

JOHN A. CALLAHAN

Curriculum Vitae

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[UD Experts](#), [Geography Faculty Profile](#)

PROFESSIONAL EXPERIENCE

2021 – Present Visiting Assistant Professor, Dept of Geography and Spatial Sciences, College of Earth, Ocean, & Environment, University of Delaware (UD), Newark, DE
2014 – 2021 Associate Scientist, Delaware Geological Survey (DGS), UD, Newark, DE
2008 – 2014 Research Associate, DGS, UD, Newark, DE
2001 – 2008 Information Resource Consultant/Geospatial and Statistical Analyst, Research Data Management Services, UD, Newark, DE
2000 – 2001 GIS Consultant, ESRI, Inc., King of Prussia, PA
1999 – 2000 Remote Sensing Analyst, Earth Satellite Corporation, Rockville, MD

EDUCATION

Ph.D. Climatology, Department of Geography and Spatial Sciences, University of Delaware, 2021
Title: *Skew Surge and Extreme Coastal Flooding Events in the Delaware and Chesapeake Bays of the U.S. Mid-Atlantic Coast for 1980 – 2019*
M.S. Geography, University of Delaware, 2014
Title: *Estimation of Precipitable Water Over the Amazon Basin Using GOES Imagery*
B.S. Physics, Temple University, Philadelphia, PA, 1994
B.S. Mathematics, Temple University, Philadelphia, PA, 1994

RESEARCH INTERESTS

Climate change and sea-level rise, storm surge and tidal analysis, natural hazards and risk from severe weather/climate change, Mid-Atlantic tropical and extratropical storms, prediction and early warning systems, remote sensing of land surface and atmosphere, geospatial and statistical analysis methods, lidar/GPS, topographic and watershed hydrological analysis and elevation metrics, teleconnections and synoptic atmospheric circulation patterns, atmospheric water vapor, dendroclimatology, surface water monitoring and water resources, science communication and critical thinking, public and K-12 outreach

HONORS AND AWARDS

2021 UD Department of Geography and Spatial Sciences Graduate Research Award
2019 John C. Frye Memorial Award for Environmental Geology, for the publication “Recommendation of Sea-Level Rise Planning Scenarios for Delaware”, awarded by Geological Society of America and the Association of American State Geologists
2007 Delaware State Geographic Service Award, recognized for Outstanding Service to the Delaware GIS community

- 2003 John Wesley Powell Award, for the “Data Mapping and Integration Laboratory (DataMIL) Project”, awarded by United States Geological Survey (USGS)
- 2002 Special Achievement in GIS Award, sponsored by ESRI
- 1998 Research Data Management Services Graduate Fellowship, UD
- 1995 UD Department of Physics and Astronomy Graduate Teaching Award
- 1994 Outstanding Physics Graduate Award, Department of Physics, Temple University
- 1989 Outstanding Achievement Scholarship, Full four-year tuition, Temple University

FUNDED GRANTS

- Co-Principal Investigator, "Flood Analysis for Woodland Beach Road", Delaware Department of Transportation (DelDOT), 2021 – 2022.
- Co-Principal Investigator, "Assessing spatial distributions of soil carbon stocks and their vulnerability to sea level rise in tidal marsh ecosystems", Delaware National Estuarine Research Reserve (DNERR), 2019 - 2021.
- Principal Investigator, "Storm Surge and High Tide Relationships in Development of a Delaware Inland Bays Coastal Flood Warning System", Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 2019 - 2021.
- Co-Principal Investigator, "Determination of Flood Elevations and Hydrology of Delaware Roadways", Delaware Department of Transportation, 2020.
- Co-Principal Investigator, "Morphology and Tidal Inundation of Tidal Wetlands in the Delaware Estuary", Delaware Sea Grant, 2018 - 2020.
- Principal Investigator, "Development of a Coastal Storm Hazard Early Warning and Decision Support Dashboard for Delaware: Integration and Analysis of Past Coastal Storms", Delaware Sea Grant, 2017 - 2018.
- Principal Investigator, "Digital Elevation Model, GIS, and Watershed Analysis to Support USGS StreamStats Update", Delaware Department of Transportation, 2017 - 2018.
- Co-Principal Investigator, "Creation of an Improved Accuracy LiDAR-Based Digital Elevation Model for St. Jones and Blackbird Creek Reserves", Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 2017 - 2018.
- Principal Investigator, "Determination of Future Sea-Level Rise Planning Scenarios and Development of Coastal Inundation Maps for the State of Delaware", Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 2015 - 2016.
- Investigator, "Delaware Participation in the National Groundwater Monitoring Network", United States Geological Survey, 2016.
- Co-Principal Investigator, "Development of a Transportation Weather and Flood Monitoring and Warning System Strategic Plan for Delaware", Delaware Department of Transportation, 2015 - 2016.
- Co-Principal Investigator, "Drought Conditions Indicators for Delaware", Delaware Emergency Management Agency (DEMA), 2015.
- Principal Investigator, "Conversion of Historic Seismic Signal Data for Internet Accessibility", Delaware Emergency Management Agency (DEMA), 2014 - 2015.
- Principal Investigator, "Analysis of Storm Surge and Tidal Data Relationships in the Delaware Inland Bays based on Meteorological Conditions", Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 2014 - 2015.
- Principal Investigator, "Delaware Contribution to the National Geothermal Data System Regarding Metadata Management", National Science Foundation (NSF), 2014 - 2014.

