directors, North American Cartographic Information Society (NACIS)

2005- 2006 Advisory Board Member, GIS “Body of Knowledge” (BoK) Curricula Project University Consortium for Geographic Information Science (UCGIS)

2005 Education Awards Committee University Consortium for Geographic Information Science (UCGIS)

2004 – 2005 National Research Council, Panel on Theoretical and Applied Research Priorities for the National Geospatial Intelligence Agency

2004 – 2005 Member, Strategic Planning Committee, Cartography and Geographic Information Society (CaGIS)

2004 – 2010 Primary Delegate for University of Colorado to University Consortium for Geographic Information Science (UCGIS)

2002 – 2004 Secondary Delegate for University of Colorado to University Consortium for Geographic Information Science (UCGIS)

2001 - 2004 Evaluation Advisory Board for DLESE (Digital Library for Earth System Education), National Science Foundation Online Community Center

2001- 2002 National Research Council, Panel on Research Priorities for the U.S. Geological Survey

2000 - 2003 Long-Range Planning Committee, Association of American Geographers

1999 – 2003 National Advisory Board for VISIT (Virtual Immersion in Science Inquiry for Teachers), a National Science Foundation Online Collaboratory sited in Michigan

1997 - 1999 National Research Council, Distributed Geolibraries Panel

1996 - 2002 Primary Delegate for University of Colorado to University Consortium for Geographic Information Science (UCGIS)

1992 - 1998 National Research Council, Mapping Science Committee
1995 - 1997 Board of Directors, North American Cartographic Information Society

1995 - 1997 Education Committee, University Consortium for Geographic Information Science (UCGIS)

1995 - 1996 NCGIA Science Policy Committee

1994 - 1997 Board of Directors, American Cartographic Association

- 1994 - 1995 Second Delegate for SUNY-Buffalo to University Consortium for Geographic Information Science (UCGIS)
- 1990 - 1992 Board of Directors, American Cartographic Association
- 1988 - 1993 NCGIA Science Policy Committee
- 1989 NCGIA Liaison, Geographic Information Management Systems Joint Committee, American Congress on Surveying and Mapping and American Society for Photogrammetry and Remote Sensing.
- 1987 – 1989 Academic Director, Cartography Specialty Group, Assn of American Geographers.
- 1983 Nominating Committee, Cartography Specialty Group, Assn of American Geographers.
- 1980 Student Representative, Cartography Specialty Group, Assn of American Geographers.

Other Professional Service

- 2020 Member Scientific Program Ctte, AutoCarto 2020 Conference, Redlands CA (Nov)
- 2019 Member Scientific Program Ctte, 29th Int'l Cartographic Congress (ICC 2019), Tokyo Japan
 Member Scientific Program Ctte for 20th ICA Workshop on Generalization and Multiple Representations, Tokyo Japan
 Member Scientific Program Ctte for ABS2019 (International Workshop on Abstraction, Scale and Perception)
- 2018 Member Scientific Program Ctte for 10th International Conference on Geographic Information Science (GIScience'18), Melbourne Australia, 28-31 August 2018
 Member Scientific Program Ctte for AutoCarto 2018 Conference, Madison WI
 Member Scientific Program Ctte for 29th International Cartographic Congress (ICC 2019), Tokyo Japan
 Member Scientific Program Ctte for 20th ICA Workshop on Generalization and Multiple Representations, Tokyo Japan
- 2017 Member Scientific Program Ctte for 28th International Cartographic Congress (ICC 2017), Washington DC
 Member Scientific Program Ctte for 19th ICA Workshop on Generalization and Multiple Representations, Washington DC
- 2016 Member Scientific Program Ctte for GIScience 2016 Conference, Montreal, Canada
 Member Scientific Program Ctte for AutoCarto 2016 Conference, Albuquerque NM
 Member Scientific Program Ctte for 18th ICA Workshop on Generalization and Multiple Representations, Helsinki Finland
- 2015 Member Scientific Program Ctte for 27th International Cartographic Congress (ICC 2015), Rio de Janeiro, Brazil
 Member Scientific Program Ctte for 17th ICA Workshop on Generalization and Multiple Representations, , Rio de Janeiro, Brazil

