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Research and Teaching Interests

Forest and Terrestrial Ecology
Carbon Cycle/Global Change
Biodiversity
Remote Sensing/GIS/Spatial Analysis

Education

Ph.D. School of Natural Resources & Environment, University of Michigan, Ann Arbor, MI.
Concentration: Forest Ecology and Remote Sensing.

Ph.D. Dissertation: *Classification, Biomass Estimation, and Carbon Dynamics of a Northern Forest using SIR-C/X-SAR Imagery.*

Ph.D. Core Curricula: Woody Plants: Biology and Identification, Forest/Terrestrial Ecology, Forest Hydrology and Watershed Management, Forest Ecosystem Dynamics, Soil Properties and Processes, Process Geomorphology, Global Biogeochemical Cycles, Natural Resources Measurements, Forest Measurements, Field Surveying, Natural Resources Data Analysis, Statistics, Multivariate Analysis, Forest Sampling Methodology, Research Paradigms in Ecology, Programming, Remote Sensing of Environment, Interpretation of Remote Sensing Data, Principles of Radiation for Remote Sensing, Imaging Radar Remote Sensing, Computer Mapping, Georeferenced Data Applications, Thesis credits (dissertation topic research on forest composition, biomass and carbon).

M.S. School of Information Science, University of Illinois, Urbana, IL.
Concentration: Government and Geographic Information.

B.S. Department of Geography, Western Illinois University, Macomb, IL.
Concentration: Physical Geography.

Professional Experience

Assistant Research Scientist, School of Natural Resources and Environment (SNRE), The University of Michigan (July 2000 – present).

Research program focuses on forested ecosystem dynamics, land-cover change, and carbon in temperate, boreal, and tropical forests. Program supported by NSF, NASA, and USFS. Recent and ongoing projects include: dynamics of aspen-dominated ecosystems in Upper Great Lakes forests through an integrated geoecosystem and remote sensing approach (USFS); integration of forest structure derived from radar into biodiversity and ecosystem informatics (NSF); reforestation and urbanization: analysis of hotspots of change over the USFS North Central region (USFS); land-cover change and carbon dynamics using forest gap models, remote sensing, and landscape models in the Russian boreal forest (NASA); deforestation and land-cover change in riparian systems in Venezuela (NSF); forest and

landscape modeling in Indonesia (NASA); NSF Biocomplexity and the Environment interdisciplinary project modeling the changing rural-urban landscape – developing measures of changing ecosystem productivity (NSF); productivity dependence on tree, forest and landscape structure at UMBS (USFS).

Adjunct Assistant Professor, School of Natural Resources and Environment, The University of Michigan (January 2000 – July 2000).

Develop research program in forest ecosystem dynamics including both field ecology and remote sensing based analyses at the University of Michigan Biological Station (UMBS). Funded under USFS.

Research Scientist, Terrestrial Sciences, Earth Sciences Group, ERIM International (August 1998-June 2000)

Responsibility for basic and applied research at the interface of forestry, ecosystem ecology, and land management with remote sensing and geographic information systems. Research-oriented projects included effects of human settlement on forest harvesting and fire patterns in the boreal forest including Russia; SAR forest characterization: height, volume, and biomass; remote sensing analysis of wetland ecosystems; estimation of forest carbon and NPP; effects of disturbance on forest succession; forest and land-cover classification and change; and forest monitoring indicators. Applied projects for government and commercial forest agencies include analysis of forest change and forest health indicators.

Post-Doctoral Research Associate, Center for Remote Sensing, Boston University (August 1997- July 1998)

Analyze integration of imaging radar data with other methods of measuring, modeling and monitoring terrestrial net primary production in forested regions; use remote sensing data to investigate groundwater hydrology in the Middle East.

