

Curriculum Vitae

Alan H. Strahler, Ph.D.

Office Address: Department of Earth and Environment, Boston University, 675 Commonwealth Avenue, Boston, MA 02215

Telecommunications : Office phone: (617) 353-5984; Office fax: (617) 353-8399; Home phone: (617) 262-3210; Home fax: (617) 948-0014; Mobile: (617) 791-8959; E-mail: alan@bu.edu

Areas of Specialization:

Laser scanning and imaging for measurement of forest canopy structure; Bidirectional reflectance of land surfaces; Global land cover and land cover change mapping; Spatial modeling and spatial statistics as applied to image understanding; Multivariate statistical methods in geography and remote sensing.

Education:

- 1964 The Johns Hopkins University: B. A.
- 1969 The Johns Hopkins University: Ph. D.
Dissertation Title: Forest Ecology of the Fairfax Line, Virginia and West Virginia
Dissertation Committee: H. M. Raup, M. G. Wolman, C. B. Hunt

Employment:

- 2005 Chairman *ad interim*, Fall term, Dept. of Geography and Environment
- 1998–2002 Chairman, Dept. of Geography, Boston University
- 1990–1991 Chairman *ad interim*, Dept. of Geography, Boston University.
- 1988–present Professor, Dept. of Geography and Environment; Researcher, Center for Remote Sensing, Boston University, Boston, MA
- 1982–1988 Professor and Chairman, Dept. of Geology and Geography, Hunter College, New York, NY
- 1980–1982 Associate Professor, Department of Geography, University of California at Santa Barbara
- 1974–1980 Assistant Professor, Department of Geography, University of California at Santa Barbara

- 1973–1974 Charles Bullard Forest Research Fellow and University of Virginia Sesquicentennial Associate, Department of Biology, Harvard University, Cambridge, Massachusetts
- 1969–1974 Assistant Professor, Dept. of Environmental Sciences, University of Virginia, Charlottesville, VA

Honors and Awards:

- 2011 William T. Pecora Award for outstanding contributions to understanding the Earth by means of remote sensing, Department of Interior, NASA.
- 2009 SAIC Estes Memorial Teaching Award, American Society of Photogrammetry and Remote Sensing, with stipend.
- 2003 Fellow, American Association for the Advancement of Science.
- 2003 NASA Group Achievement Award, Aqua Mission Team, 8/27/2003
- 2003 NASA Goddard Space Flight Center Group Achievement Award, Outstanding Teamwork EOS Aqua Mission Team, 5/16/2003
- 2003 NASA Certificate of Recognition, for the creative development of technically significant software accepted and approved by NASA, entitled "Surface Albedo, Bidirectional Reflectance, and Land Cover Type Derived from MODIS Data—Level 3 Landcover, Monthly."
- 2003 NASA Certificate of Recognition, for the creative development of technically significant software accepted and approved by NASA, entitled "Surface Albedo, Bidirectional Reflectance, and Land Cover Type Derived from MODIS Data—BRDF/Albedo 16-Day"
- 2000 Doctorat Honoris Causa, Université Catholique de Louvain, Belgium.
- 2000 Who's Who in the World, 17th Edition, 2000, and following editions
- 1999 National Research Council, Selection as member of the Task Group on the Review of the Scientific Aspects of the NASA Triana Mission
- 1995 Third Annual Gregory Lecturer, University of Southampton, Highfield, Southampton, England.
- 1994 Chinese Academy of Science, First Class Science Prize, for work on geometric-optical canopy reflectance modeling.
- 1993 Anastasia Van Burkalow Award for Distinguished Service, Department of Geology and Geography, Hunter College, City University of New York.

- 1993 Appointment to Chinese Academy of Science as Honorary Professor, Institute for Remote Sensing Application.
- 1993 Medal, Outstanding Contributions to Remote Sensing, Association of American Geographers/Remote Sensing Science Group.
- 1988 Ford Bartlett Award, American Society of Photogrammetry and Remote Sensing.
- 1987 Appointment as National Program Visiting Scientist, Visiting Scholar Exchange Program, Committee on Scholarly Communication with the People's Republic of China, National Academy of Sciences. Travel and subsistence for September, 1987, work on a joint project involving remote sensing of the forest shelter belt in northern and northwestern China.
- 1976 Appointment as Regent's Faculty Fellow, University of California. Summer stipend coordinated with sabbatical research leave proposed as "The Use of Conditional Probabilities in Vegetation Research."
- 1973–1974 Appointment as Charles Bullard Forest Research Fellow, Dept. of Biology, Harvard University, Cambridge, MA. A competitive award paying regular salary to support a year of independent research and study at Harvard.
- 1973–1974 Appointment as Sesquicentennial Research Associate, Center for Advanced Studies, University of Virginia. Matching support for Bullard Fellowship.

Professional Service:

- 2005–2008 Finance Chair, International Geoscience and Remote Sensing Symposium, Boston Meeting, July, 2008.
- 2000–2010 Member, Science Team, Deep Space Climate Observatory Satellite (Triana), NASA.
- 2000–2005 Member, Committee on Earth Observation Satellites Working Group on Calibration and Validation Land Cover Panel
- 1999–2000 Member, Program Committee, Eighth International Symposium on Physical Measurement and Signatures in Remote Sensing, Aussois, France, 8–12 January, 2000.
- 1999–2000 Associate Editor, *Journal of Geophysical Research*.
- 1998–1999 Member, Program Committee, ALPS'99, Ocean Color, Land Surfaces, Radiation and clouds, Aerosols: The Contribution of POLDER and New Generations of Spaceborne Sensors for Global Change Studies, Meribél, France, 18–22 January 1999.
- 1998–1999 Member, Program Committee, Second International Workshop on Multiangular Measurements and Models, Ispra, Italy, 15–17 September, 1999.

