U.S. GEOLOGICAL SURVEY
RESEARCH/DEVELOPMENT SCIENTIST RECORD

Research Grade Review (RGE)

1) NAME Eddy Lynn Usery

2) DATE PREPARED December 13, 2011

3) DUTY STATION Center of Excellence for Geospatial Information Science (CEGIS), Rolla, MO

4) REGION National Geospatial Program Headquarters, Core Science Systems

5) CLASSIFICATION TITLE, SERIES, AND GRADE Research Physical Scientist, GS 1301/15

6) DATE OF ENTRANCE ON DUTY TO FEDERAL SERVICE Sept 12, 1977

7) DATE OF LAST PROMOTION April 2005

8) DATE OF LAST RESEARCH/DEVELOPMENT PANEL REVIEW June 2010

9) EDUCATION

University of Alabama	Geography/Chemistry	1970-1973	BS-1974
University of Georgia	Geography	1974-1976	MA-1977
University of Missouri-Rolla	Computer Science	1978-1980	
University of Georgia	Geography	1980-1983	PhD-1985

10) TECHNICAL TRAINING RECEIVED

2011 Orbis Technologies, Inc.	Semantic Web Training
2010 USGS	GIS Workshop/ArcGIS
1999 Site-Specific Technologies, Inc.	SSToolbox
1999 U.S. Geological Survey	GIS Weasel, MMS
1999 University of Georgia	ArcView GIS Spatial Analyst
1997 University of Georgia ITOS	ArcView GIS
1996 ERDAS, Inc.	Imagine Programming
1995 ERDAS, Inc.	Imagine
1995 Univeristy of Georgia, UCNS	Novell Netware
1991 International Business Machines	AS/400
1987 Yourdon, Inc.	Structured Analysis
1986 Environmental Systems Research Institute	Arc/Info
1984 American Institute for Professional Education	Relational Data Bases
1980 U.S. Geological Survey	Digital Cartography

11) PROFESSIONAL EXPERIENCE

a. PRESENT ASSIGNMENT

From: October 2006 **To:** Present

Director, CEGIS (50%)/Research Physical Scientist (50%) My position as Director of CEGIS includes developing the research agenda, securing project funding and staff, providing scientific guidance and operational

procedures to complete projects, and developing, presenting, and publishing scientific results. As the Director of CEGIS, I am a member of *The National Map* Management Team and of the Senior Staff of the National Geospatial Program (NGP) in which I provide a research perspective and participate as a full voting member for all decisions concerning *The National Map* and NGP. I provide the scientific leadership for CEGIS and the NGP. I am responsible for formulating and guiding a broad scale attack on critical problems in frontier areas of geospatial research, which is of national or international scope and importance. CEGIS research is attacking basic research problems of fundamental interest and extraordinary difficulty with projects that influence planned activities of numerous scientists in government, academic institutions and private industry. I serve as mentor and leader to a team of scientists, technicians, and computer specialists and am directly involved with the following CEGIS research projects all funded by NGP; Semantics for *The National Map,* CyberGIS, and Data Integration for *The National Map*.

NAME AND TITLE OF SUPERVISOR, TEAM LEADER(S), OR PROJECT CHIEF(S)
Julia Fields, Deputy Director, National Geospatial Program

b. PREVIOUS PROFESSIONAL POSITIONS
DATES From: Jan 1994 **To:** Sept 2006
BRIEF DESCRIPTION OF WORK OR POSITION

University of Georgia, Department of Geography

Professor (2004-2006), Associate Professor (1997-2003), Assistant Professor (1994-1997)

Positions involved teaching, research, and graduate student supervision in geographic information science, cartography, remote sensing, and geography. Details including classes taught, grants awarded, students supervised, publications, and presentations are presented in later sections.

c. PREVIOUS PROFESSIONAL POSITIONS
DATES From: Sept 1988 **To:** Jan 1994
BRIEF DESCRIPTION OF WORK OR POSITION

Assistant Professor, University of Wisconsin-Madison, Department of Geography

Position involved teaching, research, and graduate student supervision in geographic information science, cartography, remote sensing, and geography. Details including classes taught, grants awarded, students supervised, publications, and presentations are presented below.

d. PREVIOUS PROFESSIONAL POSITIONS
DATES From: Jan 1984 **To:** Sept 1988
BRIEF DESCRIPTION OF WORK OR POSITION

Geographer, USGS, Mid-Continent Mapping Center
Conducted GIS research, applications and analysis projects. Served as Manager, Graphics Production Module for Mark II. Conducted research in mapping automation, GIS, and applications of expert systems

e. PREVIOUS PROFESSIONAL POSITIONS

DATES From: Sept 1977 **To:** Jan 1984
BRIEF DESCRIPTION OF WORK OR POSITION

Cartographer, USGS, Mid-Continent Mapping Center

Completed Cartographer Development Program (CDP). I received production mapping training in field surveying, photogrammetry, and cartography. I helped design, develop, and implement the Digital Cartographic Software System (DCASS) and conducted mapping automation research.

12) SIGNIFICANT RESEARCH or DEVELOPMENT ACCOMPLISHMENTS

a. RECENT ACCOMPLISHMENTS

Major accomplishments since my last promotion (4/2005) include: (1) CEGIS, (2) semantics for geospatial data, (3) CyberGIS, and (4) data integration for *The National Map*.

12a.1. Center of Excellence for Geospatial Information Science (CEGIS) (2006-2011)

My work includes overall scientific direction of the NGP through CEGIS, determining appropriate research for support of *The National Map,* structuring science investigations to determine the future of *The National Map* and the National Spatial Data Infrastructure, and managing the research projects of CEGIS through provision of scientific direction to all principal investigators. I also provide collaboration with University research teams and direct the scientific research through the CEGIS Faculty Affiliate program, which I established. The idea for CEGIS originated in the Geography Research Plan [95], which advocated the formation of several Centers of Excellence for geographic research within the USGS, CEGIS being the only one that was formed. In early 2005, I developed a scope of work for CEGIS and a staffing plan for a virtual Center including a small core of USGS scientists, post docs, contracted researchers from universities, and students. CEGIS was officially formed in January, 2006 and the USGS contracted the National Research Council to develop *A Research Agenda for Geographic Information Science at the U.S. Geological Survey* which became the basis for CEGIS research. During FY 07, I began implementation of the concept of Affiliated Faculty in which a university faculty member with the aid of the graduate student(s) and in coordination with CEGIS staff scientists, conducts research on CEGIS projects.

Results The current (December 2011) CEGIS organization includes six CEGIS Federal scientists, three affiliated faculty (Cynthia Brewer, Pennsylvania State University; Barbara Buttenfield, University of Colorado; and Keith Clarke, University of California at Santa Barbara), a GIS technician, a computer science specialist, and10 students (2 Ph.D, 4 masters, 4 undergraduates). Substantive results have included generalization procedures and algorithms that have now become operational for *The National Map;* data integration procedures that have been commercialized; a design for a new generation of USGS topographic maps, now being converted to a standard for USGS; research and development of a taxonomy and ontology for *the National Map;* and an evolution to research on CyberGIS as the next generation of GIS that generates new science results.

Impact The scientific impact of the development of CEGIS is significant for the USGS and for the cartography and GIScience disciplines. For USGS, CEGIS provides an organization devoted to cartographic and GIScience research that can support *The National Map* and National Spatial Data Infrastructure with a goal to re-establish the USGS as a scientific leader in research in cartography and GIScience. The ability to attract the highest quality academic researchers as Faculty Affiliates attests to the credibility of CEGIS. With the current support of internal USGS researchers and the academic affiliates, the impact of CEGIS on the discipline has been greatly enhanced. CEGIS also has significant impact through training of students and building scientific and research capacity for the next generation. The impact of CEGIS has been to restore a leadership role for USGS in GIScience and cartographic research. CEGIS has been acknowledged by the University Consortium for Geographic Information Science (UCGIS) (in text of award presentation to me as a **Fellow of UCGIS**) and others as a USGS source of cutting edge scientific research in geospatial information science.

