# CURRICULUM VITAE

**SAMUEL N. GOWARD**

# PERSONAL INFORMATION

## Education

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| Ph. D. | 1979 | Indiana State University, Department of Geography and Geology |
|  |  | Dissertation: Physical nature of the interface as a factor in urban climate. |
| M. A. | 1974 | Boston University, Department of Geography |
|  |  | Research paper: Comparison of windchill and frigorimeter-recorded atmospheric cooling power. |
| B. A. | 1967 | Boston University, College of Liberal Arts, Major: Geography |

## Appointments

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| --- | --- | --- |
| July 2015 | Professor Emeritus | Dept. Geographical Sciences, University of Maryland, College Park |
| 2010 - 2015 | Professor | Dept. Geographical Sciences University of Maryland, College Park |
| 2009 Aug-Dec | Int. Chair/Professor | Department of Geography University of Maryland, College Park |
| 2005-2009 | Professor | Department of Geography University of Maryland, College Park |
| 2001-2004 | Professor | Department of Geography & Institute for Advanced Computer Studies, University of Maryland, College Park |
| 1995-2001 | Chair and Professor | Department of Geography, University of Maryland, College Park |
| 1994-1996 | Professor | Department of Geography & Institute for Advanced Computer Studies, University of Maryland, College Park |
| 1992-1994 | Professor | Department of Geography, University of Maryland, College Park |
| 1989-1992 | Associate Professor | Department of Geography, University of Maryland, College Park |
| 1986-1989 | Assistant Professor | Department of Geography, University of Maryland, College Park |
| 1985-1986 | Program Manager | Hydrology and Remote Sensing Science Programs, Land Processes Branch, Earth Science and Applications Division, National Aeronautics and Space Administration, Headquarters, Washington, D.C. |
| 1982-1986 | Assistant Research Scholar | Department of Geography, University of Maryland, College Park Earth Resources Branch, an NASA Goddard Space Flight Center, Greenbelt, Maryland |
| 1978-1982 | Research Associate *and* Lecturer | Earth Resources Program, NASA Goddard Institute for Space Studies New York City, New York *and* Department of Geography, Columbia University, New York City |
| 1977-1978 | Instructor & Acting Director | Remote Sensing Laboratory, Dept. Geography, Indiana State University, Terre Haute, Indiana |
| 1969-1973 | Radar Technician | Air Defense, Nike-Hercules System, U.S. Army |

# RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

## Books

Goward, S.N., Williams, D.L., Irons, J.R., Arvidson, T., Rocchio, L., Russell, C. and Johnston, S., 2017. *Landsat's Enduring Legacy: Pioneering Global Land Observations from Space,* American Society of Photogrammetry and Remote Sensing, Bethesda, Maryland, 620 p.

### Chapters in Books

#### Published

Huang, C., Schleeweis, K., Thomas, N. & Goward, S.N. (2011). Forest dynamics within and around the Olympic National Park assessed using time series Landsat observations. In: Y. Wang (Ed.), *Remote Sensing of Protected Lands* (pp. 71-93), London: Taylor & Francis.

Goward, S.N., Arvidson, T.A., Williams, D.L., & Irons, J. (2011). The future of Landsat-class high resolution optical multispectral remote sensing. In B. Ramachandran, C. Justice, & M. Abrams (Eds*.), Land Remote Sensing and Global Environmental Change: NASA's Earth Observing System and the Science of ASTER and MODIS* (pp. 809-834). New York: Springer

Goward, S.N., Williams, D.L., Arvidson, T.A., Irons, J., and Irish, R.R. (2009). Moderate spatial resolution optical sensors. In T. Warner, D.N. Nellis and G. Foody (Eds.), *SAGE Handbook of Remote Sensing*. (pp. 123-138) London, U.K.: Sage.

Goward, S. N. (2005). Albedo and reflectivity, (invited), in J. E. Oliver (ed.), Encyclopedia of World Climatology, Encyclopedia of Earth Sciences Series , Springer., New York, pp. 5-7.

Czajkowski, K. P., S. N. Goward, T. Mulhern, S. J. Goetz, A. Walz, D. Shirey, S. Stadler, S. Prince, and R. O. Dubayah (2004), Recovery of environmental variables from thermal remote sensing, in *Thermal Remote Sensing in Land Surface Processes,* Ed. J. Luvall and D. Quattrochi, CRC Press, 11-32.

Goward, S. N. and D.G. Dye (1997). Global biospheric monitoring with remote sensing. *The Use of Remote Sensing in Modeling Forest Productivity at Scales from Stand to the Globe*, in H. L. Gholz, K. Nakane and H. Shimoda, (eds.), New York, Kluwer Academic Publishers, pp. 241-272

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Townshend, J.R., C.J. Tucker and S.N. Goward (1993). Global vegetation mapping, in R. Gurney, J. Foster and C. Parkinson (eds), *Atlas of Satellite Observations Related to Global Change* ,Cambridge University Press, Cambridge, pp. 301-311.

Goward, S. N. and N.N. Kazantsev (1991). Monitoring environmental change: Geographic information systems and remote sensing. In *Global Change: Geographical Approaches*, in J. R. Mather and G. V. Sdasyuk (eds.) Tucson, University of Arizona Press (also published in Russian by Progress Publishers, Moscow), pp. 183-198.

Goward, S. N. (1987). Albedo and reflectivity, (invited), in J. E. Oliver and R. W. Fairbridge (eds.), *Encyclopedia of Climatology*, Encyclopedia of Earth Sciences, Vol XI, Van Nostrand Reinhold Co., New York, pp. 39-42

Goward, S. N., and Leatherman, S. L. (1986) *Remote Sensing Laboratory Manual* (original edition), Kendall-Hunt Publishing Co., 120 pp.

Goward, S. N., Tucker, C. J., and Dye, D. G. (1986). North American vegetation patterns observed with meteorological satellite data, (invited), Chap. 9 in M. I. Dyer and D. A. Crossley, Jr. (eds.), *Coupling of Ecological Studies with Remote Sensing*, U.S. Man and Biosphere Program, U.S. Department of State, publ. 9504: 96-115.

## Articles in Referred Journals

#### In Prep

Goward, S.N., Huang, C., Schleeweis, K., Zhao, F., Rishmawi, K., Masek, J.G., Cohen, W., Moisen, G., Nemani, R., & Lindsey, M.A. (in prep). US national forest disturbance patterns and dynamics: NAFD Phase III results

#### Published

Goward, S. N., Loboda, T. V, Williams, D.L., & Huang. C. (2019) Landsat orbital repeat frequency and cloud contamination: A case study for eastern United States, *Photogrammetric Engineering and Remote Sensing*, Vol. 85 (2) 109-118.