- 1998–2004 Member, Science Advisory Panel, EROS Data Center Distributed Active Archive Center.
- 1997–1999 Member, Land Cover Working Group, International Geosphere-Biosphere Data and Information System (IGBP-DIS).
- 1996–2000 Member, Steering Committee, International Satellite Land Surface Climatology Project (ISLSCP).
- 1995–1999 Member, Land Cover Validation Working Group, International Geosphere-Biosphere Data and Information System (IGBP-DIS).
- 1991–1996 Associate Editor, *IEEE Transactions on Geoscience and Remote Sensing*.
- 1991 Associate Guest Editor, Special Issue on Remote Sensing Science of *IEEE Transactions on Geoscience and Remote Sensing*, (February, 1992).
- 1989–2004 Member, Science Team, Moderate Resolution Imaging Spectroradiometer (MODIS) Instrument.
- 1989 Member, Program Committee, IGARSS'90: International Geoscience and Remote Sensing Symposium, 1990, College Park, MD.
- 1988 Member, Proposal Review Panel, Earth Observing System Announcement of Opportunity, NASA Office of Space Science and Applications.
- 1987–1989 Member, Alaska SAR Facility Prelaunch Science Working Team, NASA/Caltech Jet Propulsion Laboratory.
- 1987 Member, Proposal Review Panel, Advanced Visible and Infrared Imaging Spectrometer Instrument Evaluation Program, NASA Office of Space Science and Applications.
- 1987 Member, Proposal Review Panel, Remote Sensing Applications Commercialization Program, NASA Office of Space Science and Applications.
- 1985–1987 Member, Physical Sciences & Engineering Panel, AAAS National Council for Science and Technology Education Project 2061.
- 1985–1986 Chair, Local Arrangements Committee, Association of American Geographers Middle States Division 1986 Annual Meeting at Hunter College, NY, NY.
- 1984–1988 Member, Advisory Board, Geological Sciences Section, New York Academy of Science.
- 1979–1980 Member, Working Group on Mathematical Pattern Recognition and Image Analysis, Fundamental Research Requirements Study, NASA Earth Resources Applications Branch.

Reviewer Services:

Manuscripts, *Journal of Geophysical Research*

Manuscripts, *IEEE Transactions on Geoscience and Remote Sensing*.

Manuscripts, *Photogrammetric Engineering and Remote Sensing*.

Manuscripts, *Remote Sensing Reviews*.

Manuscripts, *Remote Sensing of Environment*.

Manuscripts, *International Journal of Remote Sensing*.

Grant Applications, NASA Office of Space Science and Applications and Earth Science Enterprise.

Grant Applications, NSF Geography and Regional Science Program.

Consultant Service:

1979–1981 Consultant, HDR Sciences, Inc., Santa Barbara, CA. Activities involved quantitative analysis of biological and environmental data; Landsat processing and application for large area land cover inventory.

University Service: Boston University:

2007–2008 Associate Chair, Department of Geography and Environment

2007–2008 Member, Academic Promotion and Tenure Committee, College of Arts and Sciences

2004–2009 Director of Graduate Studies, Department of Geography and Environment

1998–2001 Chairman, Department of Geography

1991–1992 Director of Graduate Study and Advisor, Department of Geography.

1990–1991 Chairman *ad interim*, Department of Geography.

1989–1990 Director of Graduate Study and Advisor, Department of Geography.

1988 Associate Chairman, Department of Geography.

University Service: Hunter College:

1986–1988 Member, CCE Appeals Subcommittee, Faculty Personnel and Budget Committee

- 1985–1986 Member, Personnel Procedures Subcommittee, Faculty Personnel and Budget Committee
- 1985–1988 Member, Curriculum & Examination Committee, Earth & Environmental Science Doctoral Program, City University of New York Graduate Center
- 1983–1988 Member, Executive Committee, Earth & Environmental Science Doctoral Program, City University of New York Graduate Center
- 1982–1988 Chair, Department of Geology and Geography
- 1982–1988 Member, Faculty Personnel and Budget Committee
- 1982–1988 Member, Personnel and Budget Committee, Division of Sciences and Mathematics
- 1982–1988 Member, College Laboratory Technician Subcommittee, Faculty Personnel and Budget Committee
- 1982–1985 Member, Ancillary Units Subcommittee, Faculty Personnel and Budget Committee

University Service: U. C. Santa Barbara:

- 1979–1982 Member, Computer Rate Committee
- 1978–1980 Member, Coal Oil Point Reserve Advisory Committee
- 1975–77 Member, Valentine Eastern Sierra Reserve Advisory Committee
- 1975–1977 Appointment to Faculty of the Graduate School of Education

University Service: University of Virginia:

- 1970–1973 Member, University Committee on the Environment
- 1970 Program Chairman and Coordinator, Virginia Improved Environment Week, April 19–25, 1970. A week-long symposium on environmental problems arranged in response to Earth Day. A broad program involving local schools, the Charlottesville community, and the University.