12a.2. Semantics for Geospatial Data (2007-2011)

The history of research that led to the current ontology work for *The National Map* began in the 1980s with the research and development of a feature-based data model for GIS [4]. The theoretical underpinnings for this model were achieved in the 1990s documented in [7],[10],[11],[27]. The development of the current feature-based data model for the National Hydrography Dataset (NHD) resulted from feature-based research. The evolution and implementation of these feature-based concepts [27], [35],[38] provided a path to the Semantic Web research of CEGIS today, with an early collaborative paper in my academic work [23].

Results The results to date have included the conversion of USGS vector data for nine test areas (six watersheds and three urban areas) for hydrography (NHD), transportation, boundaries, structures, and the Geographic Names Information System (GNIS) to Semantic Web format of Resource Description Framework (RDF) triples and a developed approach for conversion of geographic features such as mountains, valleys, and craters that only appear as names on topographic maps and in raster datasets (elevation, orthographic images, and land cover [36],[37],[49].

Impact Accomplishments have included my co-organization of a Specialists Meeting on "Developing an Ontology for *The National Map*." [36] Recent work (2009-2011) has focused on creating the ontology and converting data from *The National Map* to a Semantic Web format (RDF and OWL) [37]. Impacts of this work include national and international recognition of the USGS as a major force in developing the future geospatial semantic web. Results to date have led to my invitation as the keynote speaker at the Terra Cognita Workshop of the 2009 International

Semantic Web Conference, and publications [36],[37], and [49], which have extended early work on semantics of geospatial data in collaboration with University researchers[23]. As a result, the USGS is now recognized as a major research force in geospatial semantics demonstrated by our hosting the Spatial Ontology Community of Practice (SOCoP) workshops at the USGS National Center in December 2010 and December 2011. Other scientists and organizations are adopting and using our methods and data to further develop the geospatial Semantic Web. Examples include the Spatial Ontology Community of Practice (SOCoP) and the Open Geospatial Consortium.

12a.3. CyberGIS (2009-2011)
Original goals of this project include research and development of a Web implementation for fast and accurate reprojection and resampling of raster data for *The National Map*. While this is a current project, it is building from over ten years of research on projection of raster datasets (see section 12b). Among the problems being addressed are the gain and loss of categorical pixel values during transformation and projection of categorical raster data, excessive execution times, for example over 100 hours of computation for large raster datasets, and a user-intuitive Web interface for projecting data from *The National Map*. The use of parallel computing techniques and implementation of map projection using Grid computing are being investigated. A cyberGIS version of map projections software, mapIMG, has been implemented.
Impact My work in this area led to my position as a Senior Investigator on a National Science Foundation grant of $4.5 million to the University of Illinois-Urbana/Champaign and a consortium of other researchers and institutions to research and develop CyberGIS as the next generation of GIS capable of solving new problems that GIS cannot address today. My role places the USGS as a major player in this research.

12a.4. Data Integration for *The National Map* (2003-2011)
Results This project has provided a basis for defining geospatial data integration based on an empirical study of various data overlays. A rating scale was developed to assess the accuracy of integration using shape, position, and temporal characteristics. The data integration ratings on a 5-point scale (similar to a Likert scale) provided by a group of cartographic technicians viewing the data overlay combinations from *The National Map* at 1:24,000 scale, two at a time, showed that a 3 on this scale was perceived as integrated. Converting this to a geometric specification by measuring the discrepancies between features on different layers provided a value of 6.2 m root mean square error (RMSE) between geographic features on the two layers. Theoretical concepts from cartography provide a basis to define data integration possibilities based on metadata attributes of scale and resolution. An automated method to integrate roads with orthographic images was implemented. These results and the methods are available in [32]. Additional work in data integration of raster data using image fusion concepts is documented in [24],[26], [30].
Scientific Impact Contributions include empirical methods for studying data integration and the basis of a scientific theory of data integration. Work in this area has led to support of research at the University of Southern California with Professor Craig Knoblock and his team, who have extended the work through a private company, Geosemble, that now has contracts with the National Geospatial-Intelligence Agency for operational data integration. My own publications in this area include [32] and a refereed chapter [47] in a forthcoming book that resulted from a workshop on Generalization and Data Integration (GDI) that was developed and funded through CEGIS. This workshop brought together researchers from the United States and Europe to develop new approaches to the problems of GDI.

b. OTHER CAREER ACCOMPLISHMENTS

12b.1 Developing a Feature-based Data Model
The development of a theory of geographic features, amenable to computer implementation, that effectively represents human cognition has been a major research area in geographic information systems (GIS) and science (GIScience) for 25 years or more. My own work in this area began with initial research to develop feature lists (early versions of ontologies) for the USGS and the Defense Mapping Agency in the 1980's. However, through my academic research, I was able to contribute to the development of a theory of geographic features published in [7] and several broader articles including [10], [11],[38]. This work has continued with the most recent efforts at USGS focused on the theory and its implementation in applications of watershed modeling and feature extraction from remotely-sensed images [61], [66]. The impact of this work is evidenced through funding support over many years by IBM Corporation, USGS Prospectus, and the National Geospatial-Intelligence Authority (NGA), citations of published work, and the adoption of the feature-based model through influence of my work and that of other researchers in this time period, as the standard of GIScience and system implementations. A recent indication of this impact is my **invited co-authorship** of a chapter on representation of time in GIS in the American Society for

Photogrammetry and Remote Sensing (ASPRS) *Manual of GIS* [43]. In this broad research area, my contributions continue to represent the cutting edge of science, but also currently focus on implementation methodologies.

A significant research achievement was developing a framework with underlying theoretical support which allows the representation of attributes and relationships for the multiple dimensions of geographic phenomena. This framework, developed as a feature-based model, was conceived from an initial focus on geographic entities as the primary level for appropriate representation. The model essentially changed the geospatial paradigm by removing the necessity of viewing spatial attributes, such as location, as the fundamental basis of geography and helped establish the concept that spatial location is only one of many attributes of a particular geographic feature. The initial documentation of this approach relied on work in a terrain application [6] and theoretical concepts from cognitive psychology[7]. Establishing that the basic level of abstraction of geographic phenomena, as has been done in cartography, corresponds to the basic level established by researchers in cognitive psychology brought a firm theoretical basis to feature-based approaches to geographic representation. Extending this research to embrace the abstraction and generalization concepts of cartography and the theory of regions from geography led to a conceptual model with potential as a basis for a multidimensional theory of geographic phenomena [10]). Documentation of this theory and an implementation using fuzzy sets based on attribution as proof of concept was achieved [38]. The extension to a complete theory and the feasibility of implementation was investigated in [61], [66].

This work provides a theoretical base and feature-based data model that now is supporting research to place USGS geospatial data on the Semantic Web, an evolution of the World Wide Web in which the meaning (semantics) of information and services on the Web is defined. See the discussion of the current Semantics for Geospatial Data project under Section 12a2. Publications resulting from the development of this conceptual framework and work toward a multidimensional theory include [6], [7],[10], [11], [27], [35], [38], [61],[66], and [70].

12b.2 Map Projections of Raster Data (2001-2009)

Goals of this project included research and development of a Web implementation for fast and accurate reprojection and resampling of raster data. The results include theoretical development of error models [15], examination of existing projections [17], empirical analysis with actual global datasets [16], [17],[19], [90],[91],[92] and the development of a new projection concept [19]. Solutions in the form of a public-domain raster data projection software package (mapIMG), a Web-accessible Decision Support System for Map Projection Selection [94], and a USGS bibliography of map projections (http://www.mapthematics.com/WIKINDX/wikindx3/index.php) have been provided. More recent work has focused on theoretical and technical development for rapid projection of large raster datasets for *The National Map* using parallel and grid-computing and on using map projections to provide a basis for modeling, simulation, and animation of sea level rise [46]. This work led to current CyberGIS project in CEGIS.

