

## CURRICULUM VITAE FOR JOSEPH F. KNIGHT

### IDENTIFYING INFORMATION

#### Academic Rank

Associate Professor in Department of Forest Resources and Department of Soil, Water, and Climate; College of Food, Agriculture, and Natural Resource Sciences (CFANS)  
1530 Cleveland Ave. N Saint Paul, MN 55108

#### Education

Degree	Institution	Date(s)
B.S.	Purdue University, Environmental Science	1997
Ph.D.	North Carolina State University, Forestry	2002

#### Positions/Employment

*University of Queensland, Australia*

Visiting Scholar 2016

*University of Minnesota, Twin Cities*

Director, Remote Sensing and Geospatial Analysis Lab 2015 - present

Associate Professor 2013 - present

Assistant Professor 2007 - 2013

*United States Environmental Protection Agency*

Biologist 2003 - 2007

National Research Council Postdoctoral Associate 2002 - 2003

Remote Sensing Analyst 1998 - 1999

*North Carolina State University*

Adjunct Assistant Professor 2003 - 2007

Research Associate 2002 - 2003

Research Assistant 1997 - 1999

#### Current Membership in Professional Organizations

American Society for Photogrammetry and Remote Sensing (since 1997)

IEEE Geoscience and Remote Sensing Society (since 2002)

### HONORS AND AWARDS FOR RESEARCH/CREATIVE WORK, TEACHING, PUBLIC ENGAGEMENT, AND SERVICE

#### *University of Minnesota*

Center for Transportation Studies Research Partnership Award, 2017

Richard C. Newman Art of Teaching Award, 2012

CFANS Distinguished Teaching Faculty Award, 2011

#### *External Sources*

Elected Director of Remote Sensing Applications Division of American Society for Photogrammetry and Remote Sensing (served 2010-2012)

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

## RESEARCH, SCHOLARSHIP, AND CREATIVE WORK

### Grants and Contracts (since August, 2007)

Sponsor	Title	Dates (MM/DD/YY)	Amount	Role
Minnesota Department of Natural Resources	Wetland Habitat Assessment in the Great Lakes Basin	11/1/2017 – 7/31/2020	\$120,000	PI
Minnesota Department of Natural Resources	Forest Inventory and Analysis Using High Resolution Lidar and Imagery	9/30/2017 – 1/31/2019	\$111,000	PI
Minnesota Department of Natural Resources	Informing Winter Habitat Management Prescriptions and Population Vital Rate Estimates for White-tailed Deer in Northcentral and Northeastern Minnesota	06/2017 – 04/2019	\$303,000	Co-PI
Agricultural Research, Extension, Education, and Technology Transfer (AGREETT)	UAS equipment in support of research at the Cloquet Forestry Center and Hubachek Wilderness Research Center	1/1/2017 – 12/31/2017	\$34,400	PI
U.S. Fish and Wildlife Service	An approach for mapping and monitoring coastal wetlands in the Great Lakes Basin	7/1/2016 – 9/30/2017	\$113,850	PI
Minnesota Department of Natural Resources	Assessing and Monitoring Wetlands Over Large Spatial Extents	1/1/2016 – 1/31/2017	\$100,000	PI
Twin Cities Metropolitan Council	Metropolitan Area High-Resolution Land Cover Classification	5/1/2016–12/31/2016	\$76,500	PI
USDA Forest Service	Implementing the USFS Landscape Change Monitoring System in the Great Lakes Basin	9/1/2015 – 8/31/2017	\$128,937	PI
USDA Forest Service	Linking land use, land cover, and change to water quality in the Great Lakes	9/1/2015 – 8/31/2017	\$202,565	PI
MN Legislative-Citizen Commission on Minnesota Resources	Mapping Landscapes for Better Land and Water Management	7/1/2014-6/30/2016	\$300,000	PI
National Science Foundation	Mining Climate and Ecosystem Data	9/1/10-8/30/16	\$10,000,000	Co-I
MN Legislative-Citizen Commission on Minnesota Resources	Rapid Forest Ecosystem and Habitat Inventory by Imputation	7/1/2013-6/30/2016	\$262,000	Co-I
Office of the Vice President for Research	U of M Spatial Sciences Infrastructure (U-Spatial)	1/1/2012-12/13/2017	\$2,500,000	Co-I
U.S. Fish and Wildlife Service	Innovative Wetlands Mapping Methods using Geospatial Science	4/30/2010-9/30/2014	\$315,000	PI

College of Food, Agriculture, and Natural Resource Sciences	Re-visioning the ESPM Core Curriculum	05/1/2012-06/30/2014	\$78,000	Co-PI
MN Legislative-Citizen Commission on Minnesota Resources	Updating the Minnesota National Wetlands Inventory: Phase 3	7/1/2011-6/30/2014	\$1,500,000	Co-PI
Institute on the Environment	Connecting People, Land, and Water in the Urban Environment	1/1/2011-12/31/2013	\$400,000	Co-I
MN Legislative-Citizen Commission on Minnesota Resources	Updating the Minnesota National Wetlands Inventory: Phase 2	7/1/2010-6/30/2013	\$1,100,000	Co-PI
MN Legislative-Citizen Commission on Minnesota Resources	Strengthening Natural Resource Management with LIDAR Training	7/1/2011-6/30/2013	\$180,000	Co-I
Minnesota Department of Transportation	Economic and Environmental Costs and Benefits of Living Snow Fences	6/1/2009-8/31/2011	\$99,000	Co-I
Minnesota Department of Natural Resources	Methods Development Research for Wetland Mapping in Minnesota	6/11/2008-6/30/2011	\$206,000	PI
Minnesota Department of Natural Resources	Methods Development for Validation of Wetland Maps	8/11/2008-6/30/2011	\$82,000	PI
Office of the Vice President for Research	Automated Assessment of Forest Cover Change	7/1/2009-6/30/2011	\$250,000	Co-I
Office of International Programs	Ecology of Cryptococcus neoformans in sub-Saharan Africa	11/1/2008-10/30/2009	\$125,000	Co-PI
Office of International Programs	Environmental Transmission of the AIDS-Associated Pathogen Cryptococcus neoformans in sub-Saharan Africa	5/9/2008-10/1/2009	\$22,800	Co-PI
UMN Graduate School	Phenology-Based Mapping of Impervious Surfaces in the Twin Cities Metro Area	1/1/2008-6/30/2009	\$26,573	PI

