

William M Christie
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Work Experience:

USDA Forest Service, Southern Research Station
Eastern Forest Environmental Threat Assessment Center
200 WT Weaver Blvd
Asheville, NC 28804 United States

09/2010 - Present
Salary: \$78,943 USD Per Year
Hours per week: 40
Series: 0401 Pay Plan: GS Grade: 11 step 8
Biological Scientist (Remote Sensing / Geospatial Analyst)

HiForm – High resolution forest mapping: Developed a cloud-based forest disturbance mapping protocol using 10m Sentinel-2 with Google Earth Engine (EE). Research-oriented, event-based forest change mapping regarding forest health and disaster response. These high resolution forest disturbance products are shared with internal and external partners via ArcGIS Online and USDA FTP direct. Actively outreach and openly share this high resolution forest disturbance mapping workflow virtually and via onsite presentation.

ForWarn II - a National, moderate resolution forest disturbance web mapping application: Managing team member of a MODIS-based national forest health web mapping application. Responsible for contractor interactions, forest disturbance monitoring, mapping and communication. Routinely deliver *ForWarn* outreach webinars and on-site presentations to diverse audiences with varying skill levels. Product sharing via individual data requests and on ArcGIS Online.

Research Analysis and Support: Develop and vet research datasets produced in-house, produce publication quality presentation materials for internal and external collaborations, publications and conferences, apply geospatial analysis to address new forest threat situations to resolve novel or obscure problems, responsible to assess data quality, compatibility and dataset limitations for multi-disciplinary geospatial applications.

Recent Research Projects: forest disturbance mapping of severe weather events (ex: Hurricane Michael, H. Dorian, H. Florence, H. Irma, H. Maria, tornadic events) using the *HiForm* high resolution mapping workflow. Other interests include mapping of sudden aspen decline in the upper mid-west and western U.S., long term NDVI trend analysis of Forest Service Wilderness and Roadless Areas, post-wildfire monitoring and recovery mapping, Southern Pine Beetle / Ips disturbance.

Database Management: Data life-cycle management of greater than 5TB of geospatial image, vector and tabular datasets, annual maintenance and updating of representative data layers used in *ForWarn II*, storage of MODIS NDVI raster data, phenology-based derivatives and the Unit's original research datasets. Responsible for all data transfers by specific user request, custom output formatting and by AOI.

National Team Support: Geospatial Analyst Science Team member for Phase 1 of the National Wildfire Cohesive Strategy as GIS support responsible for spatial and tabular dataset acquisition, analysis and publication-quality map output. National-level data sourcing, storage and organization, pre- and post-processing, large-area geospatial analysis, output formatting and cartographic production.

Partner Collaborations: Maintain contactor relationships with application developers, interface with the Southern Group of State Foresters GIS Committee at the Southern Research Station Liaison and continue to foster partnership relationships (with other Forest Service Research Stations, Regional National Forests Districts and Forests, FIA, USFWS, NPS, NASA Develop, universities, State forestry agencies and NGO's.

- **Additional support information:** <https://new.cloudvault.usda.gov/index.php/s/PBM9sRHWN3PsJBo>

Immediate Supervisor: William (Bill) Hargrove, Research Ecologist (828-257-4846)

Okay to contact Supervisor: yes

Alabama Forestry Commission
513 Madison Avenue
Montgomery, AL 36367 United States

11/2007 - 08/2010

Salary: 46,500.00 USD Per Year

Hours per week: 45

GIS Analyst

Fielded web-based mapping application for: forest stewardship, prescribed burning permits, active wildfire status, invasive species. Performed all mapping requests for the Forestry Commission. State GIS lead and contributor to the Southern Forest Land Assessment, Southern Wildfire Risk Assessment, Annual State Forest Resource Reports and the Alabama Forest Resource Assessment and Strategy Project.

- Managed all GIS operations and completed projects by user request and upon own initiative
- Developed and maintained ArcSDE/SQL enterprise geodatabases for Fire, Protection and Forest mgmt.
- Implemented internet and intranet GIS applications using ArcGIS Server and JavaScript map services

Supervisor: Dan Jackson (retired), Director of Forest Protection (334-240-9300)

Okay to contact this Supervisor: yes

Tennessee Wildlife Resources Agency
Ellington Agricultural Center
Nashville, TN 37211 United States

06/2005 - 10/2007

Salary: 42,500.00 USD Per Year

Hours per week: 40

GIS / Remote Sensing Analyst

Contributor to Agency's website content by maintaining public-facing maps for download. Produced advanced visualization perspectives of marketing analyses, license sales, wetland designs and other geospatial modeling and analysis. Performed USGS GAP Analysis Pilot Project with multi-layer datasets to establish methods and provide a framework for the statewide application of GAP analysis project.

Supervisor: Jeanette Jones (615-781-6534)
Okay to contact this Supervisor: Yes
Reason for leaving TWRA: followed daughters move to AL

SAIC (U.S. Army Engineering and Support Center)
4820 University Square
Huntsville, AL 35816 United States

07/2004 - 06/2005
Salary: 62,500.00 USD Per Year
Hours per week: 40
GIS Analyst (Software Engineer)

SAIC (Scientific Applications International Corporation), SAIC Client: U.S. Army Engineering and Support Center, Huntsville, Alabama.

Technical GIS lead for the development of the Coalition Munitions Clearance (formally, the Captured Enemy Ammunition-CEA) intranet website regarding the reporting and spatial display of real time ordinance and explosives inventory from Iraq. COE Intranet web mapping application developed and fielded using ESRI's Internet Map Server (ArcIMS9), Spatial Database Engine (ArcSDE9) with Microsoft SQL Server RDBMS. Responsible for design, migration and implementation of metadata compliance (SDSFIE/FMSFIE) ArcSDE geodatabases. Performed custom mapping applications and delivered presentations to Executive civilian and military Corps personnel.