- Principal Investigator, "Development of a High Water Mark Database and Display System for Coastal Flooding Events in Delaware", Delaware Sea Grant, 2014 - 2016.
- Principal Investigator, "Mobile Application and Data Integration for the Delaware Coastal Flood Monitoring System", Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 2014 - 2015.
- Co-Principal Investigator, "Development and Support of a Hydrologic Monitoring Capability for Transportation in Delaware", Delaware Department of Transportation, 2013.
- Co-Principal Investigator, "A Climate Change Analysis for Delaware and the Delaware Bay Estuary", Delaware National Estuarine Research Reserve (DNERR), 2012 - 2013.
- Co-Principal Investigator, "Modeling Tsunami Inundation and Assessing Tsunami Hazards for the US East Coast", NOAA National Tsunami Hazard Mitigation Program (NTHMP), 2010 – 2013.
- Co-Principal Investigator, "Delaware Geological Survey Node Development for Inclusion and Participation in the United States Geoscience Information Network (USGIN)", National Science Foundation (NSF), 2012.
- Co-Principal Investigator, "Expansion of the Coastal Flood Monitoring System for Delaware", Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 2011 – 2012.
- Principal Investigator, "A Web-Delivered Application for Hydrogeologic Data", Delaware Department of Natural Resources and Environmental Control (DNREC) Water Supply Section, 2010 – 2011.
- Co-Principal Investigator, "Offshore Wind Power for Delaware in a Marine Spatial Planning Context", Delaware Sea Grant Program, 2011 - 2012.
- Co-Principal Investigator, "DGS Digital Image Metadata", USGS National Geological and Geophysical Data Preservation Program, 2009 – 2010.
- Co-Principal Investigator, "A Prototype Coastal Flood Monitoring System for Delaware", Joint funding from Delaware NSF EPSCoR and Delaware Dept of Environmental Control (DNREC), 2009 - 2010.
- Co-Principal Investigator, "Development of the Delaware Spatial Data Clearinghouse", USGS NSDI Cooperative Agreements Program, 2002 – 2003.
- Co-Principal Investigator, "The USGS National Map/Delaware Framework DataMIL Project", USGS Title VIII Funding Initiatives, 2001 – 2002.
- Collaborator, "A University Teaching Laboratory for Geographic Information Science", UNIDEL, University of Delaware, College of Arts and Sciences, 2001.

RESEARCH SUMMARY

Department of Geography and Spatial Sciences	My current position as Visiting Assistant Professor carries a 100% teaching load. However, service and research are continuing in some areas. I actively serve as Chapter Author for the 5 th National Climate Assessment (NCA5) on the Coastal Effects chapter, as well as on the Delaware Hazard Mitigation Council, the Delaware River Basin Commission Advisory Committee on Climate Change, and the Resilient and Sustainable Communities League (RASCL) Science and Research Liaison Committee. As for research, two projects are ongoing: 1) tidal and storm surge analysis is ongoing to develop a predictive statistical model using machine learning techniques (using Matlab and python) for inland bay communities, and 2) assessing impacts of flooding on transportation in Delaware. Future planned research areas include identifying past trends and future scenarios in coastal water levels and climate variables, developing a regional climatology
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of Atlantic tropical cyclones, analyzing atmospheric circulation patterns and their influence on regional severe weather, remote sensing of atmospheric components of the hydrologic cycle, and remote sensing of land-use change.

Delaware
Geological Survey

Work while at the DGS was wide ranging but centered on hazards of weather and climate and their impact on the state of Delaware, as well as interpretation and guidance to local and state planners and policy makers. Most of my research concerned observations and projections of coastal flooding, e.g., trends and projections, tidal datums, storm surge, high water marks, and high-tide flood frequency. On these topics, I consulted for members of state and federal agencies (USGS, NOAA, NASA, FWS) and non-profit organizations performing restoration, modeling studies, or vulnerability assessments in the region. Similarly, I was the lead developer on an online coastal flood early warning and monitoring system (<http://www.coastal-flood.udel.edu>) and provided guidance to state agencies and local communities in real-time preparation of severe weather events. I also was an active member in developing the Delaware All-Hazard State Mitigation Plan (coordinated by the Delaware Emergency Management Agency) and lead author on the technical report identifying future SLR planning scenarios to use in long-term planning activities in Delaware.