## Publications

### *Refereed Publications*

Pastick, N.J., Duffy, P., Genet, H., Rupp, T.S., Wylie, B.K., Johnson, K.D., Jorgenson, M.T., Bliss, N., Mcguire, A.D., Jafarov, E.E., **Knight, J.F.** (2017) Historical and Projected Trends in Landscape Drivers Affecting Carbon Dynamics in Alaska. *Ecological Applications*, 27(5), pp. 1383-1402.

Jiang, Z., Li, Y., Shekhar, S., Rampi, L., **Knight, J.F.** (2017). Spatial Ensemble Learning for Heterogeneous Geographic Data with Class Ambiguity: A Summary of Results. *ACM SIGSPATIAL*.

**Knight, J. F.**, Pelletier, K. C. and Rampi, L. P. (2017). Change Detection. *The International Encyclopedia of Geography*. 1–9.

El Garouani, A., Mulla, D.J., El Garouani, S., **Knight, J.F.** (2017) Analysis of Urban Growth and Sprawl from Remote Sensing Data: Case of Fez, Morocco. *International Journal of Sustainable Built Environment*, 6(1):160-169.

- Pei, W, Yao, S, **Knight, J.F.**, Dong, S., Pelletier, K.C., Rampi, L.P., Wang, Y., Klassen, J. (2017) Mapping and detection of land use change in a coal mining area using object-based image analysis. *Environmental Earth Sciences*, 76(125). DOI: [10.1007/s12665-017-6444-9](https://doi.org/10.1007/s12665-017-6444-9).
- Pei, W, Yao, S., Dong, S., **Knight, J.F.**, Xu, C., Chen, Y. (2015) Using field spectral measurements to estimate chlorophyll-a in waterlogged areas of Huainan, China. *GIScience and Remote Sensing*, 52(6): 660-679 DOI: [10.1080/15481603.2015.1082173](https://doi.org/10.1080/15481603.2015.1082173).
- Corcoran, J.M., **Knight, J.F.**, Pelletier, K.C., Rampi, L.P., Wang, Y. (2015) The effects of point or polygon based training data on RandomForest classification accuracy of wetlands. *Remote Sensing*, 2015(7), DOI: 10.3390/rs70404002. DOI: [10.3390/rs70404002](https://doi.org/10.3390/rs70404002).
- Kloiber, S.M., Macleod, R.D., Smith, A.J., , **Knight, J.F.**, Huberty, B.J. (2015) A semi-automated, multi-source data fusion update of a wetland inventory for east-central Minnesota, USA. *Wetlands*. January 2015, DOI: [10.1007/s13157-014-0621-3](https://doi.org/10.1007/s13157-014-0621-3).
- Nigon, T.J., Mulla, D.J., Rosen, C.J., Cohen, Y., Alchanatis, V., **Knight, J.F.**, Rud, R. (2015) Hyperspectral aerial imagery for detecting nitrogen stress in two potato cultivars. *Computers and Electronics in Agriculture*, 112: 36–46. DOI: [10.1016/j.compag.2014.12.018](https://doi.org/10.1016/j.compag.2014.12.018).
- Knight, J.F.**, Corcoran, J.M., Rampi, L.P., Pelletier, K.C. (2015) "Theory and Applications of Object-Based Image Analysis and Emerging Methods in Wetland Mapping" In: *Remote Sensing of Wetlands: Applications and Advances*. Editors: Tiner, R.W., Lang, M.W., Klemas, V.V. CRC Press, ISBN [9781482237351](https://doi.org/9781482237351), 574 pp.
- Jiang, Z., Shekhar, S., Zhou, X., **Knight, J.F.**, Corcoran, J.M. (2014) Focal-Test-Based Spatial Decision Tree Learning. *IEEE Transactions on Knowledge and Data Engineering*, 27(6): 1547-1559. DOI: [10.1109/TKDE.2014.2373383](https://doi.org/10.1109/TKDE.2014.2373383).
- Larue, M.A. and **Knight, J.F.** (2014) Applications of very high resolution imagery in the study and conservation of large predators in the Southern Ocean. *Conservation Biology*. doi:[10.1111/cobi.12367](https://doi.org/10.1111/cobi.12367).
- Rampi, L.P., **Knight, J.F.**, and Pelletier, K.C. (2014) Wetland mapping in the Upper Midwest United States: an object-based approach integrating lidar and imagery data. *Photogrammetric Engineering and Remote Sensing*, 80(5):439-449. DOI: [10.14358/PERS.80.5.439](https://doi.org/10.14358/PERS.80.5.439).
- Rampi, L.P., **Knight, J.F.**, and Lenhart, C.F. (2014) Comparison of flow direction algorithms in the application of the CTI for mapping wetlands in Minnesota. *Wetlands*, Feb. 2014, doi: 10.1007/s13157-014-0517-2. DOI: [10.1007/s13157-014-0517-2](https://doi.org/10.1007/s13157-014-0517-2).
- Jiang, Z., Shekhar, S., Zhou, X., **Knight, J.F.**, Corcoran, J.M. (2013) Focus-Test-Based Spatial Decision Tree Learning: A Summary of Results. 2013 IEEE International Conference on Data Mining (ICDM '13). DOI: [10.1109/ICDM.2013.96](https://doi.org/10.1109/ICDM.2013.96). \*
- Corcoran, J.M., **Knight, J.F.**, and Gallant, A.L. (2013) Influence of Multi-Source and Multi-Temporal Remotely Sensed and Ancillary Data on the Accuracy of Random Forest Classification of Wetlands in Northern Minnesota. *Remote Sensing*, 5(7): 3212-3238. DOI: [10.3390/rs5073212](https://doi.org/10.3390/rs5073212).
- Knight, J.F.**, B. Tolcser, J. Corcoran, and L. Rampi. (2013) The effects of data selection and thematic detail on the accuracy of high spatial resolution wetland classifications. *Photogrammetric Engineering and Remote Sensing*, 79(7): 613-623. DOI: [10.14358/PERS.79.7.613](https://doi.org/10.14358/PERS.79.7.613).
- Jiang, Z., Shekhar, S., Mohan, P., **Knight, J.F.**, Corcoran, J. (2012) Learning spatial decision tree for geographical classification: a summary of results. ACM SIGSPATIAL GIS 2012. DOI: [10.1145/2424321.2424372](https://doi.org/10.1145/2424321.2424372).\*