Ph.D. Program Research

Research Assistant: Microwave Image Processing Laboratory, The University of Michigan (July 1990 - July 1997)

Research appointment consisted of a series of projects over seven years all related to the goals of a long-term NASA SIR-C/X-SAR Ecology research site. The ecology goals for the Michigan Forests Test Site (MFTS) were to use field experiments to calibrate new remotely sensed data and to quantify and map structure and function of a mixed forested/wetland/agricultural region: land cover/forest type, forest height, biomass, and productivity. Initial appointment was as the forest ecology and tree ID expert on the team. Asked to take the central role in planning forest sampling; forest and other field data collection efforts (63,000 trees in 70 4-ha stands over 4 years, LAI, vegetation and soil moisture, weather, roughness); managing field personnel; completing extensive biometric statistical analyses; and completing GPS mapping missions. Research culminated in analysis of forest field data and radar imagery for land-cover classification and derivation of biophysical parameters related to carbon (forest height, biomass/carbon, and productivity). Communicated results in journals, conferences and technical reports.

Previous Professional Experience

The University of Michigan (1985-1989)

While completing part-time coursework in preparation for full-time Ph.D. work in the School of Natural Resources and Environment (SNRE), served as Head of an internationally recognized map collection and cartographic information (topographic, geologic, hydrologic, as well as digital data) center affiliated with the Program in Geography and University Library. Significant experience in directing planning, personnel, budget, facilities, acquisitions, and research service in this unit, campus-wide, and through professional organizations. Guest lecturer for various courses and groups. Left this position in 1990 for full-time Ph.D. research opportunity.

Publications (** peer reviewed)

In Progress

Book Chapters

Contributor to the LCLUC Book.**

Journal Articles

Bergen, K.M., B.V. Barnes, E. Zimmerman. Succession in Aspen-Dominated Forests in the Upper Great Lakes Region: A Geoecosystem Approach. [for *Canadian Journal of Forest Research*]**

Bergen, K.M., D.G. Brown, J. Rutherford, E. Gustafson. Hotspots of Land-Cover Change 1980-2000 in the USFS North Central Region. [for *Landscape Ecology*]**

Accepted

Bergen, K.M., S. Conard, R. Houghton, E. Kasischke, S. Kharuk, O. Krankina, J. Ranson, H. H. Shugart, A. Sukhinin, R. Treyfeld. 2002. NASA and Russian Scientists Observe Forest Land-Cover/Land-Use Change and Carbon in Russia. Accepted for publication. *Journal of Forestry***

Published

Bergen, K.M., D.G. Brown, M.C. Dobson, and E. Gustafson. 2002. Integrating Radar Remote Sensing of Forested Habitat Structure: A Pilot Project for Biodiversity Informatics. *Proceedings, National Science Foundation National Conference on Digital Government Research*, Los Angeles, pp. 149-154.

Karwan, D., D.A. Allan, and K.M. Bergen. 2001. Changing Near-Stream Land Use and River Channel Morphology in the Venezuelan Andes. *Journal of American Water Resources Association*, December, pp. 1579-1587.*

Bergen, K.M. 2000. Guest Editor, *Journal of Forestry* Special Issue on Forestry and Remote Sensing, 96 pp.**

Bergen, K.M., J. Colwell, and F. Sapio. 2000. Forestry and Remote Sensing: Collaborative Implementation. *Journal of Forestry* Special Issue on Remote Sensing in Forestry, 98:4-9.**

Roller, N. and K.M. Bergen. 2000. Integrating Forest Remote Sensing Data with other Data and Methods." *Journal of Forestry* Special Issue on Remote Sensing in Forestry, 98:61-63.**

Bergen, K.M. and M.C. Dobson. 1999. Integration of Remotely Sensed Radar Imagery in Modelling and Mapping of Forest Biomass and Net Primary Production. *Ecological Modelling*, 122: 257-274.**

Kasischke, E.S., K. Bergen, R. Fennimore, et al. 1999. Mapping the Severe 1998 Forest Fires in the Russian Far East using NOAA AVHRR Imagery. *EOS Transactions***

Dobson, M.C. and K.M. Bergen. 1999. Land-Cover Classification and Forest Biophysical Retrieval from SAR. *Proceedings of the Society American Foresters*.

Bergen, K.M. and M.C. Dobson. 1999. Monitoring Forest Biomass, Harvest, and ANPP using SAR. *Proceedings of the Society American Foresters*.