Examples of other projects include: quantifying bias in lidar-derived elevation models due to presence of vegetation in tidal saltmarshes; down-scaling satellite estimates of soil moisture and comparing against land cover; identifying habitat locations for Delmarva Fox Squirrel based on lidar surface elevation and tree canopy heights; developed tsunami-risk and SLR coastal inundation maps for the state of Delaware; built map-based applications to display and distribute Delaware spatial framework layers and orthophotography; climate analysis of Atlantic White Cedar tree-ring growth in a coastal ghost forest; identifying transportation assets and assessing their vulnerabilities to stream and coastal flooding; analysis of tropical and extratropical cyclone frequency off the coast of Delmarva; marine spatial planning work for offshore wind. Fieldwork included water level sensor installations and data collection, and GPS surveying.

In addition, during my time at DGS I was also responsible for writing grant proposals, management of project budgets, supervision of staff and students, writing interim and final reports, public outreach activities, data and database management, and served as webmaster.

PhD Research
Dept of Geography,
Univ of Delaware

PhD research focused on coastal flooding events along the US Mid-Atlantic coast and encompassed three primary projects: 1) ranking and spatial clustering of skew surge and storm tide from tropical cyclones; 2) extreme value analysis of skew surge using block maxima (BM/GEVr) and points-over-threshold (POT/GP) approaches; and 3) comparison of magnitude, timing, and spatial variation of extreme water levels between tropical cyclones and mid-latitude weather systems. This work primarily used data from NOAA tide gauges in the Delaware and Chesapeake Bays for 1980 - 2019, but also included International Best Track Archive for Climate Stewardship (IBTrACS) database for tropical

cyclone tracks and the North American Regional Reanalysis model for the synoptic atmosphere patterns. Analysis was performed in Matlab and R programming languages and included techniques such as harmonic analysis, correlations, K-Means clustering, extreme value distributions, and Principal Components Analysis.

- MS Research
Dept of Geography,
Univ of Delaware
- Master's research focused on satellite remote sensing of total precipitable water (PW) over the Amazon River Basin using GOES satellite imagery. NCEP/NCAR Reanalysis modeled atmospheric profile temperature and humidity were input to an atmospheric transfer model to estimate longwave radiation and initial guess surface temperature and precipitable water. These data were then compared against observed GOES imagery (11 and 12-micron bands) to adjust initial guesses as necessary closer to observed values. Derived estimates of PW were interpolated under cloud fields, and clear-sky retrievals were compared against vertically integrated humidity data from *in situ* radiosondes. Research included several days at the NASA Marshall Space Flight Center in Huntsville, AL for training. Reanalysis data processing and output data analysis was performed in Fortran, McIDAS-X, ArcMap, python and ArcInfo Workstation.
- Research Data
Management
Services,
Univ of Delaware
- Served as the campus GIS coordinator and primary technical support for geospatial and image analysis in teaching and research activities across departments and centers at the University of Delaware, supporting ArcGIS suite of products, image processing software, and open source GIS. Work was primarily service-driven and included coordination of meetings, management of software site licenses, supervising students, developing and teaching workshops, technical training, project design and grant writing assistance, statistical and geospatial analysis consulting, programming support, design and implementation of web and database applications, and representation of UD in state and national GIS activities. Also developed and maintained state-focused data distribution applications: the Delaware Census 2000 Mapper, Delaware State Geospatial Information (Metadata) Clearinghouse, and Delaware Data Mapping and Integration Laboratory (DataMIL), the latter of which won the USGS John Wesley Powell Award.
- ESRI, Inc.
- GIS Consultant. Developed custom applications and provided technical assistance for a variety of ESRI software products, including ArcView, ArcInfo, ArcGIS with extensions, and ArcIMS map server. Responsibilities included on-site installations, trouble shooting, and optimization, project management, documentation, maintaining client relationships, and small proposal writing. Developed and taught workshops and training on various ESRI software. Represented ESRI in several seminars, meetings, and conferences.
- EarthSat, Inc.
- Applications Scientist. Performed supervised and unsupervised land-use classifications on multi-band Landsat Thematic Mapper (TM) scenes utilizing ground truth and ancillary information in a team-based, production environment. This work was part of the global land cover project, GeoCover. Developed automated geospatial and statistical processes through ERDAS Imagine EML/SML programming languages as well as ARC/INFO AML scripting.