Wiesner, D.L., Moskalenko, O., Corcoran, J.M., Meya, D.B., Kajumbula, H., **Knight, J.F.**, Boulware, D.R., and Nielsen, K. (2012) Strain genotype influences phenotype, clinical outcome, and immunological response during cryptococcal meningoencephalitis in humans. *mBio*, 3(5), DOI:[10.1128/mBio.00196-12](https://doi.org/10.1128/mBio.00196-12).

**Knight, J.F.** and M.L. Voth. (2012) Application of MODIS imagery for intra-annual water clarity assessment of Minnesota lakes. *Remote Sensing*, 4(7): 2181-2198. DOI: [10.3390/rs4072181](https://doi.org/10.3390/rs4072181).

Corcoran, J.M., **Knight, J.F.**, B. Brisco, S. Kaya, A. Cull, K. Murhnaghan. (2011) The integration of optical, topographic, and radar data for wetland mapping in northern Minnesota. *Canadian Journal of Remote Sensing*, 27(5): 564-582. DOI: [10.5589/m11-067](https://doi.org/10.5589/m11-067).

**Knight, J.F.** and M. Voth. (2011) Mapping Impervious Cover Using Multi-Temporal MODIS NDVI Data. *IEEE Journal of Selected Topics in Applied Earth Observation and Remote Sensing*, 4(2). DOI: [10.1109/JSTARS.2010.2051535](https://doi.org/10.1109/JSTARS.2010.2051535).

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. (2009) 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. DOI: [10.1080/01431160802552801](https://doi.org/10.1080/01431160802552801).

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. DOI: [10.1016/j.rse.2006.06.018](https://doi.org/10.1016/j.rse.2006.06.018).

**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. DOI: [10.2747/1548-1603.43.1.1](https://doi.org/10.2747/1548-1603.43.1.1).

**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). DOI: [10.1109/TGRS.2003.816587](https://doi.org/10.1109/TGRS.2003.816587).

Khorrarn, 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.

#### ***Non-refereed Journal Articles, Essays, or Book Chapters***

**Knight, J.F.**, Corcoran, J.M., Rampi, L.P., Pelletier, K.C. Theory and Applications of Object-Based Image Analysis and Emerging Methods in Wetland Mapping. In *Remote Sensing of Wetlands: Applications and Advances*, R. Tiner, V. Klemas, M. Lang, eds. Taylor and Francis Group, New York.

**Knight, J.F.**, Corcoran, J.M., Rampi, L.P., Tolcser, B.T., Voth, M. "Wetland mapping methods for the Twin Cities metropolitan area." Project report to Legislative-Citizen Commission on Minnesota Resources (LCCMR). December 31, 2009.

**Knight, J.F.**, Corcoran, J.M, Rampi, L.P., Tolcser, B.T., Voth, M. "Wetland mapping methods for the Arrowhead region of Minnesota." Project report to Legislative-Citizen Commission on Minnesota Resources (LCCMR). September 30, 2010.

Khorram, S., **Knight, J.F.**, and H.I. Cakir. 2003. "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.

**Knight, J.F.** 2002. Improving estimates of the accuracy of thematic maps. Ph.D. Dissertation, North Carolina State University.

Khorram, S. and **Knight, J.F.** "Land cover classification of the Hominy Creek watershed." Center for Earth Observation Technical Report 217. North Carolina State University. June, 2000.

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

Khorram, S., X.L. Dai, and **Knight, J.F.** "Accuracy assessment of the EPA Region IV dataset of the MRLC land cover mapping program." Center for Earth Observation Technical Report 215. North Carolina State University. October, 1999.

***Proceedings of Conferences (non-refereed)***  
*(Speaker in italics)*

Khorram, S., Yuan, H., and **Knight, J.F.** 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 Khorram, S. 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., **Knight, J.F.**, 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, **Knight, J.F.**, 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, **Knight, J.F.**, 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*.