- Performed engineering and environmental GIS analysis and mapping for COE Plans and presentations as an active member of Huntsville Center's GIS Team
- Developed and produced the USACE Huntsville Centers Enterprise Geographic Information Systems (eGIS) Program Management Plan (2005)
- Designed, migrated and implemented large-area enterprise-level ArcSDE geodatabases for specific theatre-level operations
- Migrated COE CADD datasets and projects to ArcGIS desktop

Supervisor: Tommy Hunt (256-895-1612)
Okay to contact this Supervisor: Yes

K. S. Ware and Associates, L.L.C.
54 Lindsley Ave
Nashville, TN 37210 United States

08/2001 - 01/2004
Salary: 54,450.00 USD Per Year
Hours per week: 40
Senior GIS Analyst

Sole responsibility for GIS project development, management and analysis. Managed multiple environmental GIS projects concurrently and delivered accurate and timely information before project deadlines. Representative engineering-related GIS applications include:

- Volumetric determinations of river sediment deposition and removal from hydrographic surveys
- Digital elevation terrain modeling and 3D mapping of hazardous contaminants in the soil column

- Environmental site investigations, analysis, mapping and reporting
- Database quality control and testing using GIS and customized programming
- Societal, economic and demographic mapping and analysis using hybrid census data
- Composed and delivered market-oriented GIS presentations to public, private and military contractors
- Managed customized programming efforts using Avenue scripts, extensions and Visual Basic
- Actively developed client-contractor relationships, interacting with multiple public, private and NGO's

Supervisor: Greg Brubaker (615-742-7476)

Okay to contact this Supervisor: Yes

The Nature Conservancy, Tennessee Field Office
21st Ave., South
Nashville, TN 37215 United States

06/1997 - 08/2001

Salary: 42,000.00 USD Per Year

Hours per week: 38

GIS Scientist and Data Manager

Independently operated and developed TNC's Tennessee Field Office GIS lab. Data Manager for state-wide and regional rare species databases which exceeded 25,000 records. Other activities included:

- Implemented over 300 individual mapping applications and research projects locally and regionally. These projects related to the planning, management and conservation of sensitive ecological areas and their associated state-listed and federally rare, threatened or endangered (T&E) species.
- Constructed over 400 cartographic products in support of staff documentation and development activities, which included high quality large-format informative and scientific posters.
- Provided GIS support to statewide field office locations (ex: preparation of documentation and training materials, customized maps, reports, databases).
- Hydrologic modeling applied to a bog community that provided habitat for the Federally Endangered species (see pg2, <https://new.cloudvault.usda.gov/index.php/s/WQH ErbXqsAtCX2g>)
- designated Regional GIS POC for the Cumberland's and Ridge and Valley Ecoregional Planning process, a TNC directed ecological and socioeconomic GIS analysis of the regions resources to prioritize conservation action

Supervisor: Gabby Lynch (423-739-2537)

Okay to contact this Supervisor: Yes

Tennessee Natural Heritage Program
401 Church Street
Nashville, TN 37243 United States

07/1993 - 06/1997

Salary: 26,000.00 USD Per Year

Hours per week: 38

Heritage Program Data Manager / GIS Specialist

Responsibility for Natural Heritage Program database and GIS program activities. Implemented GIS-based environmental review, provided training and staff assists, Performed rare, threatened and endangered (RTE) field identifications, collection, inventory and mapping using sampling techniques and GPS technology.

Tennessee Wildlife Resources Agency (TWRA)
Ellington Agricultural Center
Nashville, TN 37203 United States

06/1991 - 06/1993

Salary: 20.00 USD Per Hour

Hours per week: 40

Remote Sensing Analyst, Contractor

Contracted to design, implement and assess the States' GAP Analysis Pilot Project. The project involved all aspects of remote sensing including, but not limited to: satellite image selection and acquisition, spectral signature collection and refinement, digital image processing, hybrid image classification, interpretation of statistical output measures, raster math, land use/land cover mapping, accuracy assessment, project management and administration leading to interim and final project report documents.

The Nature Conservancy
Southeast Regional Office
Chapel Hill, NC 27514 United States

01/1991 - 06/1991

Salary: 20.00 USD Per Hour

Hours per week: 40

Data Collection Contractor

Contracted to visit (18) National Parks and Historic Sites in the southeastern U.S. to collect and inventory biological information, including natural resource maps, biological surveys, published and non-published manuscripts. Responsible for documenting the site's collection in hardcopy format and the transfer of these data back to TNC. Required extensive travel, attention to detail, records documentation, reporting and communication. This effort resulted in the completion of the regions biological survey in the time allotted as required by the National Park Service (the only region in the U.S. to fulfil this requirement).

C. Christie's Clothiers
Green Hills Location
Nashville, TN 37205 United States

08/1989 - 01/1991

Salary: 25,000.00 USD Per Year

Hours per week: 40

Database Specialist

Temporarily assisted with family-owned retail business via database management and reporting.

**Florida Department of Transportation, Topographic Bureau
Apalachee Parkway
Tallahassee, FL 32310 United States**

02/1989 - 07/1989

Salary: 24,000.00 USD Per Year

Hours per week: 40

Remote Sensing Analyst

Digital classification of Landsat Thematic Mapper imagery for statewide vegetation mapping project included, classification QAQC (manual correction), image acquisition, image processing, interpretation, large data set mosaics, accuracy assessment and hard copy production.

**Tennessee Department of Conservation
Ecological Services Division
701 Broadway
Nashville, TN 37243 United States**

06/1986 - 02/1989

Salary: 17,876.00 USD Per Year

Hours per week: 38

Heritage Program Data Manager

Database management of rare, threatened and endangered (RTE) plant and animal species, implemented QAQC procedures, performed data transfers and reconciliation with federal partners (TVA, USFS, USFWS, USCOE), maintained statewide digital and hard copy map and specie collection files, maintained all computer hardware, OS and application software and peripherals, performed inter/intra-Departmental environmental reviews creating custom reports. Assisted staff with field work, sampling design and inventory, data processing and analysis, graphics and map production for manuscripts, reports and publications.

**Earth Science Information and Sales Office, U.S. Geological Survey
701 C Street, Box 53, Federal Building
Anchorage, AK 99513 United States**

08/1984 - 05/1986

Salary: 24,000.00 USD Per Year

Hours per week: 40

Earth Science Information Specialist

- Performed comprehensive searches for image and map products and performed natural resource related literature reviews.
- Lead the establishment of an archive of NOAA AVHRR imagery (first of its kind digital archive of Alaskan NOAA AVHRR satellite imagery). This was accomplished through the establishment of cooperative management agreements between NOAA/NWS, USGS/EROS Data Center Field Office and the USGS/Earth Science Information and Sales Office.

Education:

University of South Carolina, Columbia, SC

Master's Degree 05/1984

GPA: 3.0 of a maximum 4.0

Credits Earned: 37 Semester hours

Major: Geography

Specialized in GIS and Remote Sensing technology

Middle Tennessee State University, Murfreesboro, TN

Bachelor's Degree 12/1981

GPA: 2.67 of a maximum 4.0

Credits Earned: 86 Semester hours

Major: Geography Minor: Political Science

Specializing in Cultural Geography

Lake City Community College and Forest Ranger School, Lake City, FL

Associate's Degree 07/1979

GPA: 2.52 of a maximum 4.0

Credits Earned: 96 Semester hours

Major: Forest Technology

All aspects of Forestry related operations, silviculture, and mensuration.