Zhao, F., Huang, C., Goward, S.N., Schleeweis, K., Rishmawi, K., Lindsey, M., Denning, E., Keddell, L., Cohen, W.C. Yang, Z., Dungan, J.L., & Michaelis, A (2018). Development of Landsat-based annual US forest disturbance history maps (1986–2010) in support of the North American Carbon Program (NACP) *Remote Sensing of Environment*, 209, 312-326

Schleeweis, K., Goward, S.N., Huang, C., Rishmawi, K., Lindsay, M.A., Michaelis, A., & Masek, J.G. (accepted Jan 2016) Selection and quality assessment of Landsat data for the North American Forest Dynamics (NAFD) forest history maps of the U.S, *International Journal of Digital Earth*.

Goward, S.N., C. Huang, F. Zhao, K. Schleeweis, K. Rishmawi, M. Lindsey, J.L. Dungan, and A. Michaelis. 2015. NACP NAFD Project: Forest Disturbance History from Landsat, 1986-2010. ORNL DAAC, Oak Ridge, Tennessee, USA. <http://dx.doi.org/10.3334/ORNLDAAC/1290>

Williams, C.A., G.J. Collatz, J. Masek, C. Huang, and S.N. Goward (2014) Impacts of disturbance history on forest carbon stocks and fluxes: Merging satellite disturbance mapping with forest inventory data in a carbon cycle model framework, *Remote Sensing of Environment*, 151, 57-71.

Schleeweis, K., S. N. Goward, C. Huang, R. E. Kennedy, J. G. Masek, G. Moisen, and N. Thomas (2013), Regional dynamics of forest canopy change and underlying causal processes in the conterminous US. *Journal of Geophysical Research,* DOI:10.1002/jgrg.20076

Masek, J.G., Goward, S.N., Kennedy, R.E, Cohen, W.B., Moisen, G.G., Schleeweis, K., Huang C. (2013) U.S. forest disturbance trends observed with Landsat time series, *Ecosystems*, 16(6): 1087-1104 DOI: 10.1007/s10021-013-9669-9

Marx, A and S.N. Goward (2013) Remote sensing in human rights and international humanitarian law monitoring: Concepts and methods, *The Geographical Review* 103 (1): 100-111.

Goward, S.N., C.Q. Huang, J.G. Masek, W.B. Cohen, and G.G. Moisen. (2012). NACP North American Forest Dynamics Project: Forest Disturbance and Regrowth Data. Available on-line [http://daac.ornl.gov] from ORNL DAAC, Oak Ridge, Tennessee, U.S.A doi: <http://dx.doi.org/10.3334/ORNLDAAC/1077>

Goward, S.N., G. Chander, M. Pagnutti, R. Ryan, R. Tetrault, N. Thomas and A. Marx (2012) Complementarity of Resourcesat AWiFS and Landsat TM/ETM+ sensors, *Remote Sensing of Environment*, 123: 41-56

Williams, C.A., G.J. Collatz, J. Masek and S.N. Goward (2012), Carbon consequences of forest disturbance and recovery across the conterminous United States, *Global Biogeochemical Cycles*. Vol. 26 GB1005

Masek, J. G., W, Cohen, D. Leckie, M. Wulder, R. Vargas, B. de Jong, S. Healey. B. Law, R. Birdsey, R.A. Houghton, D. Mildrexler, S.N. Goward, , and W. B. Smith (2011) Recent rates of forest harvest and conversion in North America, *Journal of Geophysical Research*, 116mG00K03, Easton

Huang, C., Goward, S.N., Masek, J.G., Thomas, N., Zhu, Z., & Vogelmann, J.E. (2010). An automated approach for reconstructing recent forest disturbance history using dense Landsat time series stacks. *Remote Sensing of Environment, 114*, 183-198

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K. P. Czajkowski, S. N. Goward, D. Shirey, and A. Walz (2002). Thermal Remote Sensing of Near-surface Water Vapor, *Remote Sensing of Environment* 79 (2-3): 253-265.

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Prince, S. D., S. N. Goward, S. Goetz and K. Czajkowski (2000). Interannual atmosphere-biosphere variation: Implications for observation and modeling, *Journal of Geophysical Research* 105 (D15) 20,055-20,063.

Masek, J. G, F. E. Lindsay, and S. N. Goward (2000). Dynamics of urban growth in the Washington DC metropolitan area, 1973-1996, from Landsat Imagery, *International Journal of Remote Sensing* 21:3473-3486.

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Goetz, S. J., S. D. Prince, S. N. Goward, M. M. Thawley, J. Small and A. Johnston (1999). Mapping net primary production and related biophysical variables with remote sensing: Application to the BOREAS region. *Journal of Geophysical Research* 104 (22): 27719-27734.

Goetz, S. J., S. D. Prince, S. N. Goward, M. Thawley and J. Small (1999). Satellite remote sensing of primary production: an improved production efficiency modeling approach, *Ecological Modeling* 122 (3): 239-255.

Goward, S. N., Haskett, J, Williams, D., Arvidson, T., Gasch, J., Lonigro, R., Reeley, M., Irons, J., Dubayah, R., Turner, S., Campera, K. and Bindschadler, R. (1999). Enhanced Landsat Capturing All the Earth’s Land Areas, *EOS Transactions*, 80 (26): 289, 293.

Czajkowski, K., S. N. Goward and H. Ouaidrari (1998). Impact of AVHRR filter function on surface temperature estimation from the split window approach. International Journal of Remote Sensing, 19: 2007-2012.

Goward, S. N. and D. Williams (1997). Landsat and Earth Systems Science: Development of terrestrial monitoring, *Photogrammetric Engineering and Remote Sensing* 63(7):887-900.

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## Book Reviews, Other Articles and Reports

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Huang, C., Zhao, F. Goward, S.N. and Schleeweis, K. (2015), North American Forest Dynamics (NAFD) Study Releases an Annual Record of US Forest Disturbance History over a Quarter Century, *Geografitti*, December 2015. P. 9

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Goward, S. N (2003). Landsat: Where art thou, *Space News*, Editorial, September 2003.

Arvidson, T., R. Irish, B. Markham, D. Williams, J. Feuquay, J. Gasch, and S. N. Goward (2003). Validation of the Landsat 7 long-term acquisition plan*, Earth Observation Magazine*, July 2003, 12(5): 10-20.

Goward, S. N. (2001). The Landsat Data Continuity Mission Workshop Results, *Space News*, Letter to the Editor, January 2001.

Goward, S.N. (1989). Landsat 1989: Remote sensing at the crossroads (editorial) *Remote Sensing of Environment*, Special Volume: Landsat Thematic Mapper, 28: 3-4.