**Presentations, Posters, and Exhibits**

***Invited Presentations at Professional Meetings, Conferences, etc.***

*(Speaker in italics)*

***Knight, J.F.*** *Invited seminar: Impervious Surface Mapping with Remote Sensing.* Minnesota Association of Professional Soil Scientists (MAPSS), Dec. 1, 2017, St. Cloud, MN, 35 attendees.

***Knight, J.F.*** *Wetland Mapping Research Review.* Binational Great Lakes Remote Sensing Collaborative Coastal Wetlands Annual Meeting, Sept. 19, 2017, Cloquet Forestry Center, Cloquet, MN, 25 attendees.

***Knight, J.F.***, *Remote Sensing Down Under*, ASPRS Western Great Lakes Annual Meeting, Feb. 2, 2017, Lake Elmo, MN, 25 attendees.

***Knight, J.F.*** *High-Resolution Land Cover Classification.* University of Queensland, Australia. November 13, 2016.

***Knight, J.F.*** *Studying our Changing Planet from Above: Remote Sensing Research in Minnesota and Queensland.* University of Queensland, Australia. August 3, 2016.

***Knight, J.F.*** *Studying our Changing Planet from Above: Remote Sensing in Natural Resource Applications.* Sip of Science. October 14, 2015. Audience: 50.

***Knight, J.F.*** *Vision for spatial science at UMN.* UMN Spatial Forum. November 19, 2014. Audience 100.

***Knight, J.F.*** *Wetland and general land cover classification using image objects and lidar.* U.S. Department of the Interior Remote Sensing Working Group, WebEx, Oct. 27, 2014.

***Knight, J.F.*** *Land Cover Classification using Image Objects and Lidar.* UMN Geography Department seminar series. March 5, 2014. Audience: 30.

***Knight, J.F.*** *New developments in wetland mapping science.* Presentation for U.S. Fish and Wildlife Service managers. USFWS Regional Office, Bloomington, MN. Dec. 14, 2011. Audience ~20.

***Knight, J.F.*** *Geospatial research review.* Institut Agronomique et Veterinaire Hassan II, Agadir, Morocco, Mar. 19, 2010, audience ~10.

***Knight, J.F.*** *Geospatial research review.* Ecole Nationale Forestiere d'Ingenieurs, Sale, Morocco, Mar. 16, 2010, audience ~40.

***Knight, J.F.***, L. Ortiz, B. Tolcser, S. Kloiber. *Mapping wetlands using terrain indices.* Society of Wetland Scientists Annual Conference, Madison, WI, June 23, 2009, audience ~100.

***Knight, J.F.*** *“Wetlands Mapping Expert Panel”.* Society of Wetland Scientists Annual Conference, Madison, WI, June 23, 2009, audience ~100.

***Knight, J.F.*** *Mapping Minnesota’s Wetlands,* Geography Department coffee hour. Feb. 26, 2009, audience ~30.

**Knight, J.F.** Satellites in Our Everyday World, University of North Carolina-Asheville March 14 - 16, 2001, audience ~100.

***Contributed Papers Presented at Professional Meetings, Conferences, etc.***  
(Speaker in italics)

**Knight, J.F.**, *Unmanned Aircraft Systems (“Drones”) Research, Teaching, and Extension in Forestry and Natural Resources*, FNRM seminar series, Oct. 25, 2017, UMN St. Paul campus, 20 attendees.

**Knight, J.F.**, *Studying our Changing Planet from Above: Remote Sensing Research in Minnesota and Queensland*, FNRM seminar series, Sept. 27, 2017, UMN St. Paul campus, 20 attendees.

*Pelletier, K.C., Knight, J.F.*, *An Object-Based Approach for Mapping and Monitoring our Forests*, Remote Sensing Applications in Forestry Workshop, Sept 21, 2017, Cloquet Forestry Center, Cloquet, MN, 40 attendees.

*Pelletier, K.C., Knight, J.F.*, *Object-based Image Analysis for Wetland Mapping*, 2017 Binational Great Lakes Remote Sensing Collaborative Coastal Wetlands Annual Meeting, Sept 19, 2017, Cloquet Forestry Center, Cloquet, MN, 25 attendees.

*Pelletier, K.C., Knight, J.F.*, *Object-based Image Analysis*, Great Lakes Research Initiative Workshop and Technical Meeting, Ottawa, Ontario, 20 attendees.

**Knight, J.F.** & *Heins, D.H.* *Unmanned Aircraft Systems Program Update*, Minnesota Association of County Land Commissioners (MACLC) Meeting, Feb. 22, 2017, Saint Paul, MN, 20 attendees.

*Pastick, N.J., Duffy, P., Genet, H., Rupp, T.S., Wylie, B.K., Johnson, K.D., Jorgenson, M.T., Bliss, N., McGuire, A.D., Jafarov, E.E., Knight, J.F.* (2016). Historical and Projected Trends in Landscape Drivers Affecting Carbon Dynamics in Alaska. American Geophysical Society Fall Meeting, San Francisco, Calif., 12-16 December 2016, abstract number B54F-03.

*Pelletier, K.C., Heins, Daniel, Host, Trevor, and Knight, J.F.* *WindWorks: The UMN UAS Program*. Minnesota GIS/LIS Consortium, Duluth, MN. October 28, 2016.

*Host, T.K., Rampi, L.P., Knight, J.F.* High-Resolution Land Cover Classification: Twin Cities, Duluth, Rochester. GIS/LIS Annual Conference. October 28, 2016.