Courses Taught:

Undergraduate Level:

Weather and Climate
Physical Landscapes

Remote Sensing of Environment
 Advanced Image Interpretation
 Physical Geography
 Environmental Pollution
 Human Species: Problems of Survival

Advanced and Graduate Level:

Principles of Remote Sensing
 Advanced Remote Sensing
 Field Measurements in Remote Sensing
 Digital Image Processing
 Physical Models in Remote Sensing
 Geographic Data Analysis I & II, w/ Laboratory
 Classification and Clustering
 Biogeography
 Foundations of Biogeography
 Quantitative Biogeography
 Natural Vegetation Classification, Inventory and Dynamics
 Remote Sensing of Vegetation
 Seminars

Theses and Dissertations Directed: (* indicates dissertation or thesis supervisor)

Doctoral:

Zhu, Zhe, 2013, *Continuous Change Detection and Classification of Land Cover Using All Available Landsat Data*. Boston University.

Rao, Preeti, 2013, *Carbon, nitrogen, and vegetation along an urbanization gradient: An integrated approach using field, remotely sensed and socioeconomic data*. Boston University.

*Yao, Tian, 2012, *Measuring Forest Structure and Biomass Using Echidna[®] Ground-Based Lidar*. Boston University.

Yang, Xiaoyuan, 2011, *Using a Ground-Based Lidar Instrument (Echidna[®]) to Reconstruct Three-Dimensional Forest Structure for Biophysical and Ecological Studies*. Boston University.

Zhao, Feng, 2010, *Measuring Leaf Area Index and Foliage Profile Using a Ground-Based Lidar Instrument (Echidna[®])*. Boston University.

Shuai, Yanmin, 2010, *Tracking Daily Land Surface Albedo and Reflectance Anisotropy with Moderate-Resolution Imaging Spectroradiometer (MODIS)*. Boston University.

Jiao, Ziti, 2009, *The Use of MODIS Reflectance Anisotropy to Recover Land Surface Properties*. Boston University.

- Roman-Colon, Miguel, 2009, *The MODIS BRDF/Albedo Product: Assessment of Pixel-Specific Accuracy through Synergistic use of In-Situ and Remotely Sensed Data*. Boston University.
- Zhang, Qingling, 2009, *A Global Spatially and Temporally Complete Reflectance Anisotropy Database to Improve Surface Characterization for Environmental Modeling*. Boston University.
- Ganguly, Sangram, 2008, *Earth System Data Records of Vegetation Leaf Area Index from Multiple Satellite-Borne Sensors*. Boston University.
- Huang, Dong, 2007, *Impact of Three-Dimensional Vegetation Structure on Canopy Radiation Regime*. Boston University.
- Liu, Jicheng, 2005, *The Effect of Forest Canopies and View Angles on Binary Mapping of Snow Cover*. Boston University.
- *Jin, Yufang, 2002, *Evaluation, Improvement, and Application of Surface BRDF and Albedo Retrievals from MODIS Observations*. Boston University.
- Levine, John B., 2002, *Delineation of Recharge, Discharge and Midline Zones through Numerical Modeling and Satellite Radiometry*. Boston University.
- McIver, Douglas, 2002, *Adapting Machine Learning Methods for Coarse Resolution Land Cover Classification*. Boston University.
- Shabanov, Nikolay V., 2002, *Application of Stochastic Radiative Transfer to Remote Sensing of Vegetation*. Boston University.
- Song, Conghe, 2001, *Monitoring Succession in Temperate Conifer Forests with Remote Sensing: Implications for Terrestrial Carbon Budgets*. Boston University.
- Zhang, Yu, 2001, *LAI and FPAR Estimation and Land Cover Identification with Multiangle Satellite Data*. Boston University.
- *Muchoney, Douglas, 2000, *Landscape Classification and Parameterization Based on Multiscale Remote Sensing and Site Data*. Boston University.
- *Borak, Jordan, 2000, *Identification of Land-Cover Change and Interannual Climate Variability in Africa from Satellite Imagery*. Boston University.
- Seto, Karen Ching Yi, 2000, *Monitoring and Modeling Land-Use Change in the Pearl River Delta, China, Using Satellite Imagery*. Boston University.
- *Strugnell, Nicholas, 2000, *Retrieval of Land Surface Albedos from Satellite Measurements*. Boston University.
- Collins, John B., 1998, *Geostatistical Methods for Analysis of Multiple Scales of Variation in Spatial Data*. Boston University.

- *Hu, Baoxin, 1998, *The Retrieval of Surface Reflectance Parameters from the Coupled Atmosphere-Land Surface System: Advanced Methods*. Boston University.
- Ni, Wenge, 1998, *Development and Application of Models of the Radiation Regime within Conifer Forests*. Boston University.
- *d'Entremont, Robert Paul, 1997, *Meteorological Applications of Surface Bidirectional Reflectance Distribution Functions Retrieved from Satellite Data*. Boston University.
- *Felde, Gerald W., 1997, *The Effect of Soil Moisture and Vegetation on the 37 GHZ Microwave Polarization Difference Index and on 91 and 150 GHZ Earth Surface Emissivities*. Boston University.
- Abuelgasim, Abdelgadir A. M., 1996. *The Applications of Neural Network in Mapping, Modeling and Change Detection Using Remotely Sensed Data*. Boston University.
- Lenny, Mary Pax, 1996, *Monitoring Agricultural Lands in Egypt with Multitemporal Vegetation Indices Derived from Satellite Imagery*. Boston University.
- *Moody, Aaron, 1995, *Land-Cover Mapping at Coarse Scales from Satellite Remote Sensing: Issues Regarding Errors and the Spatial Properties of Landscapes*. Boston University.
- *Schaaf, Crystal Lynn Barker, 1994, *Modeling the Direct-Beam Instantaneous Spectral Surface Albedo of a Forested Landscape Using Geometric-Optics and a Distributed Parameter Approach*. Boston University.
- *Wu, Yecheng, 1993, *Research and Applications of a Canopy Reflectance Model*. Boston University.
- *Liang, Shunlin, 1993, *Radiative Transfer Modeling of the Coupled Atmosphere and Plant Canopy and BRDF Retrieval*. Boston University.
- Marceau, Danielle Jeanne, 1992, *The Problem of Scale and Spatial Aggregation in Remote Sensing: An Empirical Investigation Using Forestry Data*. University of Waterloo. (External Examiner.).
- Sun, Guaqing, 1990, *Radar Backscatter Modeling of Coniferous Forest Canopies*. University of California, Santa Barbara.
- Harper, Barry M., 1988, *Radiative Transfer in Australian Sub-Tropical Rainforest Stands*. University of Wollongong. (External Reader.).
- Ahmad, Waqar, 1988, *A Forest Inventory using Landsat MSS Data in Northeast Tasmania, Australia*. University of Tasmania. (External Reader.)
- *Franklin, Janet, 1988, *Canopy Reflectance Modeling in a Tropical Savanna*. University of California, Santa Barbara.
- *Li, Xiaowen, 1985, *Geometric-Optical Modeling of a Coniferous Forest Canopy*. University of California, Santa Barbara.