PHD DISSERTATION AND MASTERS THESIS

Callahan, John A., 2021. Skew surge and extreme coastal flooding events in the Delaware and Chesapeake Bays of the US Mid-Atlantic coast for 1980 - 2019. Phd Dissertation, Dept of Geography and Spatial Sciences, 230 pp. Available from Dissertations & Theses @ University of Delaware; ProQuest Dissertations & Theses A&I. (2572616185). <https://www.proquest.com/dissertations-theses/skew-surge-extreme-coastal-flooding-events/docview/2572616185/se-2?accountid=10457>

Callahan, John A., 2014. *Estimation of Precipitable Water Over the Amazon Basin Using GOES Imagery*. Master's Thesis, University of Delaware, Department of Geography, 221 pages. Available from University of Delaware Institutional Repository. <http://udspace.udel.edu/handle/19716/15868>

PUBLICATIONS – ARTICLES, BOOK CHAPTERS, SIGNIFICANT REPORTS

Callahan, John A., Daniel J. Leathers, and Christina L. Callahan (*in press*). Comparison of Extreme Coastal Flooding Events Between Tropical and Mid-Latitude Weather Systems in the Delaware and Chesapeake Bays for 1980- 2019. *Journal of Applied Meteorology and Climatology*.

Warner, Daniel L., Mario Guevara, **John Callahan**, and Rodrigo Vargas, 2021. Downscaling satellite soil moisture for landscape applications in the Mid-Atlantic region, USA. *Journal of Hydrology*, Vol 38. <https://doi.org/10.1016/j.ejrh.2021.100946>

Callahan, John A., and Daniel J. Leathers, 2021. Estimation of Return Levels for Extreme Skew Surge Coastal Flooding Events in the Delaware and Chesapeake Bays for 1980 – 2019. *Frontiers in Climate*, Vol. 3:684834. <https://doi.org/10.3389/fclim.2021.684834>

Callahan, John A., Daniel J. Leathers, and Christina L. Callahan, 2021. Skew Surge and Storm Tides of Tropical Storms in the Delaware and Chesapeake Bays for 1980- 2019. *Frontiers in Climate*, Vol. 3:610062. <https://doi.org/10.3389/fclim.2021.610062>

Stotts, Stephanie, **John Callahan**, and Olivia Gulledge, 2021. Impact of Channel Dredging and Straightening in an Atlantic White Cedar (*Chamaecyparis thyoides* L. (B.S.P.)) Freshwater Tidal Wetland. *Journal of Coastal Research*, Vol 37(5), 973-986. <https://doi.org/10.2112/JCOASTRES-D-20-00093.1>

Callahan, John A., Benjamin P. Horton, Daria L. Nikitina, Christopher K. Sommerfield, Thomas E. McKenna, and Danielle Swallow, 2017. Recommendation of Sea-Level Rise Planning Scenarios for Delaware. Technical Report prepared for Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 117 pp. <https://doi.org/10.13140/RG.2.2.17411.66082>

Samoteskul, K., Firestone, J., Corbett, J., **Callahan, J.**, 2014. Changing Vessel Routes Could Significantly Reduce the Cost of Future Offshore Wind Projects. *Journal of Environmental Management*, Volume 141, pp 146–154. <https://doi.org/10.1016/j.jenvman.2014.03.026>

Bates, A., Samoteskul, K., **Callahan, J.**, Corbett, J., Kempton, W., Madsen, J., Shriver, G., Dvorak, M., Kenney, R., McCormack, R., Harris, K. Noel, L., and Firestone, J., 2012. Delaware Marine Spatial

Planning: Offshore Wind Context. Final Report. Center for Carbon-free Power Integration, 108 pp. Available at <http://carbonfree.udel.edu>.

Madsen J., A. Bates, **J. Callahan**, and J. Firestone, 2011. Use of Geospatial Data in Planning for Offshore Wind Development. In: Thakur J.K., Singh S.K., Ramanathan A., Prasad M.B.K., Gossel W. (eds) *Geospatial Techniques for Managing Environmental Resources*. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-1858-6_16

Vanderlaan, Angelia S. M., James J. Corbett, Shannon L. Green, **John A. Callahan**, Chengfeng Wang, Robert D. Kenney, Christopher T. Taggart, and Jeremy Firestone, 2009. Probability and Mitigation of Vessel Encounters with North Atlantic Right Whales, *Endangered Species Research*, Vol 6, p. 273-285. <https://doi.org/10.3354/esr00176>

DATSETS

Callahan, John A. and Leathers, Daniel J., 2021. Return Levels and 90% Confidence Intervals for Extreme Skew Surge Coastal Flooding Events in the Delaware and Chesapeake Bays. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.16840102>

Callahan, John A., Leathers, Daniel J., and Callahan, Christina L., 2021. Tide gauge skew surge for Delmarva tropical cyclones for 1980-2019. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.15019683.v2>

Callahan, John A., Leathers, Daniel J., and Callahan, Christina L., 2021. Tide gauge and region skew surge index for Delmarva tropical cyclones for 1980-2019. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.15019695>

Callahan, Christina, and John A. Callahan, 2021. Delaware High Water Mark Database, HydroShare, <http://www.hydroshare.org/resource/4705f9605a5a46dd916ad784e97a8397>

Warner, D.L., Guevara, M., Callahan, J., Vargas, R. 2020. 2018 Daily Downscaled ESA-CCI Soil Moisture Grids for Delaware, USA, HydroShare, <http://www.hydroshare.org/resource/81867bb55f134d8d89ec2250ae6c1014>.

