

JOSEPH F. KNIGHT

Department of Forest Resources and
Department of Soil, Water, and Climate
College of Food, Agriculture, and Natural Resource Science
University of Minnesota
1530 Cleveland Ave N, 301E Green Hall
St. Paul, MN 55108-6112
jknight@umn.edu 612-625-5354

AREA OF INTEREST

Studying how changing land use affects both natural resources and humans. Geospatial science methods such as remote sensing, image processing, and geographic information systems (GIS) are used in applications such as: identifying and characterizing natural and anthropogenic landscape change to assess impacts on natural resources, wetlands mapping and characterization, describing landscape-human interactions that lead to exposure to infectious diseases, and thematic accuracy assessment methods development.

EDUCATION

Ph.D. Forestry (minors: Statistics, Geographic Information Science) North Carolina State University, 2002

B.S. Natural Resources and Environmental Science, Purdue University, 1997

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Forest Resources (60%) and Department of Soil, Water, and Climate (40%), College of Food, Agriculture, and Natural Resource Science, University of Minnesota, 2007 to present.

Research: Identifying and characterizing natural and anthropogenic landscape change using multispectral and multitemporal remotely sensed data, wetland delineation and characterization, thematic accuracy assessment methods development

Teaching: FR 3262/5262 Remote Sensing of Natural Resources and Environment, FR 5615 Field Remote Sensing and Resource Survey, ESPM 1011 Issues in the Environment

Biologist, U.S. Environmental Protection Agency, Research Triangle Park, NC, 2003-2007

Research: Land use and land cover mapping and change detection, marine water quality assessment using image data, image processing methods development

Adjunct Assistant Professor, Forestry Dept., North Carolina State University, 2003-2007

Teaching: Forestry 753, Environmental Remote Sensing

National Research Council Postdoctoral Associate, Environmental Protection Agency, Research Triangle Park, NC, 2002 - 2003

Research: Land use and land cover mapping and change detection, marine water quality assessment using image data, image processing methods development

Research Associate, Forestry Department, North Carolina State University, 2000 – 2002

Research: Land use and land cover mapping and change detection, thematic accuracy assessment methods development

Other duties: Grant proposal writing

Remote sensing analyst, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1998-1999

Duties: Land use and land cover mapping, field sampling methods development

Research Assistant, Forestry Department, North Carolina State University, 1997 – 1999

Research: Land use and land cover mapping and change detection, thematic accuracy assessment methods development

GRANTS AND CONTRACTS

Minnesota Futures Research Grant, Office of the Vice President for Research, University of Minnesota. \$250,000. *Automated Assessment of Forest Cover Change*. PIs: Kumar, V., Knight, J.F., Banerjee, S., Steinbach, M. 7/1/2009 – 6/30/2011.

Legislative-Citizen Commission on Minnesota Resources via Minnesota Department of Natural Resources via Science Museum of Minnesota. \$48,895. *Spatial Analysis on the Effects of Conservation Grasslands on Water Quality*. PIs: Knight, J.F. and Bolstad, P.V. 9/16/2008 - 6/30/2010.

Office of International Programs, University of Minnesota. \$22,800. *Environmental Transmission of the AIDS-associated Pathogen *Cryptococcus neoformans* in sub-Saharan Africa*. PIs: Knight, J.F. and Nielsen, K. 5/9/2008 – 10/1/2009.

Legislative-Citizen Commission on Minnesota Resources via Minnesota Department of Natural Resources. \$206,000. *Methods Development Research for the Minnesota NWI Update*. PI: Knight, J.F. 8/11/2008 - 6/30/2011.

University of Minnesota Graduate School Grant-in-Aid. \$26,573. *Phenology-based mapping of impervious surfaces in the twin cities metropolitan area*. PI: Knight, J.F. 1/1/2007 – 6/30/2008.

Agriculture Experiment Station Project MIN-42-015, *Mapping and Monitoring the Effects of Natural and Anthropogenic Changes on Minnesota's Natural Resources*. PI Knight, J.F. Project does not provide funding.

PROPOSALS IN PREPARATION

U.S. Environmental Protection Agency. \$300,000. *Improved Mapping and Monitoring of Existing and Restorable Wetlands*. PI: Knight, J.F. Submitted 6/1/09. In review.

Minnesota Futures Research Grant, Office of Vice President for Research, University of Minnesota. \$250,000. *Geospatial Analysis of Land Change and Ecosystem Services in Minnesota*. PIs: Bauer, M.E., Manson, S.M., Knight, J.F., Snyder, P.K., Twine, T.E. Submitted 4/6/09. In review.