## Talks, Abstracts, and Other Professional Papers Presented

### Recent Talks

#### Invited

Goward, S.N., Masek, J.G., Cohen, W.B. Mosien, M. Huang, C. Kennedy, R. Schlessweis, K., Nemani, R. (2013) US forest disturbance trends observed with Landsat time series. *North American Carbon Program, All Investigators Meeting IV, Albuquerque, NM February 2013*

Goward, S.N., Cohen, W.B., Huang, C., Masek, J.G., Mosien, M. Nemani, R., Schlessweis, K., Thomas, N. (2012) The North American forest dynamics study: A decade of learning about US Forest Disturbance**.** *U.S. Forest Service Forest Inventory and Analysis Symposium*, Baltimore, MD, December 2012

Williams, C.A., G.A. Collatz, J.G. Masek, A.R. Jacbson, L.S. Heath, S.N. Goward, W. Cohen, **Current Estimates of the US Forest Carbon Sink: Inferring Magnitudes and Mechanisms from Inventories, Flux Measurements, Atmospheric Inversions, Remote Sensing, and Bottom-Up Modeling** *North American Carbon Program, All Investigators Meeting*, New Orleans, LA, February 2011.

Goward, S.N., Kennedy, R, Masek, J. G., Cohen, W. B., Mosien, G.G. Huang, C. Thomas, N. E., and Schlessweis, K. (2009). Conterminous U.S. forest disturbance dynamics evaluated from Landsat time series stacks, *American Geophysical Union Fall Meeting*, San Francisco, CA December 2009

Goward, S.N. (2009). Landsat and climate change, *American Society of Photogrammetry and Remote Sensing Annual Conference*, March 9-13 2009, Baltimore, MD.

Goward, S. N. (2008). Satellite data exploitation, *17th Annual Pecora Symposium*, Denver, Colorado, November 19, 2008.

Goward, S.N. (2008). National Land Imaging Program: Where are we? *Global Land Survey Annual Meeting*, Arlington, VA, 28-29 October 2008.

Goward, S.N., W. Cohen, J. Masek, G. Moisen (2008)., North American Forest Dynamics (NAFD): A North American Carbon Program Core Project, 2008 *U.S. Forest Service Forest Inventory and Analysis Symposium*, October 20-23, 2008

Goward, S.N. (2008). Climatology, Columbia University and Conrad Casarjian, Session honoring Dr. John E. Oliver, *31st* *Applied Geography Conference*, Wilmington, Delaware, October 15-17, 2008.

Goward, S.N. (2008). The Earth’s Climate Change, *Moderate Resolution Satellite Imagery for Global Monitoring of Critical Issues,* House of Representatives, Congressional Event and Briefing*,* September 12, 2008. Gold Room, Rayburn Building.

Goward, S. N. (2006) Future of Land Remote Sensing: What is needed? *Joint Agency Commercial Imagery Evaluation (JACIE) Workshop*, 14 March, 2006, Patuxent National Wildlife Research Center.

Goward, S. N., Townshend, J., Fleming, D. and Davis, P. (2005). IKONOS Science Data Purchase: Lessons Learned 1999-2004, *NASA/USGS Data Gap Characterization Working Group*, Greenbelt, Maryland, 14 December 2005

Goward, S. N. (2005). Future of Land Remote Sensing: Time to Think Again, *16th Pecora Conference*, Sioux Falls, South Dakota, 26 October 2005

Goward, S. N. (2005), North American Forest Disturbance and Regrowth since 1972 from FIA and Landsat Data, US Forest Service, *7th Annual Forest Inventory and Analysis Symposium*, Portland, Maine, 03 October 2005

Fuandeen, J., Goward, S.N., Williams, D.L. (2002). Spatial-temporal patterns of Landsat data held in the USGS National Satellite Land Remote Sensing Data Archive, *Pecora 15/Land Satelllite Information IV*, Denver, Colorado, November, 2002.

Arvidson, T., Feuquay, J., Gasch, J., Goward, S. N., Irish, R., Markham, B., Williams, D. L. (2002). Validation of the Landsat 7 long-term acquisition plan. *Pecora 15/Land Satellite Information IV*. Denver, Colorado, November 2002.

Goward, S. N. (2001). Landsat: Yesterday, Today and Tomorrow. *39th Goddard Memorial Symposium*, Greenbelt MD, March 2001.

Goward, S. N., J. R. G. Townshend, P. Davis, D. Fleming, and C. Boros (2001). Radiometric comparison of IKONOS and Landsat 7 ETM+ observations: Implications for science applications, *High Spatial Resolution Commercial Imagery Workshop*, March, 2001, Greenbelt, MD.

Goward, S. N. (2000). Human transformations of land cover: Monitoring the terrestrial biosphere from space, *Ohio State University Global Change Science Lectures*, February, 2000, Columbus, OH.

Masek, J., Goward, S. N., Williams, D. L. and Irons, J. (2000) The Landsat-7 Mission: First Results, *COSPAR 2000*, July, 2000, Warsaw, Poland.

#### Presented

Loboda, T, S.N. Goward, and D.L. Williams, Cloud Impact on Landsat Surface Observations: An Assessment Based on a Decade of Daily Terra MODIS Observations 19th Pecora Conference, Denver, CO, November.

Hancock, J.J., J. Cardon, D.L. Williams and S.N. Goward, 2014 Thermal Infrared Earth Monitoring Instrument for Future Landsat Missions, 19th Pecora Conference, Denver, CO. November.

Williams, D.L., S.N. Goward, and T. Loboda, 2014 Temporal Repeat Frequency Needed to Achieve Cloud-Free Imagery from Landsat-Class Observatories: An Analysis from 10 Years of MODIS TERRA Daily Coverage, JACIE (Joint Agency Commercial Imagery Evaluation) 2014, Louisville, KY, March.

Huang , C., Goward, S.N., F.A. Zhao, K. Schleeweis, K. Rishmawi, J. Masek, W.B. Cohen, J. Dungan, G. Moisen, R. Nemani, 2014, A Quarter-Century U.S. Forest Disturbance History Mapped from Landsat, American Geophysical Union, San Francisco, December

Huang C., Goward, S.N., K. Schleeweis, Zhao, F., J. Masek, W.B. Cohen, G. Moisen, R. Nemani, 2013, US Forest Disturbance Rates Observed from Landsat, American Geophysical Union, San Francisco, December

D.L. Williams and S.N. Goward, 2013, The Terrestrial Ecosystem Dynamics Mission (TerEDyn) 12th Annual JACIE Civil Commercial Imagery Workshop, St. Louis, MO.

D.L. Williams and S.N. Goward, 2013, TerEDyn: the Terrestrial Ecosystem Dynamics Mission, 9th IAA Symposium, Berlin, Germany.

Schleeweis, K., S.N. Goward, C. Huang, J.G. Masek, G.G. Moisen. 2012. Understanding trends in observations of forest disturbance and their underlying causal processes. In: Morin, Randall S.; Liknes, Greg C., comps. Moving from status to trends: Forest Inventory and Analysis (FIA) symposium 2012; 2012 December 4-6; Baltimore, MD. Gen. Tech. Rep. NRS-P-105. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. [CD-ROM]: 131-136.

Masek, J.G., Rishwami, K., Neigh, C, , Goward, S.N, (2012) Post-disturbance recovery analyzed from remote sensing time series and FIA data, *U.S. Forest Service Forest Inventory and Analysis Symposium*, Baltimore, MD, December 2012.