- Member Scientific Program Committee for Vespucci 2015 Symposium on Geographic Analysis, Castine, Maine
- 2014 Member Scientific Program Ctte for GIScience 2014, Vienna Austria
Member Scientific Program Ctte for AutoCarto 2014, Pittsburgh, Pennsylvania
- 2013 Member Scientific Program Ctte for 16th ICA Workshop on Generalization and Multiple Representations, Dresden Germany
- 2012 Member Scientific Program Ctte for GIScience 2012, Columbus Ohio
- 2012 Member Scientific Program Ctte for 15th ICA Workshop on Generalisation and Multiple Representations, Istanbul, Turkey
- 2011 Member Scientific Program Ctte for 14th ICA Workshop on Generalisation and Multiple Representations, Paris, France
- 2009 - pres Reviewer for the National University Research Grants Committee, Hong Kong, PRC (1-2 proposals per year).
- 2008 - 2010 Regular Review Panel, NSF Geography and Spatial Sciences Division (met twice per year)
- 2007 External Reviewer, National Research Council Panel on Research Agenda for USGS Center for Excellence in Geographic Information Science (CEGIS)
- 2006 External Review Coordinator, National Research Council Panel on Floodplain Mapping Technologies
- 2005 External Evaluator, Program Review, Dept. Geography, University of Zurich, CH
- 2003 – pres. Reviewer for NSF Geography and Regional Science Division (~ 1-2 proposals per year)
- 2000 Reviewer for NSF Digital Government Initiative
- 1999 Reviewer for NSF Geography and Regional Science Division Enhancing Infrastructure for the Social and Behavioral Sciences
- 1998 - 2005 Reviewer for the National University Research Grants Committee, Hong Kong, PRC (2-3 proposals per year).
- 1997 External Reviewer, Department of Geography, St. Cloud State University. St. Cloud, Minnesota
- 1995 Reviewer for NSF Geography and Regional Science Dissertation Awards Program
- 1994 Review panel member for NSF Environmental Biology Division Special Competition for the National Center for Ecological Analysis and Synthesis
- 1992-1994 Review panel member for NSF Geography and Regional Science Division Dissertation Grant Program
- 1991 Panel Chair, review panel for NSF Instrumentation and Lab Improvement Program

- 1990 Review panel member for NSF Instrumentation and Lab Improvement Program
- 1988 Faculty Group Leader, SUNY-Buffalo Teaching Assistant Workshop

Professional Affiliations

- American Association of University Women (AAUW)
- American Cartographic Association (ACA; now CaGIS)
- American Civil Liberties Union (ACLU)
- American Congress on Surveying and Mapping (ACSM)
- Association of American Geographers (AAG)
- Cartography and Geographic Information Society (CaGIS; formerly ACA)
- International Cartographic Association (ICA)
- League of Women Voters
- National Geographic Society
- National Organization of Women (NOW)
- North American Cartographic Information Society (NACIS)
- Smithsonian Institution Associates
- Society of Woman Geographers (SWG)

University Service

University of Colorado – Boulder

System

- 2016 External (CU System) Reviewer for Department of Geography and Environmental Science, University of Colorado – Colorado Springs

Campus

- 2019-2020 Academic Review, Planning and Advisory Committee (ARPAC) member
- 2018 ARPAC Internal Reviewer (Alliance for Technology, Learning and Society – ATLAS)
- 2016 ARPAC Internal Reviewer (Department of Art and Art History)
- 2011 - 2012 Associate Vice Chancellor’s Research Data Management Task Force
- 2011 Reviewer for campus proposal for 2012 NSF Sustainability Research Networks Competition
- 2010 Primary Unit Evaluation Committee (PUEC) for promotion of Bruce Montgomery, CU Libraries, to Full Professor (PUEC Chair)
- 2009 Vice Chancellor's Academic Affairs Budget Advisory Committee (AABAC) Provost’s Steering Committee for Re-Accreditation
- 2009 ARPAC Internal Reviewer (Department of Spanish and Portuguese)
- 2008 - 2009 Flagship 2030 Faculty Taskforce (Co-Chair with Prof. Uriel Nauenberg, Physics)
- 2007 - 2010 Graduate School Executive Advisory Committee member (3 year term)

2006	Search Committee for Provost	
2005 - 2010	Boulder Faculty Assembly (BFA) BFA Grievance Process Committee BFA Bylaws Committee 2008 BFA Executive Committee BFA Budget Committee	Vice Chair 2008-2009; Member 2005-2010 Chair 2007-2008 Chair 2008-2009 Member 2005-2009 Member 2008-2010
2004 - 2005	University Graduate School Fellowship Committee	
2002 - 2004	CU- Boulder Campus LEAP Program Coach (NSF ADVANCE: Leadership Education for Advancement and Promotion)	
2002 - 2007	CU-Boulder Geospatial Data Brownbag Colloquium Series (Coordinator)	
2001	Internal Review Committee, Institute for Behavioral Sciences	
1997 - 2000	Alliance for Technology, Learning and Society (ATLAS Campus Initiative), Committee on Multidisciplinary Research	

College of Arts & Sciences

2020	Ad hoc Committee on Teaching in the College of Arts and Sciences	
2018 – present	Arts and Sciences Council (ASC)	Parliamentarian
2017- present	Arts and Sciences Council (ASC) ASC Diversity Committee	
2013 - 2016	Arts and Sciences GIScience Advisory Board (Chair)	
2008 - 2011	Advisory Board member, A&S Community Involvement (ASCI) Program	
2004 – 2007	Arts and Sciences Council (ASC) ASC Executive Committee ASC Budget Committee ASC Diversity Committee	Chair, 2005- 2007 Member 2004-2005 Chair, 2005- 2007 Member, 2004-2005 Member, 2005 – 2007 Chair, 2005-2006 Member, 2006-2007
2002 – 2005	Arts and Sciences Personnel Committee	Chair, 2004-2005 Associate Chair, 2003-2004 Member, 2002-2003
2001 – 2002	Arts and Sciences Dean Search Committee	