*Rampi, L.P., Host, T.K., Knight, J.F.* Updated Minnesota Statewide Land Cover Classification. GIS/LIS Annual Conference. October 28, 2016.

*Heins, D. Pelletier, K.C.; Host, T.K., Knight, J.F.* Integrating UAS data and acquisition operations at the RSGAL. GIS/LIS Annual Conference. October 28, 2016.

*Pelletier, Keith C., and Knight, J.F.* *Come fly with me: Adventures with an UAS*. Upper Midwest Geospatial Conference, La Crosse, WI. May 25, 2016.

*Pastick, N.J., Jorgenson, T., Wylie, B.K., Minsley, B.J., Brown, D., Genet, H., Johnson, K., McGuire, A.D., Kass, A., and Knight, J.F.* Towards a better understanding of the sensitivity of permafrost and soil carbon to climate and disturbance-induced change in Alaska. American



Geophysical Union Fall Meeting. San Francisco, CA. Dec 16, 2015

*Pelletier, K.C.* and **Knight, J.F.** Off the tracks – Adventures with an unmanned aerial system. University of Minnesota U-Spatial Forum. Minneapolis, MN. November 20, 2015. Audience: 50

*Blouzdis, C. E.,* Pelletier, K.C. and **Knight, J.F.** Mapping Riparian Indicators of Function and Connectivity. FNRM 8107 Graduate Student Seminar Series. St. Paul, MN. Nov 4, 2015. Audience: 25.

**Knight, J.F.** Studying our Changing Planet from Above: Remote Sensing in Natural Resource Applications. Sip of Science. October 14, 2015. Audience: 50.

*Pelletier, K.C.* and **Knight, J.F.** Object-based change detection for identifying sediment sources and sinks. Environmental Protection Agency, Duluth, MN, August 25, 2015. Audience: 20

*Blouzdis, C. E.,* Pelletier, K.C. and **Knight, J.F.** Mapping Riparian Indicators of Function and Connectivity. EPA-MED Research Meeting. Duluth, MN. Aug 25, 2015. Audience: 12.

*Pelletier, K.C.* and **Knight, J.F.** Object-based change detection for identifying sediment sources and sinks. In Proceedings of the 2015 ASPRS Imaging and Technology Forum. Tampa, FL: ASPRS, May 5, 2015. Audience: 50

*Pelletier, K.C.* and **Knight, J.F.** Object-based change detection for identifying sediment sources and sinks. Natural Resources Graduate Symposium. University of Minnesota. Minneapolis, MN. April 22, 2015. Audience: 30

**Knight, J.F.** Vision for spatial science at UMN. UMN Spatial Forum. November 19, 2014. Audience 100.

**Knight, J.F.** Land Cover Classification using Image Objects and Lidar. Water Resource Sciences seminar series. December 9, 2014. Audience: 25.

**Knight, J.F.** Wetland and General Land Cover Classification using Image Objects and Lidar. Department of the Interior Remote Sensing Working Group. October 27, 2014. Audience: 25.

**Knight, J.F.** Land Cover Classification using Image Objects and Lidar. Water Resource Sciences seminar series. October 3, 2014. Audience: 35.

*Klassen, J.S* and **Knight, J.F.** In search of the lost point cloud: 3D models from aerial photograph. Rochester, MN. Oct 2, 2014. Audience: 30.

*Pelletier, K.C.* and **Knight, J.F.** An object-based approach using lidar and optical data for landscape change detection. Minnesota GIS/LIS Consortium Annual Conference. Rochester, MN. Oct 2, 2014. Audience: 50.

*Pelletier, K.C.* and **Knight, J.F.** An object-based image analysis approach for mapping and monitoring flooding and topographic change near Duluth, Minnesota, USA. International Geoscience and Remote Sensing Symposium. Quebec City, QC. July 15, 2014. Audience: 100.

**Knight, J.F.** Land Cover Classification using Image Objects and Lidar. UMN Geography

Department seminar series. March 5, 2014. Audience: 30.

**Knight, J.F.** Land Cover Classification using Image Objects and Lidar. UMN Water Resources Science seminar series. Dec. 5, 2013.

*Pelletier, K.C.* and **Knight, J.F.** New Opportunities for Extracting and Analyzing Green and Gray Infrastructure Using Lidar Point Clouds and Intensity in Minnesota. Minnesota GIS/LIS Consortium, Rochester, MN. October 11, 2013. Audience Size: 50.

*Rampi, L.P.*, **Knight, J.F.**. Wetland mapping in Minnesota: An object-based approach to integrate LIDAR and multispectral imagery. Minnesota GIS/LIS 23rd Annual Conference, Mayo Civic Center, Rochester, Minnesota, U.S.A. 10/10/13, 45 people.

*Rampi, L.P.*, **Knight, J.F.**. Wetland mapping in Minnesota: An object-based approach to integrate LIDAR and imagery data. Society of Wetlands Scientists (SWS) Annual meeting 2013, Duluth entertainment convention center, Minnesota, U.S.A. 06/06/13, 45 people.

*Corcoran, J.M.*, **Knight, J.F.** Mapping and Monitoring Wetland Ecosystems More Accurately by Integrating Data from Several Remotely Sensed Platforms. American Association of Geographers, Los Angeles, CA, April 9, 2013, Approximately 20 people in audience.