Significance The results of this work were reviewed with a critical eye by academia and the vendor community, but now the adoption of the results, the provision of the web-based decision support system for map projection selection (http://mcmcweb.er.usgs.gov/cartoresearch), and the availability to the vendor community and the public of all datasets and a software package, including algorithms and source code, that correctly execute global raster data projections, has brought recognition and acceptance. As a result, I am now considered a leader in the general area of map projections (vice-Chair Map Projections Commission of ICA) and probably the best recognized authority concerning projection of raster data. Further evidence of the significance and impact of my work in this area is my **invited lead authorship** of a chapter on map projections and coordinate systems in the American Society for Photogrammetry and Remote Sensing *Manual of GIS* [45]. A 2007 presentation of a model of global sea level rise based on our projection and resampling methods received international attention and I was interviewed by Reuters, MSNBC, and CBS with the Reuters story appearing on CNN. I continue to receive US and international invitations, such as the National Academy of Sciences, to present and discuss this work. Also, this work was recently published as an **invited** chapter in a book on geotechnical contributions to urban hazards [46].

Impact The accuracy and validity of global and regional raster data used in environmental models can now be determined and tools for correctly transforming and projecting these datasets are available. Solutions in commercial software have been implemented and made available. USGS is again a recognized authority on map projections and the work continues to develop applications in operational aspects of *The National Map*. This project led directly to the current CyberGIS project. The use of parallel computing techniques and implementation of map projection using Grid computing are being investigated.

12b3. University Affiliation Currently, I am an Adjunct Professor with the Missouri University of Science and Technology where I teach Remote Sensing Technology. I was also a professor at the University of Wisconsin-Madison and the University of Georgia, where I taught cartography and GIS, developed certificate programs in GIS, and conducted grant supported research in theory and applications of GIS, cartography, and remote sensing.

13. SCIENTIFIC LEADERSHIP

My contributions to advance the USGS mission and programs include the scientific advancements discussed in 12 a and b, but also include the leadership role I provide in the scientific community as a USGS representative. These include my role as **past-president of University Consortium for Geographic Information Science, past-president of Cartography and Geographic Information Society, and former editor for *Cartography and Geographic Information Science*.** I am an advocate for the USGS on all fronts, but particularly provide connection to the academic community where I am recognized as a major spokesperson for USGS geospatial science and other activities. I also provide research leadership within the USGS as exemplified by the implementation of CEGIS for which I helped develop the mission and scope of operations including the 2006 Prospectus call for proposals and review process. I also served as an advisor the USGS Bureau Science Strategy Team in 2006 and on the writing team for the Water Resources Research program five-year research plan (2006-2010). I was a member of the USGS Wyoming Landscape Conservation Initiative Ecological Assessment Science Team (EAST) to help develop this initiative for the FY 2008 USGS budget. Another example is demonstrated by my participation on the Geography Science Planning Team to help establish a future science and research vision for geography in the USGS. These activities are supported by my years of activity with UCGIS as Chair of the Research Committee and as co-editor of a significant volume documenting a research agenda in geographic information science [51]. In the last three years, I served on the EPN Customer Advisory Group and a member of both the Visioning Team and the Cost Model Team. I also served as a member of the Geography Science Synthesis Team and currently serve on the RGE Advisory Group. I served on organizing or program committees for conferences, such as Auto-Carto 2005 and the 17th ACM International Symposium on Advances in Geographic Information Systems (ACM GIS) 2010. I served as the Program Chair for AutoCarto 2010, and a member of the Program Committees for Geomorphommetry 2011, ACM SIGSpatial GIS 2011, UCGIS 2011, Terra Cognita 2011, International Cartographic Conference, Paris, 2011, and currently the International Cartographic Conference, Dresden, 2013. Also, I am currently **chair of the U.S. National Committee to the International Cartographic Association,** Chair of the Local Organizing Committee and Conference Director for the 2017 International Cartographic Conference to be held in Washington, D.C. I am Vice-Chair of the ICA Commission on Map Projections and Chair of the ICA Technology Outreach Working Group.

14. SCIENTIFIC AND PUBLIC SERVICE

a. CURRENT MEMBERSHIPS IN PROFESSIONAL SOCIETIES

Memberships Association of American Geographers (1980-present), Cartography and Geographic Information Society (1997-present), American Society for Photogrammetry and Remote Sensing (1977-present), North American Cartographic Information Society (1994-present), International Cartographic Association, British Photogrammetric Society, member 1980-2006

Elected positions

Chair of the Local Organizing Committee and Conference Director for the 2017 International Cartographic Conference to be held in Washington, D.C

Chair, International Cartographic Association Technology Outreach Working Group, 2012-2016

Vice-Chair, International Cartographic Association Commission on Map Projections, 2012-2016

Program Committee for the ACM International Symposium on Advances in Geographic Information Systems (ACM GIS) 2007, 2008, 2009, 2010, 2011

U.S. National Committee to the International Cartographic Association, member, 2004-2008, Chair for 2008-2016.

Secretary, International Cartographic Association Commission on Map Projections, 2008

University Consortium for Geographic Information Science, USGS delegate, 2007-present

University Consortium for Geographic Information Science, President-elect, 2003; President, 2004; Past-President, 2005

University Consortium for Geographic Information Science, Director, 2002-2003

Cartography and Geographic Information Society, Vice president, 2001; President, 2002; Past-president, 2003

University Consortium for Geographic Information Science, Chair, Research Committee, 1999-2001

ISPRS Commission IV, Working Group I, GIS Data and Applications, Chair, 1992-1996

b. TECHNICAL PRESENTATIONS

USGS Advancements in Geospatial Semantics and CyberGIS, Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing, China, 2011. (INVITED)

Data Exchange for Global Science, US China Roundtable on Scientific Data Cooperation, Beijing, China, 2011. (INVITED)

USGS Needs and Advancements in CyberGIS, CyberGIS All-hands Meeting, Oak Ridge, TN, 2011. (INVITED)

National Geospatial Data Assets Maintained by the U.S. Geological Survey as Part of *The National Map*, International Cartographic Conference, Paris, France, 2011. (PRESENTED)

The U.S. National Committee and the International Cartographic Association, North American Cartographic Information Society, Madison, WI, 2011. (INVITED)

Ontology and Semantics for *The National Map*, University of Nebraska, Department of geography, Lincoln, Nebraska, 2011 (INVITED)

Semantics for Complex Features and Images, American Society for Photogrammetry and Remote Sensing, Milwaukee, 2011. (PRESENTED)

CyberGIS Research and Implementation in the USGS, Association of American Geographers Annual Conference, Seattle, WA, 2011. (INVITED)

USGS Volunteered Geographic Information Workshop, Herndon, VA, 2010. (INVITED)

Cyberinfrastructure Components of *The National Map*, CyberGIS Workshop 2010, Washington, D.C. (INVITED)

Data Sharing – Critical for Global Science, US China Roundtable on Scientific Data Cooperation. Irvine, CA, USA, 2010. (INVITED)

The Digital Transition in Cartography: USGS Data Innovations, 1970s, 3rd International Symposium on the History of Cartography, University of Texas at Arlington, Arlington, TX, 2010. (INVITED)

The National Map, Geospatial Ontology, and the Semantic Web, International Semantic Web Conference, *Terra Cognita* Workshop, near Washington, D.C. , 2009. (INVITED Keynote)

Mapping Developments and GIS in the USGS, 1884-2009, International Cartographic Conference, Santiago, Chile, 2009. (PRESENTED)

125 Years of Topographic Mapping, 80-panel exhibit of USGS Topographic Mapping history, ESRI User Conference, San Diego, CA, 2009. (INVITED)

Place Still Matters: Generalizing the National Hydrography Dataset by Local Terrain and Climate, Buttenfield, B., C. Brewer, E.L. Usery, North American Cartographic Information Association, 2009.

