

# Joseph K. Berry



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Dr. Joseph K. Berry is the Principal of Berry & Associates // Spatial Information Systems ([BASIS](#)), consultants and software developers in Geographic Information Systems (GIS) technology. He has written over two hundred papers and presented numerous workshops and courses on the analytic capabilities of GIS technology. He is the author of the popular books [GIS Modeling](#), [Map Analysis](#), [Spatial Reasoning](#), [Beyond Mapping](#), [Analyzing Precision Ag Data](#), [Analyzing Geo-Business Data](#), [Analyzing Geo-Spatial Resource Data](#), and [The Precision Farming Primer](#). The four online books in the [Beyond Mapping Compilation Series](#) contain nearly 1000 pages and more than 750 figures based on his popular "Beyond Mapping" columns over 25 years in GIS World/GeoWorld magazine. He currently serves as the Keck Scholar in Geosciences at the University of Denver and an Adjunct Faculty member in Natural Resources at Colorado State University.

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## Background Information

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## PROFESSIONAL EXPERIENCE ([return to top](#))

**1999 - Present, W. M. Keck Scholar in Geosciences, Geography, University of Denver**, Denver, Colorado — visiting scholar in the geosciences. Present courses in GIS Modeling and series of seminars, lectures and workshops concerning the application of GIS modeling in a wide variety of academic disciplines; assist in the development of GIS research and teaching programs. Graduate student advisor.

**1994 - Present, Adjunct Faculty, Natural Resources, Colorado State University,** Fort Collins, Colorado — Instructor in formal courses and workshops for professionals in GIS technology; graduate course in GIS Concepts; Osher Life Long Learning faculty member. Graduate student advisor.

**1988 - Present, Principal, Berry and Associates,** Fort Collins, Colorado — Provide council to companies and organizations in the implementation of GIS technology. Advise in the development of applications models emphasizing natural resource management, environmental assessment, precision farming, and retail/financial systems. Present numerous keynote addresses, invited seminars and task force white papers on map analysis application and future directions in GIS. Jointly developed products include *MapCalc* for grid-based map analysis, *FRAGSTATS\*ARC* for landscape structure analysis and *Virtual Forest* for 3-D rendering and visualization of forested landscapes.

**2003 - 2005, Senior Consultant, New Century Software,** Fort Collins, Colorado — involved in the development of new products and project oversight. Principal advisor and project manager for a web-based pipeline routing and evaluation project; developed surface flow algorithms for Spill Analyst software; advisor for advisor for a pipeline risk project.

**2000 - 2002, Special Projects Manager, Red Hen Systems,** Fort Collins, Colorado — involved in the development of new products. Principal advisor for the MapCalc software project in grid-based map analysis for Windows/NT environments; advise in development of site-specific and data mining applications for agriculture; assist in applications of video mapping and GIS multimedia.

**1989 - 1994, Associate Professor, Colorado State University,** Fort Collins, Colorado — Established the GIS program and conducted research in map analysis and GIS modeling.

**1986 - 2000, President, Spatial Information Systems, Inc.,** Fort Collins, Colorado — Directed development, sales and distribution of computer programs for grid-based spatial analysis, modeling and visualization. More than 15,000 copies of the *Professional Map Analysis Package* (pMAP) for instruction, research and commercial use have been distributed. Converting the pMAP program to Visual C++ controls for Win/NT environments.

**1986 - 1988, President, Spatial Information Analysis, Inc.,** New Haven, Connecticut — Provided council to government organizations and private companies in the implementation of GIS technology and application modeling. Presented eighty-two workshops on basic and advanced topics in GIS for a variety of universities, government organizations and private companies.

**1976 - 1988, Associate Professor and Associate Dean, Yale University,** Graduate School of Forestry and Environmental Studies, New Haven, Connecticut — Conducted research in map analysis and multivariate statistical analysis procedures. Jointly developed the *Map Analysis Package* (MAP) used in research and teaching throughout the world. Established graduate research and instructional programs in GIS technology. Associate dean duties included primary responsibilities for academic and administrative matters of the School. Received Lilly foundation award and grant for excellence in teaching.

**1970 - 1976, Research Associate, Colorado State University,** Fort Collins, Colorado — Lead scientist for projects in spectral variations due to sun angle and soil conditions (NASA); spectral variability in mountainous terrain (Army, USFS); plant canopy reflectance modeling, techniques for spatial analysis of patterns, procedures for extracting plant canopy geometry and utilizing mathematically modeled information for spectral classification (Army, NASA); computer classification of snow depth, determination of hydrologic modeling parameters from remote sensing data, vegetation series, and wildlife habitat types (USFS, NASA, NSF).

**1969 - 1970, 1st Lieutenant, US Army Signal Corps** — Consecutively acted as Platoon Leader, Battalion Adjutant, Battalion Intelligence Officer, and Company Commander. Company commander duties included command of 176 personnel, control of a \$1.5 million dollar property book

and responsibility for the fixed installation communications of the 2<sup>nd</sup> Infantry Division, Camp Casey, Korea.

**1967 - 1969, Research Assistant, University of California, Berkeley, California** — Assisted in field data collection and analysis for remote sensing research. Designed and constructed a four-band optical combiner for imagery enhancement. Assisted in the design and construction of a flatbed optical scanner. (Revised 12/08)

## EDUCATION [\(return to top\)](#)

**Ph.D.** emphasizing computer processing of remote sensing data, Colorado State University, 1976

Dissertation Topic: *Extracting Intrinsic Scene Features Through Plant Canopy Reflectance Modeling*, using computer modeling to predict vegetative biomass, composition and structure from multispectral response; sponsored by NASA and DOD.

**M.S.** in Business emphasizing real estate and operations research, Colorado State University, 1973

Master's Thesis: *Applications of the Program Evaluation and Review Technique (PERT) in the Planning Process*, Real Estate Series paper No. 360-5, Colorado State University, 1974. E. Prill, E. Waples and J. Berry.

**B.S.** in Forestry emphasizing photogrammetry, University of California, Berkeley, 1969

## BIOGRAPHICAL SKETCH [\(return to top\)](#)

**Joseph K. Berry** is a leading consultant and educator in the application of Geographic Information Systems (GIS) technology. He is the principal of Berry and Associates // Spatial Information Systems ([BASIS](#)), consultants and software developers in GIS technology and the author of the "Beyond Mapping" column for GeoWorld magazine since 1989. He has written over two hundred papers on the theory and application of map analysis techniques, and is the author of the popular books [Beyond Mapping](#) (Wiley, 1993), [Spatial Reasoning](#) (Wiley 1995) and [Map Analysis](#) (GeoTec Media, 2007), [GIS Modeling](#) (Basis, 2014). Since 1976, he has presented college courses and professional workshops on geospatial technology to thousands of individuals from a wide variety of disciplines. Dr. Berry conducted basic research and taught courses in GIS for twelve years at Yale University's Graduate School of Forestry and Environmental Studies, and is currently the W. M. Keck Visiting Scholar in Geosciences at the University of Denver and an Adjunct Faculty member in Natural Resources at Colorado State University.

Dr. Berry's research and consulting emphasizes grid-based map analysis and GIS modeling for better understanding of spatial patterns and relationships. Such studies have involved the spatial characterization of timber supply, outdoor recreation opportunity, comprehensive land use plans, wildlife habitat, wildfire risk and impact, marine ecosystem populations, haul road networks, surface and ground water hydrology, island resources planning, retail market analysis, in-store movement analysis, hazardous waste site location, air pollution modeling, optimal routing of infrastructure, precision agriculture and site-specific management. Of particular

concern, have been applications that fully incorporate map analysis and modeling into the decision-making process through spatial consideration of social and economic factors, as well as physical characteristics and conditions. (Revised 06/09)

## RESEARCH AND CONSULTING INTERESTS [\(return to top\)](#)

**Keywords:** Geographic Information Systems, Geospatial Technology, Geotechnology, Grid-based Map Analysis, GIS Modeling, Spatial Analysis, Spatial Data Mining, Multimedia Mapping, Map Visualization, Geospatial Resource Management, Precision Agriculture, Geo-Business, Wildfire Risk Mapping, Least Cost Path Routing.