Legislative-Citizen Commission on Minnesota Resources. \$2,222,820. *Updating the Minnesota Wetlands Inventory: Phase 2*. PIs: Kloiber, S, Knight, J.F. Submitted 5/1/09. In review.

Legislative-Citizen Commission on Minnesota Resources. \$390,000. *Monitoring and Modeling Minnesota Landscapes and Ecosystem Services*. PIs: , M.E., Manson, S.M., Knight, J.F., Snyder, P.K., Twine, T.E. Submitted 5/1/09. In review.

PEER REVIEWED PUBLICATIONS

Lunetta, R.S., **J.F. Knight**, H.W. Paerl, J.J. Streicher, B.J. Peierls, T. Gallo, J.G. Lyon, T.H. Mace, C.P. Buzzelli. Measurement of Water Color using AVIRIS Imagery to Assess the Potential for an Operational Monitoring Capability in the Pamlico Sound Estuary, USA. *International Journal of Remote Sensing*, 30(13): 3291-3314.

Lunetta, R.S., **J.F. Knight**, J. Ediriwickrema, J.G. Lyon, L.D. Worthy, (2006). Land Cover Change Detection Using Multi-Temporal MODIS NDVI Data. *Remote Sensing of Environment*, 105: 142-154.

Knight, J.F. and R.S. Lunetta, (2006). Regional Scale Land Cover Characterization Using MODIS NDVI 250 m Multi-temporal Imagery: A Phenology-Based Approach. *GIScience and Remote Sensing*, 43(1): 1-23.

Knight, J.F. and R.S. Lunetta, (2003). An Experimental Assessment of Minimum Mapping Unit Variability. *IEEE Transactions on Geoscience and Remote Sensing*, 41(9).

Khorram, S., **J.F. Knight**, and H.I. Cakir, (2003). Thematic Accuracy Assessment of Regional Scale Land Cover Data. In R.S. Lunetta and J.G. Lyon, editors, *Remote Sensing and GIS Accuracy Assessment*. Boca Raton: CRC Press.

Lunetta, R.S., J.S. Iiames, **J.F. Knight**, R.G. Congalton, T.H. Mace, (2001). An Assessment of Reference Data Variability Using a Virtual Field Reference Database. *Photogrammetric Engineering and Remote Sensing*, Vol.67, No. 6, pp. 707-715.

PROCEEDINGS, BOOK CHAPTERS, TECHNICAL REPORTS

Khorram, S., **J.F. Knight**, and H.I. Cakir. "Thematic Accuracy Assessment of Regional Scale Land Cover Data." *Geospatial Data Accuracy Assessment*. Editors: R.S. Lunetta and J.G. Lyon. EPA Report: EPA/600/R-03/064. Washington, DC: Environmental Protection Agency, pp. 107-123. 2003.

Knight, J.F., (2002). Improving Estimates of the Accuracy of Thematic Maps. Ph.D. Dissertation, North Carolina State University.

Khorram, S., H. Yuan, and **J.F. Knight**, (2001). Application of Neural Network-based Classification for Watershed Land Cover Mapping, *Proceedings of the 20th International Cartographic Conference*, Beijing, P. R. China, v.1, pp.744 -754.

Knight, J.F. and S. Khorram, (2000). Accuracy Assessment of Thematic Data Using Fuzzy Sets and Inter-Class Spectral Distances. *Proceedings of the 4th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences*. Delft University Press, Delft, The Netherlands, pp 359-364.

Khorram, S., **J.F. Knight**, X.L. Dai, H. Yuan, H.I. Cakir, Z. Mao, (2000). Issues Involved In The Accuracy Assessment Of Large Scale Land Use/Land Cover Mapping And Monitoring From Remotely Sensed Data. *Proceedings of the IEEE International Geoscience and Remote Sensing Symposiums (IGARSS 2000)*, Hawaii.

Khorram, S., X.L. Dai, **J.F. Knight**, H.I. Cakir, Z. Mao, and H. Yuan, (2000). Improving Estimates of the Accuracy of Thematic Maps When Using Aerial Photos as the Ground Reference Source. *Proceedings 2000 ASPRS Annual Conference*, Washington, DC.

Khorram, S., L.P. Jones, **J.F. Knight**, H.I. Cakir, H. Yuan, Z. Mao, and D.M. Haupt, (2000). Development of a Land Cover Classification System to Assist the Local Watershed Planning Process for the North Carolina Wetlands Restoration Program: A Land Cover Classification for the Hominy Swamp Creek (Wilson, NC) Watershed Using Digitized Color Infra-red Aerial Photographs as the Data Source. *Watershed Management & Operations Management 2000*.