The USGS Center of Excellence for Geospatial Information Science, CEGIS Research Meeting, Rolla, MO , 2009 (PRESENTED)

Geospatial Data Integration: A Review and a USGS Approach, China-US Roundtable on Scientific Data Cooperation, Qingdao, China, 2009. (INVITED)

Geospatial Data Integration: A Review and a USGS Approach, University of Missouri-Kansas City, 2009. (INVITED)

The USGS Center of Excellence for Geospatial Information Science – Spatio-temporal Data Model Research, National Science Foundation Workshop on Geospatial and Geotemporal Informatics, 2009. (INVITED)

Modeling Sea Level Rise and Surge with Geographic Information System Datasets, International Geographical Union, Tunis, Tunisia, 2008. (PRESENTED)

Modeling and Animation of Sea Level Rise and Surge with Geographic Information System Datasets, Missouri University of Science and Technology, Rolla, MO, 2008. (INVITED)

Resolution and Resampling Effects of Raster Data in Global and Regional Models , National Research Council Board on Earth Sciences and Resources, Irvine, CA, 2008. (INVITED)

The USGS Center of Excellence for Geospatial Information Science, Association of American Geographers, Boston, 2008. (PRESENTED)

The USGS Center of Excellence for Geospatial Information Science, AutoCarto 2008, Shepherdstown, West Virginia, 2008. (PRESENTED)

Elements of a Global Model: An Example of Sea Level Rise and Human Populations at Risk, 2nd USGS Modeling Conference, Orange Beach, AL, 2008. (PRESENTED)

The Use of Geospatial Data, Methods, Models, Processes, Simulation, and Animation to Model Global and Regional Events, National Research Council Board on Earth Sciences and Resources, Irvine, CA, 2007. (INVITED)

From Numbers to Graphics; From Graphics to Animation, U.S. Geological Survey New England Science Forum, 2007. (INVITED)

Modeling Sea-Level Rise Effects on Population using Global Elevation and Land-Cover Data, Association of American Geographers, San Francisco, 2007. (PRESENTED)
Data Integration for *The National Map*, University of Missouri-Rolla, 2007. (INVITED)
Generalization for *The National Map*, University of North Carolina-Greensboro, 2007. (INVITED)
Geographic Information Science Research in the U.S. Geological Survey, Association of American Geographers, Chicago, 2006. (PRESENTED)
Integrating Data Layers to Support *The National Map* of The United States, International Cartographic Conference, A Coruña, Spain, 2005. (PRESENTED)
Reprojecting Raster Data of Global Extent, Auto-Carto 2005, Las Vegas, Nevada. (PRESENTED)
GIS Data Resolution Effects on Watershed Models, Ain Shams University, Cairo, Egypt, 2004. (INVITED)
Multidimensional Data Modeling for Feature Extraction and Mapping, American Congress on Surveying and Mapping, Nashville, TN, 2004. (PRESENTED)
Autostereoscopic Visualization: A Review of theTechnologies and Potential, Association of American Geographers, Philadelphia, PA, 2004. (PRESENTED)
Automatic Generation of Parameter Inputs and Visualization of Model Outputs for AGNPS using GIS, USGS DoD Environmental Program Conference, Biloxi, MS, 2004. (INVITED)
Extraction of Mission-Specific and National Map Features from Multimodal Sources, Western Illinois University, Macomb, Illinois, 2003. (INVITED)
Data Integration of Layers and Features for *The National Map*, American Congress on Surveying and Mapping, Phoenix, AZ, 2003. (PRESENTED)
Mission-Specific Littoral Feature Extraction and Product
Generation from Multimodal Sources, Association of American Geographers, New Orleans, LA, 2003. (INVITED)
Database and Symbology Issues Associated with Littoral Map Generation, American Society for Photogrammetry and Remote Sensing,, Anchorage AK, 2003. (INVITED)
Analysis of Resolution and Resampling on GIS Data Values, American Society for Photogrammetry and Remote Sensing,, Anchorage AK, 2003. (PRESENTED)
Projecting Global Raster Databases, Geoinformatics, 2002, Nanjing, China. (PRESENTED)
Optimization of Coastal Zone Databases Using Multimodal Data, National Imagery and Mapping Agency NURI Symposium, Reston, VA, 2002. (INVITED)
Feature Extraction from Multimodal Sources to Support *The National Map*, North American Cartographic Information Society, Columbus, OH, 2002. (PRESENTED)
Processing Global Raster Databases with Geographic Information System Software: Problems and Solutions, University of Delaware, Newark, Delaware, 2002. (INVITED)
Resolution and Resampling Effects of GIS Databases for Watershed Modeling, Auburn University, Auburn, Alabama, 2002. (INVITED)

On average I made 3 to 5 presentations at major conferences each year for the last 25 years, so I am only listing invited presentations prior to 2002.

Optimization of Coastal Zone Databases Using Multimodal Data, National Imagery and Mapping Agency NURI Symposium, Reston, VA, 2001. (INVITED)
A Comparison of Equal-Area Map Projections for Regional and Global Raster Databases,@ ASPRS Central Region, Rolla, Missouri, 2000. (INVITED)
Urban Dynamics and Retrospective, Seoul Development Institute, Seoul, Korea, 2000. (INVITED)
Developing a GIS Database for Precision Farming, Precision Agriculture '96, Southeast Trade Show and Forum, Tifton, Georgia, 1996. (INVITED)
GPS/GIS Application to Precision Farming, GPS/GIS '96, Billings, Montana, 1996. (INVITED)
Integration of Remote Sensing/GIS for the Sustainable Development and Management of Natural Resources, Russian Academy of Science, Siberian Branch, Earth and Cryosphere Institute, Tyumen, Russia, 1995. (INVITED)
European Science Foundation Scientific Programme, GISDATA Specialist Meeting on Spatial Conceptual Models for Geographic Objects with Undetermined Boundaries, Baden, Austria, 1994. (INVITED)
Display of Geographic Features from Multiple Image and Map Databases, International Society for Photogrammetry and Remote Sensing, Commission IV Symposium on Mapping and Geographic Information Systems, Athens, GA, 1994. (INVITED)

Geographic Information Systems, Chung Cheng Institute of Technology, Tao Yuan, Taiwan, R.O.C., 1993. (INVITED)
Softcopy Photogrammetry for Generation and Updating of Data Layers and Base Maps of GIS, Panel Discussion, GIS/LIS '93, Minneapolis, Minnesota, 1993. (INVITED)
Introduction to Geographic Information Systems, Department of Geography, University of Wisconsin-Platteville, Platteville, Wisconsin, 1993. (INVITED)
Geographic Information Systems: Trends and Developments, Department of Geography, Indiana University, Valparaiso, Indiana, 1988. (INVITED)

c. RENDERING SCIENTIFIC JUDGMENT

2011	US-China Roundtable on Scientific Data Cooperation, Beijing, China, 2011. Sponsored by the U.S. National Academy of Science and the Chinese Academy of Science (Invited participant)
2011	University Consortium for Geographic Information Science, Spatial Sciences Symposium, Catalina Island, CA (Invited participant)
2011	USGS RGE Advisory Group
2011	USGS RGE Second-level Review Panel
2011	USGS *The National Map* Users Conference, program abstract reviews
2011	Faculty Evaluations for Promotion and Tenure, Penn State University, University of Kansas, Northwest Missouri State University, University of West Georgia
2010	Chair, UCGIS Fellows Committee
2010	Faculty evaluation for UCGIS Educator of the Year Award
2010	Faculty evaluations for promotion and tenure, University of Kansas, University of West Florida, Florida State University, Clarke University, University of California-Santa Barbara
2010	CyberGIS Workshop, Washington, D.C., Feb 3-4, 2010, National Science Foundation (Invited participant)
2010	US-China Roundtable on Scientific Data Cooperation, Irvine, CA, USA, 2010. Sponsored by the U.S. National Academy of Science and the Chinese Academy of Science (Invited participant)
2009-2010	USGS Geography Science Synthesis Team (member)
2009-2010	USGS Electronic Publishing Network Visioning Team. (member)
2009-2010	USGS Electronic Publishing Network Customer Advisory Group Cost Model Team (member)
2009	USGS 125th Anniversary of Topographic Mapping Celebration Team (member)
2009	China-US Roundtable on Scientific Data Cooperation, Qingdao, China, 2009. Sponsored by the U.S. National Academy of Science and the Chinese Academy of Science
2009	Workshop on GeoSpatial and GeoTemporal Informatics, Arlington, VA. National Science Foundation
2008-2009	U.S. Geological Survey Electronic Publishing Network Customer Advisory Group. (member)
2007	U.S. Geological Survey, Wyoming Landscape Conservation Initiative Ecological Assessment Science Team (member)
2006	U.S. Geological Survey Center of Excellence for Geospatial Information Science (CEGIS) Oversight review panel for Prospectus proposals. (organizer and member)
2006	U.S. Geological Survey Science Strategy Team, Advisory Panel (member)
2006	U.S. Geological Survey Hydrologic Research and Development Five-Year Plan Writing Team (member)
2006	American Association Advancement of Science Review Panel, Canon-National Park Service Scholarships (member)
2005-2006	Developed concept and scope of work for Center of Excellence in Geospatial Information Science for U.S. Geological Survey.
2006	Corresponding Editor, *Geographical Papers*, Department of Geography, University of Karachi, Pakistan
2006	Evaluation of candidates for Head, Department of Geography University of Karachi, Pakistan
2006	Evaluated faculty for promotion and/or tenure for: Pennsylvania State University, University of California at Santa Barbara, Michigan State University, Texas State University
2005	Evaluated faculty for promotion for University of South Carolina
2005	Editor, *Auto-Carto 2005: A CaGIS Research Symposium*, edited 40 papers, published 17.