**Interests:** Research interests involve the development of new procedures, models and software systems for the application of spatial analysis and data mining to a wide variety of disciplines including natural resources management, precision agriculture, infrastructure routing, and geo-business. Recent projects include infusing stakeholder perspectives into GIS models, use of optimal path and corridor analysis in siting pipelines and electric transmission lines, web delivery of spatial analysis capabilities, assessing visual exposure, applying geotechnology for precision conservation management, precision agriculture systems development, retail competition analysis and spatial factors affecting shopper propensity. (Revised 06/09)

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## KEYNOTE, PLENARY AND INVITED PRESENTATIONS [\(return to top\)](#)

1. [A Map-ematical Framework for Quantitative Analysis of Mapped Data](#): *Map Analysis and GIS Modeling for Understanding and Communicating Spatial Patterns and Relationships within STEM Discipline Contexts*, University of Denver, Center for Statistics and Visualization and Department of Geography and the Environment, February 20, 2015, Denver Colorado. University seminar. (Link to [PowerPoint](#); 11.5MB)
2. [University Seminar Series on Geotechnology](#), three part university-wide seminar series sponsored by CSU Geospatial Centroid on “**Future Directions of Map Analysis and GIS Modeling**,” September 19 (Link to [Handout](#); [PowerPoint](#), 13MB; [Video](#) of presentation); “**GIS in Natural Resources and Agriculture**,” October 17 (Link to [Handout](#); [PowerPoint](#), 15MB; [Video](#) of presentation); “**Eye-Witness to GIS’s 40 year Evolution/Revolution**,” November 14, 2014 (Link to [Handout](#); [PowerPoint](#), 20MB; [Video](#) of presentation), Colorado State University, Fort Collins, Colorado. University seminar series.
3. [GIS in Natural Resources and Agriculture](#), University of Colorado, Denver Campus, Geography and Environmental Sciences, October 8, 2014, Denver Colorado. University seminar. (Link to [PowerPoint](#); 13MB)
4. [Eye-Witness to GIS’s 40 Year Evolution/Revolution](#), University of Denver, Geography Colloquium, October 2, 2014, Denver, Colorado. Seminar. (Link to [PowerPoint](#) 18MB; [Video](#) of Presentation, 55 minutes)
5. [GIS in Natural Resources and Agriculture](#), 2014 Manitoba GIS User Group, October 1, 2014, Winnipeg, Manitoba, Canada. Closing Remarks. (Link to [PowerPoint](#), 6MB)
6. [Future Directions of Map Analysis and GIS Modeling](#), 2014 Manitoba GIS User Group, October 1, 2014, Winnipeg, Manitoba, Canada. Opening Keynote address. (Link to [PowerPoint](#), 9MB)

7. [\*\*Precision Agriculture's Bold New Era: A Brief History, Current Expression and Radical New Directions\*\*](#), Precision Ag 2.0 Conference, February 11-12, 2014, Calgary, Alberta, Canada. Plenary address.
8. [\*\*Returning the Scientific Horse to in Front of the Technical Cart\*\*](#), Precision Ag 2.0 Conference, February 11-12, 2014, Calgary, Alberta, Canada. Breakout session.
9. [\*\*Closing Panel on Geospatial STEM\*\*](#), Geospatial Conference of the West (GeCo West), September 16, 2013, Laramie, WY. Plenary panel.
10. [\*\*Future Directions of Map Analysis and GIS Modeling: Where We are Headed and How We Can Get There\*\*](#), 2013 Arkansas GIS Symposium, September 13, 2013, Rogers, AR. Keynote address. (Link to [PowerPoint](#); 10MB)
11. [\*\*SpatialSTEM: A Mathematical Structure for Teaching and Communicating Fundamental Concepts in Spatial Reasoning, Map Analysis and GIS Modeling\*\*](#), University of Arkansas, Geosciences Colloquium, September 13, 2013, Fayetteville, AR. University Colloquium. (Link to [PowerPoint](#), 10.6MB)
12. [\*\*Map Analysis and Modeling in Forestry's Future: Where We are Headed and How We Can Get There\*\*](#), Esri Forestry GIS Solutions Conference, April30-May3, 2012, Redlands, CA. Plenary session. (Link to [PowerPoint](#), 6MB; [Video of Presentation](#) –video of presentation, 39 minutes)
13. [\*\*Map-ematically Messing with Maps: Extending Traditional Math/Stat to Grid-based Map Analysis and Modeling\*\*](#), Colorado State University, January 30, 2012, Fort Collins, CO. General seminar. (Link to [PowerPoint](#); 8.5MB)
14. [\*\*Future Directions of GIS in Forestry: Extending Grid-based Map Analysis and Geo-web Capabilities\*\*](#), Esri Forestry GIS Solutions Conference, May 24-26, 2011, Redlands, CA. Plenary session. (Link to [PowerPoint](#); 7.5MB)
15. [\*\*Geotechnology in Transition: Evolution, Current Practice, Trends and Future Directions that are Moving Us Beyond Mapping\*\*](#), Geospatial Workshop for the City of Oslo, Oslo, Norway, September 2, 2010. Keynote address. (Link to [PowerPoint](#); 14MB).
16. [\*\*Education Panel GeoTec 2010: GIS in Higher Education\*\*](#), 24<sup>th</sup> Annual Conference on Geographic Information Systems, Toronto, Ontario, Canada, April 12-15, 2010. Special session.
17. [\*\*Opening Plenary Panel GeoTec 2010: Geospatial Technology Outlook\*\*](#), 24<sup>th</sup> Annual Conference on Geographic Information Systems, Toronto, Ontario, Canada, April 12-15, 2010. Plenary session.
18. [\*\*Geotechnology in Transition: Brief History, Current Practices, Trends and Future Directions\*\*](#), ESRI Southwest User's Group Conference, Pueblo, Colorado, October 19-23, 2009. Keynote address. (Link to [PowerPoint](#); 14MB).
19. [\*\*Panel on Geospatial Jobs and the 2009 Economy\*\*](#), Location Intelligence Conference, Denver, Colorado, October 5-7, 2009. Plenary session.
20. [\*\*Panel on GIS Career Opportunities\*\*](#), GIS in the Rockies, Loveland, Colorado, September 16-18, 2009. Special session.
21. [\*\*Opening Plenary Panel GeoTec 2009: Geospatial Technology Outlook\*\*](#), 23<sup>rd</sup> Annual Conference on Geographic Information Systems, Vancouver, British Columbia, Canada, June 1-4, 2009. Plenary session.
22. [\*\*Geotechnology: Potential and Pitfalls of Applying Map Analysis in Natural Resources\*\*](#), Pingree Park Alumni Reunion, Warner College of Natural Resources, Colorado State University, August 8-10, 2008. Plenary address. (Link to [PowerPoint](#); 10MB).
23. [\*\*So Where Is Precision Ag\*\*](#), 9<sup>th</sup> International Conference on Precision Agriculture, Denver, Colorado, July 21-23 2008. Keynote address. (Link to [PowerPoint](#); 7.6MB; [Podcast](#); [Podcast/Slide](#) Time Marks for simultaneous viewing) and Plenary Question Session (link to [Question Responses](#)).
24. [\*\*Opening Plenary Panel GeoTec 2008, Geospatial Technology Outlook\*\*](#), 22<sup>nd</sup> Annual Conference on Geographic Information Systems, Ottawa, Ontario, Canada, June 3-4, 2008. Plenary session.

25. **[GIS and Technical OZ](#)**: *A Discussion of the History, Driving Forces and Future Directions Guiding the Evolution/Revolution of Geotechnology*, 23<sup>rd</sup> New York State Geographic Information Systems Conference, Albany, New York, October 1-3, 2007. Keynote address. (Link to [PowerPoint](#))
26. **[Mapping Geotechnology](#)**: *A Brief History and Probable Future of Geotechnology*, Association of American Geographers, Great Plains – Rocky Mountain Region Annual Meeting, Denver, Colorado, September 28-29, 2007. Keynote address. (Link to [PowerPoint](#))
27. **[Opening Plenary Panel GISR 2007](#)**, *Service Oriented Architecture's Implications on GIS Technology*, GIS in the Rockies Conference, Denver, September 12-14, 2007. Plenary session.
28. **[Opening Plenary Panel GeoTec 2007](#)**, *Geospatial Technology Outlook*, 21<sup>st</sup> Annual Conference on Geographic Information Systems, Calgary, Alberta, Canada, May 14-17, 2007. Plenary session.
29. **[Not Your Grandfather's Map](#)**, Geo-Gathering Conference, Estes Park, Colorado, May 7-8, 2007. Keynote address.
30. **[So Where Is Precision Ag](#)**: *A Brief History, Current Expression and Future Directions*, Nebraska Agricultural Technologies Association Conference, Grand Island, Nebraska, February, 2007. Keynote address.
31. **[Overview of Multimedia Mapping](#)**, Northern Alberta Institute of Technology, GIS Day Symposium, Edmonton, Alberta, Canada, November, 2006. Plenary address.
32. **[Geotechnology in Agriculture: Getting It Right](#)**, Geographic Information and Spatial Technologies conference, Ag Canada, Winnipeg, Manitoba, Canada, October, 2006. Keynote address.
33. **[Opening Plenary Panel GeoTec 2006: Geospatial Technology Outlook](#)**, 20<sup>th</sup> Annual Conference on Geographic Information Systems, Ottawa, Ontario, Canada, June, 2006. Plenary session.
34. **[Spatial Reasoning in a World of Maps](#)**, GeoAlberta Conference, Edmonton, Alberta, Canada, May, 2006. Keynote address.
35. **[Geotechnology in the Technical Land of Oz](#)**, Northern Alberta Institute of Technology, GIS Day Symposium, Edmonton, Alberta, Canada, November, 2005. Keynote address.
36. **[Opening Plenary Panel GeoTec 2005: Future Directions in the Spatial Technologies](#)**, 19<sup>th</sup> Annual Conference on Geographic Information Systems, Vancouver, British Columbia, Canada, February, 2005. Plenary session.
37. **[Getting Your Arms Around Geospatial Technology](#)**, Geospatial Information Systems and Science Forum, Washington University, St. Louis, Missouri, November, 2004. Keynote address.
38. **[Closing Plenary Panel GeoTec 2004](#)**, 18th Annual Conference on Geographic Information Systems, Toronto, Ontario, Canada, March, 2004. Closing panel on Future Directions in the Spatial Technologies. Plenary session.
39. **[GIS in Transition: Moving Maps to Mapped Data, Spatial Analysis and Beyond](#)**, NW ESRI Users' Group Conference, Stevenson, Washington, September 16-18, 2003. Keynote address. ([Keynote.ppt](#) 13MB)
40. **[Precision Agriculture: Brief History, Current Realities and Probable Future Directions](#)**, USDA Service Center Agencies National Geospatial Conference, Houston, Texas, June 9-13, 2003. Plenary address.
41. **[Closing Plenary Panel GeoTec 2003: Current and Future State of Spatial Technology](#)**, 17th Annual Conference on Geographic Information Systems, Vancouver, British Columbia, Canada; March 16-19, 2003. Plenary session.
42. **[Understanding Spatial Analysis and Statistics](#)**, New Frontiers in GIS, Red Hen Systems Annual Conference, Fort Collins, Colorado, March 13-14, 2003. Plenary address and closing panel.