Moisen, G.G., T. Schroeder, K. Schleeweis, C. Toney, W. Cohen, S. Goward. 2012. Attributing causal agents to nationwide maps of forest disturbance. Proceedings of the 2012 FIA Symposium. In: Morin, Randall S.; Liknes, Greg C., comps. Moving from status to trends: *Forest Inventory and Analysis (FIA) symposium 2012*; 2012 December 4-6; Baltimore, MD. Gen. Tech. Rep. NRS-P-105. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. [CD-ROM]:61-64.

Huang, C., Goward, S.N., Schleeweis, K., Lindsay, M., Masek, J.G., Nemani, R. Cohen, W.B. (2012) First wall-to-wall mapping of US forest disturbances using dense time series Landsat observations, *U.S. Forest Service Forest Inventory and Analysis Symposium*, Baltimore, MD, December 2012

Goward, S. N., Post World War Two technology harvest: The Landsat observatory (1950 – 1972) *Pecora 18 Symposium*, Herndon, VA, November 2011.

Schleeweis, K.G., S.N. Goward, C. Huang N.E. Thomas, R.E. Kennedy, Patterns of Forest Change Observations and Processes, *North American Carbon Program, All Investigators Meeting*, New Orleans, LA, February 2011.

Huang, C. ,R. Dubayah, G. Hurtt, S.N. Goward1, J. G. Masek, and Z. Zhu. Tracking Forest Biomass Dynamics Using A Landsat-Lidar Fusion Approach, *North American Carbon Program, All Investigators Meeting*, New Orleans, LA, February 2011.

Thomas, N.E., C. Huang, S. N. Goward, S. Powell, K. Rishmawi, K. Schleeweis, and A. Hinds (2011) Validation of North American Forest Disturbance Dynamics Derived from Landsat Time Series, Stacks *North American Carbon Program, All Investigators Meeting*, New Orleans, LA, February 2011.

Goward, S.N., R.E. Kennedy, J. G. Masek, W.B. Coehn, G. Moisen, C. Huang, N. Thomas, K.G. Schleeweis, (2011) Trends and Patterns of US Forest Disturbance from the Landsat Observation Record: Results from the North American Forest Dynamics Project. *North American Carbon Program, All Investigators Meeting*, New Orleans, LA, February 2011.

C. Huang, Dubayah, R., Hurtt, G. Goward, S.N., Masek, J.G., Zhi, Z. (2010) Monitoring Forest Carbon Dynamics for REDD: A Landsat-Lidar Fusion Approach, *American Geophysical Union Fall Meeting*, San Francisco, CA December 2010

Thomas, N.E., Goward, S,N., Kennedy, R., Masek, J.G., Cohen, W.B., Moisen, G.G., Huang, C. ,Schleeweis, , K. (2010) Conterminous US Forest Disturbance Dynamics Evaluated from Landsat Time Series Stacks, *American Geophysical Union Fall Meeting*, San Francisco, CA December 2010

Schleeweis, K. G., Goward, S.N. and Huang, C. (2010) Processes and Patterns, *ForestSat 2010*, Spain 2010

Goward, S.N., Thomas, N., Schleeweis, K., Hinds, A., Masek, J., Cohen, W., Moisen, G. (2010) North American Forest Dynamics (NAFD) Study: A Core Project of the North American Carbon Program. *Association of American Geographer Annual Meeting*, Washington DC, April 2010.

Goward, S.N. Cohen, W., Masek, J.G., and Moisen, G. (2009) Role of Forest Disturbance and Regrowth in North American Carbon Balance, *North American Carbon Program, 2nd NACP All-Investigators Meeting*, San Diego, CA, Feb. 17-20, 2009.

Huang, C., S.N. Goward, J.G. Masek, W. B. Cohen, G.G. Moisen, C. Huang, S. Healey, R. Kennedy, S. Powell, K. Schleewies, A. Hinds, K. Rishwami (2008). North American Forest Dynamics Evaluated Using Landsat Observations and FIA Measurements: Science Goals within NACP, *American Geophysical Union Fall Meeting*, San Francisco, CA December 2008

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Davis, B.A., Pagnutti, M.A., Ryan, R.E. and Goward, S.N. (2008). Landsat/AWiFS Comparison, *Global Land Survey Annual Meeting*, Arlington, VA, 28-29 October 2008.

Thomas N.E., Healey, S.P., Moisen, G., Goward, S.N. (2008). Adapting NAFD technologies to FIA operations. Presented: *FIA Science Symposium, Park City, UT:* October 21-23, 2008.

Goward, S.N. W. Cohen, J. Masek and G. Moisen (2008). Two decades of forest disturbance and regrowth across the United States evaluated using the Landsat record for the North American Carbon Program, *NASA Carbon Cycle and Ecosystems Joint Science Workshop*, College Park, MD, April 28- May 1, 2008

Goward, S.N., D.L. Williams and A. Macatee (2008). *Cloud Contamination in Landsat Imagery: Current and Future Possible Solutions, Association of American Geographers*, Boston, MA, April 17-19, 2008.

Cohen, W. B., S. P. Healey, S. N. Goward, G. G. Moisen, J. G. Masek, R. E. Kennedy, S. L. Powell, C. Huang, N. Thomas, K. Schleeweis, and M.A. Wulder. 2007. Use of Landsat-based monitoring of forest change to sample and assess the role of disturbance and regrowth in the carbon cycle at continental scales, pp.14-19, proceedings of the ForestSat 2007, Montpellier, France, 5-7 November.

Healey, S., G. Moisen, J. Masek, W.B. Cohen, S.N. Goward, S. Powell, M. Nelson, D. Jacobs, A. Lister, & Shaw, J. (2008). Measurement of forest disturbance with Landsat and FIA data: Anticipated benefits from FIA’s collaboration with NASA and University partners. In R. R.E McRoberts, G.A. Van Deusen, P.C., McWilliams, W.H. (Ed.), *7th Annual Forest Inventory and Analysis Symposium* (pp. 171-178). Portland Maine: U.S. Department of Agriculture Forest Service, Washington DC

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Goward, S.N., N. Thomas, Huang, C. et al (2007). Two decades of forest disturbance and regrowth across the United States evaluated using the Landsat record for the North American Carbon Program, *American Geophysical Union Fall Meeting*, San Francisco, CA, December 2007

Masek, J.G., R. Wolfe, F. Hall, et al (2007). Assessing North American forest disturbance from the Landsat archive, IGARRS Symposium Proceeding, 2007.

Goward, S.N., J.G. Masek, C. Huang, W. Cohen, , G. Moisen, R. Kennedy, S. Powell, S. Healey, N. Thomas, K. Schleeweis (2007). US Forest Disturbance and Regrowth Assessment from the Landsat Record in support of the North American Carbon Program (NACP). *Assoc. Amer. Geographers Annual Meeting*, San Francisco, CA, April 20, 2007.