PUBLICATIONS – CONFERENCE PAPERS AND PUBLISHED ABSTRACTS

- Medlock, C.L., McKenna, T.E., and **Callahan, J.A.**, 2018. LiDAR vertical bias assessment and digital elevation model correction in Delaware's tidal salt marshes. Abstract EP23C-2340. *American Geophysical Union 2018 Fall Meeting*, Washington, D.C., December 10-14.
- Abdolali, A., **Callahan, J.**, Guiteras, S., Kirby, J.T., Shi, F. and Mitchell, L., 2016. Vegetation bias correction in tidal salt marsh LiDAR data sets with artificial neural networks. *Restore America's Estuaries 8th National Summit on Coastal and Estuarine Restoration and 25th Biennial Meeting of The Coastal Society*, Abstract, New Orleans, LA., December 10-15, doi:10.13140/RG.2.2.21299.63527
- Tehranirad, B., Kirby, J.T., **Callahan, J.**, Shi, F., Banihashemi, S., Grilli, S.T., Grilli, A., Tajalli Bakhsh, T. and O'Reilly, C., 2014. Tsunami inundation mapping for the upper East Coast of the United States, *AGU Fall Meeting*, Abstract NH12A-04, San Francisco, CA, December 15-19.

- Samoteskul, K., Firestone, J., **Callahan J.**, and Corbett, J., 2013. Vessel Traffic Rerouting to Hasten Offshore Wind Power Development and Enhance Net Societal Benefits, *EWEA Offshore Wind Power Conference*, Frankfurt, Germany, November 2013.
- Samoteskul, K., Firestone, J., **Callahan, J.**, and Corbett, J.J., 2013. Analysis of Vessel Traffic Rerouting Scenarios to Open Areas for Offshore Wind Development Reveals Significant Societal Benefits, *AGU Science and Policy Meeting*, Washington, DC, June 2013.
- Samoteskul, K., Firestone, J., **Callahan, J.**, and Corbett, J.J., 2013. Costs and Benefits of Rerouting Vessel Traffic to Open Shallow Waters for Offshore Wind Development, *WINDPOWER 2013*, Chicago, IL, May 2013.
- Wunsch, D.R., **Callahan, J.A.**, and Ramsey, K.W., 2013. The role of the Delaware Geological Survey in Support of Delaware's Planning and Preparedness for Hurricane Sandy, *Northeast Section – 48th Annual Meeting Abstracts with Programs*, v. 45, no.1, p. 133.
- Samoteskul, K., Firestone, J., **Callahan, J.**, and Corbett, J.J., 2012. Costs and Benefits of Rerouting Vessel Traffic to Open Shallow Waters for Offshore Wind Development, *AWEA Offshore Wind Power Conference*, Virginia Beach, VA, October 2012.
- Tehranirad, B., J.T. Kirby, F. Shi, **J.A. Callahan**, J.C. Harris, S.T. Grilli and T.S. Tajali Bakhsh, 2012. Tsunami hazards on the US East Coast: Inundation Mapping and Tsunami Process Over a Wide Shelf. *EOS Transactions AGU*, 93 (52), Fall Meeting Supplemental, San Francisco, Dec. 3-7. Abstract NH33A-1645.
- Schenck, William S., and **John A. Callahan**, 2009. A New Delaware DataMIL, *Digital Mapping Techniques '09 - Workshop Proceedings*, USGS Open File Report 2010-1335.
- Wang, C., J.J. Corbett, and **J. Callahan**, 2007. Geospatial Modeling of Ship Traffic and Air Emissions, Paper UC1683, *Proceedings of the 2007 ESRI International User Conference*, San Diego, CA.
- Andres, A. Scott, and **John A. Callahan**, 2003. State of Delaware Initiatives in Internet Ground-Water Data. *National Ground Water Association Annual Ground-Water Expo*, Orange County Convention Center, Orlando, FL, December 9 – 12, 2003.
- DeLiberty, Tracy L., and **John A. Callahan**, 2001. Diurnal Variability of Satellite Derived Precipitable Water in the Amazon Basin, *Proceedings of the 11th Conference on Satellite Meteorology and Oceanography*, American Meteorological Society. Madison, Wisconsin, Oct. 15-18, 2001, pp 196-199.
- DeLiberty, Tracy L, **John A. Callahan**, Gary Jedlovec, and Anthony Guillory, 2000. Temporal and mesoscale variations of satellite derived precipitable water in the Amazon Basin. *96th Annual Meeting of the Association of American Geographers*. Pittsburg, PA. April 4-8, 2000.
- DeLiberty, T.L., **J.A. Callahan**, A.R. Guillory, and G.J. Jedlovec, 2000. A Regional Scale Assessment of Satellite-Derived Precipitable Water in the Amazon Basin. *Proceedings of the 10th Conference on Satellite Meteorology and Oceanography*, American Meteorological Society, Long Beach, CA, Jan 9-14, 2000, pp 414-417.
- DeLiberty, Tracy L. and **John A. Callahan**, 1999. Mesoscale Moisture Variations Associated With Cold Surges In Southern Brazil, *Proceedings of the 23rd Conference on Hurricanes and Tropical Meteorology*, American Meteorological Society, Dallas, TX, January 11-15.
- DeLiberty, Tracy L., and **John A. Callahan**, 1997. An investigation of satellite-derived land surface temperatures in Amazon Basin using split window technique. *93rd Annual Meeting of the Association of American Geographers*. Fort Worth, TX. April 1-5.