43. **New Frontiers for GIS in Agricultural Research**, 2<sup>nd</sup> Annual Geo-Spatial Technologies in Agriculture Symposium, University of California Kearney Agricultural Center, Parlier, California; January 29-31, 2003. Keynote address.
44. **Closing Plenary Panel GeoTec 2002: *Future Directions in the Spatial Technologies***, 16th Annual Conference on Geographic Information Systems, Toronto, Ontario, Canada; April 8-11, 2002. Plenary session.
45. **GIS at the Crossroads: *From Where is What and Wow, to Why and So What***, ESRI Users' Group Conference, Sacramento, California; January 14-17, 2002. Keynote address.
46. **GIS Technology in Transition: *An Appraisal of Past Experience and Probable Future***, 2001 Spatial Odyssey Conference, U. S. National Park Service, Primm Valley Resort, Nevada; December 3-7, 2001. Keynote address.
47. **[The State of Precision Ag Technology](#)**, Society for Engineering in Agriculture Annual Meeting, Rocky Mountain Section, Fort Collins, Colorado; November 2, 2001. Keynote address.
48. **Future Directions in GIS Technology: *Moving Beyond Abstract Reality (an Oxymoron)***, New Frontiers in GIS, Red Hen Systems Annual Conference, Fort Collins, Colorado; March 7-8, 2002. Keynote address and closing panel.
49. **Closing Plenary Panel GIS 2001: *Current and Future State of Spatial Technology***, 15<sup>th</sup> Annual Conference on Geographic Information Systems, Vancouver, British Columbia, Canada; February 19-22, 2001. Plenary session.
50. **Managing Agricultural Resources with Geographic Information Systems**, FarmTech 2001 Conference, Santa Barbara, California; February 4-6, 2001. Keynote address.
51. **The State of Precision Ag Technologies**, 4<sup>th</sup> Kansas Precision Agriculture Conference, Great Bend, Kansas; January 30-31, 2001. Keynote address.
52. **Applying Map Analysis Techniques to Site-Specific Management**, Southwest Agriculture Conference, Ridgeway, Ontario, Canada; January 3-4, 2001. Keynote address.
53. **Information Technology: *The Cornerstone in Agriculture and Resource Management***, Meeting on the Use of Information Technology to Improve Management Decisions in Agriculture and Natural Resource Management, Brighton, Colorado; November 29-30, 2000. Keynote address.
54. **Site-Specific Agriculture**, 4<sup>th</sup> Successes in Precision Agriculture Conference, Brandon, Manitoba, Canada; November 15-16, 2000. Keynote address.
55. **Thinking with Maps**, Public Technology Conference, Denver, Colorado; April 6-8, 2000. Invited paper.
56. **Closing Plenary Panel GIS 2000: *The Future of Geospatial Technology***, 14th Annual Conference on Geographic Information Systems, Toronto, Ontario, Canada, March 13-16, 2000. Plenary session.
57. **Agricultural Technology for the 21st Century**, 3<sup>rd</sup> Annual FarmTech Conference, Santa Barbara, California; January 23-25, 2000. Keynote address.
58. **Site-Specific Agriculture: *Current Realities, Possibilities and Trends***, 4<sup>th</sup> Success in Precision Agriculture Conference, Assiniboine College, Brandon, Manitoba, Canada; November 15, 1999. Keynote address.
59. **Thinking Spatially Into the Next Millennium: *Past, Present and Future Directions in GIS Technology***, 6<sup>th</sup> EPPL/EPIC Conference, Minnesota DNR, St. Paul, Minnesota; October 27, 1999. Keynote address.

60. [GIS Out of the Box](#): *Current and Future Direction in GIS*, Fall Colloquium Series, Department of Geography, University of Denver, Denver, Colorado; October 14, 1999. Colloquium address.
61. **GeoBusiness Out of the Box: Discovering Our Common Threads**, 1999 Business Geographics Conference, Chicago, Illinois; October 5, 1999. Keynote address.
62. [A World of Change](#): *Dreams, Realities and Future Directions in GIS Education*, W.M. Keck Geosciences Center Dedication, University of Denver, Denver, Colorado; September, 29, 1999. Luncheon address.
63. **Spatial Technologies in Agri-Business Mini-Conference**, 1999 Business Geographics Conference, Chicago, Illinois; October 4, 1999. Plenary address.
64. **GIS and the Team Concept**, 40<sup>th</sup> Technical Conference, American Design Drafting Association, Denver, Colorado; May 6-7, 1999. Keynote address.
65. **Where Do We Go From Here: Past, Present and Future Directions of GIS Technology**, U.S. Geological Survey 1999 GIS Conference, Denver, Colorado; April 19-20, 1999. Keynote address.
66. **Advanced 3-D Visualization Techniques for Forest Management and Research**, Invited Speaker Series, Geography Department, University of Colorado, Boulder, Colorado; March 5, 1999. Invited seminar.
67. **Managing Agricultural Resources with Geographic Information Systems**, FarmTech '99 Conference, Rincon Publishing, Santa Barbara, California; January 17-19, 1999. Keynote address.
68. **Planting the Seeds of High-Tech Farming**, Precision Agriculture: The Future of Farming Conference, Colorado State University Cooperative Extension, Brighton, Colorado; December 10-11, 1998. Keynote address.
69. **From Landscapes to Cogniscapes: Thinking with Maps for Effective Natural Resource Decisions**, SOFOR GIS '98 Conference, University of Georgia, Athens, Georgia; October 28-29, 1998. Keynote address.
70. **GIS Technology on the Farm**, Mid-America GIS Symposium, Lincoln, Nebraska; May 4-7, 1998. Co-organizer of a Functional Discipline Group on Agriculture. Plenary address.
71. **Brainstorming the Precision Farming Process**, Insight '98 Meeting, Farmland Industries, Kansas City, Kansas; July 28, 1998. Invited seminar, two plenary sessions (introductory and intermediate) and special session for researchers.
72. **Understanding Business Applications of GIS Technology**, Invited Speaker Series, University of Wyoming, Laramie, Wyoming; April 29, 1998. Invited seminar.
73. **Mapping the Yellow Brick Road: Dreams, Realities and Future Directions of GIS Technology**, 9th Annual Montana/Idaho GIS Conference, Butte, Montana; April 27-29, 1998. Keynote address.
74. **Restructuring GIS's Role in Decision-Making**, GIS '98/RT '98 Conference, Toronto, Ontario, Canada; April 7-9, 1998, 1998. Plenary address.
75. **Positioning Yourself in the Spatial Technologies**, Invited Speaker Series, Colorado State University, Fort Collins, Colorado, February 23, 1998 and The Metropolitan State University, Denver, Colorado, March 25, 1998. Invited seminar.
76. [Is Technology Ahead of Science?](#), Intensive Wheat Management Conference, Denver, Colorado; March 4-5, 1998. Keynote address.
77. **Managing Field Variability**, Western Precision Agriculture Conference, Boise, Idaho; January 26-27, 1998. Plenary address.