2005	National Science Foundation Review Panel, Information Technology Research, Washington, D.C. (member)
2004	USGS Geography Science Planning Team (member)
2003-2006	Editor, *Cartography and Geographic Information Science*
1999-2002	Chair, Research Committee, University Consortium for Geographic Information Science
1998-2006	Graduate Coordinator, Geographic Information Science Certificate Program, University of Georgia
1996-2006	University of Georgia Delegate, University Consortium for Geographic Information Science (UCGIS)
1994-2006	Graduate Faculty, University of Georgia (member)
1999-2003	Editorial Board, *Cartography and GIS*
2001	National Science Foundation, Information Technology Research (ITR) Review Panel, Washington, D.C. (member)
1998-2001	Undergraduate Advisor, Department of Geography, University of Georgia
1997-2001	Co-editor, *Department of Geography Discussion Paper Series*
1995-2001	National Environmentally Sound Production Agriculture Laboratory (NESPAL), University of Georgia (member)
1998	Y2K Area Coordinator for Social Sciences, University of Georgia
1997-1998	Chair, Curriculum Committee, Department of Geography, University of Georgia
1993-1997	Editorial Advisory Board, *ISPRS Journal of Photogrammetry and Remote Sensing* (member)
1992-1996	Chair, International Society for Photogrammetry and Remote Sensing (ISPRS), Commission IV, Working Group I, GIS Data and Applications
1990-1994	University of Wisconsin-Madison LIS/GIS Steering Committee (member)
1988-1992	University of Wisconsin-Madison Department of Geography Computer Committee (chair)
1987	U.S. Geological Survey Committee Investigating Cartographic Entity Definitions and Standards (CICAEDAS) (member)
1986	U.S. Geological Survey Feature Attribute Coding Standard (FACS) Evaluation Working Group (for Defense Mapping Agency) (member)
1984	U.S. Geological Survey Spatial Data Processor (SDP) Design Team (member)

Reviews

Books

Coxon, A.P.M., *Multidimensional Scaling: The User's Guide*, Prospectus for a new textbook to Sage Publications.

Lillesand, T.M, R.W. Kiefer, and J. Chipman, 2003. *Remote Sensing and Image Interpretation, 5th Edition*, John Wiley and Sons, New York

Clarke, K.C., *Getting Started with Geographic Information Systems*, prospectus for an elementary textbook, for Prentice-Hall, Inc., 1995.

Estes, J. and J. Star, 1990. *Geographic Information Systems: An Introduction*, Second edition preparation, for Prentice-Hall, Inc., 1995.

Slocum, T., *Thematic Mapping using Computer-Aided Techniques*, prospectus for textbook, for Prentice-Hall, Inc, 1994.

Maguire, D. J., M.F. Goodchild, and D.W. Rhind, (eds.), 1991. Geographical Information Systems, Principles and Applications, Longman Scientific and Technical Publications, London, *Cartographic Perspectives*, 1992.

Mutunayagam, N.B. and A. Bahrami, 1987. *Cartography and Site Analysis with Micro-computers*, Van Nostrand Reinhold Company, N.Y., *The American Cartographer*, 1991.

Multimedia

DiBiase, D., 1996. *Hypermedia Homeware for Introductory College Education in Geographic Information Science*, Prospectus for Prentice-Hall, Inc.

Journals

Annals of the Association of American Geographers, Cartography and Geographic Information Science, International Journal of Geographical Information Science, Transactions in GIS, Cartographic Perspectives, Journal of Spatial Information Science, ISPRS Journal of Photogrammetry and Remote Sensing, International Journal of Remote Sensing, Photogrammetric Engineering and Remote Sensing, GIScience and Remote Sensing, Professional Geographer, Urban Geography, Computers, Environment, and Urban Systems, ACM GIS, Terra Cognita

Proposals

U.S. Geological Survey, National Science Foundation, National Aeronautics and Space Administration, U.S. Department of Agriculture, American Association for the Advancement of Science, National Geographic Society, State of Maine

d. LECTURESHIPS AND OTHER ACADEMIC SERVICE

Course Development and Instruction

I currently hold a position as an Adjunct Professor with the Missouri University of Science and Technology (MST).

Summer 2011, I taught GE 344 Remote Sensing Technology to a class of 19 U.S. Army captains at MST. I taught this same course in Summer 2009 (5 enrolled) and Fall 2008 (24 enrolled).

I have taught classes internally at USGS including Advanced Remote Sensing (2003) and Digital Image Processing (1985). I also developed a Web-based class in Geospatial Data Synthesis and Modeling under contract for the University of Mississippi.

In my academic position with UGA, I served as the Graduate Coordinator and Undergraduate Advisor for the Geographic Information Science Certificate Programs, which I developed. I also served as Undergraduate Advisor for Geography from 1998-2001. I received a University System of Georgia Connecting Teachers with Technology, Faculty Development Award, 1995. I received a University System of Georgia Teaching and Learning Grant in 1997 to develop The Geography of Georgia as a multimedia-based class. This class was well-received and now enrolls 80 students per semester. Courses of instruction have also included the following:

University of Georgia 1994-2005

Geography 2610 - Geography of Georgia (computer and multimedia based class)
(http://www.ggy.uga.edu/courses/geog2610) Enrollment 80, Fall semesters, 1999-2002
Geography 4370/6370 - Introduction to Geographic Information Systems
Enrollment 40, alternate years, both semesters, 1998-2001, 2 of 3 quarters 1994-1997
Geography 4410/6410 - Cartographic Visualization
(http://www.ggy.uga.edu/courses/geog4410) Enrollment 15, Sp. 2000, Sp. 2002
Geography 4470/6470 - Geographic Analysis and GIS
(http://www.ggy.uga.edu/courses/geog4470) Enrollment 15, once per year, 1994-Present
Geography 8350 Remote Sensing with GTS Applications
(http://www.ggy.uga.edu/courses/geog8350/) Enrollment 17, Fall 2005
Geography 8570 - Seminar in GIS (including three virtual seminars over WWW)
Enrollment 7, once per year, 1995-Present
Geography/CRSS 4375/6375 - GIS Applications in Agriculture
(http://www.ggy.uga.edu/courses/geog4375) Enrollment 10, Fall 2001, 2002
Geography 420/620 Use and Interpretation of Aerial Photographs, Enrollment 30, Summer, 1983

University of Wisconsin-Madison 1988-1993

Geography 370 - Introduction to Cartography Enrollment 55

Geography 377 - Introduction to Geographic Information Systems, Enrollment 30
Geography 576 - Coordinate Systems and Map Transformations, Enrollment 15
Geography 578 - Digital Image mapping, Enrollment 15
Geography 579 - GIS and Cartographic Analysis, Enrollment 15
Geography 970 - Seminar in Cartography - Feature-Based GIS, Enrollment 15

Missouri University of Science and Technology (formerly University of Missouri-Rolla)

Geological Engineering 400 – Photogrammetry, Enrollment 1, 1987
Geological Engineering 300 – Geographic Analysis and GIS, Enrollment 10, 2001
(This course was taught to USGS personnel within the MCMC facility)

Geological Engineering 344 – Remote Sensing Technology, Enrollment 20, 2008-present.