PUBLICATIONS – TECHNICAL REPORTS, MAPS, AND NEWSLETTERS

- Warner, Daniel L., **John A. Callahan**, and Thomas E. McKenna, 2021. Assessing spatial distributions of blue carbon stocks in Blackbird Creek and St. Jones River coastal marshes. Technical Report prepared for Delaware National Estuarine Research Reserve, 21 pp.
- Brinson, Kevin R., Daniel L. Warner, and **John A. Callahan**, 2021. Determination of Flood Elevations and Hydrology of Delaware Roadways. Technical Report prepared for Delaware Department of Transportation, 23 pp.
- Callahan, John A.**, Kevin R. Brinson, and Christina L. Callahan, 2019. Development of a Coastal Storm Hazard Early Warning and Decision Support Dashboard for Delaware: Integration and Analysis of Past Coastal Storms: Final Report prepared for Delaware Sea Grant, 14 pp.
- McKenna, Thomas E., **John A. Callahan**, Catherine L. Medlock, and Naomi S. Bates, 2018. Creation of Improved Accuracy LiDAR-Based Digital Elevation Models for the St. Jones River and Blackbird Creek Watersheds. Technical Report prepared for Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 37 pp.
- Callahan, John A.**, and Naomi S. Bates, 2018. Development of Delmarva Fox Squirrel Habitat Maps from LiDAR Data for Sussex County, Delaware. Technical Report, Delaware Department of Natural Resources and Environmental Control (DNREC) Division of Fish and Wildlife, 20 pp.
- Bates, Naomi S., and **John A. Callahan**, 2017. Delaware Coastal Inundation Maps, Data and Mapping Methodology. Technical Report prepared for Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 26 pp.
- Brinson, K.R., and **Callahan, J.A.**, 2016. Development of a Weather and Flood Monitoring and Warning System Strategic Plan for Delaware, Technical Report prepared for Delaware Department of Transportation, 107 pp.
- Andres, A.S., **J.A. Callahan**, C. He, T.E. McKenna, D.R. Wunsch, 2016. Delaware National Groundwater Monitoring Network, Technical Report, USGS, 32 pp.
- Tehrani-rad, B., Kirby, J.T., **Callahan, J.A.**, and Shi, F., 2015. Tsunami inundation mapping for Atlantic City, NJ NGDC DEM, Research Report No. CACR-15-01, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
- Tehrani-rad, B., Kirby, J.T., **Callahan, J.A.**, and Shi, F., 2015. Tsunami inundation mapping for the northern half of the State of New Jersey, Research Report No. CACR-15-02, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
- Tehrani-rad, B., Kirby, J.T., **Callahan, J.A.**, and Shi, F., 2015. Tsunami inundation mapping for New York City, Research Report No. CACR-15-03, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware, 71 pp.
- Tehrani-rad, B., Kirby, J.T., **Callahan, J.A.**, and Shi, F., 2015. Tsunami inundation mapping for Montauk, NY NGDC DEM, Research Report No. CACR-15-04, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
- Tehrani-rad, B., Kirby, J.T., **Callahan, J.A.**, and Shi, F., 2015. Tsunami inundation mapping for Nantucket, MA NGDC DEM, Research Report No. CACR-15-05, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, University of Delaware.
- Tehrani-rad, Babak, Banihashemi, Saeidah, Kirby, James T., **Callahan, John A.**, and Shi, Fengyan, 2014. Tsunami Inundation Mapping for Ocean City, MD NGDC DEM, Research Report No. CACR-14-04, Center for Applied Coastal Research, Department of Civil and Environmental Engineering, UD, 58 pp.
- Callahan, John A.**, 2015. Analysis of Storm Surge and Tidal Data Relationships in the Delaware Inland Bays based on Meteorological Conditions, Technical Report prepared for Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs, 38 pp.