78. **GIS/GPS/IDI Technology in Production Agriculture: *Building an Action Plan***, FarmTech Conference, Santa Barbara, California; January 26-27, 1998. Plenary address.
79. **What's Wrong with this Picture of Precision Farming**, Conference on Precision Agriculture: Moving to New Production and Management Systems, Des Moines, Iowa; December 1 & 2, 1997. Plenary address.
80. **Moving Input/Output to Thruput: *Restructuring GIS's Role in Decision-Making***, SaskGIS '97, Regina, Saskatchewan, Canada, October 28, 1997. Keynote address.
81. **Jumping Through the GIS Looking Glass: *Reflection, Introspection and Direction of GIS Technology***, 7<sup>th</sup> Annual Ohio GIS, Columbus, Ohio; October 8, 1997. Keynote address.
82. **Where Is GIS: *Development, Directions and Delusions of a Maturing Technology***, Minnesota GIS/LIS '97, St. Cloud, Minnesota; October 1, 1997. Keynote address.
83. **Taking GIS Farther**, 3<sup>rd</sup> INFOAG Conference, Champaign, Illinois; August 6-8, 1997. Keynote address.
84. **Education, Vocation and GIS Enlightenment**, 6<sup>th</sup> Annual IMAGIN Forum, Lansing, Michigan; May 1-2, 1997. Plenary address.
85. **GIS/GPS/IDI Technology in Production Agriculture**, Western Precision Agriculture Conference, Pasco, Washington; February 18-19, 1997. Plenary session.
86. **From the Map Room to the Boardroom: *Moving GIS From Input to Thruput in Decision-Making***, 7<sup>th</sup> Annual Nevada State GIS Conference, Reno, Nevada; January 22-24, 1997. Keynote address.
87. **Identifying the Gaps**, A\*E\*A User Conference on Providing Tools for a Knowledge-Based Agriculture, Chicago, Illinois; December 10-11, 1996. Keynote address.
88. **Map-ematics: *Is There a Fundamental Math/Stat Structure Underlying GIS Technology?***, seminars for Metro State College and Denver University, Denver, Colorado; December 2, 1996. Visiting scholar.
89. **Managing Field Variability**, Annual Meeting, Kansas Farm Bureau, Wichita, Kansas; November, 21-23, 1996. Plenary session.
90. **Concepts and Issues in GIS Technology and Its Business Applications**, International Modern Marketing Forum, American Marketing Association, Fort Collins, Colorado; July 31, 1996. Keynote address.
91. **From Pretty Maps to Mapped Data**, 3<sup>rd</sup> International Conference on Precision Agriculture, Minneapolis, Minnesota; June 23-26, 1996. Special working session.
92. **Forces and Trends in the Spatial Technologies**, Advanced Spatial Technologies Workshop, MAFES, Mississippi State University; March 12-14, 1996. Keynote address.
93. **Managing Field Variability**, GIS '96 International Symposium, Vancouver, British Columbia, Canada; March 18-21, 1996. Invited seminar.
94. **GIS Education: *Moving Beyond Mapping Toward Spatial Reasoning***, lectures for the Universities of Natal, Stellenbosch and Capetown, Republic of South Africa; February 22-23, 1996. Visiting scholar.
95. **Where Is GIS? – *Spatial Data Mapping, Management and More***, Earth Data Information Systems Conference (EDIS '96), Pretoria, Republic of South Africa; February 19-21, 1996. Keynote address.
96. **What GIS Is (and isn't): *Understanding a New Technology***, series of lectures for Louisiana State University; February 2, 1996. Visiting scholar.
97. **Field Variability and Precision Farming: *A Myriad of Approaches and Issues***, AFBF National Advisory Committee Meetings, New Orleans, Louisiana; January 31-3 February, 1996. Keynote address.

98. **Managing Field Variability: GPS/GIS/IDI Technology in Production Agriculture**, National Alliance of Independent Crop Consultants national meeting, Orlando, Florida; January 27, 1996. Plenary address.
99. **Approaches and Issues in Precision Farming**, American Farm Bureau Federation national convention, Reno, Nevada; January 8, 1996. Plenary address.
100. **Uncovering the Ag Research Agenda**, USDA-ARS Open Meeting on Precision Farming, Fort Collins, Colorado; December 7, 1995. Keynote address.
101. **GIS Technology in Precision Farming**, American Farm Bureau Federation Information Technology Council Meeting; November 20, 1995. Keynote address.
102. **Forces and Trends in Spatial Data Mapping, Management, Modeling and More**, MapInfo Developer's Conference, Miami, Florida; November 1-4, 1995. Keynote address.
103. **Guessing Is Simpler: The Driving Forces, Trends, Impacts and Probable Future of GIS Technology**, 2<sup>nd</sup> MAGIC Conference on GIS Technology, Scottsdale, Arizona; August 14-15, 1995. Keynote address.
104. **Where Is GIS?: Driving Forces, Trends and Probable Future**, TSU/GIS '95, Eighth Annual Geographic Information Systems Conference, Towson, Maryland; June 7-8, 1995. Keynote address.
105. **Is CAD Behind or Beyond Mapping?**, Autodesk World Sales Conference, Phoenix, Arizona; May 21-26, 1995. Plenary address.
106. **What GIS Is (and Isn't): Understanding a New Technology**, Cutting-Edge Colloquium, Evergreen State College, Olympia, Washington; April 24-26, 1995. Visiting scholar.
107. **Where Is GIS?-- Forces, Trends and Forecasts**, GIS in Arkansas: Meeting Tomorrow's Challenges, Fayetteville, Arkansas; April 30-2, 1995. Keynote address.
108. **Innovative Decision Support: The Future of GIS**, Fourth Annual IMAGIN Forum, Lansing, Michigan; April 10-11, 1995. Keynote address.
109. **Considerations in GIS Education and Training**, Fourth Annual IMAGIN Forum, Lansing, Michigan; April 10-11, 1995. Luncheon address.
110. **GIS in Production Agriculture**, GIS '95 International Symposium, Vancouver, British Columbia, Canada; March 29, 1995. Invited seminar.
111. **Do's and Don't: Relating Natural Resource's GIS Experience to Agriculture**, National Forum for Agriculture, Des Moines, Iowa; February 28, 1995. Plenary address.
112. **From the Knowledge Age to the Information Age: The Application of GIS to Agriculture Land Use**, The Western Institute for Agricultural Land Use, Denver, Colorado; February 16, 1995. Keynote address.

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## WORKSHOPS AND WORKING SESSIONS [\(return to top\)](#)

1. **[GIS in Forestry and Natural Resources](#): Current Analytical Capabilities and Future Directions**, special presentation for the Faculty Delegation from Wondo Genet College of Natural Resources, Hawassa University, Ethiopia, April 11, 2014, Colorado State University. Special presentation with teaching materials.
2. **[GIS Modeling](#): graduate course in grid-based Map Analysis** continuously taught from 1977-present (Yale University 1977-1989, Colorado State University 1990-1998 and the University of Denver, 1999-