Job Related Training Completed:

- 2019 GTAC-NASA Joint Workshop: Satellite Data to Support Natural Resource Management (USFS)
- 2019 Geospatial Analysis in R (NASA ORNL DAAC)
- 2018 Overview of Sentinel Satellites 1 and 2 (USFS)
- 2018 Land Change Monitoring, Assessment, and Projection - LCMAP (USGS EROS)
- 2018 ArcGIS Online, Intermediate (USFS)
- 2018 Change Detection for Land Cover Mapping (NASA ARSET)
- 2018 Remote Sensing Approaches to Broader-scale Vegetation Monitoring (USFS)
- 2018 ArcGIS Pro for ArcMap Users (USFS)
- 2018 Satellite Imagery and SPB Response Awareness (USFS)
- 2018 GTAC Lightning Talk - Image Analysis Window (USFS)
- 2018 Collector for ArcGIS in the Forest Service (USFS)
- 2017 Forest Fragmentation and Land Cover Patterns (USFS)
- 2017 Introduction to Remote Sensing for Scenario-Based Ecoforecasting (NASA ARSET)
- 2017 Introduction to Change Detection (webinar contributor x2, USFS)
- 2017 Landsat classification tools for long-term collaborative monitoring and management (USFS)
- 2017 Managing Forest Service SDE Geodatabases (USFS)
- 2016 Google Earth Engine: JavaScript and the Code Editor (x2, USFS)
- 2016 Turning Geospatial Big Data into Intelligence (Planet Labs)
- 2016 Planet Labs, Dove Satellite Imagery (Planet Labs)
- 2016 Digital Globe, Multi-Platform Satellite Imagery (Digital Globe)
- 2016 Google Earth Engine (USFS)
- 2016 ArcGIS Online, Introduction (USFS)

- 2015 NRM Awareness (USFS)
- 2015 Citrix Video User Guide for ArcGIS Training (USFS)
- 2015 Large LiDAR Acquisition Processing (USFS)
- 2015 Raster Geoprocessing (USFS)
- 2014 Grass 7 (Center for Geospatial Analytics, North Carolina State University, Raleigh, NC)
- 2014 Grass GIS Geoprocessing (Center for Geospatial Analytics, NCSU, Raleigh, NC)
- 2014 Change Detection (USFS)
- 2014 eCognition Image Processing (USFS)
- 2014 Band Combinations (USFS)
- 2014 A Quick Tour of the All-New TEUI Geospatial Toolkit 5.0 (USFS)
- 2014 TimeSync: Plot-level Interpretation of Landsat Time-series Stacks (USFS)
- 2013 BAER, RAVG and MTBS Wildfire Mapping (USFS)
- 2013 Change Detection (USFS)
- 2013 Python for Geoprocessing (USFS)
- 2013 ERDAS Imagine 2013 Tips and Tricks (USFS)
- 2012 Image Processing using RSAC's Landsat Tools (USFS)
- 2012 Geoprocessing (USFS)
- 2012 Change Detection (USFS)
- 2012 Change Analysis using ERDAS (USFS)
- 2011 BAER Wildfire methods (USFS)
- 2011 ERDAS Imagine 10 (USFS)
- 2011 Digital Image Processing in Imagine (USFS)
- 2010 Spatial Statistics (USFS)

Software Proficiency:

- ArcGIS Desktop 10.5.1 (Spatial Analyst, 3D Analyst)
- ArcGIS Online, Enterprise and single use
- ArcGIS Collector
- ERDAS IMAGINE 2016
- eCognition (introduction)
- Google Earth Engine Code Editor
- GRASS 7+
- QGIS 3+
- Microsoft Windows 10
- Linux - Fedora 30

Additional support documentation): <https://new.cloudvault.usda.gov/index.php/s/PBM9sRHWn3PsJBo>

Affiliations:

- Southern Group of State Foresters GIS Committee – Designated USDA Forest Service Southern Research Station Liaison (2012 - present)
- American Society of Photogrammetry and Remote Sensing - Membership Committee Chair, Alaska Region (1986)

Professional References:

- Steve Norman, Research Ecologist, USDA Forest Service, Southern Research Station, Eastern Forest Environmental Threat Assessment Center, (828) 259-0535, stevenorman@fs.fed.us
- Gabrielle Call, Director of Protection, Nature Conservancy, Shady Valley Program, (423) 739-2537, glynch@tnc.org
- Tommy Hunt, US Army Corps of Engineers, Engineering Directorate, Center GIS Manager (256) 895-1612, Tommy.J.Hunt@HND01.usace.army.mil

Publications (Authored)

2017. Christie, William M. Forest Effects from Hurricane Irma in South Florida. Direct request from State of Florida Forest Service, Tallahassee, FL. (Map document, <https://new.cloudvault.usda.gov/index.php/s/fQNgKBSz8a4Bs7F>).

2016. William M Christie, Steven P Norman, William W Hargrove, Joseph P Spruce (Self Represented). Distinguishing ephemeral from seasonally-persistent forest disturbances using NDVI time series. U.S. Department of Agriculture Forest Service, Southern Research Station. International Association of Landscape Ecologists Annual Meeting, Asheville, NC. (Poster, <https://forestthreats.org/products/posters/distinguishing-ephemeral-from-seasonally-persistent-forest-disturbances-using-ndvi-time-series>)

2011. Christie, William, Hargrove, William, Norman, Steve Norman. The Tornado Outbreak of April, 2011 recorded by the USDA Forest Service's Forest Change Assessment Viewer. Southern Man and the Biosphere (SAMAB), 21st Annual Conference, Eastern Forest Environmental Threat Assessment Center, USDA Forest Service, Southern Research Station, Asheville, NC. (Poster, <https://forestthreats.org/products/posters/the-tornado-outbreak-of-april-2011-recorded-by-the-usda-forest-services-forest-change-assessment-viewer>)

2011. Christie, William, Hargrove, William, Norman, Steve Norman. The Tornado Outbreak of April, 2011 recorded by the USDA Forest Service's Forest Change Assessment Viewer. 2012 ESRI International Users Conference. (Poster, <https://forestthreats.org/products/posters/the-tornado-outbreak-of-april-2011-recorded-by-the-usda-forest-services-forest-change-assessment-viewer>)

2008. Christie, William M. Mapping the Future. Alabama Forestry Commission. Alabama's Treasured Forest Magazine, Spring Edition. Alabama Forestry Commission, Montgomery, Alabama. (Magazine article, <https://new.cloudvault.usda.gov/index.php/s/BX98wb9Nq6byq3d>)

2007. Christie, William M. Forest Increase Land Use Change, 1992 – 2001 Using National Land Cover Data (Poster). Tennessee Wildlife Resources Agency, Nashville, Tennessee.