Graduate Student Supervision

I have supervised the completion of 9 Ph.D. dissertations and 13 MA/MS theses. I served on 25 Ph.D. and 33 MA/MS advisory committees. I have supervised 4 post doctoral associates for the USGS.

Ph.D. (University of Georgia)

Ling, Yangrong, 2006. *Fusion of High Resolution Satellite Images*
Le, Yanfen, 2005. *Multiple Representations of Time for Base Geographic Data*
Jun, Byong-Woon, 2005. *An Integrated GIS Approach To Environmental Equity Assessment*
Choi, Jinmu, 2004. *A Prototype of Feature-Oriented GIS*
Shepard, Erik, 2003. *A Qualitative Comparison of Relational and XML Data Models For Spatiotemporal Persistence with Applications to Temporally Extended AM/FM/GIS*
Lyle, Stacey, 2003. *Small-Format Digital Camera Use In Geographic Information System Agricultural Applications*.
Fuller, Robert., 2003. *Fuzzy Classification and Post-Processing of Satellite Imagery to Define Watershed Model Parameters.*
Seong, Jeong Seong, 1999. *Multi-Temporal, Integrated Global GIS Database and Land Cover Dynamics Asia, 1982-1994*.
Mozolin, Mikhail V., 1997. *Inductive Machine Learning Methods in Geographic Research.*

MA/MS (University of Georgia):

Ernst, Torsten, 2005. *Application of Hyperspectral Remote Sensing for the Detection of Mine Sites Prone to Acid Mine Drainage*
Rice, Michael, 2005. *A New Hybrid Computational Intelligence Algorithm for Optimized Vehicle Routing*
Tu, Bei, 2004. *Measuring Coastline Change for Jekyll and Sapelo Island with GIS Techniques.*
Weaver, Bryan, 2004. *Data and Institutional Integration across Spatial Scales for The National Map*
Shepard, Erik, *A Parallel Approach to Searching for Neighbors with Minimal IinterprocessCommunication*
Pape, David., 1998. *Extracting Features from Raster Maps: Three Approaches*
Haney, Andrew .J., 1997. *Redistricting Methods in the Congressional Plans of Four Southern States, 1960-1997.*

MA/MS (University of Wisconsin-Madison):

Katinsky, Matthew H., 1994. *Fuzzy Set Modelling in Geographic Information Systems*.
Lacy, James P., 1994. *An Artificial Neural Network for Large-Scale Wetlands Mapping*.
Ruzycki, Thomas S., 1994. *The Measurement of Segregation and the Modifiable Areal Unit Problem.*
Pohle, Theresa A., 1993. *GIS Modelling of a Small Watershed on the Urban Fringe.*
Tang, Agatha Y.S., 1992. *Data Model Design for a Feature-Based GIS*.
Graff, Linda H., 1991. *Automated Classification of Basic Level Terrain Features in Digital Elevation Models.*

COMMITTEE MEMBER (University of Georgia)

Ph.D.

Hu, Zhiyong, 2004. *Modeling Urban Growth in The Atlanta, Georgia Metropolitan Area Using Remote Sensing and GIS*
Zhang, Yangjian, 2004. *Identification of Wildland Urban Interface at the Regional and Landscape Scales*
Fleming, Steven D., 2004. *Geospatial Information for Joint Military Operations in the Littoral Zone*
Thebpanya, Paporn, 2003. *An Analysis of the Utilization of Sound for Cognitive Enhancement of Topographic Maps for the Visually Impaired*
Weaver, Autumn, 2002. *Characterizing Soil Acidity In Coastal Plain Soils*
Hirano, Akira, 2001. *Digital Stereoscopic and Hyperspectral Data For Environmental Mapping Applications*
Porter, Robert, 2001. *Environmental Justice and Locally Desirable Land Uses in the Chattahoochee National Forest: A GIS Based Network Analysis*
Wang, Kai, 2001. *Automated Extraction of Drainage Networks with Triangulated Irregular Networks*
Pocknee, Stuart, 2000. *The Management of Within-Field Soil Spatial Variability.*
Graves, William, 2000. *Market Response to Innovation: Bridging the Gap between Invention and Production.*
Sultana, Selima, 2000. *Effects of Spatial Structure, Job-Housing MisMatch, and Dual Earner Households on Work Trips in the Atlanta Metropolitan Area*.
Green, Raymond, 2000. *Multiple Objective Location of Air Transport Hubs.*
Yang, Xiaojun, 2000. *Integrating Image Analysis and Dynamic Spatial Modeling with GIS in a Rapidly Suburbanizing Environment*.
Franklin, Dorcas, 2000. Aspects of *Water Quality in the Southern Piedmont*
Beavers, Robert Maxwell, 1999. *An Evaluation of Cartographic Visualization's Utility in the Spatial Analysis of Urban Social Dynamics*
Weng, Qihao, 1999. *Environmental Impacts of Land Use and Land Cover Change in the Zhujiang Delta, China: An Analysis Using an Integrated GIS, Remote Sensing and Spatial Modeling Approach*
Hu, S., 1998. *A Multimedia Approach to the Utilization of Everglades National Park GIS Databases*
Wheeler, A., 1997. *Competitive Facility Location Strategies for Retail Firms.*
Kramer, E. A., 1995. *Measuring Landscape Changes in Remnant Tropical Dry Forests.*

MA/MS

Hinely, Adam, 2006. *GIS-Based Modeling of Bearded Capuchin Monkey Tool Use*
Manglass, Louis, 2006. *Historic Airboat Use and Change Assessment Using Remote Sensing and Geographic Information Systems in Everglades National Park*
Lund, Larry, 2006. *Cartographic Potential of ASTER VNIR Imagery*
Dolezal, John R., 2005. *Database Development and Geovisualization for Managing National Park Resources*
Sabins, Joel S., 2005. *Investigating Eastern North American Tree Species Richness and Diversity Using Relevé Data*
Sweet, Matthias, 2004. *Highway Investment and Economic Development: the GA-316 Corridor*
Russell, Heather, 2004. *A Habitat Suitability Model for the Gopher Tortoise in Georgia: A Geographic Information Systems Approach*
Giraldo, Mario Andres, 2003. *Spatial and Temporal Land Use Analysis of the EARTH University Property in The Caribbean Humid Tropics of Costa Rica from 1973 to 2001 using Remote Sensing Data.*
Parisi, Wendy, 2001. *Landscape Indicators of the Cherokee darter (Etheostoma (Ulocentra) cotti) in the Etowah Basin, Georgia*
Valesquez, Cristian, 2001. *Assessment of Agricultural Land in Southwest Georgia from SPOT 4 Vegetation Data*
Chorney, Christopher, 2001 *Processes and Perceptions of Environmental Degradation: The Case of the Karen Refugees in Thailand*
Stoughton, Candace, *River Channel Planform Change in the South Fork Broad River, Georgia, 1944-1993.*
Bassett, Troy, 1999. *Military Base Closings: Possibilities for Redevelopment*
Boulware, Jennifer Grant, 1999. *Comparison of Static and Interactive Maps Using Speed and Accuracy*
Keyes, Timothy, 1999. *Fragmentation and Edge Effects: A Multi-Scale Study of Avian Nesting Success in an Eastern Deciduous Forest*
Mark, Michael, 1999. *The Geography of HIV/AIDS: A Spatio-Temporal Analysis of the HIV/AIDS Pandemic, 1987-*

1997

Thebpanya, Paporn, 1999. *An Evaluation of High-Resolution Thermal Infrared ATLAS Data for Land Use/Cover Mapping in the Atlanta Metropolitan Area*

Bower, A., 1998. *The Use of Surface Models to Analyze Micro-Scale Population Change*