- present). ([Link](#) to most recent course materials, including lectures, readings, exercises and software for hands-on experience in grid-based map analysis and modeling)
3. **SpatialSTEM: A Mathematical/Statistical Framework for Understanding and Communicating Map Analysis and Modeling**, Geospatial Conference of the West (GeCo West), September 16, 2013, Laramie, WY, September 16, 2013. Half-day intermediate workshop. ([Link to workshop materials](#))
  4. **[SpatialSTEM: A Mathematical/Statistical Framework for Understanding and Communicating Map Analysis and Modeling](#)**, National Geospatial-Intelligence Agency, St. Louis Facility (with video-teleconference to NGA in Springfield, VA), April 30, 2013. Half-day intermediate workshop. ([Link to workshop materials](#))
  5. **SpatialSTEM: A Mathematical/Statistical Framework for Understanding and Communicating Map Analysis and Modeling**, University of Colorado, Denver Campus, three-parts presented November 1 and 2, 2012. Six-hour intermediate workshop.
  6. **SpatialSTEM: A Mathematical/Statistical Framework for Understanding and Communicating Map Analysis and Modeling**, Colorado State University, Fort Collins, CO, four-parts presented from August 29 through September 14, 2012. 6 hours intermediate workshop.
  7. **[Map Analysis and Modeling: Instructor Materials for Labs, Workshops and Courses](#)**, GIS in Higher Education Summit, Pikes Peak Community College, April 30, 2010. 1.5 hour special session. ([Link to workshop materials](#), 15MB)
  8. **[Map Analysis and Modeling: Instructor Materials for Labs, Workshops and Courses](#)**, 24<sup>th</sup> Annual Conference on Geographic Information Systems, Toronto, Ontario, Canada, April 12-15, 2010. 1.5 hour special session. ([Link to workshop materials](#), 15MB)
  9. **[Grid-based Map Analysis and Modeling: Applying Raster Analysis in a Vector World](#)**, ESRI Southwest User's Group Conference, Pueblo, Colorado, October 19-23, 2009. 1.5 hour technical session. ([Link to Background paper](#) and [PowerPoint](#), 21MB)
  10. **GIS Modeling and Application Issues**, GeoTec 23<sup>th</sup> Annual Conference on Geographic Information Systems, Vancouver, British Columbia, Canada, June 1-4, 2009. Full-day.
  11. **[Grid-based Map Analysis and GIS Modeling](#)**, an intermediate workshop on grid-based map analysis principles, procedures, considerations and applications, Pecora 17 Conference, ASPRS, Denver, Colorado, November 16-20, 2008. Full-day.
  12. **GIS Modeling and Application Issues**, GeoTec 22<sup>nd</sup> Annual Conference on Geographic Information Systems, Ottawa, Ontario, Canada, June 3-5, 2008. Full-day.
  13. **[Grid-based Map Analysis Techniques and Modeling](#)**, a 3-day hands-on workshop for faculty, Carleton College, Northfield, Minnesota, March 19-21, 2008. 18 contact hours. ([link to Materials](#))
  14. **[Grid-based Map Analysis Techniques and Modeling](#)**, 23<sup>rd</sup> New York State Geographic Information Systems Conference, Albany, New York, October 1-3, 2007. 1.5 hour technical session. ([link to Materials](#))
  15. **[Map Analysis: Understanding Spatial Patterns and Relationships](#)**, a special 3-hour session on infusing grid-based map analysis into academic curricula, GeoTec 21<sup>th</sup> Annual Conference on Geographic Information Systems, Calgary, Alberta, Canada, May 14-17, 2007.
  16. **[Multimedia Mapping](#)**, Association of American Geographers, Great Plains – Rocky Mountain Region Annual Meeting, Denver, Colorado, September 28-29, 2007. 2.5 hour hands-on session. ([link to Materials](#))
  17. **[GIS Modeling](#)**, GeoTec 21<sup>th</sup> Annual Conference on Geographic Information Systems, Calgary, Alberta, Canada, May 14-17, 2007. Full-day.
  18. **Analyzing Precision Ag Data**, Nebraska Agricultural Technologies Association Conference, Grand Island, Nebraska, February, 2007. 3-hour technical session.

19. [Basics of Multimedia Mapping](#), Northern Alberta Institute of Technology, GIS Day Symposium, Edmonton, Alberta, Canada, November, 2006. 1-hour technical session.
20. [Analyzing Precision Ag Data](#), Geographic Information and Spatial Technologies conference, Ag Canada, Winnipeg, Manitoba, Canada, October, 2006. Three-hour intermediate session.
21. **GIS Modeling**, GeoTec 20th Annual Conference on Geographic Information Systems, Ottawa, Ontario, Canada, June, 2006. Full-day.
22. [Grid-based Map Analysis Techniques and GIS Modeling](#), GeoAlberta Conference, Edmonton, Alberta, Canada, May, 2006. Half-day workshop with introductory and follow-on intermediate sessions.
23. [Applying Raster Analysis in a Vector World](#), GIS-T Conference, Columbus, Ohio, March, 2005. Half-day intermediate workshop.
24. [Grid-based Map Analysis Techniques and GIS Modeling](#), Northern Alberta Institute of Technology, GIS Day Symposium, Edmonton, Alberta, Canada, November, 2005. 2-hour intermediate workshop.
25. **Applying Raster Analysis in a Vector World**, Geospatial Information Systems for Transportation Symposium, Lincoln, Nebraska, April, 2005. Half-day intermediate workshop.
26. **Grid-based Map Analysis and GIS Modeling**, American Association of Geographers Conference, Denver, Colorado, April, 2005. Half-day. ([download](#), PowerPoint, Software, Exercises, and Data used in the workshop).
27. **GIS Modeling**, GeoTec 19th Annual Conference on Geographic Information Systems, Vancouver, BC, Canada, February, 2005. Full-day.
28. **Grid-based Map Analysis Techniques and GIS Modeling**, Geospatial Information Systems and Science Forum, Washington University, St. Louis, Missouri, November, 2004. Three-hour session.
29. [Grid-based Map Analysis and GIS Modeling](#), GIS in the Rockies, Denver, Colorado, October, 2004. Half-day session.
30. [Grid-based Map Analysis Techniques and Modeling](#), ASPRS Annual Conference, Denver, Colorado, May, 2004. Half-day session. ([download](#), PowerPoint, Software, Exercises, and Data used in the workshop).
31. **GIS Modeling in Ecosystem Management**, Workshop for Federal Ecosystem Managers, CEEM, Colorado State University, April, 2004. Full-day.
32. **Grid-Based Map Analysis Techniques and Modeling**, an intermediate-level workshop for Northwest ESRI Users' Group Conference, Stevenson, Washington, September 16-18, 2003. Two-hour session.
33. [Analyzing Precision Ag Data](#), USDA Service Center Agencies National Geospatial Conference, Houston, Texas, June 9-13, 2003. Three-hour session. ([download](#), PowerPoint, Software, Exercises, and Data used in the workshop).
34. **GIS Modeling in Ecosystem Management**, Continuing Education in Ecosystem Management Workshop Series, Colorado State University, Fort Collins, Colorado, April 16, 2003. Full-day.
35. **GIS Modeling**, GeoTec Conference, 17th Annual Conference on Geographic Information Systems, Vancouver, BC, Canada, March 16-19, 2003. Full-day.
36. **Applying Spatial Statistics and Analysis to Agriculture**, Second Annual Geo-Spatial Technologies in Agriculture Symposium, University of California Kearney Agricultural Center, Parlier, California, January 29-31, 2003. 2-hour Introductory and 4-hour Advanced sessions.

37. **Grid-Based Map Analysis: An Intermediate Workshop in Concepts, Procedures and Considerations in Analyzing Mapped Data**, GIS in the Rockies Conference, Denver, Colorado, October 8, 2002. Half-day.
38. **Introduction to GIS for Tribal Leaders and Managers**, Sinte Gleska University, Sioux Nation, Mission, South Dakota, October 3, 2002. Half-day.
39. **Integrating Maps Into Teaching and Community Projects: A Hands-On Experience**, Sinte Gleska University, Sioux Nation, Mission, South Dakota, October 4, 2002. Full-day.
40. [Analyzing Precision Ag Data](#), AgKnowledge GIS Faculty Development Workshop, Kirkwood College, Cedar Rapids, Iowa, August 12-15, 2002. Half-day.
41. **Maps and Images on the Internet**, AgKnowledge GIS Faculty Development Workshop, Kirkwood College, Cedar Rapids, Iowa, August 12-15, 2002. Half-day.
42. **GIS Modeling in Ecosystem Management**, Continuing Education in Ecosystem Management Workshop Series, Colorado State University, Fort Collins, Colorado, April 17, 2002. Full-day.
43. **GIS Modeling**, GeoTec Conference, 16th Annual Conference on Geographic Information Systems, Toronto, Ontario, Canada, April 8, 2002. Full-day.
44. **Grid-based GIS Modeling**, part of the Advanced Geospatial Analysis Course, Space Imaging, Thornton, Colorado, February 28, 2002. Half-day.
45. **Grid-Based Modeling: Concepts, Procedures and Considerations in Spatial Analysis, Surface Modeling and Spatial Data Mining**, ESRI Users' Group Conference, Sacramento, California, January 14-17, 2002. Full-day.
46. **GIS Modeling and Application Issues**, 2001 Spatial Odyssey Conference, U. S. National Park Service, Primm Valley Resort, Nevada, December 4, 2001. Full-day.
47. **GIS Modeling and Application Issues**, 3<sup>rd</sup> International Conference on Geospatial Information in Agriculture and Forestry, Denver, Colorado, November 4, 2001. Full-day.
48. [GIS Modeling in Education](#), GIS in the Rockies Conference, Denver, Colorado, September 18, 2001. Half-day.
49. **The State of Precision Ag Technology**, Simplot Ag Technology Meeting, Boise, Idaho, August 14, 2001. Half-day.
50. **GIS for Non-GIS Educators**, short course for Middlebury, Vassar and Mt. Holyoke Colleges faculty and staff, Middlebury, Vermont, June 24 – July 6, 2001. Two-weeks.
51. **GIS Modeling in Ecosystem Management**, Continuing Education in Ecosystem Management Workshop Series, Colorado State University, Fort Collins, Colorado, March 11, 2001. Full-day.
52. **GIS Modeling Workshop**, GIS 2001 Conference, Vancouver, British Columbia, Canada, February 18, 2001. Full-day.
53. **Applying Map Analysis Techniques to Site-Specific Management**, 4th Kansas Precision Agriculture Conference, Great Bend, Kansas, January 30-31, 2001.
54. **Exploring Spatial Information and Analysis in Agriculture**, Red Hen Systems, Fort Collins, Colorado, August 17-18, 2000.
55. **GIS Mapping for the Pros**, 4th Successes in Precision Agriculture Conference, Brandon, Manitoba, Canada, November 15-16, 2000.
56. **GIS Modeling in Ecosystem Management**, Continuing Education in Ecosystem Management Workshop Series, Colorado State University, Fort Collins, Colorado, March 31, 2000.