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Moisen, G.G., S.P. Healey, W.B. Cohen, S.N. Goward, J.G. Masek, S.L. Powell, R.E. Kennedy, C. Huang. (2006). Forest Inventory and Analysis and the North American Carbon Program: a model for collaboration, poster presented at the *NASA Carbon Cycle and Ecosystems Joint Workshop on NASA Biodiversity, Terrestrial Ecology, and Related Applied Sciences*, 21-25 August 21-25, University of Maryland Conference Center, College Park.

Kennedy, R.E., Cohen, W.B. Moisen, G.G., Goward, S.N., Wulder, M., Powell, S.L, Masek, J.G., Huang, C., Healey, S.P. (2006). A sample design for Landsat-based estimation of national trends in forest disturbance and regrowth. *Joint Workshop on NASA Biodiversity, Terrestrial Ecology, and Related Applied Science*, Adelphi, MD, August 21-25, 2006.

Chengquan H. Goward, S. N., Masek, J. Thomas, N. and Powell, S. Scheleeweis, K. (2006). **Reconstruct forest disturbance history using Landsat data: methodology development and preliminary results. *NASA Terrestrial Ecology and Applied Sciences Workshop*, University of Maryland, University College, 25 August 2006.**

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Justice, C.O. and Goward, S.N. (2005) Landsat-type observations: Needs for global land science, *American Society for Photogrammetry and Remote Sensing*, Baltimore, Maryland,10 March 2005.

Goward, S. N., A. F. H. Goetz, K. J. Thome, S. L. Ustin, J. R. Schott, J. R. G. Townshend, C. E. Woodcock, T. Koger, J. Pearlman, R. W. Tuner (2002). The RESOURCE21 science advisory board: Recommendations for an observatory to continue the Landsat mission heritage. *Proceedings of the Pecora 15/Land Satellite Information IV*. Denver, Colorado, November 2002.

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Arvidson, T., Gasch J., Serge Andréfouët S., Hu C., Goward SN., Müller- Karger F.E. (2000). An assessment of Landsat 7/ETM+ acquisition over coral reefs worldwide. *IGARRS Symposium*, July 2000, Honolulu HI.

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Arvidson, T., Goward, S.N., and Williams, D.J. (2008). Characterizing the Landsat Global long-term record. In *13th Australasian Remote Sensing and Photogrammetry Conference*, Canberra, Australia.

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Masek, J. G., Wolfe, R, Hall, F. Goward, S.N. Huang, C., Cohen, W., Kennedy. R., Powell, S., Healey, S. Moisen, G. ) (2007) Assessing North American Forest Disturbance from the Landsat Archive. *Proceedings of IGARRS 2007*. Spain.

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Lemoigne, J., Netanyahu, N., Masek, J.G., Mount, D.M, and Goward, S.N. (2001). Robust matching of wavelet features for sub-pixel registration of Landsat data, *Proceedings of IGARSS 2001* Annual Meeting.

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LeMoigne, J., N. Netanyahu, J. Masek, D. Mount, S. Goward, and M. Honzak (2000). Geo-registration of Landsat data by robust matching of wavelet features, *IGARSS Annual Meeting*, Honolulu, 2000.

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## Contracts and Grants

### Previous

Huang, C, S. Goward, S, Houghton, J. Masek et al. Role of Forest Disturbance and Regrowth in the US Carbon Budget, *NASA HQ, Ecosystems*, 2014-2017.

Huang, C., S. Goward, M. Hansen, et al Assessment of North American Industrial Forests: Disturbances, Biomass Extraction, and Growth Vigor *NASA HQ LCLUC Program* 2014-2017

 Goward, S.N., W.B. Cohen, J.G. Masek, G. Moisen, and R. Nemani, US Forest Disturbance History from Landsat, *Terrestrial Ecology, NASA HQ, North American Carbon Program*, August 2011 – August, 2015, (15% time)

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Huang, C., R. Dubayah. G. Hurtt, J. Masek, and S.N. Goward, Integration of long term Landsat observations with DESDynI measurements for monitoring terrestrial carbon flux within and beyond the DESDynI mission *NASA Terrestrial Ecology*, (5% time)

S. S. Johnston, S.N. Goward, T.M. Holm, D.L. Williams, T.J. Arvidson and L.E. Rocchio, Preserving Landsat’s Legacy *NASA History Office, NASA Headquarters*, February 2008 – January 2011 (Time coved under above activity)

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Goward, S. N., J Masek, W. B. Cohen, and G. Moisen. *North American Forest Disturbance and Regrowth since 1972: Empirical Assessment with Field Measurements and Satellite Remotely Sensed Observations*, February 2005 to January 2008 North American Carbon Program, NASA Ecosystems (25% time)

Goward, S. N., *Validation of the Landsat 7Long-Term Acquisition Plan*, Cooperative Agreement with NASA Goddard Space Flight Center, July 2002-June 2005 ($150,000).

Goward, S.N., W.B. Cohen and J. Masek, *Assessing Eastern North America Forest Disturbance and Regrowth: Potential from Passive Optical Remote Sensing Evaluated in the US Mid-Atlantic Region* March 2003 – February 2005, Ecosystems Program, NASA HQ ($500,000)

Goward, S. N., Townshend, J., Pirages, D*., Enhancing Earth System Science Using Commercial Terrestrial Remote Sensing Systems*., NASA Stennis Space Center, MS, November, 1997 - February 2004 ($1,003,023)

Goward, S. N., Townshend, J., Geores, M, Davis, L. and Tucker, C. J. *Terrestrial Monitoring at High Spatial Resolution: The Role of Landsat-type Sensors in Mission to Planet Earth*, National Aeronautics and Space Administration, October 1996 – June 2002 ($2,000,000)

Goward, S. N. and J. G. Masek., *Prototype Implementation of a Research Environment for Advanced Landsat Monitoring (REALM)* Cooperative Agreement with NASA Goddard Space Flight Center, June 1999 – May 2002 ($500,000).

Goward, S. N., Czajkowski, K. P., Xue, Y. and Stadler, S., Terrestrial Environmental Variables Derived from EOS Platform Sensors., NASA Headquarters, November 1998 – October 2001 ($450,000)

Goward, S. N., *Determination of Spectral Properties Associated with Phytomass and PAR*, Cooperative Agreement with the US Department of Agriculture, Agricultural Research Service, Beltsville, Maryland, Nov. 94 to June 99 ($500,000)

Goward, S. N., Dubayah, R. and Townshend, J*. Remote Sensing Methods for Biospheric Monitoring*, Cooperative Agreement with NASA Goddard Space Flight Center, January 1996 - May 1999 ($500,000)

Goward, S. N., *Biospheric Monitoring from Space: Environmental(*[*Goward 2001*](#_ENREF_1)*;* [*Goward and Masek 2001*](#_ENREF_2)*;* [*Goward et al. 2001*](#_ENREF_3)*) Constraints*, National Aeronautics and Space Administration, Sept 1995-August 1997 ($400,000)

Townshend, J., Vermote, E., Justice, C. and Goward, S. N*., AVHRR Land Pathfinder Data Set; Version 2*, National Aeronautics and Space Administration, June 1995 to May 1997 ($800,000).