Boydell, B., 1997. *Development of Precision Farming for Southeastern USA*

Whitley. R., 1996. *An Examination of the Accuracy of Topographic Mapping Using Digital Photogrammetric Systems.*

Lawson, N, 1995. *Computerized Cartographic Production in an Interactive Atlas.*

Faber, B.J., 1995. *Quality of Life Assessment through the Integration of Landsat Thematic Mapper and Census Data.*

Aranyakananda, P., 1994. *Land Use Change and Population Estimation from Landsat TM Data for Bangkok, Thailand, 1988-1991.*

COMMITTEE MEMBER (University of Wisconsin-Madison)

Ph.D

Ping, H., 1994. *Manual Digitizing Error Analysis and Error Model Development.*

Tsai, V.J.D., 1994. *Towards an Integrated Three-Dimensional Geographic Information System.*

Wiegand, N., 1994. *Creating an Extensible GIS from an Extensible Database Management System.*

Sun, B. L., 1992. *Geometric Control of SPOT Panchromatic Imagery Using Digitized Aerial Photographs.*

Bolstad, P.V., 1990. *The Integration of Remote Sensing, Geographic Information System, and Expert System Technologies for Satellite Image Based Land Cover Classification under Lake States Conditions.*

MS

Phillips, H.A., 1995. *Spatial Analysis of Northeastern Wisconsin Gypsy Moth Trap Data, 1990-1994.*

Maher, D.H., 1993. *Charles S. Pierce and Cartography.*

Crane, A.I., 1992. *Improving the Accuracy of Classified Images with Neural Networks.*

Coatney, S.K., 1992. *Marketing Geographic Information Systems and Cartographic Services.*

Samson, L. F, 1992. *The Non-Stationary Modifiable Areal Unit Problem for the Correlation Coefficient.*

Savory, D.J., 1992. *Digital Terrain Classification via Scale-Sensitive Edge Detection: Hillslope Characterization for Soil-Landscape Analysis.*

Slocum, L. S., *1992. Exploring the Potentialfor Integrating Geographic Information Systems with Video Technology.*

Thiede, W., *1992. The Influence of Technology on Design Changes of the United States Geological Survey Topographic Maps from 1967 through Spring 1992: Philosophy and Rationale.*

Benson, J. L., 199*1. Map Accuracy in Composite Variable Mapping: A Look at the Modelling Process.*

Podger, N.E., 1991. *Displaying Three-Dimensional Data Using an Autostereoscopic Technique on Microcomputers.*

COMMITTEE MEMBER EXTERNAL

Zamir, Umair-Bin, 2011. *Spatial Analysis of Crimes and Violence Pattern in Karachi through Geoinformatics Techniques*, University of Karachi, External Dissertation Reviewer

Syed Hasan Abbas, 2009. *GIS-Based Decision Support System for Disaster Mitigation and Management for Floods*, Motilal Nejru National Institute of Technology, Allahabad, India, External Dissertation Reviewer

Qiungfeng Guan, 2008. *Parallel Algorithms for Geographic Processing*, University of California at Santa Barbara, External Member Dissertation Advisory Committee

Hatem Halaoui, 2005. *AIRSTD: An Approach for Indexing and Retrieving Spatio-Temporal Data*, Hunter College, City University of New York, External Member Dissertation Advisory Committee

Post Doctoral Supervision

Dr. Jamil Kazmi, University of Karachi, Pakistan, Fulbright Scholar, 1 year postdoc with University of Georgia, 1997.

Dr. Derek Wu, Texas State University, San Marcos, Texas; 16-month post doc with USGS, 2006-2007; See [29], [31], [34].

Dr. Minzhen Wei, University of Missouri-Rolla; 2 year post doc with USGS, 2007-2008. See [81].

Dr. Qingfeng (Gene) Guan, University of California Santa Barbara; 1 year postdoc with USGS, 2008; current (2011) collaborator on CyberGIS project.

e. TECHNICAL TRAINING PROVIDED None

f. SPECIAL ASSIGNMENTS

International Business Machines (IBM) Sept-Dec, 1991. Research and Development of Feature-based GIS on RS/6000 with AS/400 Relational Database

IBM June-Sept, 1992. An Assessment of the State of the GIS Industry

g. OTHER TECHNICAL ACTIVITIES

University and USGS Grant Award Record

Grants received (dates, amounts, principal investigator or co-principal investigator)

University Extramural Research Grants

Homeland Security Workshop, 2003. Co-PI's Amit Sheth, **E. Lynn Usery**, Xiaobai Yao, Budak Apinar. University Consortium for Geographic Information Science, $15,000.

Feature Extraction from Multimodal Sources to Support *The National Map*, 2002. PI - R. Welch, Co-PI - **E.L. Usery**, U.S. Geological Survey. Total funding $153,000; UGA funding $47,000.

Optimization of Coastal Zone Databases Using Multimodal Data, 2001. PI-Roy Welch, Co-PI - **E.L. Usery**, National Imagery and Mapping Agency, $420,000.

Accountability at Local, State, and Federal Levels for Impacts of Agricultural Conservation Practices on Water Quality, 1998. Coordinator, D. Fisher, Co-PI - **E.L. Usery**. U.S. Department of Agriculture, $313,822.

A Precision Farming Application of GIS, 1997. PI - Craig Kvien, Co-PI - **E.L. Usery**, ERDAS, Inc., $6,700.

Producer Assessment of Sustainable Land Management Practices to Protect Water Quality, 1997. PI - Miguel Cabrera, Co-PI's - Jean Steiner, Henry Hibbs, Jack Houston, L.M. Risse, **E.L. Usery**, U.S. Department of Agriculture, $250,000.

A Landscape Approach to Protecting Water Quality in the Southeastern Coastal Plain, 1995. PI for GIS, **E.L. Usery**, $85,792. G. Vellidis, C. Kvien, D. Thomas, Project Leaders. USDA. Total Project, $281,928.

GIS Directions: Review and Assessment of the Technology, 1992. PI - **E.L. Usery**, IBM Corporation, $17,111.

Feature-Based Approaches to GIS, 1991. IBM Corporation, $27,655. PI - **E.L. Usery**. Tenure at IBM resulted in the grant of an IBM RS/6000 Model 930 Powerserver (value at $100,000) and an IBM X-Station 130 (value at $7,000) to the University of Wisconsin-Madison for GIS research.

Location and Object Access of Database Attributes from GIS Graphics Displays, 1991. PI - **E.L. Usery**, ERDAS, Inc. software grant awarded to the University of Wisconsin-Madison.

Workstation Hardware and Software to Support Interdisciplinary Research and Outreach in Land and Geographic Information Systems (LIS/GIS), 1990. IBM Corporation, equipment and software grant awarded to the University of Wisconsin-Madison. PI -B. Niemann, CoPI's - **E.L. Usery**, F. Scarpace, A. Vonderohe.

Workstation Arc/Info and pcArc/Info Software to Support Interdisciplinary Research and Outreach in Land and Geographic Information Systems (LIS/GIS), 1990. ESRI Software and personnel grant awarded to the University of Wisconsin-Madison. PI - B. Niemann, CoPI's - **E.L. Usery**, F. Scarpace, A. Vonderohe.

Internal Research Grants (USGS and others competitively awarded)

Automated Data Integration in Support of *The National Map*, 2003. PI - **E.L. Usery**, Co-PIs - Michael P. Finn, W. Steve Helterbrand, U.S. Geological Survey Prospectus Award, $307,520 per year for 3 years.

The Big Unknowns in Global Change, Co-PI's Elgene Box, **E. Lynn Usery**, Ray Lassiter, Richard Wiegert. UGA State-of-the-Art Conference, $15,000.

Methods to Achieve Accurate Projection of Regional and Global Raster Databases, 2000. PI- **E.L. Usery**, Co-PIs - Daniel Steinwand and Jeong-Chang Seong, U.S. Geological Survey Grant, $300,000.

Building Geographic Features from Raster Data, 1993. PI - **E.L. Usery**. Wisconsin Alumni Research Foundation, University of Wisconsin. PI - **E.L. Usery**, $15,182.