*Rampi, L.P.*, **Knight, J.F.**. Wetland mapping in three different ecoregions in Minnesota: An object based approach to integrate LIDAR and multispectral imagery. American Society for Photogrammetry and Remote Sensing (ASPRS) 2013 annual conference, Baltimore Marriott Waterfront, Baltimore, Maryland, U.S.A. 03/28/13, 40 people.

*Rampi, L.P.*, **Knight, J.F.**. Wetland mapping in Minnesota: An object based approach to integrate LIDAR and multispectral imagery. International LiDAR Mapping Forum (ILMF) conference, Hyatt Regency Denver at Colorado Convention Center, Denver, Colorado, U.S.A. 02/11/13, 200 people.

*Corcoran, J.*, **Knight, J.F.** incorporating data from several remotely sensed platforms to map current and potentially restorable wetlands. International Association for Ecology (INTECOL), Orlando, FL, June 6, 2012.

*Rampi, L.*, **Knight, J.F.** GIS/Remote sensing tools for wetland prioritization, Elm Creek advisory committee meeting, Fairmont, MN, May 30, 2012. Audience ~ 15.

*Corcoran, J.*, **Knight, J.F.**. Integration is modernization: on incorporating data from several remotely sensed platforms to accurately map current and potential wetlands. American Society for Photogrammetry and Remote Sensing (ASPRS), Sacramento, CA, March 5, 2012.

*Rampi, L.*, **Knight, J.F.** Using lidar, high resolution imagery and other ancillary data for wetland mapping in Minnesota. 5th Annual Minnesota Wetlands Conference, January 18, 2012. Audience ~ 200

*Corcoran, J.M.*, **Knight, J.F.**. Data integration of fully polarimetric synthetic aperture radar (SAR), optical imagery, and topographic data for wetland mapping. ASPRS 2011 Annual Conference, Milwaukee, WI. May 5, 2011. Audience ~25.

*Rampi, L.* and **Knight, J.F.**. Using lidar and high resolution imagery for object-oriented wetland mapping in Minnesota. ASPRS 2011 Annual Conference, Milwaukee, WI. May 5, 2011. Audience ~25.

**Knight, J.F.** Breaking the 85% Barrier. (discussion facilitator). ASPRS 2011 Annual Conference, Milwaukee, WI. May 4, 2011. Audience ~40.

*Zamora, D., G. Wyatt, D. Current, D. Gullickson, D. Smith, Knight, J.F., D. Paudel.* Development of living snow fence payments. 2011 Society of American Foresters National Convention, Honolulu, HI. Nov. 3, 2011.

*Corcoran, J.M.* and **Knight, J.F.** Synthetic Aperture Radar (SAR) for wetland mapping. University of Minnesota Department of Forest Resources Seminar. St. Paul, MN; Oct. 27, 2010, audience ~20.

*Corcoran, J.M.* and **Knight, J.F.** Synthetic Aperture Radar (SAR) for wetland mapping. Minnesota Water Resources Conference. St. Paul, MN. Oct. 19-20, 2010, audience ~100.

*Corcoran, J.M.* and **Knight, J.F.** Synthetic Aperture Radar (SAR) for wetland mapping and change detection. Minnesota GIS/LIS Consortium Annual Conference. Duluth, MN. Oct. 16, 2010, audience ~30.

*Voth, M.* and **Knight, J.F.** Assessing Minnesota water clarity using MODIS Imagery. MN GIS/LIS Consortium Annual Conference. Oct. 14, 2010, audience ~25.

*Corcoran, J.M.* and **Knight, J.F.** Synthetic Aperture Radar (SAR) polarimetry for wetland mapping and change detection. RADARSAT-2 Annual Workshop. Montreal, QC. Oct. 1, 2010, audience ~ 75.

*Voth, M.* and **Knight, J.F.** Wetland delineation in eCognition. Minnesota National Wetland Inventory update stakeholder meeting, Fort Snelling State Park, St. Paul, MN. February 25, 2010, audience ~30.

*Tolcser, B.P.* and **Knight, J.F.** Mapping of wetlands using decision trees. Fort Snelling State Park, St. Paul, MN. February 25, 2010, audience ~30.

*Rampi, L.* and **Knight, J.F.** Evaluating the use of topographic data for wetland mapping in Minnesota. Minnesota Wetlands Conference, St. Paul MN. Jan. 20, audience ~50.

*Rampi (Ortiz), L., Knight, J.F., Tolcser, B.* Evaluating the potential for using topographic data for wetland mapping in Minnesota. Water Resources Conference, St. Paul, MN, October 26-27, 2009, audience ~35.

*Rampi (Ortiz), L., Knight, J.F., Tolcser, B.* Evaluating the potential for using topographic data for wetland mapping in Minnesota. Minnesota GIS/LIS Conference, Duluth, MN, October 21-23, 2009, audience ~40.

**Knight, J.F., M. Voth.** Mapping impervious cover using multi-temporal MODIS NDVI data. Multi-Temp 2009, Groton, CT, July 27-29, 2009, audience ~100.

***Knight, J.F.***, L. Ortiz, B. Tolcser, S. Kloiber. Mapping wetlands using terrain indices. American Society of Photogrammetry and Remote Sensing (ASPRS) Annual Conference, Baltimore, MD, May 3-13, 2009, audience ~30.

***Knight, J.F.*** Review of current research. Minnesota Geospatial Futures symposium, UMN campus, Jan. 29-31, 2009, audience ~50.