Walthall, C. L., Goward, S. N. and Williams, D. L., *Biophysical Significance of Spectral Vegetation Indices in the Boreal Forest.* National Aeronautics and Space Administration, BOREAS project, March 1993 to February 1996 ($300,000).

Goward, S. N., Prince, S., Dubayah, R., Townshend, J., and Tucker, C. J. *Biospheric Dynamics in the Boreal Forest Ecotone.* National Aeronautics and Space Administration, BOREAS project, March 1993 to February 1996 ($300,000).

Goward, S. N. with Running, S. W, and Nemani, R. (Univ. Montana) *Estimating Regional Forest Evapotranspiration and Photosynthesis with a Satellite-Derived Vegetation Index and Surface Temperature,* National Science Foundation, Ecosystems Program, June, 1989 to May 1992 ($265,000).

Goward, S. N., *Toward New Theories in Macroscale Bioclimatology*, National Aeronautics and Space Administration, Headquarters, Land Processes Ecosystems Program, August 1987 to January 1994 ($600,000).

Goward, S. N. and Hope A. S. (San Diego State U.) *Measurement of Evapotranspiration with Combined Multispectral Solar Reflective and Thermal Infrared Radiance Observations*, National Aeronautics and Space Administration FIFE (First ISLSCP (International Satellite Land Surface Climatology Program) Field Experiment) Guest Investigator Program, May 1987-April 1992 ($240,000).

Goward, S. N., *Estimating Photosynthetically Radiation with Satellite Data*, Cooperative Agreement with the US Department of Agriculture, Agricultural Research Service, Beltsville, Maryland, Sept. 89 to Feb. 94 ($300,000)

Goward, S. N. and Walthall, C. L., *Analysis of Terrestrial Conditions and Dynamics*, National Aeronautics and Space Administration, Goddard Space Flight Center Cooperative Agreement, December 1982 - May 1992) (~$100,000 K per year, 10 year total > $1,000,000)

Goward, S. N., *Cooperative Distribution of Reprocessed NOAA Global Vegetation Index Data*, National Oceanic and Atmospheric Administration, National Geophysical Data Center, Boulder Colorado, September 1991-December 1991 ($9,000)

Goward, S. N. and Petzold, D. E., *Spectral Contrasts in Open-Lichen Woodlands of the Subarctic*, National Aeronautics and Space Administration AVIRIS (Advanced Visible/Infrared Imaging Spectrometer) Guest Investigator Program June 1987-May 1989 ($65,000)

Mulhern, T., and Goward, S. N., *Lichen Dynamics in the Boreal Forest-Tundra Ecotone: A Potential Indicator of Global Change*, National Aeronautics and Space Administration Graduate Student Researcher Program, August 1988 - July 1991

Justice, C. O., and Goward, S. N., *Analysis of Subsaharan African Grasslands*, National Aeronautics and Space Administration, Goddard Space Flight Center, July 1987 -December 1989 ($250,000)

Goward. S. N., and Ragan, R. M., *A Field-Portable Spectrometer for Remote Sensing Research*, University of Maryland, Graduate School, Designated Research Initiative Fund, 1986 ($42,000)

#### Columbia University

Goward, S. N., and Webb, K.E. *Application of Digital Analysis of MSS Data to Agro-Environmental Studies*, National Aeronautics and Space Administration, Goddard Institute for Space Studies Cooperative Agreement with Geography, Columbia University, New York, September, 1978 to November, 1982 ($500,000)

#### Indiana State University

Mausel, P. W. and Goward, S. N., *Remote Sensing Short Courses for Practicing Professionals*, National Science Foundation, Alternatives for Higher Education Grant September 1977- August 1978 ($45,000)

## Fellowships, Prizes, and Awards

Indiana State University, Graduate School, *2017 Outstanding Alumni Award*.

University of Maryland, College of Behavioral and Social Sciences, *2013 Dean’s Medal*.

US Geological Survey and National Aeronautics and Space Administration, *2008 William T. Pecora Award*

American Society of Photogrammetry and Remote Sensing (ASPRS). *2008 SAIC Estes Memorial Teaching Award,* Proceeds donated to Department or Geography

U.S. Geological Survey *John Wesley Powell Award*, for Educational activities related to Landsat March 2006,

NASA Headquarters, August 2004, Joint Agency Commercial Imagery Evaluation Team (JACIE) , Group Achievement Award

U.S. Geological Survey, October 2001, Landsat-7 Satellite Team, Group Award, William T. Pecora Award

NASA Goddard Space Flight Center, December 1999, Landsat Project Office Science Team, Group Achievement Award, Best of the Best for 1999.

NASA Goddard Space Flight Center, September 1999, Landsat Project Office Science Team, Group Achievement Award, 2nd Quarter 1999.

Association of American Geographers, April 1998, Remote Sensing Science Group, Outstanding Contributions.

## Editorships, Editorial Boards, and Reviewing Activities for Journals and Other Learned Publications.

### Editorial Board

*Remote Sensing of Environment*, 1995 to present.

### Special Issue Editor

Goward, S. N., Arvidson, T, and Williams D. L. (2006) Focus Issue: Landsat Operations: Yesterday, Today and Tomorrow, *Photogrammetric Engineering and Remote Sensing,* 70(10), pp. 1120-1190

Zanoni, V. and S. N. Goward, guest editors, (2003). Special Issue on IKONOS, *Remote Sensing of Environment* 88 (1-2), 1-219.

Goward, S. N. and J. Masek (2001). Special issue on Landsat 7, *Remote Sensing of Environment*78 (1-2):1-222.

Goward, S. N. Williams, D. L., and Peterson, D. (1994). Remote Sensing of Forest Ecosystems Special Issue, *Remote Sensing of Environment, 47*.

Goward, S. N., (contributing editor), 1989. I. Kutlykov and G. White, (senior editors), *Global Change: Geographical Approaches*, Bilateral U.S.-U. S.S.R. Geography Committee on the International Geosphere-Biosphere Program, Progress Publishers, Moscow.

Goward, S. N., and Ungar, S. G. (1987). Terrestrial Patterns and Processes: Perspectives from Space, *Advances in Space Research*, Vol. 7, no. 11: 3-237.

### Book Reviews

Werle, D, 1988, Radar Remote Sensing: A Training Manual, Dendron Surveys Ltd., Ottawa, Canada, *Photogrammetric Engineering and Remote Sensing*, May 1990.