Cartographic Abstraction and Generalization as a Basis for GIS Feature Determination, 1991. Wisconsin Alumni Research Foundation, University of Wisconsin , PI - **E.L. Usery**, $21,129.

Large Format Hardcopy Display of Three-Dimensional Geographic Data, 1991. Wisconsin Alumni Research Foundation, University of Wisconsin , PI - **E.L. Usery**, Co-PI - J. S. Norton. University of Wisconsin-Madison, $4,000.

Models of Features for Geographic Information Systems, 1990. PI - **E.L. Usery**. Wisconsin Alumni Research Foundation, University of Wisconsin, $21,365.

A Geological Engineering Application of a Knowledge-Based Geographic Information System, 1986. PI - **E.L. Usery**, Co-PI - D. Barr, University of Missouri-Rolla. U.S. Geological Survey GIS Policy Task Force, $98,000.

Basin Delineation and Determination of Parameters to Support Water Models using GIS Techniques, 1985. PI - Allen Lumb, Co-PI - **E.L. Usery**. U.S. Geological Survey GIS Policy Task Force, $20,000 in 1986; $25,000 in 1987.

Instructional Grants

Geospatial Data Synthesis and Modeling, 2002. PI- **E.L. Usery**, Web course development for the University of Mississippi's Center for Geospatial Workforce Development, NASA, $80,000.

GGY 261 - Geography of Georgia, 1997. PI - **E.L. Usery**. University System of Georgia Teaching and Learning Grants, $19,893.

Geosciences Learning Center and GIS Proposal Funding, 1994. **E.L. Usery**, P. Schroeder, D. Leigh and J.C. Thill. Funded $99,995 by University of Georgia Telephone Fund.

Using the IBM AS/400 for Interdisciplinary Instruction, Research, and Outreach in Land and Geographic Information Systems, 1990. IBM Corporation, $800,000 equipment grant awarded to the University of Wisconsin-Madison. PI - B. Niemann, CoPI's - **E.L. Usery**, F. Scarpace, A. Vonderohe.

Conference and Conference Session Organization

International Cartographic Conference of the International Cartographic Association, Washington, D.C., 2017. Chair of Local Organizing Committee and Conference Director

AutoCarto 2010, Program Chair, Cartography and Geographic Information Society

CEGIS Research Meeting, Organizer and Chair, 2008, 2009, 2011

Specialist Meeting to Develop an Ontology for *The National Map*, 2009, co-organizer with Dalia Varanka.

AutoCarto 2008, Organized a workshop on *The National Map*

AutoCarto 2008, Organized a workshop on Map Projections for Map Projections Commission of the ICA

GIScience 2008, Co-Organizer, Workshop on Cyberinfrastructure, Park City, Utah.

Association of American Geographers Annual Meeting 2006. Organized a session on Geographic Information Science Research in the USGS.

Auto-Carto 2005, Las Vegas, NV. Co-organizer with K. Eric Anderson.

UCGIS Visualization and Knowledge Discovery Workshop, 2003, Landsdowne, Virginia.

UCGIS Homeland Security Workshop, 2003, Amicalola Falls, Georgia.

USGS, NMD Research Symposium 2000, Rolla, Missouri, USA, with Steve Helterbrand.

ISPRS Congress, 1996, Vienna, Austria (3 oral and 2 poster sessions)

ISPRS Commission IV, WG 1, Workshop on Mapping and Environmental Applications of GIS Data, Madison, Wisconsin, 1995 (Organized conference and edited *Proceedings*).

ISPRS Commission IV Symposium, 1994, Athens, Georgia (2 oral and 1 poster sessions)

GIS/LIS '93, Minneapolis, Minnesota (1 oral session).

Course notes, materials, web site development

Usery, E.L., 2008-2011. *Remote Sensing Technology*, Developed complete course web site with lectures, notes, presentations, homework and project assignments. (MST)

Usery, E.L., 2005. *Remote Sensing with GIS Applications*, Developed complete course web site with lectures, notes, presentations, homework and project assignments. (UGA)

Usery, E.L., 2002. *Geographic Analysis and Geographic Information Systems*, Baxter Street Bookstore, Athens, Georgia, 305 p. Developed complete course web site with lectures, notes, presentations, homework and project assignments, exams in 2003. (UGA)

Usery, E.L., 2002. *Geography of Georgia*, Baxter Street Bookstore, Athens, Georgia, 78 p. Complete course web site with lectures, notes, presentations, homework and project assignments, exams in 2003. (UGA)

Usery, E.L., 2000. *Introduction to Geographic Information Systems*, Baxter Street Bookstore, Athens, Georgia, 162 p. (UGA)

Usery, E.L. and J.C. Seong, 2000. *Introduction to Geographic Information Systems – Laboratory Manual*, Baxter Street Bookstore, Athens, Georgia, 14 exercises, 112 p. (UGA)

15. TECHNOLOGY AND INFORMATION TRANSFER AND DISSEMINATION

2009 USGS 125th Years of Topographic Mapping Exhibit at the Environmental Systems Research Institute (ESRI) User Conference.

2007 Designed, developed, and populated the CEGIS website http://cegis.usgs.gov

2007 Interviewed by Reuters, MSNBC, and CBS News on AAG presentation, Modeling Sea-Level Rise Effects on Population using Global Elevation and Land-Cover Data. Interview published on CNN and MSNBC.

2003 Interviewed by Los Angeles Times on Map Projections

16. INVENTIONS, PATENTS HELD None

17. HONORS, AWARDS, RECOGNITION, ELECTED MEMBERSHIPS

ASPRS	Presidential Citation Award, 2011
ICA	Elected, Vice-Chair, Commission on Map Projections, 2011-2015
UCGIS	**Elected as Fellow of UCGIS in 2010, one of only 3 in the world.**
USGS	STAR Award 2009 for development of 125 years of topographic mapping
USGS	Performance Award, 2008, 2009, 2010, 2011
CaGIS	**Elected as Fellow of the Cartography and Geographic Information Society and the American Congress on Surveying and Mapping, 2006.**
USGS	STAR Award, 2005, 2006, 2007, 2008, 2009
ICA	Elected (2006) to Chair the U.S. National Committee to the International Cartographic Association 2008-2012.
ICA	Elected as a member of the U.S. National Committee to the International Cartographic Association, 2005
USGS	Award for Science Planning Team, 2005
ASAE	Superior Paper Award Suttles, J.B., G. Vellidis, D.D. Bosch, R. Lowrance, J.M. Sheridan, and **E.L. Usery**, 2004. Watershed-Scale Simulation of Sediment and Nutrient Loads in Georgia Coastal Plain Streams *Transactions of the ASAE*, Vol. 46, No. 5.
UCGIS	**Elected President-Elect, 2003; President, 2004; Past-President 2005**.
UCGIS	Elected to Board of Directors, 2002
ASPRS	Best Scientific Paper in Remote Sensing, Seong, J.C. and **E.L. Usery**, 2001. Fuzzy Image Classification for Continental-scale Multitemporal NDVI Series Using Invariant Pixels and Image Stratification Method, *Photogrammetric Engineering and Remote Sensing*, 287-294.
CaGIS	**Elected Vice-President, 2001; President, 2002; Past-President, 2003**
UCGIS	Chair, Research Committee, 1999-2002
UGA	Connecting Teachers with Technology, Faculty Development Award, 1995;
UGA	Sigma XI Dissertation Award, 1986
UGA	Graduate School Research Award, 1983
USGS	Sustained Performance Award, 1987; Performance Award, 1986; Cartographer Development Program; Graduate School Research Opportunity, 1982
University of Alabama	Stewart J. Lloyd Scholarship, Fred H. Shores Scholarship, Member of Gamma Theta Upsilon
High School	American Legion Award, Valedictorian

18. BIBLIOGRAPHY (all items are listed in chronological order by section)

a. PUBLISHED REPORTS (In chronological order in each section)

Journal articles (refereed)

1. Welch, R. and **E.L. Usery**, 1984. Cartographic Accuracy of Landsat-4 MSS and TM Image Data, *IEEE Transactions on Geoscience and Remote Sensing*, v. GE-22, no. 3, p. 281-288.

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