2005. Christie, William M. Enterprise Geographic Information Systems (eGIS) Program Management Plan. US Army Corp of Engineers, Huntsville Engineering and Support Center, Huntsville, Alabama. (Internal draft document, <https://new.cloudvault.usda.gov/index.php/s/YowjtPqB8g3itRY>).

2000. Christie, William M. Wetlands Inventory and Mapping for The Tapoco Division of Alcoa Power Generating, Inc. The Nature Conservancy, Nashville, Tennessee. 43pp (hardcopy available).

1991. Christie, William M. Vegetation Mapping in Tennessee: A Precursor to Gap Analysis. Progress Report to the Tennessee Department of Conservation, Ecological Services, Nashville, Tennessee.

1988. Christie, William M. Estimating the Loss of Bottomland Hardwood Forest in West Tennessee Using ARC/INFO. Tennessee Department of Conservation, Ecological Services, Nashville, Tennessee.

1986. Christie, William M., R. J. Pawlowski, and M. D. Fleming. A Repetitive Digital NOAA-AVHRR Archive for Alaskan Engineering and Scientific Applications. American Society of Photogrammetry and Remote Sensing/American Congress of Surveying and Mapping Fall Convention. Proceedings. Anchorage, Alaska. (Manuscript, <https://new.cloudvault.usda.gov/index.php/s/4Fr5kfaSannpo3g>).

1984. Christie, William M. The Spectral Characterization of *Pinus elliottii* using Thematic Mapper Imagery. Master's Thesis. The University of South Carolina, Columbia, South Carolina.

Publications (Co-Authored)

2020. Norman, Steven P.; Christie, William M.. Chapter 7 - Satellite-based evidence of forest stress and decline across the conterminous United States for 2016, 2017, and 2018 (<https://www.fs.usda.gov/treesearch/pubs/60387>). In: Potter, Kevin M.; Conkling, Barbara L., eds. Forest health monitoring: national status, trends, and analysis 2019. Gen. Tech. Rep. SRS-250. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 151-166 (<https://www.fs.usda.gov/treesearch/pubs/60380>).

2018. Steve Norman, William Christie. Provisional Impacts of Hurricane Michael on the Pan Handle of Florida from Sentinel 2 imagery. *ForWarn* Highlight <https://forwarn.forestthreats.org/highlights/1052#>. (Poster, <https://new.cloudvault.usda.gov/index.php/s/qzYCwP6tYtnBDdn>).

2018. Steve Norman, William Christie, William Hargrove. Mountain wave-induced extreme wildfire behavior: The deadly eastern Tennessee fires of 2016. 15th International Wildland Fire Safety Summit and 5th Human Dimensions of Wildland Fire Conference. December 10-14, 2018. Asheville, North Carolina. (Poster, <https://new.cloudvault.usda.gov/index.php/s/8Y2BH2ZxzcMj5N9>).

2018. Steve Norman, William Christie. Provisional Impacts of Hurricane Florence on the Croatan National Forest, NC from Sentinel 2 imagery. *ForWarn* Highlight <https://forwarn.forestthreats.org/highlights/1050#>. (Internal research map document, <https://new.cloudvault.usda.gov/index.php/s/4Yt3JExRDortnRc>).

2018. Steve Norman, William Christie, William Hargrove. Hurricane impacts to Puerto Rico's forests: the importance of topography and chance. International Association for Landscape Ecology, United States Chapter (US-IALE), 2018 Annual Meeting, Chicago, Illinois, April 8-12, 2018. (Poster, <https://new.cloudvault.usda.gov/index.php/s/qKn6bp462TkaxEa>).

2017. Monica J. Schwalbach, Lars A. Pomara, Stanley J. Zarnoch and William M. Christie. Least Tern (*Sternula antillarum*) Population Response to Water Levels on Cheyenne River and Oahe Reservoir, South Dakota. *Waterbirds: Journal of the Waterbirds Society* (in review). USDA Forest Service, Southern Research Station, 200 W.T. Weaver Boulevard, Asheville, North Carolina.

2017. Steven Norman, William Hargrove, William Christie. Spring and autumn phenological variability across environmental gradients of Great Smoky Mountains National Park, USA, *Remote Sensing* 2017, 9(5), 407; doi: 10.3390/rs9050407. (Manuscript, <http://www.mdpi.com/2072-4292/9/5/407/htm>)