### Journal Review

|  |  |
| --- | --- |
| AAG Annals  | J. Applied Meteorology |
| AAG Professional Geography | J. Geophysical Research - Biogeosciences  |
| Advances in Space Research | J. of Arid Environments |
| Agronomy Journal | Journal of Climate |
| Bioscience | Photogrammetric Engineering and Remote Sensing |
| Earth Interactions | Physical Geography |
| Ecological Applications | Remote Sensing of Environment |
| Ecology | Remote Sensing Reviews |
| Ecosystems | Research and Exploration |
| Geocarto | Theoretical and Applied Climatology |
| IEEE Geosciences and Remote Sensing | Vegetatio |
| International Journal of Remote Sensing | Vegetation Science |

# TEACHING Mentoring AND ADVISING

## Courses Taught in Last Five Years

### Specialized

|  |  |
| --- | --- |
| Course # | Description |
| GEOG472 |  Remote Sensing Digital Image Processing and Analysis (3). Undergraduate/Graduate-level offering on digital image processing and analysis procedures used for remote sensing data interpretation. Requires an introductory course in remote sensing and quantitative/statistical methods. Graduate student requirements substantially higher than for undergraduates Enrollment 40-50  |
| GEOG 671 |  Remote Sensing Observations and Instrumentation (3) Graduate-level offering on advanced concepts underlying the sensor systems and data products used to produce contemporary digital remotely sensed land observations. Typical enrollment 25-30 |
| GEOG 672 |  Biophysics of Remote Sensing (3)Graduate-level offering on advanced concepts underlying biophysical interpretation of remote sensing measurements. Basis of much of contemporary remote sensing interpretations. Typical enrollment 25-30 |
|  GEOG788B | Seminar in Remote Sensing (1-3)Most recent offering in 2007. Topic was Future of Remote Sensing. Considered current national and international political and technical dynamics in establishing an operational land imaging system. Included several quest lecturers from the Washington DC region. Enrollment 10 |
| GEOG600 | Introduction to Graduate Studies in Geography |

Independent Study (GEOG 789 and GEOG 798)

On average more than 5 undergraduate and graduate students register, per semester, for directed readings and independent study in remote sensing and physical geography under my direction. Approximate total contact hours in last 5 years: 100

## Course or Curriculum Development

GEOG 671 Remote Sensing Observations and Instrumentation

GEOG 672 Biophysics of Remote Sensing

GEOG 472 Remote Sensing Digital Image Processing and Analysis (Spring 2005)

## Teaching Awards and Other Special Recognition

American Society of Photogrammertry and Remote Sensing (ASPRS). *2008 SAIC Estes Memorial Teaching Award,* Proceeds donated to Department or Geography

### Master’s

#### Scholarly Paper

|  |  |  |
| --- | --- | --- |
|  | Elaine Denning (2013) |  |
| Akiko Eiders (2010) | Tom Fitzwater (2010) | Louis Keddell (2013) |
| Tim Clark, (2008) | Elizabeth Hoy (2009) | David Dubin (2010) |
| Ping Liu (2001) | Matthew Smith (2005) | John Reed (2006) |

#### Thesis

|  |  |
| --- | --- |
| Shannon Franks, 2005 | How many bits? Radiometry for forest analysis |
| Andrew Johnston. 1998 | Remote sensing of standing biomass in the Canadian Boreal forest |
| Pamela Nagler, 1997 | Spectral properties of plant litter versus bare soil |
| Anu Bowman, 1997 | emissivity factor in surface temperature determination with thermal infrared measurements |
| James McManus, 1994 | Estimation of agricultural net production from remotely sensed observations. |
| Lara Prihodko, 1992 | Estimation of air temperature from AVHRR observations:1987 FIFE observations. |
| Wayne Dulaney 1991 | Analysis of First International Satellite Land Surface Climatology Project (ISLSCP) Field Experiment (FIFE) data. |
| David Toll, 1991,  | Spectral estimates of surface albedo |
| Eli Rutstein, 1989 | Forest canopy analysis with fisheye lens photography. |
| Vivre Koomanoff, 1988 | Comparison of remotely sensed spectral vegetation index measurements and a world ecosystems map. |
| Betsy James, 1988 | Bathymetric charts from satellite remotely sensed images. |
| Dennis Dye, 1985 | Estimating net primary productivity with NOAA-7 AVHRR data. |
| Sheila Donovan, 1985 | Vegetation discrimination with bidirectional reflectance measurements. |

### Doctoral

|  |  |
| --- | --- |
| Andrew Marx, 2013 | Employing Moderation Resolution Sensor in Human Rights and International Humanitarian Law Monitoring |
| Andrew Johnston, 2013 | Tree Cover Variability on the District of Columbia |
| Karen Schleeweis, 2012 | Towards a Better Understanding of Forest Change Processes in the Contiguous U.S. |
| David Fleming, 2005 | Effect of Spectral Response Function on Multi-spectral Measurements and NDVI from Disparate Remote Sensing Systems |
| Theresa Mulhern 1995 | Reflectance of Lichens in the Circumpolar Sub Arctic |
| Karl F. Huemmrich 1995 | An Analysis of Remote Sensing of the Fraction of Absorbed Photosynthetically Active Radiation in Forest Canopies. |
| Dennis G. Dye, 1992 | Satellite estimation of the global distribution and interannual variability of photosynthetically active radiation |
| Robert Lutz, 1990 | Teleconnections between tropical convective activity and mid-latitude circulation |
| Darrel Williams, 1989 | Radiative properties of spruce forests as a factor in their geographical distribution |
| Alan Hope, 1986 | Estimating evapotranspiration from combined spectral reflectance and thermal emissions data. |

### Columbia University, New York City

#####  Doctoral

Helene Wilson, 1990 Landsat measurement of green vegetation cover in a heterogeneous landscape

Ernestine Cary, 1984 Spatial Patterns of Tropical Agriculture and Their Relation to Socio-Economic and Physical Factors at Multiple Scales.

Barbara Bury, 1984 Human Ecology of Agricultural Production in Rukwu Region, Tanzania.

Minoru Ueda, 1982 Role of Intermediate Technology in Agricultural Development: A Comparative Analysis of Japanese and Philippines Rice Production.

Christopher Brest, 1982, Seasonal Dynamics of Urban-Rural Albedos.

#####  Master's

 Michael Miller, 1982 Evaluating seasonal trends in surface albedo with satellite data and a simple atmospheric model.

George Chruickshanks, 1982, Relation between thermal emissions and spectral reflectance of a complex vegetated landscape from Landsat and Heat Capacity Mapping Mission observations.

Debra Rothberg, 1982, Comparative thermal emissions behavior of corn and soybean canopies.