*Woodcock, Curtis E., 1985, *Understanding Spatial Variation in Remotely Sensed Images*. University of California, Santa Barbara.

Yool, Stephen R., 1985, *Landsat Channel Transforms for Classification of Natural Vegetation*. University of California, Santa Barbara.

*Logan, Thomas L., 1983, *Regional Biomass Estimation of a Coniferous Forest Environment from NOAA-AVHRR Satellite Imagery*. University of California, Santa Barbara.

Orwig, Deborah A., 1978, *Ecological Study of the Phytoplankton and Microzooplankton of Two Inshore Areas in the Santa Barbara Channel*. University of California, Santa Barbara.

Masters:

*Salomon, Jonathan G., 2006, *Validation of the MODIS Bidirectional Reflectance Distribution Function and Albedo Retrievals using Combined Observations from the Aqua and Terra Platforms*. Boston University.

Kelly, Melissa Jan, 2000, *Image Interpretation Keys of Validation of Global Land Cover Data Sets*. University of California, Santa Barbara.

*Chi, Huaying, 1999, *NDVI Phenology Metrics and their Use in Regional Land Cover Classification*. Boston University.

Shabanov, Nikolay V., 1999, *Stochastic Modeling of Radiation Regime in Discontinuous Vegetation Canopies*. Boston University.

*Hyman, Andrew H., 1998, *Characterizing the Spatial Variability of Albedo in a Semidesert Landscape for the Validation of Satellite Data*. Boston University.

*Robb, Robert Radburn, 1997, *Estimation of Bidirectional Reflectance Distribution Functions for New England Forests with Snow from Satellite Remote Sensing Data*. Boston University.

*Borak, Jordan S., 1996, *Feature Selection and Land Cover Classification of a MODIS-like Data Set for a Semiarid Environment*. Boston University.

Cashman, Pamela Ann, 1994, *Quantification of Spatial Structure in Simulated MODIS 250-m Imagery*. Boston University.

Ryherd, Soren, 1991, *The Use of Texture in the Segmentation of Remotely Sensed Images*. Boston University.

Jakabhazy, Vida, 1991, *Stand Structure of Old Growth Forest Stands in the Central Sierra Nevada*. Boston University.

Chen, Ruiming, 1991, *Nonlinear Estimation of Scene Parameters from Digital Images*. Boston University.

- Mertz, Frederick C., 1984, *A Primer to Spatial Data Processing Using the VICAR/IBIS Software Package*. University of California, Santa Barbara.
- Eckhardt, David W., 1983, *Modeling the Effect of Incoming Solar Radiation Vegetative Fuel Loading in Chamise Chapparal*. University of California, Santa Barbara.
- Franklin, Janet, 1983, *Empirical Study of the Spatial Pattern of Coniferous Trees*. University of California, Santa Barbara.
- *Spanner, Michael A., 1982, *Soil Loss Prediction in a Geographic Information System Format*. University of California, Santa Barbara.
- *Lehman, Paul E., 1982, *The Status and Distribution of the Birds of Santa Barbara County, California*. University of California, Santa Barbara.
- Bertke, Susan G., 1982, *Fundamental Concepts of Remote Sensing*. University of California, Santa Barbara.
- *Moran, Mary S., 1982, *Modeling Timber Suitability Class and Site Index Through the Use of Digital Terrain Tapes and Soil Maps*. University of California, Santa Barbara.
- Johnson, Leland F., 1982, *Atmospheric Effects on Satellite Augmentation in the USDA June Enumerative Survey: A Radar/Landsat Comparison*. University of California, Santa Barbara.
- Li, Shusun, 1982, *A Model for the Anisotropic Reflectance of Pure Snow*. University of California, Santa Barbara.
- *Atwater, Susan G., 1981, *Monitoring Seasonal Change in Chapparal Moisture Content Using Landsat Digital Data*. University of California, Santa Barbara.
- *Blakley, James A., 1981, *A Quantitative Analysis of the Association Between Plant Species in the Shortgrass Prairie of Central Colorado*. University of California, Santa Barbara.
- Li, Xiaowen, 1981, *Invertible Coniferous Forest Canopy Reflectance Model*. University of California, Santa Barbara.
- *Maynard, Paul F., 1981, *The Logit Classifier: A General Maximum Likelihood Discriminant for Remote Sensing Applications*. University of California, Santa Barbara.
- Marks, Barbara, 1981, *A Method for Estimating Canopy Density Over Large Areas*. University of California, Santa Barbara.
- Zhan Cixiang, 1981, *A Spatial-Spectral Classification Approach for Cropland*. University of California, Santa Barbara.
- Wan Zhengming, 1981, *A Method for Digital Snow Mapping at Subpixel Resolution from NOAA Thermal Satellite Data*. University of California, Santa Barbara.
- Torburn, Tara L., 1980, *Identification of Cotton Fields from Landsat Imagery the Southern San Joaquin Valley, California*. University of California, Santa Barbara.