***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. Audience ~60.

***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. Audience ~60.

***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. July 13, 2000. Audience ~150.

***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. Audience ~40.

## **Websites**

Remote Sensing Core Curriculum website (<http://r-s-c-c.org>), site redesign and update.  
Knight Geospatial Science Group website (<http://knightlab.org>), site design and creation

## TEACHING AND CURRICULUM DEVELOPMENT

### University of Minnesota

Courses, seminars, and instructional units taught (FNRM = Forest and Natural Resource Management, ESPM=Environmental Science, Policy, and Management)

FNRM 3262/5262 Introductory Remote Sensing and Geospatial Analysis (n~30)

FNRM 4515/5615 Field Remote Sensing and Resource Survey (n~15)

FNRM 5412 Advanced Remote Sensing and Geospatial Analysis (n~20)

ESPM 1011 Issues in the Environment (n~150)

ESPM 3000 Satellites to Drones: Monitoring our Changing Environment (n~45)

ESPM 3480/5480 Drones: Data, Applications, and Operations (n~30)

*GIS and Environmental Data*, Integrating Wildlife Health: Strategic Planning Workshop, Gabbert Raptor Center, Jan. 12-14, 2009. Audience ~40.

*Introduction to Remote Sensing*, U-Spatial, August 2014, 2015, and 2017. Audience ~30.

### Curriculum Development

Served on Forest Resources curriculum sub-committee charged with redesigning the FNRM undergraduate curriculum in light of new CFANS guidelines, 2010

Co-leading efforts to revision/update Environmental Science, Policy, and Management curriculum to increase Experiential and Interdisciplinary impacts, 2011 to present

### Collaborative Efforts and Activities

Serving on ESPM Coordinating Council, which provides vision and management of ESPM major 2009 to present

Participating with Center for Teaching and Learning on a project to increase multicultural competency in CFANS courses, 2012 to present

### Faculty Development Activities regarding teaching

*Make Your Teaching Stick*, Center for Teaching and Learning, 7/11/12

*Faculty Member as Mentor: Best Practices in the Successful Mentoring of Graduate Students*, UMN Graduate School, 12/3/2009

*Using Active Space Effectively*, Center for Teaching and Learning, 11/10/09

*Early Career Series* teaching development program, Center for Teaching and Learning, 2008 academic year

## ADVISING AND MENTORING

Graduate Faculty Appointment in Programs

*Conservation Biology (Cons. Bio.)*

*Land and Atmospheric Science (LAAS)*

*Master of Geographic Information Science (MGIS)*

*Natural Resource Science and Management (NRSM)*

*Water Resource Sciences (WRS)*

## Undergraduate Student Activities

Undergraduate research projects (UROPs, directed research, lab participation, etc.)

Geovanna Hinojoza (directed project: “Contemporary issues in land cover/use classification and assessment”, 2012)

John Potapenko (directed project: “Development of field data display methods in Google Earth”, 2010)

Sonya Ewert (UROP: “*Understanding the ecological factors involved in transmission of the fungus Cryptococcus neoformans to humans in sub-Saharan Africa*”, 2009)

Undergraduate advising

Advising in Forest Resources (avg. 7-14 per year) and Environmental Science, Policy, and Management (avg. 8-15 per year) undergraduate programs

## Graduate Student Activities

Doctoral Dissertations Directed

Jennifer Corcoran, NRSM, *Integrating Data from Several Remotely Sensed Platforms to Accurately Map Wetlands*, 4/2013.

Lian Rampi, NRSM, *Evaluating state-of-the-art remotely sensed data and methods for mapping wetlands in Minnesota*, 11/2013.

Current Doctoral Student Advisees (5):

William Mekeel

Dacia Meneguzzo

Neal Pastick

Keith Pelletier

Barry Wilson

Doctoral Committees Served on (\* = graduated)

\*Tavvs Alves Entomology

\*Justin Becknell Plant Bio.

\*Shyam Boriah Comp. Sci.

Austin Dobbels Plant Sci.

\*Zhe Jiang Comp. Sci.

\*Margaret Kosmala Ecology

\*Michelle LaRue Cons. Bio.

Tyler Nigon LAAS

Zach Marston Entomology

\*Leif Olmanson NRSM

\*Martha Rogers Appl. Econ.

\*John Vincent Plant Bio. Sci.

\*An-Min Wu LAAS

\*Kate Wyman Cons. Bio.

**Master's Theses Directed**

- Trevor Host, NRSM, 11/2017  
Courtney Blouzdis, NRSM, 06/2016.  
Jason Dally, MGIS, *Minnesota Sinkhole Discovery Statewide: LiDAR Clues to the Subterranean*, 1/2015  
Daniel Heins, MGIS, 2016  
James Klassen, NRSM, *The missing dimension: adding depth to image analysis*, 6/2013  
Youseng Park, MGIS, *Mineral Detection using Hyperspectral Data Analysis with Spectral Feature Fitting (SFF) Method*, 05/2012  
Lian Rampi, NRSM, *Using Lidar and High Resolution Imagery for Mapping Wetlands in Minnesota*, 04/2011  
Matt Swanson, MGIS, Multiple Topics in GIS, 12/2013  
Bryan Tolcser, NRSM, *Remote Mapping and Classification of Wetlands using Decision Trees*, 12/2010  
Margaret Voth, NRSM, *Application of MODIS Imagery for Intra-annual Water Clarity Assessment of Minnesota Lakes*, 02/2012  
Yan Wang, NRSM, 12/2016

**Current Master's Student Advisees (4):**

- Benjamin Allen NRSM  
Patrick Landisch NRSM  
Danielle Sackett NRSM  
Peter Stangl NRSM