57. **GIS Modeling Workshop**, GIS 2000 Conference, Toronto, Ontario, Canada, March 12, 2000.
58. **Precision Agriculture: What It Is (and Isn't)**, Pecora 14 Conference, Denver, Colorado, December 6, 1999.
59. **GIS Mapping for the Pros: Moving PF Data to Decisions**, 4th Success in Precision Agriculture Conference, Assiniboine College, Brandon, Manitoba, November 15, 1999.
60. **Analysis of Landscape Structures: Mini-Workshop on Assessing Shape, Pattern, Arrangement and Fragmentation**, 6th EPPL/EPIC Conference, Minnesota DNR, St. Paul, Minnesota, October 26, 1999.
61. **Beyond Mapping: Concepts in Spatial Analysis and Modeling Mini-Workshop**, 6th EPPL/EPIC Conference, Minnesota DNR, St. Paul, Minnesota, October 26, 1999.
62. **Workshop on GIS Modeling**, U.S. Geological Survey 1999 GIS Conference, Denver, Colorado, April 19, 1999.
63. **Workshop on Landscape Analysis and Visualization**, U.S. Geological Survey 1999 GIS Conference, Denver, Colorado, April 20, 1999.
64. **GIS Modeling in Ecosystem Planning and Management**, Continuing Education in Ecosystem management Workshop, Colorado State University, Fort Collins, Colorado, March 31, 1999.
65. **12th GIS in Production Agriculture Conference**, Ag-Chem Technology & Education Center, Jackson, Minnesota, March 15-19, 1999.
66. **What GIS IS (and isn't): Fundamentals and Applications of a New Technology**, Watershed Partnerships Seminar, U.S. Office of Personnel Management, Western Management Development Center, Aurora, Colorado, March 8, 1999.
67. **GIS Modeling and Application Issues**, GIS'99 Conference, Vancouver, British Columbia, Canada, March 1, 1999.
68. **Inside the GIS Toolbox**, Precision Agriculture: The Future of Farming Conference, Colorado State University Cooperative Extension, Brighton, Colorado, December 10-11, 1998.
69. **GIS Modeling and Application Issues**, one-day workshop on principles, procedures and practice in GIS Modeling, SOFOR GIS '98 Conference, University of Georgia, Athens, Georgia, Montana, October 27, 1998.
70. **What GIS IS (and isn't): A Resource Manager's Perspective**, one-day workshop on principles, procedures and practice in applying GIS in natural resources, Western Executive Seminar Series, U.S. Office of personnel Management, Denver, Colorado, August 27, 1998.
71. **11th GIS in Production Agriculture Conference**, five-day workshop on the principles of precision farming (introduction through advanced), Farmer's Software Association, Vail, Colorado, August 17-21, 1998.
72. **GIS/GPS/IDI Technology in Production Agriculture**, half-day workshop on the principles of precision farming, Mid-America GIS Conference, Lincoln, Nebraska, May 4, 1998.
73. **GIS Modeling and Application Issues**, one-day workshop on principles, procedures and practice in GIS Modeling, 9th Annual Montana/Idaho GIS Conference, Butte, Montana, April 27, 1998.
74. **GIS Modeling and Application Issues**, one-day workshop on principles, procedures and practice in GIS Modeling, GIS '98/RT '98 Conference, Toronto, Ontario, Canada, April 7-9, 1998.
75. **GIS Modeling in Ecosystem Management**, one-day workshop on principles, procedures and practice in applying GIS in ecosystem management, Colorado State University, Fort Collins, Colorado, April 1, 1998.

76. **From Yield Maps to Management Actions**, one-day workshop on the principles of precision farming, Terra Industries, St. Louis, Missouri, March 3, 1998.
77. **Uncovering Industry's and University's Roles in Precision Farming**, two-hour working session for invited leaders, Precision Agriculture: Moving to New Production and Management Systems, Agriculture Electronics Association and Iowa State University, Des Moines, Iowa, December 1 and 2, 1997.
78. **Precision Farming: GIS/GPS/IDI Technology in Production Agriculture**, half-day workshop on the principles of precision farming, Assiniboine College, Brandon, Manitoba, Canada, November 13, 1997.
79. **Geographic Information Systems (GIS) for Aboriginal Lands Management**, five day workshop for First Nation People, The Banff Centre for Management, Banff, Alberta Canada, November 2-7, 1997. Co-instructor Jhon Goes-In-Center.
80. **GIS Modeling and Application Issues**, one-day workshop on principles and procedures in GIS modeling, SaskGIS '97 Conference, Regina, Saskatchewan, Canada, October 28, 1997.
81. **GIS Modeling in Retail Applications**, one-day intermediate workshop on GIS applications in market forecasting and financial analysis, HyperParallel Corporation, San Francisco, California, October 15, 1997.
82. **GIS Modeling and Application Issues**, one-day intermediate session on principles and procedures in GIS modeling, Minnesota GIS/LIS '97 Conference, Saint Cloud, Minnesota, October 1, 1997.
83. **GIS/GPS/IDI Technology in Production Agriculture**, one-day introductory and intermediate sessions on precision farming, Cenex Land-of-Lakes Corporation, Minneapolis, Minnesota, September 30, 1997.
84. **What GIS IS (and Isn't): The Fundamentals of a New Technology From a Resource Manager's Perspective**, one-day introductory workshop on GIS procedures and applications in natural resources, Western Executive Seminar Series, U.S. Office of Personnel Management, Denver, Colorado, September 4, 1997.
85. **9<sup>th</sup> GIS In Production Agriculture Workshop**, five-day advanced session, Farmer's Software Association, Vail, Colorado, August 18-22, 1997. Co-instructor Neil Havermale.
86. **GIS Technology and Modeling in Land Management**, five-day workshop consisting of introductory and advanced sessions, The Metropolitan State College, Denver, Colorado, August 11-14, 1997.
87. **Using GIS Technology in Resource Management for NRCS Personnel**, two-day introductory and intermediate sessions emphasizing mapped data issues, Fort Collins, Colorado, August 4-6, 1997.

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## **BOOKS AND BOOK CHAPTERS:** [\(return to top\)](#)

1. **[Beyond Mapping Compilation Series](#)**, a compilation of over three hundred "Beyond Mapping" columns appearing in GeoWorld from **1989 to 2013**. J.K. Berry. *Note: the compilation is organized into four online and hardcopy books— [GIS Modeling](#) (2007 to 2013), [Map Analysis](#) (1996 to 2007), [Spatial Reasoning](#) (1993 to 1996) and [Beyond Mapping](#) (1989 to 1993). Permission to use portions of the Beyond Mapping Compilation Series collection of columns for educational and non-commercial purposes is granted.*
2. **[GIS Modeling and Analysis](#)**, book chapter in *Manual of Geographic Information Systems*, edited by Marguerite Madden, Section 5, Chapter 29, pages 527-585, published by American Society for Photogrammetry, Bethesda, Maryland, USA, ISBN 1-57083-086-X, 2009. J.K. Berry.