- *Baggett, Jay D., 1979, *Assessing Groundwater Contamination at Rocky Mountain Arsenal Through Quantitative Studies of Plant Succession*. University of California, Santa Barbara.
- *Logan, Thomas L., 1978, *Western Species Forest Classification from Multidate Landsat and Terrain Data*.
- Marks, Danny G., 1978, *A Longwave Radiation Model for Application in a Remote Alpine Area*. University of California, Santa Barbara.
- Stow, Douglas A., 1978, *Analysis of Landsat and Digital Terrain Tape Data in a Geobase Information Systems Context: Ventura County Study Area*. University of California, Santa Barbara.

Masters Degrees by Examination:

- *Chen, Liangzan, 2000, Boston University.
- Sui, Hongzhi, 2000, Boston University.
- *Liu, Yi, 1999, Boston University.
- *Fan, Shaohua, 1998. Boston University.
- *Hodges, John C. F., 1998, Boston University.
- Morrow, Nathan, 1998, Boston University.
- Abu-Elgasim, Abdel-Gadir, 1992, Boston University.
- *Cullis, Brian J., 1981, University of California, Santa Barbara.
- *Van Cleve, David, 1981, University of California, Santa Barbara.
- *Taube, Donald, 1981, University of California, Santa Barbara.
- *Tardino, Anthony, 1987, Hunter College, City University of New York.
- *Reed, David B., 1987, Hunter College, City University of New York.
- *Walker, Susan S., 1988, Hunter College, City University of New York.

Sponsored Research:

Award Synopsis:

As Principal Investigator: 29 awards, \$9,963,158 in funding received/authorized.

As Co-investigator: 14 awards, \$3,475,113, in funding received/authorized.

Proposals Pending:

No proposals pending

Extramurally-Funded Proposals:

- "DWEL Manufacture Agreement," Commonwealth Scientific and Industrial Research Organization of Australia, Alan H. Strahler, Principal Investigator, 7/1/12-12/31/13, \$250,000.
- "MODIS Albedo, Nadir Reflectance, and Reflectance Anisotropy for Environmental Modeling and Monitoring," NASA, C. Schaaf, C.L.B. Schaaf, Principal Investigator, A. H. Strahler, Co-Investigator; \$590,606; 1/1/2011–12/31/2013.
- "Albedo and Bidirectional Reflectance Climate Data Records from NPP/VIIRS," NASA, C. L.B. Schaaf, Principal Investigator, A. H. Strahler, Co-Investigator; \$555,615; 3/1/2011–2/28/2014.
- "MRI: Development of a Dual-Wavelength, Ground-Based, Echidna® Lidar (DWEL) for Structural Characterization and Virtual Reconstruction of Forest Canopies," NSF, Alan H. Strahler, Principal Investigator; S. Chakrabarti, T. Cook, C. Woodcock, C. Schaaf, Co-Investigators; D. L. B. Jupp, D. Culvenor, P. Jung, Senior Personnel; \$1,662,384 (includes \$498,716 in BU cost sharing), 10/15/09–8/31/14.
- "Global Land Surface Albedo and Anisotropy Product from MODIS and VIIRS for Climate and Vegetation Studies," NASA, C.L.B. Schaaf, Principal Investigator, A. Strahler, Co-Investigator, \$956,000, 10/1/07–9/30/10.
- "Assessment and Enhancement of Albedo Derived from the MODIS BRDF/Albedo Product at the ARM SGP," DOE, C.L.B. Schaaf, Principal Investigator, A. Strahler, Co-Investigator, \$188,732, 1/15/06–1/14/09.
- "Retrieval of Vegetation Structure and Carbon Balance Parameters Using Ground-Based Lidar and Scaling to Airborne and Spaceborne Lidar Sensors," NASA, Alan H. Strahler, Principal Investigator, C. Woodcock, C. Schaaf, X. Li, Co-Investigators, \$374,255, 6/1/06–5/31/09.
- "A Daily BRDF/Albedo Algorithm for MODIS Direct Broadcast Sites," NASA, Crystal B. Schaaf, Principal Investigator, A. Strahler and F. Gao, Co-Investigators, \$482,894, 8/15/04–8/14/07.
- "Using EOS to Characterize the Impacts of Land Use Change on Surface Hydrological Processes in Climate Models," NASA, Robert E. Dickinson, Georgia Tech, Principal Investigator, C.L.B. Schaaf, Boston University, Co-Principal Investigator, with A. Strahler, M. Friedl, R. Myneni, N. Shabanov, E. Tsvetsinskaya and Y. Knyazikhin, \$300,000, 8/04 -2/08.