2016. Steven Norman, William Hargrove, William Christie. The extreme 2016 fall wildfire season of the Southern Appalachians. International Association for Landscape Ecology, United States Chapter (US-IALE). Apr. 2017—Baltimore, MD (Poster, <https://forestthreats.org/products/posters/the-extreme-fall-2016-wildfire-season-of-the-southern-appalachians>)
2015. Steven P. Norman, William W. Hargrove, Bjorn G. Brooks, Danny C. Lee, William M. Christie. High frequency monitoring of fire regimes and ecological resilience across the Okefenokee National Wildlife Refuge. Association for Fire Ecology Meeting, San Antonio, TX. (Poster, <https://forestthreats.org/products/posters/high-frequency-monitoring-of-fire-regimes-and-ecological-resilience-across-the-okefenokee-national-wildlife-refuge>)
2014. Lee, Danny C., et.al. The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy, Member of the National Science Analysis Team, U.S. Department of Agriculture Forest Service, Southern Research Station, 93pgs. (Member of the National Science and Analysis Team (NSAT) as GIS Analyst, geospatial data processing and graphic output provided to Danny Lee, NSAT Co-Lead, see <http://cohesivefire.nemac.org/about>.)
2013. Forest Health Monitoring: National Status, Trends, and Analysis 2013. Kevin M. Potter and Barbara L. Conkling. CHAPTER 6: Monitoring Forest Disturbances across Seasons Using the ForWarn Recognition and Tracking System (Steven P. Norman, William W. Hargrove, Joseph P. Spruce, and William M. Christie). USDA Forest Service, Research and Development General Technical Report SRS-207, pp. 85 - 99. Eastern Forest Environmental Threat Assessment Center, Raleigh, North Carolina and Asheville, North Carolina. (https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs207.pdf)
2013. Steven P. Norman, William Hargrove, William Christie. Highlights of satellite-based forest change recognition and tracking using the ForWarn system. General Technical Report (GTR): SRS-180. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 30 p. (FS GTR, <http://www.srs.fs.usda.gov/pubs/44239>)
2013. Norman, SP, Hargrove, WW, Thompson, S., Christie, WM, Spruce, JP. Mapping hemlock decline in the Southern Appalachians using high and moderate resolution imagery. International Association for Landscape Ecology Meeting, Austin Texas. (Poster, <https://forestthreats.org/products/posters/examining-hemlock-mortality-in-the-southern-appalachians-through-decline-mapping-and-comparative-viewshed-analysis>; <https://forestthreats.org/products/posters/mapping-hemlock-decline-in-the-southern-appalachians-using-high-and-moderate-resolution-imagery>)
2013. Norman, SP, Lee, Danny C., Hargrove, Christie, WM, Spruce, JP. A framework for predicting post-wildfire trajectories with desired conditions using NDVI time series, American Geophysical Union, Fall Meeting 2013, San Francisco, CA. (Poster, <https://forestthreats.org/products/posters/a-framework-for-predicting-post-wildfire-trajectories-with-desired-conditions-using-ndvi-time-series>)
2013. Norman, SP, Lee, Danny C., Hargrove, Christie, WM, Spruce, JP. Long-Term Post-Wildfire Monitoring of Phenology and Recovery Using a MODIS Time Series, 2013 ESRI International User Conference, ESRI Forestry and US Forest Service Map Galleries, San Diego Convention Center, San Diego, CA. (Poster, <https://forestthreats.org/products/posters/long-term-post-wildfire-monitoring-of-phenology-and-recovery-using-a-modis-time-series>)

Presentations (Authored)

2020. William Christie, Steven Norman, William Hargrove. ForWarn II and HiForm. 2020 USFS Region 4 Information Management Workshop webinar - Forest disturbance mapping. April 16, 2020.

<https://new.cloudvault.usda.gov/index.php/s/3t34cGnAK5psZKZ>

2020. William Christie, Steven Norman, William Hargrove. ForWarn II and the future of FHP's Forest Disturbance Mapper - ForWarn II and State Partner Outreach with HiForm. Forest Health Monitoring Workshop, February 25-27, 2020, Raleigh, NC.

<https://new.cloudvault.usda.gov/index.php/s/dY9meFMKNeQeCxi>

2020. William Christie, Steven Norman. Disturbance Mapping with Sentinel-2 data and Google Earth Engine SGSF GIS Committee Annual Meeting, February 11-13, 2020, Charlottesville, VA.

<https://new.cloudvault.usda.gov/index.php/s/86xyaBJAkRRW2f>

2019. Christie, William, Steve Norman, William Hargrove. ForWarn II and HiForM High Resolution Forest Disturbance Mapping. National GIS Coordinators Webinar, Geospatial Management Office, USDA Forest Service, 09/19/2019. (PowerPoint, <https://new.cloudvault.usda.gov/index.php/s/8jmKZoEEYfjxEeB>).

2019. Christie, William, Steve Norman, William Hargrove. High Resolution Forest Disturbance Mapping. SGSF GIS Committee Summer Meeting, Franklin, TN. (PowerPoint,

<https://new.cloudvault.usda.gov/index.php/s/NfJSnLFy3wCfEz8>)

2018. ForWarn Update Webinar. Southern Group of State Foresters GIS Committee Annual Meeting, Mobile, AL. (Slideshow, <https://new.cloudvault.usda.gov/index.php/s/bmgbtRCn8FtADtj>).

2017. Forest Effects from Hurricane Irma in South Florida. Webinar to present research findings from a MODIS-based forest change analysis post-Hurricane Irma. Attendees: State of Florida Forestry - Forest Management, Tallahassee, FL (requestor) and students from the University of Florida, Gainesville, FL. (Map document, <https://new.cloudvault.usda.gov/index.php/s/fQNgKBSz8a4Bs7F>).

2017 (x2). ForWarn Forest Disturbance and Assessment System Webinar. Presented within the USDA Forest Service Remote Sensing Application Center (RSAC) "Region 8 Remote Sensing Training Webinar", Asheville, NC.

2017. ForWarn Forest Disturbance and Assessment System Webinar. Virginia Division of Forestry, Ashville, NC. (<https://new.cloudvault.usda.gov/index.php/s/woktdL4JR6yWxk8>; mp4, <https://new.cloudvault.usda.gov/index.php/s/sdPXQtRrmRdJPNg>).

2017. ForWarn Forest Disturbance and Assessment System Webinar. National Association of State Foresters Science and Forest Health Committee Annual Meeting, Zachary, LA.

2017. ForWarn Forest Disturbance and Assessment System Introduction. Presented virtually within the USDA Forest Service Remote Sensing Application Center (RSAC) "Introduction to Change Detection" training webinar, Asheville, NC.

2017. Data sharing of ForWarn's standard and landscape scale research products. Webinar to NASA Develop students and faculty at New Mexico Highlands University, Asheville, NC.

2017. ForWarn Introduction. Visiting students from Mayland Community College at the Forest Service Southern Research Station, Asheville, NC.

2017. ForWarn Update. Southern Group of State Foresters GIS Committee Annual Meeting, Raleigh, NC.

2016. ForWarn Forest Disturbance and Monitoring System Webinar. Visiting Scientists, South Korea National Institute of Forest Science. Asheville, NC.

2016. ForWarn Forest Disturbance and Monitoring System Webinar. USDA Animal and Plant Health Inspection Service (APHIS). Asheville, NC.

2016. ForWarn Forest Disturbance and Monitoring System Webinar. USDA Forest Service Northeastern Region, State and Private Forestry, Forest Legacy Program, to 20-State partner affiliates. Asheville, NC.

2016. ForWarn Forest Disturbance and Monitoring System Webinar. USDA Forest Service Region 8 and 13 State Forestry Agency partner affiliates in forest health protection and monitoring. Asheville, NC.

2016. ForWarn and the Forest Change Assessment Viewer. North Carolina Geographic Information Coordinating Council, Raleigh, NC.