Pierce, L.E., K.M. Bergen, M.C. Dobson, and F.T. Ulaby. Multi-Temporal Land-Cover Classification Using SIR-C/X-SAR Imagery. *Remote Sensing of Environment*, 64:20-33, 1998.**

Bergen, K.M., M.C. Dobson, L.E. Pierce, and F.T. Ulaby. 1998. Characterizing Carbon in a Northern Forest by using SIR-C/X-SAR Imagery. *Remote Sensing of Environment*, 63:24-39.**

Bergen, K.M., R. DeRoo, C. Robinson and L.E. Pierce. 1998. A SIR-C Analysis of Coastal Sabkha. *Proceedings of the International Geoscience and Remote Sensing Symposium* Seattle, WA.

Bergen, K.M. *Classification, Biomass Estimation, and Carbon Dynamics of a Northern Forest Using SIR-C/X-SAR Imagery*. 1997. Ph.D. Dissertation, The University of Michigan Rackham Graduate School, Ann Arbor, 168 pp.**

Bergen, K.M., M.C. Dobson, and L.E. Pierce. 1997. Effects of Within-Season Moisture Variations on Terrain Classification Using SIR-C/X-SAR. *Proceedings of the International Geoscience and Remote Sensing Symposium* Singapore, CD-ROM, 1997.

- Bergen, K.M., M.C. Dobson, and L.E. Pierce. 1996. Carbon Dynamics in Northern Forests using SIR-C/X-SAR Imagery. *Proceedings of the International Geoscience and Remote Sensing Symposium* Lincoln, Nebraska, pp. 580-582.
- Bergen, K.M., L.E. Pierce, M.C. Dobson, and F.T. Ulaby. 1996. A Multi-Temporal Classifier for SIR-C/X-SAR Imagery," *Proceedings of the International Geoscience and Remote Sensing Symposium*, Lincoln, Nebraska, pp. 1568-1570.
- Dobson, M.C., L.E. Pierce, K.M. Bergen, and F.T. Ulaby. 1996. Temporal Stability of Northern Forest Biophysical Retrievals Using SIR-C/X-SAR. *Proceedings of the International Geoscience and Remote Sensing Symposium* Lincoln, NB, pp. 1092-1094.
- Dobson, M.C., F.T. Ulaby, L.E. Pierce, T.L. Sharik, K.M. Bergen, J. Kellndorfer, J. Kendra, E Li, Y.C. Lin, A. Nashashibi, K. Sarabandi, and P. Siqueira. "Estimation of Forest Biophysical Characteristics in Northern Michigan with SIR-C/X-SAR," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 33, No. 4, July 1995.**
- Bergen, K.M., M.C. Dobson, T.L. Sharik, and I. Brodie. 1995. *Final Report: Structure, Composition, and Above-ground Biomass of SIR-C/X-SAR and ERS-1 Forest Test Stands 1991-1994, Raco Michigan Site*. Radiation Laboratory Final Report, 036511-7-F, Radiation Laboratory, EECS Dept., The University of Michigan, Ann Arbor, MI, 192 pp.
- Bergen, K.M., M.C. Dobson, L.E. Pierce, J. Kendra, J. Kellndorfer, and P. Siqueira. 1994. *April 1994 SIR-C/X-SAR Mission: Ancillary Data Report Raco, Michigan Site*. Radiation Laboratory Technical Report, 036511-5-T, Radiation Laboratory, EECS Dept., University of Michigan, Ann Arbor, MI, 138 pp.
- Bergen, K.M., M.C. Dobson, L.E. Pierce, J. Kellndorfer, and P. Siqueira. 1994. *October 1994 SIR-C/X-SAR Mission: Ancillary Data Report Raco, Michigan Site*. Radiation Laboratory Technical Report, 036511-6-T, Radiation Laboratory, EECS Dept., The University of Michigan, Ann Arbor, MI, 167 pp.
- Pierce, L.E., M.C. Dobson, and K.M. Bergen. 1995. Land-Cover Classification Using SIR-C/X-SAR Data. *Proceedings of the International Geoscience and Remote Sensing Symposium*. Florence, Italy, 3: 1234-6.
- Dobson, M.C., L.E. Pierce, and K.M. Bergen. 1995. Retrieval of Above-Ground Biomass and Detection of Forest Disturbance. *Proceedings of the International Geoscience and Remote Sensing Symposium*, Florence, Italy, 3:1602-4.