- “Algorithm Refinement for the MODIS Bidirectional Reflectance/Albedo Product,” NASA, Crystal B. Schaaf, Principal Investigator, A. Strahler and F. Gao, Co-Investigators, \$698,049, 3/31/04–3/30/07.
- “Global Land Cover and Land Cover Dynamics from MODIS: Algorithm Refinement in Support of Global Change Research,” NASA, M. Friedl, Principal Investigator, A. Strahler, Co-Investigator, \$672,237, 3/31/04–3/30/07.
- "Assessment of Aerosol, and Albedo and Surface Type Environmental Data Records (EDRs) from VIIRS," NASA, Office of Earth Science, Crystal B. Schaaf, Principal Investigator, A. Strahler, M. Friedl, and F. Gao, Co-Investigators, \$470,996, 9/1/03–8/31/06.
- “US Australia Cooperative Research: Theory and Application of a Discrete Object Approach to Scattering of Light by Vegetation Canopies,” National Science Foundation, Alan H. Strahler, Principal Investigator, C. Woodcock and X. Li, Co-Investigators, \$34,480, 1/22/03–12/31/06.
- “Surface Products for EPIC on the Triana Satellite Platform,” University of California San Diego, NASA subcontract, Alan H. Strahler, Principal Investigator, \$434,000, 6/1/00–5/31/06.
- “Geometric-Optical Modeling of Directional Thermal Radiance for Improvement of Land Surface Temperature Retrievals from MODIS, ASTER, and LANDSAT-7 Instruments,” NASA, Office of Earth Science, X. Li, Principal Investigator, M. Friedl and A. H. Strahler, Co-Investigators, \$300,236, 5/1/98–4/30/01.
- "Center for Excellence in Remote Sensing at Boston University," NASA, Office of Earth Science, C. E. Woodcock, Principal Investigator, F. El-Baz, C. Cleveland, M. Friedl, S. Gopal, R. Kaufmann, J. Key, D. Dye, R. Myneni, G. Salvucci, A. Strahler, Co-Investigators. \$380,000, 10/1/97–9/30/98 (equipment grant).
- “Algorithm Development for NPOESS,” Atmospheric and Environmental Research, Inc., C. L. B. Schaaf, Principal Investigator, M. Friedl, J. Key, A. H. Strahler, and C. E. Woodcock, Co-Investigators, \$768,403, 8/21/97–1/31/00.
- “Land Cover/Land-Cover Change, Albedo, BRDF/Directional Reflectance and Spatial Structure Products from MODIS-N and MODIS-T,” NASA Office of Space Science and Applications, Earth Observing System Announcement of Opportunity, MODIS Team Member Investigation, Execution Phase. A. H. Strahler, Principal Investigator. \$9,464,991, 1/1/92–12/31/01. Received \$6,774,807, 1/1/92–12/14/03.
- “Modeling and Measuring the Bidirectional Reflectance of Forest and Crop Canopies Using Boolean Models and Geometric Optics,” NSF U. S.-China Cooperative Science Program and Geography and Regional Science Program, A. H. Strahler, Principal Investigator. \$96,907, 12/15/90–5/31/93.
- “Geometric-Optical Discrete-Element Scene Modeling II,” NASA Earth Science and Applications Division, Land Processes Branch, Remote Sensing Science Program. A. H. Strahler, Principal Investigator, \$358,577, 4/1/90–12/31/92.
- “Mapping Spectral Directional Radiance, Spectral Directional Surface Radiance, and Spectral Bidirectional Reflectance Distribution Functions for Land Surface Covers Using

- MODIS-T,” NASA Office of Space Science and Applications, Earth Observing System Announcement of Opportunity, MODIS Team Member Investigation, Definition Phase. A. H. Strahler, Principal Investigator. \$111,053, 3/29/90–12/14/91.
- “Undergraduate Laboratory for Remote Sensing, Digital Image Processing, Automated Cartography and Geographic Information Systems,” NSF College Science Instrumentation Program. A. H. Strahler, Principal Investigator, L. E. Band and K. C. Clarke, Co-Investigators. \$101,320 (equipment grant).
- “Geometric-Optical Discrete-Element Scene Modeling,” NASA Office of Space Science and Applications. A. H. Strahler, Principal Investigator. \$446,399, 3/1/86–8/31/89.
- “Center of Expertise in Spatial Modeling and its Application to Remote Sensing,” NASA University Applications Program. A. H. Strahler, Principal Investigator, V. B. Robinson, K. C. Clarke, and L. E. Band, Co-Investigators. \$69,999, 3/1/85–2/29/86.
- “The Extension of an Invertible Coniferous Forest Canopy Reflectance Model Using SIR-B and Landsat Data,” NASA Office of Space Science and Applications, awarded to University of California, Santa Barbara. D. S. Simonett, Principal Investigator, A. H. Strahler, Co-investigator and Subcontractor. \$70,000 to UCSB (Hunter College Subcontract \$5,100), 7/1/84–12/31/86.
- “Algorithm Development for Efficient Interrogation of a Distributed Land Data Pilot Information System,” NASA-Ames University Consortium Joint Research Interchange. A. H. Strahler, V. B. Robinson, K. C. Clarke, and L. E. Band, Collaborators. \$14,985, 1/1/84–4/30/85.
- “Preliminary Evaluation of Airborne Infrared Spectrometer for Vegetation Analysis, Phases I and II,” NASA-Jet Propulsion Laboratory, California Institute of Technology. A. H. Strahler, Principal Investigator, C. E. Woodcock, Co-Investigator. \$19,155, 7/14/83–5/31/85.
- “Research Support for Global Vegetation Inventory and Monitoring,” Subcontract to NASA Grant to University of California, Santa Barbara. A. H. Strahler, Principal Investigator. \$17,819, 2/1/83–7/31/83.
- “Synthesizing Digital Terrain Data from SPOT Imagery,” U. S. Army Cold Regions Research and Engineering Laboratory. A. H. Strahler, Principal Investigator, K. C. Clarke, Co-Investigator. \$15,454, 1/23/83–7/22/83.
- “Reflectance Modeling, Fundamental Research Program,” NASA Office of Space Science and Applications. A. H. Strahler, Principal Investigator. \$199,829, 9/1/82–9/30/85.
- “Improving Spatial Modeling in Remote Sensing,” Fundamental Research Program, NASA Office of Space Science and Applications. A. H. Strahler, Principal Investigator. \$163,654, 7/16/82–9/30/85.
- “A Survey of Geographic Information System Characteristics,” NASA-Ames University Consortium Joint Research Interchange.” A. H. Strahler, K. C. Clarke, Collaborators. \$30,000 8/1/82–9/30/83.