2016. ForWarn Update. Southern Group of State Foresters GIS Committee Annual Meeting, Columbia, SC.

2016. The Eastern Forest Environmental Threat Assessment Center and Tools (with an introduction to ForWarn). Climate, Forests and Woodlands Community of Practice, Association of Natural Resource Extension Professionals, Climate Science Initiative Webinar Series, presented virtually.

2014. Advanced Training Webinar: ForWarn Disturbance Assessment. Menominee and Chickasaw Indian Nations (invited).

2014. ForWarn Version 2; Phenological Ecoregions; Clustering NC LiDAR to Derive 3D Forest Structure Classification. Southern Group of State Foresters GIS Task Force Annual Meeting. San Antonio, TX.

2013. ForWarn: Forest Disturbance and Monitoring Every 8 Days. Natural Resources and Forestry GIS Conference. University of Georgia, Athens, GA.

2013. Geospatial Tools for Short and Long-term Forest Change Mapping. Mountain Region GIS Alliance Meeting. Asheville, NC.

2013. ForWarn Forest Change Detection System Provides a Weekly Snapshot of U.S. Forest Conditions to Aid Forest Managers. Alabama Forest Owners Association. Opelika, AL.

2013. Forest Disturbance Mapping and Phenology Research. National Park Service, Appalachian Highlands Network. , Gatlinburg, TN.

2013. ForWarn Forest Change Detection System Provides a Weekly Snapshot of U.S. Forest Conditions to Aid Forest Managers. Southern Group of State Foresters GIS Task Force Annual Meeting. Little Rock, AR.

2012. ForWarn Launch Webinars 1 & 2, ForWarn's Change Assessment Viewer and Performing Disturbance Assessments. National audience, 32 attendees (Federal, State, Private, NGO).

Presentations (Co-Authored)

2020. Steven Norman, William Christie, William Hargrove. What pressing National Forest monitoring questions can remote sensing help you with? US Forest Service Green Line Meeting, Johnson City, TN, March 2-3, 2020. <https://new.cloudvault.usda.gov/index.php/s/JzDqH4aN9DQGJqi>

2019. Pomara, Lazarus, Danny Lee, Steve Norman, Bjorn Brooks, William Christie, William Hargrove. Assessing landscape ecological resilience through remotely sensed landscape phenology. Southeast Climate Adaptation Science Center (SECASC) regional science symposium. New Orleans, LA.

2019. Steven Norman, Matt Reilly (Humboldt State University), William Christie, William Hargrove. Remote sensing monitoring research related to the 2016 Southern Appalachian Fires. Blue Ridge Fire Learning Network Workshop 14, Athens, TN, May 14-16, 2019.

<https://new.cloudvault.usda.gov/index.php/s/DACRjCe6qfPFRzp>

2019. Steven Norman, William Christie, William Hargrove. Mountain Wave Induced Extreme Wildfire Behavior: The Deadly Eastern Tennessee Fires of 2016. Great Smoky Mountains National Park Science Colloquium, Gatlinburg, TN, March 7, 2019. <https://forestthreats.org/products/posters/mountain-wave-induced-extreme-wildfire-behavior-the-deadly-eastern-tennessee-fires-of-2016>

2018. Haley Ritger^{1,2}, Dionne B. Blanks², Larissa R. Robinov², Jacob S. Armistead², Madison Murphy², Danielle Linette Quick³, Joseph Spruce², William Walter Hargrove⁴, William M Christie⁴ and Steven P Norman⁴, (1)University of Georgia, Warnell School of Forestry and Natural Resources, Athens, GA, United States, (2)NASA DEVELOP Program - SSAI, Mobile County Health Department, Mobile, AL, United States, (3)NASA DEVELOP Program - SSAI, National Program Office, Hampton, VA, United States, (4)USDA Forest Service Southern Research Station, Eastern Forest Environmental Threat Assessment Center, Asheville, NC, United States. Improving Forest Management through Early Detection of Bark Beetle Outbreaks in the Southeastern United States Using Earth Observations. American Geophysical Union (AGU) 2018 Fall Convention, Washington, D.C., December 10-14, 2018. (Abstract submission, <https://new.cloudvault.usda.gov/index.php/s/P7pSazniEpMywQ2>).

2018. William Hargrove, Steve Norman, Jitendra Kumar, William Christie. New National Percent Greenup Completion Departure Maps Show Deviations in Vegetation Timing of Seasonal Progression Every 8 Days throughout the MODIS Period. American Geophysical Union (AGU) 2018 Fall Convention, Washington, D.C., December 10-14, 2018.

2018. William W. Hargrove, Steven P. Norman, Joseph P. Spruce (Leidos), and William M. Christie. ForWarn II, A National Satellite-Based Forest Disturbance Detection System. North Carolina ArcGIS Users Group Conference, Asheville, NC. August 29-31, 2018.

2018. Steve Norman, Greg Dobson (UNC-Asheville NEMAC) and William Christie. Mapping large wildfire and community risks using North Carolina parcel data. North Carolina ArcGIS Users Group Conference, Asheville, NC. August 29-31, 2018. (Presentation, <https://new.cloudvault.usda.gov/index.php/s/QgGked3QbYL2rYg>).

2018. William Hargrove, Steven Norman, William Christie, Joe Spruce (Leidos). ForWarn and Other Uses of Satellite Phenology for Identification and Monitoring of Forest Disturbances. National Forest Health Monitoring Workshop, Western International Forest Disease Work Conference, Phoenix, AZ.

2018. Steven Norman, William Christie, William Hargrove. Use of Sentinel-2 Imagery in Forest Health. National Forest Health Monitoring Workshop, Western International Forest Disease Work Conference, Phoenix, AZ. (Presentation, <https://new.cloudvault.usda.gov/index.php/s/tG6qcHENDWQL2DN>).

2018. Steven Norman, Danny Lee, William Christie. Preparing for the Exceptional: An Examination of Likelihoods after the Historic 2016 Southern Appalachian Wildfire Season. Igniting Exchange: Bridging the Gap between Science and Management (Partners Meeting), Northeast Forest Fire Protection Compact and the North Atlantic Fire Science Exchange, Joint Fire Science Program, Portland, ME.

2018. Steven Norman, William Christie, William Hargrove. A comparison of landscape impacts from the Great Smokies May 2017 windstorm and November, 2016 wildfire caused by recurrent mountain waves. Great Smokies Science Colloquium, Great Smoky Mountains National Park, Gatlinburg, TN.

2017. Steven P Norman, William W. Hargrove and William M Christie, US Forest Service, Asheville, NC. Phenological Unmixing of Sequential Wildfire and Windstorm Effects in the Southern Appalachians (B34C-02), presented at 2017 Fall Meeting, AGU, New Orleans, LA, December 11-15, 2017.