3. [Advances in Precision Conservation](#), book chapter in *Advances in Agronomy* edited by Donald L. Sparks, volume 98, chapter 1, pages 1-44, Elsevier publishers, 2008. Jorge Delgado and J.K. Berry.
4. [Instructor's Materials for Grid-based Map Analysis and Modeling](#), a set of teaching materials for four levels of presentations—1 hour *Overview Lecture*, 2 hour *Seminar*, 8 hour *Workshop* and 10 week *College Course* ...over 300 slides and hours of hands-on exercises describing the principles, procedures, considerations and practical applications of grid-based map analysis. The *College Course* materials include laboratory lessons, projects and even exam questions and answers. These materials support the companion book [Map Analysis: Understanding Spatial Patterns and Relationships](#), by Joseph K. Berry (GeoMedia 2007).
5. [Map Analysis: Understanding Spatial Patterns and Relationships](#), book published by GeoTec Media, 2007. J.K. Berry
6. [Analyzing Geospatial Resource Data: A Hands-On Case Study in Spatial Analysis and Data Mining](#), book published by BASIS Press, Fort Collins, Colorado, 2005, 244 pages, 148 illustrations with exercises and companion software. J.K. Berry.
7. [Analyzing Geo-Business Data: A Hands-On Case Study in Spatial Analysis and Data Mining](#), book published by BASIS Press, Fort Collins, Colorado, 2003, 84 pages, 49 illustrations with exercises and companion software. J.K. Berry.
8. [Analyzing Precision Ag Data: A Hands-On Case Study in Spatial Analysis and Data Mining](#), book published by BASIS Press, Fort Collins, Colorado, 2003, 84 pages, 49 illustrations with exercises and companion software. J.K. Berry.
9. [Spatial Reasoning for Effective GIS](#), book published by Wiley and Sons Publishers, 1995, 208 pages. J.K. Berry.
10. [Beyond Mapping: Concepts, Algorithms and Issues in GIS](#), book published by Wiley and Sons Publishers, 1993, 246 pages. J.K. Berry.
11. [The Precision Farming Primer: GIS Technology and Site-Specific Management in Production Agriculture](#), online book covering [Inside the GIS Toolbox](#) columns in AgInnovator, 1993-2000. J.K. Berry
12. [Geographic Information Systems \(GIS\) Technology: A Brief History, Trends and Probable Future](#), book chapter in *Geographic Information Systems in Petroleum Exploration and Development*, Coburn, T.C. and J.M. Yarus, editors, Tulsa, OK: American Association of Petroleum Geologists, 2000. J.K. Berry.
13. [MapCalc: The Map Analysis Calculator](#), educational and professional versions of the grid-based map analysis software including student and instructor materials; software distributed by Red Hen Systems, Fort Collins, Colorado. J. K. Berry, co-developer and special project manager for system development, released 1999. (link to online [Review of MapCalc](#))
14. [GIS Technology in Environmental Management: A Brief History, Trends and Probable Future](#), book chapter in *Global Environmental Policy and Administration*, Soden and Steel, editors, Marcel Dekker Publishers, 1999, pgs. 49-76. J.K. Berry.
15. [GIS Modeling: A Conceptual Framework and its Practical Expression](#), book chapter in *GIS Applications in Natural Resource 2*, GIS World Books, 1996. J.K. Berry.
16. [Emergence and Role of Geographic Information Systems in Forest Management](#), book chapter in *Forestry and Agroforestry, V7*, Core Agricultural Literature Project, Cornell University, 1996. J.K. Berry and W. Ripple.
17. [Digital Slide Shows on GIS Concepts \(gCON™\)](#), Version 3.0, PC-based software for self-instruction in map analysis, published by GIS World Books (Longman Publishing), Fort Collins, Colorado, 1995. J.K. Berry.



18. **Implications of a Humane GIS**, book chapter in *1995 Source Book*, Association for Geographic Information, London, England, 1995, pages 57-62. J.K. Berry.
19. **GIS Resolves Land Use Conflicts: A Case Study**, book chapter in *The GIS Applications Book: Examples in Natural Resources*, American Society of Photogrammetry and Remote Sensing and American Congress on Surveying and Mapping, Falls Church, Virginia, 1994, pages 281-285. J.K. Berry.
20. **Emergence and Role of GIS in Natural Resource Information Systems**, book chapter in *The GIS Applications Book: Examples in Natural Resources*, American Society of Photogrammetry and Remote Sensing and American Congress on Surveying and Mapping, Falls Church, Virginia, 1994, pages 3-20. J.K. Berry and W. Ripple.
21. **Defining Populations Potentially Exposed to Chemical Waste Mixtures Using Computer-Aided Mapping and Analysis**, book chapter in *Toxicology of Chemical Mixtures: From Real Life Examples to Mechanisms of Toxicological Interactions*, Academic Press, New York, 1994, pages 473-503. J.R. Nuckols, J.K. Berry, et. al.
22. **Cartographic Modeling: the Analytical Capabilities of GIS**, book chapter in *Geographic Information Systems and Environmental Modeling*, Oxford University Press, Oxford, England, 1993, pages 58-74. J.K. Berry.
23. **The Application of GIS to Mammalogy: Basic Concepts**, book chapter in *GIS Applications in Mammalogy*, Oklahoma and Carnegie Museums of Natural History joint publication, 1993, pages 4-10. J.K. Berry.
24. **Tutorial Map Analysis Package (tMAP<sup>TM</sup>)**, Version 3.0, PC-based software consisting of software, database and tutorials for self-instruction in map analysis, published by GIS World Books (Longman Publishing), Fort Collins, Colorado, released 1993. J.K. Berry.
25. **GIS Industry Trends and Forecasts**, book chapter in *International GIS Source Book '94*, GIS World Books, 1993, pages 248-253. J.K. Berry, et. al.
26. **[The Professional Map Analysis Package \(pMAP<sup>TM</sup>\)](#) User's Manual and Technical Reference**, commercial software for the analysis of mapped data, published by Spatial Information Systems, Incorporated, Fort Collins, Colorado, released 1993. J.K. Berry and K.L. Reed. (*replaced by MapCalc software 2000*).
27. **GIS Resolves Land Use Conflicts: A Case Study**, book chapter in *1993 International GIS Source Book*, GIS World Books, 1992, pages 248-253. J.K. Berry.
28. **GIS in Island Resource Planning: A Case Study in Map Analysis**, book chapter in *Geographical Information Systems: Principles and Applications*, Longman Scientific and Technical Press, 1991, Vol 2:285-295. J.K. Berry.
29. **Fundamental Operations in Computer-Assisted Map Analysis**, book chapter in *Fundamentals of Geographic Information Systems: A Compendium*, American Society of Photogrammetry and Remote Sensing and American Congress on Surveying and Mapping, Falls Church, Virginia, pp. 206-211, 1987. J.K. Berry.
30. **A Spatial Analysis of Timber Supply**, book chapter in *Geographical Information Systems for Resource Management: A Compendium*, American Society of Photogrammetry and Remote Sensing and American Congress on Surveying and Mapping, Falls Church, Virginia, pages 206-211, 1987. J.K. Berry and J.K. Sailor.
31. **A Cartographic Model for Assessing Roundwood Availability**, book chapter in *Wood Power: New perspectives in Forest Usage*, B. Copeland editor, Pergamon Press, pp. 21-29, 1981. J.K. Berry and C.D. Tomlin.

## ***JOURNAL ARTICLES and Other Periodicals:*** [\(return to top\)](#)

1. **[Beyond Mapping](#)**, a continuing series of articles on advanced GIS concepts and analytical operations, [GeoWorld Magazine](#), Adams Business Media Publishers, Chicago, Illinois, 1988-present (270+ columns as of June 2011). J.K. Berry. *Note: search [GeoWorld Archives](#) on the key word "Beyond Mapping" for online articles back to 1996.*
2. **[SpatialSTEM](#)**: A New Perspective and Conceptual Framework for Grid-based Map Analysis and Modeling, invited Forestry Source feature article, Society of American Foresters, Bethesda, Maryland, May 2013. J.K. Berry. ([click here](#) for animated and annotated slides of the figures)
3. **[A Mapping Firewall](#)**: Modeling and Visualizations Assess Wildfire Threats, Risks and Economic Exposure, invited GeoWorld feature article, Adams Business Media, Chicago, Illinois, October 2009, 22:10 20-24. David Buckley, J.K. Berry and Jason Batchelor.
4. **[Precision Agriculture to Precision Conservation](#)**, invited feature article in Vector1Media (<http://vector1media.com/>) an online international magazine promoting spatial design for a sustainable tomorrow, Part 2 of a two part series, March, 2008. J.K. Berry, J.A. Delgado and R. Khosla.
5. **[Precision Farming Advances Agricultural Sustainability](#)**, invited feature article in Vector1Media (<http://vector1media.com/>) an online international magazine promoting spatial design for a sustainable tomorrow, Part 1 of a two part series, February, 2008. J.K. Berry, J.A. Delgado and R. Khosla.
6. **[Advances in Precision Conservation](#)**, Journal of Advances in Agronomy, 2008, Advances in Precision Conservation, 98:1-44. J.A. Delgado and J.K. Berry.
7. **[Beyond Location, Location, Location](#)**, invited GeoWorld feature article, Adams Business Media, Chicago, Illinois, March 2006, 19:3 22-25. J.K. Berry and K.L. Reed.
8. **[Quantifying Wildfire Risk](#)**, invited GeoWorld feature article, Adams Business Media, Chicago, Illinois, Dec 2005, 18:12 34-37. David Buckley, J.K. Berry, et. al.
9. **[Applying Spatial Analysis for Precision Conservation Across the Landscape](#)**, J. of Soil and Water Conservation, Nov/Dec 2005, 60:6 22-29. J.K. Berry, J. A. Delgado, R. Khosla and F.J. Pierce.
10. **[A Consensus Method Finds Preferred Routing](#)**, invited GeoWorld feature article, Adams Business Media, Chicago, Illinois, April 2004, 17:4 24-27. J. Glasgow, J.K. Berry, et. al.
11. **[Precision Conservation for Environmental Sustainability](#)**, J. of Soil and Water Conservation, Nov/Dec 2003, 58:6 332-339. J.K. Berry, J. A. Delgado, R. Khosla and F.J. Pierce.
12. **[What's a Map? ...Media Mapping Is Redefining the Term](#)**, invited GeoWorld feature article, Adams Business Media, Chicago, Illinois, May 2001, 14:5 40-43. B. Pfister, K. Burgess and J.K. Berry.
13. **[Inside the GIS Toolbox](#)**, a series of articles on GIS technology issues in agriculture, [@g/Innovator](#) publication of *Successful Farming* on technology in agriculture, Meredith Publishing, Des Moines, Iowa, 1993-2001 (87 articles). J.K. Berry.
14. **[Who's Minding the Farm](#)**, GeoEurope, Adams Business Media, Chicago, Illinois, August 2000. J.K. Berry.
15. **[Testing Your Precision Vision](#)**, interview on current issues and future directions, Precision Ag Illustrated, Clear Window Multimedia, August 1999. J.K. Berry.
16. **[Landscape Visualization](#)**, Analysis Notes, USFS Ecosystem Management Analysis, Fort Collins, Colorado, 1998, 8:2(7-11). J.K. Berry, D. Buckley and C. Ulbricht.