Selected Seminars, Papers, and Workshops

- Faculty/Ph.D. Seminar, School of Natural Resources and Environment, University of Michigan, invited seminar, February 2002.
- NASA- Russian Academy of Sciences Northern Eurasian Earth Science Planning Initiative (NEESPI), Moscow, Russia, invited speaker and participant, February 2002.
- USDA Forest Service, North Central Research Station, Rhinelander, WI. Hotspots of Land-Cover Change in the Upper Midwest Workshop, invited participant, October 2001.
- NASA Land-Cover Land-Use Change Annual Meeting, College Park, invited poster (with D. Brown, H. Shugart, S. Kharuk, E. Kasischke), October 2001.
- GOFC Regional Workshop, Center for International Environmental Cooperation of Russian Academy of Sciences, St. Petersburg, Russia, invited poster, June 2001.
- European Commission. Joint Research Center, Ispra, Italy, invited seminar, May 2001.
- NASA Earth Sciences Joint Working Group (ESJWG) Meeting, Washington, D.C., invited speaker and participant, April 2001.
- GOFC Global Boreal Forest Workshop, North America Working Group, invited rapporteur, August 2000.
- The Ecosystems Center, Marine Biological Laboratory, invited seminar, May 2000.
- International Conference on Riparian Ecology and Management in Multi-Land Use Watersheds, Portland, Oregon (joint paper presented by D. Karwan with K. Bergen and D. Allan), August 2000.
- NASA Land-Cover Land-Use Change Annual Meeting, Reston, paper (with E. Kasischke, H. Shugart, A. Soja, and D. Clark), April 2000.
- Kyoto Protocol Workshop, University of Michigan, Ann Arbor, 1999, invited participant.
- USFS Remote Sensing Analysis Center, Salt Lake City, Utah, invited seminar (with N. Malinas), Aug.1999.
- USDA Forest Health Monitoring Workshop, St. Louis, MO, invited poster February 1999.

Decision Support Systems in Forest Management, Asheville, NC, USFS SE Research Station, participant, August 1999.
Society of American Foresters 1998 National Convention, Traverse City, MI, papers (with C. Dobson) September 1998.
Archaeological Institute of America 99th Annual Meeting, Chicago, Illinois, invited seminar (representing Farouk El-Baz), December, 1997.
International Society for Ecological Modeling, Annual Meeting, Montreal, invited paper, August 1997.
Boston University, invited seminar, March 1997.
Ecological Society of America, Annual Conference, Providence, Rhode Island, paper, August 1996.
Hiawatha National Forest/Michigan Department of Natural Resources Clear Lake Conference, invited paper, September 1995.

Reviewing Activities

Journals

Landscape Ecology, Journal of Forestry, Forest Science, International Journal of Remote Sensing, Remote Sensing of Environment

Granting Agencies

NASA LBA, 2002; NASA New Investigator, 2002; NASA LCLUC, 2001; U.S. National Parks Service, 1999.