2017. Norman, SP, WW Hargrove, BG Brooks, DC Lee, WM Christie. Tracking shifts in productivity in response to recurrent drought and fire regime change for the Okefenokee. Association for Fire Ecology (AFE), Orlando, FL, September 15, 2017.

2017. William Hargrove, Steven Norman, William Christie and Joseph P. Spruce (Leidos-NASA Stennis). ForWarn and Other Uses of Satellite Phenology for Identification and Monitoring of Forest Insect Disturbances. 2017 Southern Forest Insect Work Conference, Melbourne, Florida, July 25-28, 2017.

2017. Steve Norman, William Hargrove, Bjørn-Gustaf Brooks, Danny C Lee, William Christie. Monitoring the cumulative effects of fire across woody wetlands of the southeastern U.S. Coastal Plain. Society of Wetland Scientists Annual Meeting, San Juan, Puerto Rico, June 7, 2017. (<https://new.cloudvault.usda.gov/index.php/s/DGm7xsYtaReLY8X>).

2017. Norman, SP, WW Hargrove, WM Christie. The phenologies of a Great Smoky Mountain. International Association for Landscape Ecology, United States Chapter (US-IALE). Apr. 2017—Baltimore, MD. (<https://new.cloudvault.usda.gov/index.php/s/tYr2YDB7gzi9HMA>).

2017. Steven Norman, William Hargrove, William Christie. Tracking spring and fall phenology across Great Smoky gradients: A 16-year record of climate and vegetation change. Great Smokies Science Colloquium, Great Smoky Mountains National Park, Gatlinburg, TN.

2017. Steven Norman, William Hargrove, William Christie. The effects of climate variability on vegetation phenology across Great Smoky Mountains National Park. First Friday All Climate Change Talks (FFACCTs). U.S. Forest Service Eastern Forest Environmental Threat Assessment Center. Hosted by the USDA Forest Service Eastern Forest Environmental Threat Assessment Center, Asheville, NC. (Presentation, <https://new.cloudvault.usda.gov/index.php/s/k2K2ibLzC776bkn>).

2016. William W. Hargrove, Steven P. Norman, William M. Christie and Joseph P. Spruce (NASA Stennis). Mapping Hemlock Mortality and Its Effects Using Decadal Trends in Forest Health. North Carolina Hemlock Woolly Adelgid Bio-Control Forum. Montreat Conference Center, Black Mountain, NC.

2016. William Hargrove and William Christie (USDA Forest Service, Southern Research Station, Eastern Forest Environmental Threat Assessment Center), Joseph Spruce (Self affiliated). Use of MODIS NDVI phenology data in monitoring regional vegetation disturbances from abiotic events. International Association of Landscape Ecologists Annual Meeting, Asheville, NC.

2015. William W. Hargrove, Steven P. Norman, Forrest Hoffman, Jitendra Kumar, William M. Christie. An Empirically Derived National Map of Relative Wildfire Probability Rankings. Association for Fire Ecology Meeting, San Antonio, TX.

2015. Forrest M. Hoffman(1), Jitendra Kumar(1), Steven P. Norman(2), Bjorn-Gustaf J. Brooks(2), William Christie(2), William W. Hargrove(2), Joseph P. Spruce(3),(1-DOE Oak Ridge National Laboratory, 2-USDA Forest Service, Eastern Forest Environmental Threat Assessment Center, 3-NASA Stennis Space Center), Applying a Big Data Approach to Detecting Fire Disturbances and Recovery at a Continental Scale Using Satellite Remote Sensing. Association for Fire Ecology, 6th International Fire Ecology and Management Congress, San Antonio, TX.

2015. William W. Hargrove, Forrest M. Hoffman, Steven P. Norman, and William M. Christie, An Empirically Derived National Map of Relative Wildfire Probability Rankings Suitable for Comparison with Independent Efforts. Association for Fire Ecology, 6th International Fire Ecology and Management Congress, San Antonio, TX.

2015. Steven P. Norman, William W. Hargrove, Forrest Hoffman, Jitendra Kumar, William M. Christie. Monitoring seasonal fire niches with large phenological and fire datasets. Association for Fire Ecology Meeting, San Antonio, TX.

2015. Steven P. Norman, William M. Christie, William Hargrove, Joseph P. Spruce, ForWarn: Satellite-based monitoring of seasonal, successional and event fuels for fire planning, Southern Blue Ridge Fire Learning Network Workshop 10, Morganton, North Carolina. (GIS data acquisition and analysis contributor)

2015. William W. Hargrove, Steven P. Norman, Joseph P. Spruce, and William M. Christie, The Use of Phenological Completion Milestones for Determining Day-of-Year of Start of Greenup and Start of Senescence. USDA Forest Service Eastern Forest Environmental Threat Center, Asheville, NC. 2015 Blue Ridge Parkway Research and Science Symposium, Blue Ridge Parkway, Asheville, NC. (GIS data acquisition and analysis contributor)

2015. William W. Hargrove, Stephen P. Norman, Joseph P. Spruce, and William M. Christie. 2015. The Use of Phenological Completion Milestones for Determining Day-of-Year of Start of Greenup and Start of Senescence. Blue Ridge Research and Science Symposium, Great Smoky Mountains National Park, TN/NC. (GIS data acquisition and analysis contributor)

2015. William Hargrove, J. Spruce, S. Norman, W. Christie, J. Kumar, F. Hoffman, J. D. Morgan and M. Hutchins, ForWarn: A Satellite-Based Forest Change Recognition and Tracking System, North Carolina GIS Conference, Raleigh, NC.

2014. Norman, SP, WW Hargrove, WM Christie, DC Lee. Five applications of the ForWarn system for wildland fire management. Wildland Fire Management Research Development and Application Group, US Forest Service Rocky Mountain Research Station (invited). (GIS data acquisition and analysis contributor)

2014. Norman, SP. Blue Mountain Forest Vegetation Workshop – PNW National Forests: Malheur, Umatilla and Wallowa-Whitman. Operational ForWarn; Long-term Monitoring using MODIS NDVI (SP Norman). (GIS data acquisition and analysis contributor)

2013. Great Smokey Mountains National Park and the NC Appalachians Highlands Network. Forest Service's Eastern Threat Center. Southern Research Station Headquarters. Asheville, NC. The Land Surface Phenology of Great Smoky Mountains National Park: A Preliminary Satellite and Climatic Analysis. (GIS data acquisition and analysis contributor).