####  Dissertation/Thesis Committee Member

|  |  |
| --- | --- |
| *PhD* | *MA* |
| Chris Neigh | Sayta Kullari  | Scott Goetz, | Michael Matson |
| Wenhui Wang | Douglas Fuller  | Keith Kamisky |  |
| Jose Roa | Jessica McCarty  | Moon Kim  |  |
| Richard Russo | Kuan Song | Terri Mulhern, |  |
| Enrique Montano | Alyssa Whitcraft | Jane Feng, |  |
| Kusuma Prabukura |  | Michael Wilfer |  |

|  |
| --- |
| James Irons (Agronomy) 1992, |
| Carolyn Merry (Civil Engineering) 1988 |
| Stephen Wharton (Civil Engineering), 1987 |

###### Columbia University, New York City

Katherine Prentice, 1986. The influence of terrestrial biosphere on seasonal carbon dioxide: An empirical model.

# SERVICE

## Professional

### National- Recent

North American Carbon Program, *Science Steering Group*, 2008-2013.

American Society of Photogrammetry and Remote Sensing, 2008 to 2011, *Manual of Remote Sensing Working Group*

American Society of Photogrammetry and Remote Sensing, 2007 to 2009, *National Land Imaging Program Working Group*

Northrop-Grumman, *Consultant Science Advice*. 2007 to 2010.

Center for Strategic International Studies - *Earth Observation and Global Change Initiative Workgroup*, 2007-2008.

Executive of President, Office of National Drug Control Policy, *consultant*, 2008 to 2012.

USGS/NASA. Member *Landsat Science Team*, 2006 – 2011.

NASA/USGS, *2005 Mid Decadal Global Land Survey Committee*,2004-2008

Association of American Geographers, *Finance Committee*, 2005 -2008.

AAG/USGS Workshop. *Toward Operational Land Remote Sensing*, Comos Club, Washington, D.C. Sept 22-23, 2004

AAG *Private-Public Partnership Working Group*, Cosmos Club, April 2001

NASA/USGS, *Landsat Data Gap Adhoc Advisory Committee,* 2004-2006.

USGS, Co-Chair, 3rd Federal Advisory Committee, *National Satellite Land Remote Sensing Data Archive (NSLRSDA),* U.S. Geological Survey, Appointed by Secretary of the Interior. February 2004 –2006

National Research Council, Reviewer, *Toward New Partnerships: Government, The Private Sector and Earth Science Research,* January 2002.

USGS, Co-Chair, 2nd Federal Advisory Committee, *National Satellite Land Remote Sensing Data Archive(NSLRSDA)*, U.S. Geological Survey. Appointed by Secretary of the Interior. February 2001 –2003.

NASA, member, *NASA EO-1 Ad Hoc Science Advisory Pane*l, 1996-1999.

NASA/USGS Team Leader, *Landsat Science Team*, , 1992-2001.

Member, *Adhoc* *Landsat Science Working Group*, National Aeronautics and Space Administration and Department of Defense, 1992 to 1994.

Expert Witness (written), *Landsat and Global Change Research*, Committee on Science, Space and Technology, U.S. House of Representatives, June 1991.

Co-Chair, Joint National Aeronautics and Space Administration/Earth Observation Satellite Company Working Group on Thermal Infrared Observations, 1986 to 1988.

Regional Councilor (Middle Atlantic), Remote Sensing Specialty Group, Association of American Geographers, 1991-1995.

American Society of Photogrammetry and Remote Sensing ,*Member, Geography and Land Use Committee*, 1981-1986.

National Council of Geographic Education, *Member, Remote Sensing Committee*, , 1983-1987.

Association of American Geographers , *Director, Remote Sensing Specialty Group*, , 1982-1984.

Association of American Geographers, *Chair, Goals Committee, Remote Sensing Specialty Group*, 1981-1983.

### International

Member, International Committee of Earth Observations Satellites, Working Group on Auxiliary Data Systems, Map Projections, 1995 -1998

Invited member, International Space Year, Earth Observations, Global Change and Dynamic Processes, 1991-92.

U.S. Delegate, U.S./USSR Earth Sciences Joint Working Group on Earth Sciences, 1990 to present.

U.S. Delegate, International Geographical Union, Commission on Global Monitoring and Forecasting, 1989 to 1992.

Chair, Local Arrangements Committee, International Geosciences and Remote Sensing Symposium, University of Maryland, College Park, May 1990.

Member, Joint U.S./USSR International Geographical Union Working Group
"Geographers and the International Council of Scientific Unions (ICSU) Global Change Program", July 1987 to 1991.

Member, International Drought Working Group, University of Nebraska, Lincoln, Nebraska, 1-2 October 1986.

Session Chair and Referee, "Symposium on Space Observations for Regional and Global Resource Assessments", 26th COSPAR (International Council of Scientific Unions, Committee on Space Research) Plenary Meeting, Toulouse , France, 1-4 July, 1986.

Session Organizer and Chair, "Vegetation Cover Analysis via Remote Sensing, Session One", 10th International Symposium on Machine Processing of Remotely Sensed Data, Purdue University, West Lafayette, Indiana, June 1984.

### Grant Proposals and Review Panels

National Aeronautics and Space Administration
National Oceanic and Atmospheric Administration
National Science Foundation
U.S. Department of State
U.S. Environmental Protection Agency
National Environment Research Council (United Kingdom)
National Geographic Society
City University of New York
University of California Research Board

## University

### Departmental (recent)

2013 – APT Subcommittee Chair

2012 – Internal-External Review Committee

2011
Chair – Undergraduate Committee
Member – Graduate Committee
Member – Research Committee

2010
Chair, Search Committee

2009
Interim Chair (August-December)

2008
*Sabbatical*

Chair, Human Geographer Search Committee
Member, GIS Master of Science Degree Development
Member, Graduate Committee
Member Research Committee
Mentor, Dr. Naijun Zhou

2007
Senator (2005-08)
Chair, Human Geographer Search Committee
Member, GIS Master of Science Degree Development
Member, Graduate Committee
Member Research Committee
Member (ad hoc) Merit Committee
Mentor, Dr. Naijun Zhou

### College

Geography Chair Review Committee, Fall 2005
Fellowship Advisory Committee, Fall 2004
College APT Committee, 2002-2004
 Strategic Planning Committee, 2001
Computer Policy Advisory Committee, 1994
Dean Advisory Committee. 1993-1995t
Classified Staff Award Committee, 1991 and 1992
Staff Review, BSOS Computer Lab, 1990-91
Dean Budget Advisory Committee, 1990-91
Computer Policy Advisory Council, 1990 to 1992
Associate Director Search Committee, BSOS Computer Lab 1989-1990
Geography Representative, Collegiate Council, 1987 to 1988

### Campus and University

BSOS Dean Review 2006-2007

BSOS Dean Search Committee, 2002-2003

Member, ESSIC Search Committee, 1997-2000

Member, Chair Review Committee, Dept. Geology, 1996

Member, Environmental Sciences Program Development, 1995-1998

Director, Remote Sensing Systems Laboratory, 1987 to 1990

Member, UMCP/NASA Relations Committee, 1991 to 1992

Member, UMCP Soviet/American Venture Initiative, 1990 to 1992