Khorram, S. and **J.F. Knight**. "Land Cover Classification of the Hominy Creek Watershed." Center for Earth Observation Technical Report 217. June, 2000.

Khorram, S. and **J.F. Knight**. "Accuracy Assessment of the Region 5 Dataset of the MRLC Consortium's National Land Cover Data." Center for Earth Observation Technical Report 218. February, 2000.

Khorram, S., X.L. Dai, and **J.F. Knight**. "Accuracy Assessment of the EPA Region IV Dataset of the MRLC Land Cover Mapping Program." Center for Earth Observation Technical Report 215. October, 1999.

MANUSCRIPTS IN PRESS

MANUSCRIPTS IN REVIEW

*Knight, J.F. and R.S. Lunetta. Assessing the Viability of Updating Large Area Land Use/Land Cover Maps using Multi-temporal MODIS Imagery. Submitted to IEEE Transactions on Geoscience and Remote Sensing, *in review*.

MANUSCRIPTS IN PREPARATION

*Knight, J.F., S. Kloiber, L. Ortiz, B. Tolcser. Wetlands Mapping Using a Slope Cost-Distance Function. To be submitted to Photogrammetric Engineering and Remote Sensing.

*Knight, J.F., M. Voth, L. Olmanson, M. Bauer. Assessing Lake Clarity in Minnesota Using MODIS Imagery. To be submitted to Remote Sensing of Environment.

*Knight, J.F., M. Voth. Impervious Surface Mapping Using Multitemporal MODIS NDVI Images. Destination TBD.

INSTRUCTION

Courses Taught (course credits, average annual enrollment)

Department of Forest Resources, University of Minnesota

FR3262/5262 Remote Sensing of Natural Resources and Environment, 2008... (4 cr., 11)

FR5615 Field Remote Sensing and Resource Survey, 2008... (2 cr., 12)

ESPM 1011 Issues in the Environment, 2007... (3 cr., 120)

Forestry Department, North Carolina State University

FOR 753 Environmental Remote Sensing, 1998-2007 (3 cr., 25)

Guest Lectures

FR 3131 Geographical Information Systems (GIS) for Natural Resources, 10/7/08 (4 cr., 80)

FR 5131 Geographical Information Systems (GIS) for Natural Resources, 10/7/08 (4 cr., 30)

GEOL 119 Remote Sensing Fundamentals, University of North Carolina, Chapel Hill, Spring 2001 and 2002 (3 cr., 20)

GRADUATE FACULTY APPOINTMENTS

Master of Geographic Information Science 2009-present

Natural Resource Science and Management 2007-present

Land and Atmospheric Science 2007-present

Water Resource Sciences 2008-present

GRADUATE STUDENT ADVISING

Advisory Committee Chair

Name	Degree	Program	Completed
Jennifer Corcoran	Ph.D.	Natural Resource Sci. & Mgmt.	

Lian Ortiz	M.S.	Natural Resource Sci. & Mgmt.
Bryan Tolcser	M.S.	Water Resource Science

Advisory Committee Member

Name	Degree	Program
Justin Becknell	Ph.D.	Plant Biology
Shyam Boriah	Ph.D.	Computer Sci./Elec. Engr.
Margaret Kosmala	Ph.D.	Ecology
Leif Olmanson	Ph.D.	Natural Resource Sci. & Mgmt.
Stacy Trouby	M.S.	Natural Resource Sci. & Mgmt.
An-Min Wu	Ph.D.	Soil Science

UNDERGRADUATE STUDENT ADVISING

Environmental Science Policy and Management: 5 advisees

Undergraduate Research Opportunities Program

Understanding the ecological factors involved in transmission of the fungus *Cryptococcus neoformans* to humans in sub-Saharan Africa, Sonya Ewert, 12/15/2008 to 5/15/2009

HONORS AND AWARDS

U.S. EPA Science and Technology Achievement Award (STAA) Level 2, 2007
Special Accomplishment Recognition Award, U.S. Environmental Protection Agency, 2006
Special Accomplishment Recognition Award, U.S. Environmental Protection Agency, 2005
Special Accomplishment Recognition Award, U.S. Environmental Protection Agency, 2004
Superior Achievement Award, U.S. Environmental Protection Agency, 1999

PROFESSIONAL DEVELOPMENT

Early Career Series, Center for Teaching and Learning, University of Minnesota, 2008-2009
Patent Seminar, University of Minnesota, Responsible Conduct of Research, 8/25/08.