Department of Geography

2019-2020	Search Committee (Chair), GIS & Spatial Analysis Faculty Hire PUEC Member for Professor Stefan Leyk Promotion to Full Professor Graduate Committee member	
-----------	---	--

2018-20	Graduate Committee member Primary Unit Evaluation Committee (PUEC) Chair for Instructor Sarah Kelly (reappointment)
2017-2018	Fundraising Committee
2016-2017	Search Committee (Chair), GIS Instructor Hire Faculty Coordinator, Undergraduate Certificate in GIS and Computational Science (F16, S17)
2015-2016	Computer Committee (Chair) Primary Unit Evaluation Committee (PUEC) Chair for Professor Seth Spielman Tenure and Promotion Search Committee (Chair), GIS Instructor Hire Awards Committee Chair, Digital Globe Undergraduate Award Competition Faculty Coordinator, Undergraduate Certificate in GIS and Computational Science
2014-2015	Search Committee (Chair), GIS & Spatial Analysis Faculty Hire Search Committee (Chair), GIS Instructor Hire Computer Committee (Chair) Undergraduate Committee (Member) Awards Committee Chair, Digital Globe Undergraduate Fellowship Competition Faculty Coordinator, Undergraduate Certificate in GIS and Computational Science
2013-2014	PUEC Chair for Professor Stefan Leyk Tenure and Promotion PUEC Chair for Professor Seth Spielman Reappointment PUEC member for Professor Elisabeth Root Reappointment Departmental Executive / Personnel Committee member Graduate Committee member Awards Committee Chair, Digital Globe Undergraduate Fellowship Competition
2011-2012	Departmental Executive / Personnel Committee member PUEC Chair for Professor Stefan Leyk Reappointment Awards Committee Chair, GeoEye Undergraduate Fellowship Competition
2010 - 2011	Search Committee Chair, System Administrator Hire Awards Committee Chair, GeoEye Undergraduate Fellowship Competition
2009 - 2010	Geography Computing Committee Chair Post-Tenure Review Committee Chair for Professor Susan Beatty Post-Tenure Review Committee Chair for Professor Bill Travis Search Committee member (Spatial Analysis Faculty Hire)
2008 - 2009	Geography Computing Committee Chair Reappointment Review Committee Chair for Professor Nicholas Nagle
2007 - 2008	Geography Computing Committee Chair Post-Tenure Review Committee Chair for Professor John O'Loughlin
2006 - 2007	Search Committee Chair (GIS Faculty hire)

Geography Computing Committee (member)

2005 - 2006 Geography Computing Committee Chair
Post-Tenure Review Committee for Professor Ken Foote

2004 - 2005 Associate Chair and Graduate Director
Faculty Search Committee (Spatial Analysis hire)
PUEC Committee member for Susan Beatty promotion to Full Professor

2003 – 2004 Associate Chair and Graduate Director
PUEC Committee member for Lynn Staeheli promotion to Full Professor
Post-Tenure Review Committee for Professor John Pitlick (Committee Chair)

2002 - 2003 Graduate Committee member
Post-Tenure Review Committee for Professor Nel Caine (Committee Chair)

2001 - 2002 Search Committee Chair (GIS Special Opportunity Faculty hire)

2000 - 2002 Department Executive (Personnel) Committee member

1999 Departmental Program Review (PRP) Committee member

1997 Departmental Strategic Planning Committee member

1996 - 2000 Computer Committee Chair

SUNY-Buffalo

Campus

1994 - 1995 President's Advisory Committee for Graduate Student Grievances
1992 - 1993 Provost's Graduate School Futures Committee
1991 – 1992 Provost's Graduate Program Evaluation Committee

College

1994 - 1995 Faculty of Social Science Budget Committee
1992 - 1995 Faculty of Social Science Policy Committee
1991 – 1993 Faculty of Social Science Curriculum Committee

Department

1987 - 1992 Policy Committee for Geographic Information and Analysis Lab
(Chair, 1987-1989)
1987 Ad Hoc Committee on Revising Graduate Core Curriculum

University of Wisconsin

Department

1986 Graduate Admissions Committee (Geography)
Curriculum Committee (Institute for Environmental Studies)
Computers and Computing Committee (Geography)

Faculty Sponsor, Women in Geography

1985 Undergraduate Advisor (Geography)
Cartography Lab Governing Board
Computers and Computing Committee (Geography)
Faculty Sponsor, Women in Geography

1984 Undergraduate Advisor (Geography)
Speakers and Honors Committee (Geography)
Faculty Sponsor, Women in Geography

University of California - Santa Barbara Department of Geography

1982-1983 Undergraduate Advisor