- “Multilayer Database Segmentation,” NASA-Jet Propulsion Laboratory. A. H. Strahler, C. E. Woodcock, Principal Investigators. \$15,000, 9/23/82–9/22/83.
- “Modeling Techniques for Forest Management Applications,” NASA-Ames Research Center. A. H. Strahler, Principal Investigator. \$25,390, 9/15/81–6/15/82.
- “Eldorado National Forest Stratification and Inventory,” U. S. Forest Service, Region 5. A. H. Strahler and C. E. Woodcock, Co-Principal Investigators. \$103,937, 7/1/81–9/30/82.
- “Use of the Logit Classifier to Improve Digital Image Classification Accuracy,” California Space Institute. A. H. Strahler, Principal Investigator. \$10,000, 7/1/81–6/30/82.
- “VICAR/IBIS Installation,” NASA Johnson Space Center. A. H. Strahler, Principal Investigator. \$30,000, 6/15/81–9/30/81.
- “Land Resources Modeling Study,” NASA Jet Propulsion Laboratory. A. H. Strahler, Principal Investigator. \$25,000, 2/12/81–12/9/81.
- “Image Segmentation for Forest Stand Delineation,” NASA Graduate Researchers Program (stipend and travel grant for C. E. Woodcock), NASA Headquarters. A. H. Strahler, Principal Investigator. \$31,000, 9/1/80–8/31/83.
- “An Invertible Coniferous Forest Reflectance Model,” California Space Institute. A. H. Strahler, Principal Investigator. \$5,000, 7/1/80–6/30/81.
- “Land-Use Planning Technologies Assessment Report,” U. S. Congress Office of Technology Assessment. A. H. Strahler, Principal Investigator. \$3,300, 7/1/80–9/30/80.
- “U. S. Forest Service Vegetative Fuels Research Proposal,” U. S. Forest Service, Region 5. J. E. Estes, Principal Investigator, A. H. Strahler and M. J. Cosentino, Co-Principal Investigators. \$11,865, 5/1/80–7/31/80.
- “Labeling Manually Delineated Timber Stands Using a Landsat-Based Stratification,” U. S. Forest Service, Region 5. A. H. Strahler, Principal Investigator. \$25,771, 5/1/80–6/30/80.
- “Use of Collateral Information to Improve Classification Accuracies from Landsat,” NASA Applications Program, Earth Resources Discipline. A. H. Strahler and J. E. Estes, Co-Investigators. \$93,500, 5/1/79–3/31/81.
- “Timber Classification and Mapping Using Landsat Imagery,” U. S. Forest Service, Region 5. A. H. Strahler, Principal Investigator. \$25,733, 2/1/80–9/30/80.
- “Vegetation Map and Analysis of Vegetation Change at Rocky Mountain Arsenal,” U. S. Department of Defense, Rocky Mountain Arsenal, Commerce City, CO. A. H. Strahler, Principal Investigator. \$9,991, 7/12/79–11/30/79.
- “Incorporating Terrain and Textural Information into Unsupervised Landsat Classification Algorithms,” California Institute of Technology-NASA President’s Fund. A. H. Strahler, Principal Investigator. Joint award, UCSB and JPL. UCSB: \$11,492; JPL: \$8,508; 4/21/79–4/11/80.

- “Preparation of Forest Stratum Map,” U. S. Forest Service-University of California Joint Agreement 32. A. H. Strahler, Principal Investigator. \$13,460, 4/1/79–9/30/79.
- “Quantitative Analysis of Contaminant Concentration Data,” U. S. Department of Defense, Rocky Mountain Arsenal, Commerce City, CO. A. H. Strahler, Principal Investigator. \$6,650, 2/1/79–5/31/79.
- “Identification of Contaminant-Stressed Vegetation Through Interpretation of Color Infrared Aerial Photography,” U. S. Department of Defense, Rocky Mountain Arsenal, Commerce City, CO. A. H. Strahler, Principal Investigator. \$9,960, 7/15/78–10/15/78.
- “Forest Classification and Inventory System Using Landsat, Digital Terrain, and Ground Sample Data,” NASA Applications Program, Earth Resources Discipline. A. H. Strahler, Principal Investigator, D. S. Simonett, Co-Investigator. Joint award, UCSB and JPL. UCSB, \$125,708; JPL, \$39,040; 4/1/78–3/31/81.
- “Vegetation Map of Maryland,” Power Plant Siting Program of Maryland Department of Natural Resources, grant to Department of Geography and Environmental Engineering, The Johns Hopkins University, Baltimore, MD. A. H. Strahler, G. Brush, Co-Investigators. \$70,000, 7/1/72–6/30/73.