INSTITUTIONAL SERVICE

Environmental Science Policy and Management Coordinating Council
Forest Resources Curriculum Committee
Forest Resources/Natural Resources Science & Management Graduate Committee
Human Dimensions of Natural Resources and Environment search committee, Forest Resources Dept.

PROFESSIONAL ASSOCIATIONS

American Society for Photogrammetry and Remote Sensing, Assistant Director of Remote Sensing Applications Division

IEEE Geoscience and Remote Sensing Society, Member

PROFESSIONAL LEADERSHIP / SERVICE

Member, Minnesota National Wetlands Inventory Update Technical Advisory Committee, 2008 to present

- Provide leadership and technical knowledge to improve MN wetland maps
- Provide technical support to project contractors

Assistant Director of Remote Sensing Applications Division, American Society for Photogrammetry and Remote Sensing, 2008-2010.

Peer Reviewer for:

- Remote Sensing of Environment
- Photogrammetric Engineering and Remote Sensing
- Journal of Applied Geography
- Aquatic Sciences
- GeoCarto International
- Remote Sensing

Award Committee Chair, Boeing Autometric Award for Best Paper in Image Analysis and Interpretation, American Society for Photogrammetry and Remote Sensing

- Select from the body of remote sensing related papers one paper that represents the most significant contribution in image analysis and interpretation

Award Committee Chair, Leica Geosystems Award for Best Scientific Paper in Remote Sensing, American Society for Photogrammetry and Remote Sensing

- Select from the body of remote sensing related papers one paper that represents the most significant overall contribution to the field

SEMINARS AND PRESENTATIONS

Knight, J.F. The Minnesota National Wetlands Inventory Update. Presented as part of the Water Resource Science seminar series, St. Paul, MN, ~30 attendees, November 21, 2008.

Knight, J.F. Multitemporal Land Cover Classification and Change Detection. Presented as part of the Soil, Water, and Climate departmental seminar series, St. Paul, MN, ~25 attendees, April 23, 2008.

Knight, J.F. Vegetation Phenology-Based Land Cover Classification and Change Detection. Presented as part of the Natural Resource Seminar series at the University of Minnesota's North Central Research and Outreach Center, Grand Rapids, MN. November 1, 2007.

Knight, J.F. A Pixel Composition-Based Reference Data Set for Thematic Accuracy Assessment. ASPRS 2005 Annual Conference, Baltimore, MD. March 7-11, 2005.

Knight, J.F. Remote Measurement of Phytoplankton Pigments in the Pamlico Sound, NC using Hyperspectral Imagery. IGARSS 2004 Annual Conference, Anchorage, AK. September 20-24, 2004

Knight, J.F. Remote Sensing of Pamlico Sound Plankton Communities Using AVIRIS Data. ASPRS Annual Conference, Anchorage, AK, May 5-9, 2003.

Knight, J.F. Accuracy Assessment of the Region 4 National Land Cover Data (NLCD). Remote Sensing and GIS Accuracy Assessment Symposium, Las Vegas, NV, December 11-13, 2001.

Knight, J.F. Thematic Accuracy Assessment of Remotely Sensed Data Using a Spectral Cost-based Approach. Remote Sensing and GIS Accuracy Assessment Symposium, Las Vegas, NV, December 11-13, 2001.

Knight, J.F. Introduction to Remote Sensing. Satellites in Our Everyday World, University of North Carolina-Asheville March 14 - 16, 2001.

Knight, J.F. Accuracy Assessment of Thematic Data Using Fuzzy Sets and Inter-Class Spectral Distances. 4th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences. Amsterdam, The Netherlands. 2000.

Knight, J.F. Improving Estimates of the Accuracy of Thematic Maps When Using Aerial Photos as the Ground Reference Source. ASPRS Annual Conference, Washington, DC. May 22-26, 2000.

PRESENTATION AUDIENCES 1997 TO PRESENT

American Society of Photogrammetry and Remote Sensing, various locations
IEEE Geoscience and Remote Sensing Society, Anchorage, AK.
Legislative-Citizens Commission on Minnesota Resources, St. Paul, MN
North Carolina State University, Raleigh, NC
North Central Research and Outreach Center, Grand Rapids, MN
The Raptor Center, Univ. of Minnesota, St. Paul, MN
Soil Water and Climate Department, Univ. of Minnesota, St. Paul, MN
U.S. Environmental Protection Agency, Las Vegas, NV
University of North Carolina – Asheville, Asheville, NC
University of North Carolina – Chapel Hill, Chapel Hill, NC
Water Resource Sciences program, Univ. of Minnesota, St. Paul, MN