**Master's Committees Served on (\* = graduated)**

- \*Divya Alla Comp. Sci.  
\*Justin Bakken MGIS  
\*Julia Benavides NRSM  
\*Jessica Campbell MGIS  
\*Ashish Garg Comp. Sci.  
\*Lori Krider WRS  
Michael McMahan Cons. Sci.  
\*Ashley Nepp MGIS  
\*Alphonse Nicholaus MGIS  
\*Tyler Nigon LAAS  
\*Philip Potyondy NRSM  
Bradley Smith Cons. Sci.  
\*Stacy Troumbly NRSM  
\*Margaret Voth MGIS

**Other Mentoring Activities**

Faculty advisor for University of Minnesota Student Chapter of American Society for Photogrammetry and Remote Sensing

## SERVICE AND PUBLIC OUTREACH

### Service to the Discipline/Profession/Interdisciplinary Area(s)

#### *Editorships/Journal Reviewer Experience*

##### Reviewer

Applied Geography (2008)

Aquatic Sciences (2008)

Canadian Journal of Remote Sensing (2010)

Environment Development and Sustainability (2013)

Environmental Management (2009, 2010)

Environmental Monitoring and Assessment (2014)

Frontiers in Ecology and Environment (2010)

GeoCarto International (2008 to 2017)

IEEE Geoscience and Remote Sensing Letters (2017)

IEEE Transactions on Automation Science and Engineering (2010)

IEEE Transactions on Geoscience and Remote Sensing (2008 to 2015)

IEEE Statistical Analysis and Data Mining (2010)

Journal of Selected Topics in Applied Earth Observations and Remote Sensing (2009, 2011)

Journal of Applied Earth Observation and Geoinformation (2014)

Photogrammetric Engineering and Remote Sensing (2008 to 2017)

PLOS One (2017)

Progress in Physical Geography (2014)

Remote Sensing (2009 to 2015)

Remote Sensing of Environment (2007 to 2012)

Sensors (2008, 2014)

Wetlands (2013, 2014)

#### *Committee memberships*

Board of Directors, American Society for Photogrammetry and Remote Sensing (ASPRS), 2010-2012

Director (*elected position*), Remote Sensing Applications Division, ASPRS, 2010-2012. This is the largest division within ASPRS, accounting for over 50% of its 6,000 members.

Chair, SAIC-Estes Memorial Teaching Award committee, 2011-2012. This award recognizes “individual achievement in the promotion of remote sensing and geographic information systems technology and applications through educational efforts”

Member, SAIC-Estes Memorial Teaching Award committee, 2009-2010

Asst. Director (*elected position*), Remote Sensing Applications Division, ASPRS, 2008-2010

Chair, Boeing Autometric Award for Best Paper in Image Analysis and Interpretation, ASPRS, 2008-2010, member of committee 2010-2012. This award recognizes “one paper that represents the most significant contribution in image analysis and interpretation.”

Chair, ERDAS Award for Best Scientific Paper in Remote Sensing, ASPRS, 2008-2010, member of committee 2010-2012. This award recognizes “one paper that represents the most significant overall contribution to the field.”

Editor, Remote Sensing Core Curriculum: This is a web-based archive of remote sensing knowledge that is intended to: 1) represent the current state of the art in the field, 2) serve as an information source for university level remote sensing courses, and 3) standardize the delivery of remote sensing information to new scientists. The editor maintains and



updates content, solicits new contributions from top researchers in the field, and works with agencies and professional societies to present new techniques and data types.

***Review panels for external funding agencies, foundations, etc.***

Minnesota National Wetlands Inventory proposal evaluation panel (2010)  
United Nations Educational, Scientific, and Cultural Organization (2010)  
Estonian Science Foundation (2009)  
National Science Foundation (2004)

**Service to the University/College/Department**

***University of Minnesota***

Collegiate Service and Intercollegiate Service

Major Coordinator, Environmental Science Policy and Management (ESPM) (2015 to present)  
Member and Track Representative, ESPM Coordinating Council (2009 to present)  
Co-leader of ESPM major re-visioning sub-committee (2011 to present)

CFANS Student Scholastic Standing Committee (2012 to 2015)  
CFANS Honors and Awards Committee member (2011 to 2013)  
CFANS Undergraduate Policy and Review Committee (Fall 2011, 2013-2014)  
CFANS Strategic Plan Task Force: Faculty and Staff Capacity Building (May, 2009)

Participated in an outreach trip to Morocco through International Programs in Food, Agriculture, and Natural Resource Sciences (IPFANS) to attempt to build collaborative research relationships with Moroccan faculty members. The UMN group met with faculty from four Moroccan research institutions to identify opportunities for joint projects. March, 2010.

Department/Unit Service

Forest Resources interim major coordinator (Fall 2011 and 2013-14 academic year)  
Member, Forest Resources Technology Committee (2011 to present)  
Member, Forest Resources Human Dimensions Faculty Search Committee (02/09-05/09)  
Member, Forest Resources Curriculum Committee (2007 to present)  
Outreach (presentations, discussions) to high school students in support of Forest Resources recruiting efforts (three presentations, 2007-2009)

**Public Outreach and Other Service**

Member, Minnesota National Wetlands Inventory update Technical Advisory Council (TAC). The TAC manages and oversees the ongoing update to the NWI update in MN.

Member, Wisconsin WisLand Science Advisory Council, 2014-2016.

Taught four Wetlands Mapping workshops to various federal, state, and local stakeholders in four locations in MN in support of funded project *Strengthening Natural Resource Management with LIDAR Training*, April 13, July 19, and August 2 & 8, 2012, total audience ~80.