Intramurally-Funded Proposals:

- “Field Data Collection to Support Invertible Coniferous Canopy Modeling,” UCSB Academic Senate General Research Committee. \$1,000, 10/15/81–6/30/82.
- “Coniferous Forest Composition Related to Environmental Factors of Site,” UCSB Academic Senate General Research Committee. \$5,108, 7/1/75–6/30/77.
- “Composition of Forest Vegetation in the Maryland Fall Line Region and its Relation to Factors of Site,” UCSB Academic Senate General Research Committee. \$1,200, 7/1/74–6/30/75.
- “Multivariate Data Analysis of Maryland Forest Communities,” Charles Bullard Forest Research Funds, Harvard University, \$2,200, 7/1/73–6/30/74.

Publications:

In Press:

Journals, Refereed Symposium Papers, and Book Chapters (259 items):

- Tang, H., Brolly, M., Zhao, F., Strahler, A., Schaaf, C., Ganguly, S., Zhang, G., Dubayah, R., 2014, Deriving and validating Leaf Area Index (LAI) at multiple scales through lidar remote sensing: A case study in Sierra National Forest, CA, *Remote Sensing of Environment*, vol. 143, pp. 131-141.
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- Howe, G., Johansen, K., Li, Z., Muir, J., Paynter, I., Phinn, S., Saenz, E., Schaefer, M., and Walker, L., 2013 (**abstract**), Terrestrial laser scanning international interest group (TLSIIG): Brisbane instrument intercomparison, *Proceedings Silvilaser 2013, 13th International Conference of LiDAR Applications for Assessing Forest Ecosystems*, Beijing, China, 9-11 October, 2013, p. 72-73.
- Li, Z., Douglas, E., Strahler, A., Schaaf, C., Yang, X., Wang, Z., Yao, T., Zhao, F., Saenz, E., Paynter, I., Woodcock, C., Chakrabarti, S., Cook, T., Martel, J., Jupp, D., Culvenor, D., Newnham, G., Lovell, J., 2013, Separating leaves from trunks and branches with dual-wavelength terrestrial lidar scanning, *Proceedings International Geoscience and Remote Sensing Symposium 2013*, Melbourne, Australia, July 21 – 26, 2013, pp. 3383-3386.
- Schaaf, C., Strahler, A., van Aardt, J., Chakrabarti, S., Li, Z., Wang, Z., Yang, X., Saenz, E., Paynter, I., Erb, A., Yang, Y., Liu, Y., Rouhani, S., Peri, F., Kim, J., Cawse-Nicholson, K., Romanczyk, P., Kelbe, D., Faulring, J., Nicholson, T., Douglas, E., Martel, J., Howe, G., Hewawasam, K., Cook, T., Culvenor, D., Newnham, G., Jupp, D., Lovell, J., Krause, K., Leisso, N., Kampe, T., and Meier, C., 2013 (**abstract**), Terrestrial LiDAR measures of forest structure, *Proceedings Silvilaser 2013, 13th International Conference of LiDAR Applications for Assessing Forest Ecosystems*, Beijing, China, 9-11 October, 2013, p. 24.
- Shuai, Y., Schaaf, C., Zhang, X., Strahler, A., Roy, D., Morisette, J., Wang, Z., Nightingale, J., Nickeson, J., Richardson, A., Xie, D., Wang, J., Li, X., Strabala, K, and Davies, E., 2013, Daily MODIS 500 m reflectance anisotropy direct broadcast (DB) products for monitoring vegetation phenology dynamics, *International Journal of Remote Sensing*, vol. 34, no. 16, pp. 5997-6016.
- Tang, H., Dubayah, R., Zhao, F., Strahler, A. and Schaaf, C., 2013, Deriving and validating leaf area index (LAI) using multiple LiDAR systems (**abstract**), *Proceedings Silvilaser 2013, 13th International Conference of LiDAR Applications for Assessing Forest Ecosystems*, Beijing, China, 9-11 October, 2013, p. 46.
- Wang, Z., Schaaf, C., Yang, X., Kim, J., Morisette, J., Zhang, X., Shuai, Y., Meier, C., Strahler, A., Yang, Y., Sun, Q., and Liu, Y., 2013 (**abstract**), Monitoring phenology over NEON terrestrial core sites with the daily MODIS BRDF/ALBEDO product, *International Geoscience and Remote Sensing Symposium 2013*, Melbourne, Australia, July 21 – 26, 2013, p. xx.
- Yang, X., Schaaf, C., Strahler, A., Li, Z., Wang, Z., Yao, T., Zhao, F., Saenz, E., Paynter, I., Douglas, E., Chakrabarti, S., Cook, T., Martel, J., Howe, G., Woodcock, C., Jupp, D., Culvenor, D., Newnham, G., and Lovell, J., 2013, Studying canopy structure through 3-D reconstruction of point clouds from full-waveform terrestrial lidar, *Proceedings International Geoscience and Remote Sensing Symposium 2013*, Melbourne, Australia, July 21 – 26, 2013, pp. 3375–3378.
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- Yang, X., Schaaf, C., Strahler, A., Kunz, T., Fuller, N., Betke, M., Wu, Z., Wang, Z., Theriault, D., Culvenor, D., Jupp, D., Newnham, G., Lovell, J., 2013, Study of bat flight behavior by combining thermal image analysis with a lidar forest reconstruction, *Canadian Journal of Remote Sensing*, vol. 39, no. S1, pp. S112-S125.
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