17. [Who's Minding the Farm](#), invited GeoWorld feature article, Adams Business Media, Chicago, Illinois, February 1998, 11:2 46-51. J.K. Berry.
18. [Visualize Realistic Landscapes](#), invited GIS World feature article, Adams Business Media, Chicago, Illinois, August 1998, 11:8 42-47. J.K. Berry, D. Buckley and C. Ulbricht.
19. [Mapping In-Store Shopper Movement and Sales](#), GBA News, GeoBusiness Association, Fort Collins, Colorado, February, 1998. J.K. Berry
20. **Precision Farming: Innovative Technologies Modernize Conventional Techniques**, invited GIS World feature article, Fort Collins, Colorado, 1998, 11:2(46-51). J.K. Berry, G. Mangold and N. Havermale.
21. **Managing Field Variability**, NAICC News, Memphis Tennessee, 1996, 10:4(4-5). J.K. Berry.
22. **Object-Oriented Technology and Its GIS Expression**, The Compiler, Florence, Alabama, 1996, 14:3(16-19). J.K. Berry.
23. [Where Is GIS?: Driving Forces, Trends and Probable Future of GIS Technology in Natural Resource Applications](#), Earth Observation Magazine, July, 1995. J.K. Berry.
24. **A Brief History and Probable Future of GIS in Natural Resources**, The Compiler, Florence, Alabama, 1994, 12:1(8-10). J.K. Berry.
25. **Assessing Spatial Impacts of Land Use Plans**, Journal of Environmental Management, academic Press Inc., Vol. 27:1-9 1988. J.K. Berry and J.K. Berry.
26. **Fundamental Operations in Computer-Assisted Map Analysis**, International Journal of Geographic Information Systems, Vol. 1, No. 2:119-136, Taylor & Francis, Ltd., 1987. J.K. Berry.
27. [A Mathematical Structure for Analyzing Maps](#), Environmental Management, Springer-Verlag, Vol 11, No. 3, pp. 317-325, 1986. J.K. Berry.
28. **The Use of a Geographic Information System for Storm Runoff Prediction from Small Urban Watersheds**, Environmental Management, Vol. 11, No. 1:21-27, Springer-Verlag, New York, 1986. J.K. Berry and J.K. Sailor.
29. [Learning Computer-Assisted Map Analysis](#), Journal of Forestry, Society of American Foresters, Vol. 84 10:39-43, 1986. J.K. Berry.
30. **Learning Computer-Assisted Map Analysis**, Journal of Forestry, Society of American Foresters, Vol. 84 10:39-43, 1986. J.K. Berry.
31. **Spatial Information Systems: 'Instant' Maps for Analysis of Natural Resources Data**, Special Libraries Journal, Vol. 72:3, 261-269, 1981. J.K. Berry.
32. [An Academic Approach to Cartographic Modeling in Management of Natural Resources](#), in the Harvard Library of Computer Graphics, Vol. 11:13-19, 1979. J.K. Berry and C.D. Tomlin.
33. **Extension of the Optical Diffraction Analysis Technique for Estimating Forest Canopy Geometry**, Aust. J. Botany, Vol. 27: 575-588, 1979. D.S. Kimes, J.A. Smith and J.K. Berry.
34. **Optical Diffraction Analysis for Estimating Foliage Angle Distribution in Grassland Canopies**, Aust. J. Botany, Vol. 27: 123-133, 1979. J.A. Smith and J.K. Berry.
35. **Portable Instrument for Simultaneous Recording of Scene Composition and Spectral Reflectance**, Optical Engineering, Vol. 17, No.2: 143-146, 1977. J.K. Berry, F. Heimes and J.A. Smith.

36. **A Comparison of Two Photographic Techniques for Estimating Foliage Angle Distribution**, , Aust. J. Botany, Vol. 25: 545-553, 1977. J.A. Smith, R.E. Oliver and J.K. Berry.
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1. **[Precision Agriculture: a transformative teaching moment for Geotechnology](#)**, 6<sup>th</sup> Annual GIScience in Higher Education Summit, March 21, 2014, Denver, CO. J.K. Berry.
2. **[SpatialSTEM: a mathematical/statistical framework for understanding and communicating grid-based map analysis](#)**, Geospatial Conference of the West (GeCo West), September 16, 2013, Laramie, WY. J.K. Berry.
3. **[SpatialSTEM: a mathematical/statistical framework for understanding and communicating grid-based map analysis](#)**, ASPRS 2013 Annual Conference, Baltimore, Maryland, March 28, 2013. J.K. Berry.
4. **[GIS in Natural Resource Education: Where are We Headed?](#)**, 9th Biennial Conference on University Education in Natural Resources, Warner College of Natural Resources, Colorado State University, March 22-24, 2012. J.K. Berry.
5. **[Making a Case for SpatialSTEM: Spatial Considerations in Science, Technology, Engineering and Mathematics Education](#)**, white paper briefly describing the *SpatialSTEM* approach relating map analysis operations to traditional non-spatial mathematical and statistical procedures, BASIS, Fort Collins, Colorado, 2012. J.K. Berry.
6. **[SpatialSTEM: Extending Traditional Mathematics and Statistics to Grid-based Map Analysis and Modeling](#)**, white paper describing an innovative approach for teaching map analysis and modeling fundamentals within a mathematical/statistical context, BASIS, Fort Collins, Colorado, 2012. J.K. Berry.
7. **[Geospatial Industry Outlook \(2010\)](#)**, plenary panel responses to the most important topics of the year, GeoTec Conference on Geographic Information Systems, Toronto, Ontario, Canada, 2010. J.K. Berry.
8. **[A Brief History and Probable Future of Geotechnology](#)**, white paper on the evolution and future directions of GIS technology, BASIS, Fort Collins, Colorado, 2009. J.K. Berry.
9. **[3D GIS Concepts and Considerations](#)**, white paper compilation of *Beyond Mapping* columns in GeoWorld discussing the underlying concepts, procedures and considerations involved in 3-dimensional GIS, BASIS, Fort Collins, Colorado, 2009. J.K. Berry.
10. **[Modeling and Visualizing Wildfire Risk and Impacts: Assessing Wildfire Threat, Communities-at-Risk, Economic Exposure and Return on Investment for Mitigation Planning](#)**, GIS in the Rockies, Loveland, Colorado, 2009. D. Buckley, J.K. Berry, David Bouwman and Skip Edel. ([PowerPoint](#), 30MB)
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13. [\*\*An Analytical Framework for GIS Modeling\*\*](#), white paper presenting a conceptual framework for map analysis and GIS Modeling, BASIS, Fort Collins, Colorado, July 2009. J.K. Berry and Shitij Mehta.
14. [\*\*Modeling Wildfire Impacts for Preparedness Planning: Assessing Wildfire Threat, Economic Exposure and ROI for Mitigation Planning\*\*](#), URISA CALGIS 2009 conference, Huntington Beach, CA, 2009. D. Buckley, J. Batchelor and J. K. Berry.
15. [\*\*New Advances and Practices in Precision Conservation\*\*](#), 9<sup>th</sup> International Conference on Precision Agriculture, Denver, Colorado, 2008. J.A. Delgado, J.K. Berry and R. Khosla.
16. [\*\*Geospatial Industry Outlook \(2008\)\*\*](#), plenary panel responses to the most important topics of the year, GeoTec Conference on Geographic Information Systems, Ottawa, Ontario, Canada, 2008. J.K. Berry.
17. [\*\*Spatial Data Mining in Geo-Business\*\*](#), GeoTech Conference on Geographic Information Systems, Ottawa, Ontario, Canada, 2008. J.K. Berry and K.L. Reed.
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24. [\*\*Concepts, Considerations and Procedures in Applying Effective Distance Modeling\*\*](#), GeoTech Conference on Geographic Information Systems, Vancouver, British Columbia, Canada, 2005. J.K. Berry.
25. [\*\*Optimal Routing and Corridor Analysis for Electric Transmission Line Siting\*\*](#), invited presentation for the Electric Power Research Institute (EPRI) Conference, Boston, Massachusetts, 2004. J.K. Berry and C. Johnson.
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