2012. Forest Service Climate Change Field Team Meeting (virtual). Asheville, NC. Monitoring and Predicting Effects of Climate Change on Forests.

2012. USDA SRS Forest Inventory and Analysis Meeting, USGS. Knoxville, TN. Using Land Surface Phenology for National Mapping of the Occurrence and Health of Evergreen and Deciduous Forests.

2012. U.S. Fish & Wildlife Service Remote Sensing Task Group Webinar. Asheville, NC. ForWarn: A New Satellite-Based Change Recognition and Tracking System for Identification of Forest Disturbances.

2012. William Hargrove, William Christie. ForWarn Launch Webinar 2. ForWarn: Forest Disturbance Analysis and Vetting. National audience (Federal, State, Private, NGO).

2012. William Hargrove, William Christie. ForWarn Launch Webinar 1. ForWarn: A New Satellite-Based Change Recognition and Tracking System for identification of Forest Disturbances. National audience (Federal, State, Private, NGO).

2012. William W. Hargrove, Joseph P. Spruce, Steven P. Norman, William M. Christie, Jitendra Kumar, and Forrest M. Hoffman. Using land surface phenology for national mapping of the occurrence and health of evergreen and deciduous forests. In Phenology 2012 Conference, Milwaukee, Wisconsin, September 10-13, September 2012.

2012. Jitendra Kumar, Forrest M. Hoffman, William W. Hargrove, Richard T. Mills, William M. Christie, Joseph P. Spruce, and Steve P. Norman. A statistical approach for detection of natural disturbances in forest ecosystems using remotely sensed phenology. In Phenology 2012 Conference, Milwaukee, Wisconsin USA, September 10-13, September 2012.

Honors/Awards:

2019. USDA Forest Service, Southern Research Station **Director's Choice Award: Benefits to the Public.** For "Improving hurricane damage assessments with new satellite technology and outreach" (<https://hiform.org/>). Team lead, Steve Norman, Ph.D., Research Ecologist and William Christie, Biological

Scientist (GIS/Remote Sensing Analyst). Eastern Forest Environmental Threat Assessment Center (USDA-FS RWU 4854), Asheville, North Carolina. (<https://srs.fs.usda.gov/research/2019-research-highlights/>)

2019. USDA Forest Service, Southern Research Station **Director's Award for Excellence in Science Delivery**. For "High-Resolution Forest Mapping (HiForM)" project mapping and outreach to State and Federal partners (<https://hiform.org/>). Team lead, Steve Norman, Ph.D., Research Ecologist and William Christie, Biological Scientist (GIS/Remote Sensing Analyst). Eastern Forest Environmental Threat Assessment Center (USDA-FS RWU 4854), Asheville, North Carolina.

2014. USDA Forest Service **Chief's Award for Sustaining Forests and Grasslands (2013)**, Inter-Agency ForWarn Team. Forest Service Southern Research Station. Principle Investigator: William Hargrove, PhD., et al. (D. Lee, S. Norman, W. Christie, S. Worley Firley, P. Spriggs, N. Grulke, S. Schroeder, W. Graham, J. Spruce, G. Gasser, J. Smoot, P. Kuper, C. Jenkerson, J. Brown, T. Loveland, F. Hoffman, J. Kumar, R. Mills, Rogers, M. Philips, D. Morgan, M. Hutchins, and C. Dougherty).

2013. USDA Forest Service, Southern Research Station **Director's Award for Partnership**. The ForWarn team: Hargrove, William, Norman, SP., Christie, Wm., UNCA's NEMAC, NASA Stennis, DOE ORNL.

2013. NASA **Group Achievement Award**. The ForWarn team: Hargrove, William, Norman, SP, Christie, Wm., Graham, W., Spruce, J., Gasser, G., Smoot, J., Kuper, P., Jenkerson, C., Brown, J., Loveland, T. The award was presented to ForWarn representatives in a ceremony at NASA's John C. Stennis Stennisphere Auditorium. Mississippi.

2013. Federal Laboratory Consortium's **Southeast Region's 2013 Partnership Award**. These two FLC awards highlight the unusual degree of 4-way interagency cooperation in ForWarn involving a unique set of substantive and ongoing collaborations required to meet ForWarn's demanding weekly production schedule. The ForWarn team: Hargrove, William, Norman, SP., Christie, Wm.

2013. (Co-Authored poster submission) **Honorable Mention at the Map Gallery People's Choice Awards**. Long-Term Post-Wildfire Monitoring of Phenology and Recovery Using a MODIS Time Series. 2013 ESRI International User Conference, **US Forest Service Map Gallery**, San Diego Convention Center, San Diego, CA. Norman, SP, Lee, Danny C., Hargrove, Christie, WM, Spruce, JP. (GIS data acquisition and analysis contributor)

2012. Federal Laboratory Consortium for Technology Transfer (FLC) honored the ForWarn team at the national level with its **2013 Interagency Partnership Award**, which recognizes outstanding collaborative work across government agencies in technology transfer and is one of the highest honors from the FLC. The ForWarn team: Hargrove, William, Norman, SP., Christie, Wm.

2012, **Most Distinguished Scientific or Technical Contribution Award**, Oak Ridge National Laboratory Computational Science and Mathematics Division. The ForWarn team: Hargrove, William, Norman, SP., Christie, WM., Hoffman, F., Kumar, J., Mills, R.

2012. USDA Forest Service, Southern Research Station **Director's Award for Excellence in Science Delivery**. Project employees from four U.S. government agencies: USDA Forest Service, NASA Stennis Space Center, USDO I US Geological Survey Earth Resources Observation Systems Data Center, and USDOE Oak Ridge National Laboratory.

2011. (Authored poster submission) **Best Communication Product/Output Award. USDA Forest Service Geospatial Management Office.** The Tornado Outbreak of April, 2011 recorded by the USDA Forest Service's Forest Change Assessment Viewer. 2012 ESRI International Users Conference. Christie, William, Hargrove, William, Norman, Steve. POSTER, <https://forestthreats.org/products/posters/the-tornado-outbreak-of-april-2011-recorded-by-the-usda-forest-services-forest-change-assessment-viewer>

2001. (Authored poster submission) **Honorable Achievement.** Rapid Terrain Analysis Module. The Consulting Engineers of Tennessee, Annual Convention, Nashville, Tennessee. This award resulted from the first GIS project completed for employer K. S. Ware and Associates, L.L.C., Nashville, Tennessee.