Grants

Recent and Current

An Integrated Geocosystem-Remote Sensing Approach to Ecosystem Management of Aspen-Dominated Forests in Northern Lower Michigan. USDA Forest Service (Co-PI with Burt Barnes (Michigan) and Tom Crow (USFS)).
Hotspots of Land-Cover Change in the North Central Region. USDA Forest Service (Co-PI with Dan Brown).
BDEI: Radar Remote Sensing of Multi-Dimensional Habitat Structure. NSF Biodiversity and Ecosystem Informatics (PI with Co-PIs Dan Brown (Michigan), Craig Dobson (NASA), and Eric Gustafson (USFS)).
Modeling Land-Cover Land-Use Change and Carbon in Siberian Boreal Forests under Changing Economic Paradigms. NASA LCLUC/Carbon Cycle Science Program (PI with Co-PIs Dan Brown, Herman H. Shugart (Virginia), and Eric S. Kasischke (Maryland)).
Developing Land-Cover Scenarios in Metropolitan and Non-Metropolitan Michigan, USA: A Stochastic Simulation Approach. NASA LCLUC/Carbon Cycle Science Program (Co-I with Dan Brown (PI) and Pierre Goovaerts (Michigan)).
Influence of Humans, Climate, and Fire on Forest Ecosystems and Carbon Dynamics in Indonesian Borneo. NASA LCLUC/Carbon Cycle Science Program (Co-I with Lisa Curran (Yale) and Eric Kasischke (Maryland)).
Project SLUCE: Spatial Land-Use Change and Ecological Effects at the Urban-Rural Interface: Agent-Based Modeling and Evaluation of Alternative Policies and Interventions. NSF Biocomplexity and the Environment (Co-I with PI Dan Brown and Steve Yaffee, Bobbi Low, Rick Riolo, Joan Nassauer).
A Workshop Planning Proposal for a Regional GOFCC Workshop: GOFCC Satellite Information Products for Forest and Land Management in Siberia/Far East. NASA LCLUC and START.

Submitted

Northern Michigan Forest Productivity Across a Complex Landscape. USDA Forest Service (Co-PI with David Ellsworth (Michigan)).

Honors/Awards/Appointments

Who's Who in America, 2001 to present.

Assistant Professor, 1998, Michigan State University – declined

Assistant Professor, 1996, Virginia Technological University – declined

Member of *Xi Sigma Pi* Forestry Honor Society. Elected Secretary/Treasurer, The University of Michigan Chapter of *Xi Sigma Pi*, 1993.

NASA SIRC-Ecology grant supported 100% of Ph.D. program.

Recipient of the 1986 SLA Geography and Map Division Bulletin Award (for best article published in the Bulletin).

Recipient of the 1982 "Donald H. Wing Award" (for best graduate research paper), School of Information Science, University of Illinois.

Gamma Theta Upsilon Geography Honor Society.

Beta Phi Mu Information Science Honor Society.

Recipient of the 1981 Western Illinois University *Gamma Theta Upsilon* Award for outstanding undergraduate research paper.

Service to the University of Michigan

Terrestrial Ecosystems Committee, SNRE, 1999 – present.

Resource Ecology and Management Concentration Group, SNRE, 2000 – present.

Member, SAGIS, speaker series 2000-2002.

University of Michigan CREES Faculty Associate, Sept., 2000-.

Faculty member in the University campus-wide Certificate Program in Spatial Information, 2000-.

Chair, University of Michigan Spatial Analysis/GIS Initiative Data & Metadata Committee, 2000-.

Organizing Committee Member, 1996-97 Distinguished Faculty and Student Seminar Series in Spatial Information, The University of Michigan, 1996-1997.

Promotion and Tenure Committee Graduate Student Representative, 1994-95, School of Natural Resources and Environment, The University of Michigan.

Member of *Xi Sigma Pi* Forestry Honor Society. The University of Michigan Chapter, 1993-.

Professional Experience and Service

Science Team Member: NASA LCLUC/Carbon Cycle Science, 2001 – present.

Science Team Member, NSF Biodiversity and Ecosystem Informatics, 2001 – present.

Consulting Scientist, ERIM, 2000 – 2001.

Workshop Organizer: NASA Global Observation of Forest Cover, 2000 – present.

NASA ESJWG, 2000 – present.

Editorial Board, Society of American Foresters, *Journal of Forestry*, 1998 – present.

Durfee Foundation EARTHWATCH field experience for talented high school students (for NASA SIR-C-ecology field experiment, forest measurements, 1994).

Durfee Foundation EARTHWATCH field experiences for talented high school students (for NASA SIR-C-ecology experiment, forest measurements, 1992).

Professional Affiliations

Member of the Ecological Society of America, 1995 – present.

Member of the Society of American Foresters, 1998 – present.

Member, American Geophysical Union, 1999 – present.

Member, International Association of Landscape Ecology, 2001 – present.