- Brinson, Kevin R., and **John A. Callahan**, 2013. Development and Support of a Hydrologic Monitoring Capability for Transportation in Delaware: Phase I Hydrologic Sensor Placement, Technical Report prepared for Delaware Department of Transportation, 49 pp.
- Leathers, Daniel J., **John A. Callahan**, and Kevin R. Brinson, 2013. Expansion of the Delaware Coastal Flood Monitoring System. Technical Report prepared for Delaware Department of Natural Resources and Environmental Control (DNREC) Delaware Coastal Programs. 27 pp.
- Callahan, John A.**, 2012. Delaware Geological Survey Node Development for Inclusion and Participation in the US Geoscience Information Network (USGIN). Technical Report prepared for Arizona Geological Survey, 116 pp.
- Callahan, John A.**, 2011. DGS Unveils New Website and Web-Mapping Services, *First State Geology*, Delaware Geological Survey Newsletter, 2011 Winter Edition, p. 2.
- Callahan, John A.**, 2011. Prototype Coastal Flood Monitoring System for Delaware, *First State Geology*, Delaware Geological Survey Newsletter, 2011 Winter Edition, p. 3.
- Callahan, John A.**, 2011. DataMIL Gets a New Look, *First State Geology*, Delaware Geological Survey Newsletter, 2011 Winter Edition, p. 4.
- Schenck, William S., and **John A. Callahan**, 2010. Delaware Geological Survey Digital Imagery Inventory. Final Report prepared for the USGS National Geological and Geophysical Data Preservation Program (NGGDPP). 26 pp.
- Callahan, John A.**, Christina L. Callahan, Richard S. Sacher, Michael B. Mahaffie, William, S. Schenck, Shannon S. Bain, and Robert E. Rinehart, 2002. The Delaware DataMIL: A Web-Based Mapping Collaboration. *ArcNews*, ESRI, Vol. 24, No. 2, Summer 2002. p. 18-19.
- Callahan, John A.**, 2002. Delaware: A National Map Pilot Project, *First State Geology*, Delaware Geological Survey Newsletter, Vol 20, No. 1, 2002 Winter Edition. p. 2.

SERVICE

Current UD Affiliations:

- Data Science Institute
- Center for Environmental Monitoring & Analysis
- Water Science and Policy Program
- DelawareView (local affiliate member accredited by AmericaView)

Current activities:

- National Climate Assessment 5 (**NCA5**) Chapter Author (Coastal Effects)
- US Climate Variability and Predictability Program (**CLIVAR**) Predictability, Predictions, and Applications Interface (**PPAI**) Panel
- Delaware River Basin Commission (**DRBC**) Advisory Committee on Climate Change (**ACCC**)
- Delaware State Hazard Mitigation Council (**SHMC**)
- Delaware Resilient & Sustainable Communities League (**RASCL**), Science/Research Committee
- Associate Member - Delaware, American Association of State Climatologists (**AASC**)
- Faculty Affiliate, Water Science and Policy Program, Univ of DE
- Affiliated Scientist, Center for Environmental Monitoring and Analysis (CEMA), Univ of DE
- **DeIDOT-TMC** Weather Group
- American Meteorological Society (**AMS**)
- American Geophysical Union (**AGU**)

- Provide real-time guidance on flooding hazards to state/local agencies with Delaware Emergency Management Agency (DEMA) and National Weather Service (NWS) during severe weather
- Provide planning guidance to state agencies on climate change and sea-level rise
- Multiple employee search and other internal committees
- Numerous public presentations and demonstrations to K-12 students/teachers

Contributor to:

- Delaware Sea Grant 15-second Science videos
- DGS Annual Report of Programs and Activities, 2014 – present.
- Delaware Homeowners Handbook to Prepare for Natural Hazards, (2019). Delaware Sea Grant.
- State of Delaware All-Hazard Mitigation Plan (2018), Delaware Emergency Management Agency (DEMA), <https://dema.delaware.gov/contentFolder/pdfs/HazardMitigationPlan.pdf>
- Connecting Our World: GIS Web Services (2003), Winnie Tang and Jan Selwood, ESRI Press.

Reviews:

- New Jersey Sea Grant Consortium Research Proposals
- He, Changming, Scott Andres, Kevin Brinson, and Tracy DeLiberty, 2020. Mapping evapotranspiration for 2016 growing season using Landsat 8 images and METRIC model, Sussex County, Delaware. Delaware Geological Survey, Report of Investigations 84. 29 pp.
- McKenna, Thomas E., 2018. Characterization of tidal wetland inundation in the Murderkill River Estuary. Delaware Geological Survey, Report of Investigations 81. 31 pp.
- Delaware Geographic Data Committee, contract proposals for state-wide orthophotography and landuse change mapping projects

Past activities:

Chair, Delaware SLR Technical Committee, 2015 – 2017
 AGU Natural Hazards Focus Group webmaster, 2015 – 2017
 Mid-Atlantic Coastal Resiliency Institute (MACRI), 2015 – 2016
 Delaware Elevation Data Working Group, 2009 – 2014
 GIS@UD User Group, 2001 – 2012
 Delaware Geographic Data Committee, 2001 – 2014
 Delaware DGDC I-Team, 2001 – 2008
 Chair, Metadata Subcommittee of the DGDC, 2002 – 2008
 Founder of the Delaware Geospatial Technology Group, 2007 – 2009
 Hosted first Google Developer Day at the University of Delaware, 2007
 Delaware Geospatial Information Clearinghouse, 2001 - 2007
 Chair, Delaware GIS Conference planning committee, 2002 - 2004
 Member, Delaware GIS Conference planning committee, 2001 - 2005

ACADEMIC TEACHING EXPERIENCE

Primary Instructor, Dept of Geography and Spatial Sciences, University of Delaware

Physical Meteorology, cross-listed with grad level
Introduction to Geographic Information Systems
Atmospheric Physics and Thermodynamics, cross-listed with grad level
Full of Hot Air: Understanding Climate Change
GIS in Natural Resource Management
Teaching Geography with Technology: A Special Summer Institute for Delaware Teachers
Climate and Life
Meteorology
Computer Methods in Geography

Online Course Development, Dept of Geography and Spatial Sciences, University of Delaware Geospatial Statistics and GIS Programming (*expected to be released 2022-2023*)

Guest Lecturer, University of Delaware

Meteorology, Physical Geography, Introduction to Data Analysis, Introduction to GIS, GIS in Public Policy, and GIS in Natural Resource Management

Graduate Teaching Assistant, Department of Geography, University of Delaware

Advanced Geographic Information Systems
Introduction to Environmental Remote Sensing
Seminar in Geographic Information Systems (graduate level course)
Introduction to Geographic Information Systems
Physical Climatology
Seminar in Geographic Information Systems (graduate level course)
Computer Methods in Geography

Graduate Teaching Assistant, Department of Physics and Astronomy, University of Delaware

Introductory Physics II
Introductory Physics I
Physical Science

Mathematics Learning Center, Tutor, University of Delaware, Jun 1995 - Aug 1995

Mathematics Learning Center, Head Tutor, Temple University, Oct 1991 - Dec 1993

SUPERVISORY AND MENTORING EXPERIENCE

Professional supervision:

2018 – 2021 Dr. Daniel Warner, GIS Analyst/Research Associate
2017 – 2019 Beatrice O’Hara, GIS Analyst
2015 – 2018 Dr. Naomi Bates, Research Associate

Masters committee:

2012 – 2014 Kateryna Samoteskul, UD CEOE School of Marine Science and Policy

Student supervision:

2021	Alexis Cervantes, Teaching Assistant for Understanding Climate Change
2017 – 2018	Catherine Medlock, Geological Sciences
2016 – 2017	Derek Schroeter, Geography
2016	Katharine Liming, Geography
2015	Peter Kinney, misc work employment
2014	Akeem Booker, Engineering
2012 – 2014	Amanda Lawson, Geography
2011	Brian Kinney, misc work employment
2010	Kyle Kinney, misc work employment
2008 – 2009	Sebastian Carisio, Geography
2003	Frank Pisan, Geography
2002	Laura Townsend, Teaching Assistant for GIS in Natural Resource Management
2002	Julia MacInnis, Geography
2001 – 2002	Kerri Steck, Geography

INVITED TALKS AND GUEST/EXPERT PANELS

The Rising Tide: Are We Prepared? University of Delaware, College of Earth, Ocean, and Environment, Ocean Currents Lecture Series, August 2021.

Future SLR Planning Scenarios for Delaware, City of Lewes Executive Committee on Resiliency, August 2021.

Solve Climate by 2030: A Global Dialog – Delaware, Panel Session. Bard College Center for Environmental Policy, April 2021.

Determining Future Sea-Level Rise Planning Scenarios for Delaware, DRBC Advisory Committee on Climate Change (ACCC) public meeting, December 2020.

Sea-Level Rise Projections and Impacts on Delaware. University of Delaware, College of Earth, Ocean, and Environment and Delaware Sea Grant, Coast Day, October 2020.

Hurricanes, Sea-Level Rise, and Coastal Flooding in the Mid-Atlantic. University of Delaware, College of Earth, Ocean, and Environment, Ocean Currents Lecture Series, September 2020.

Climate Change and Sea-Level Rise: Observations and Projections for the State of Delaware. NOAA Community Climate Adaptation Planning Training Course, St. Jones Reserve, Dover, DE, January 2019.

High Tide in Dorchester Documentary Film Screening. Guest panelist. Earth, Ocean, and Environment Club UD, Newark, DE, November 2018.

Determination of Future Sea-Level Rise Planning Scenarios for Delaware. 110th Annual Meeting of the Association of American State Geologists, Rehoboth Beach, DE, June 2018.

LiDAR Vertical Bias Estimation and DEM Correction in a Tidal Salt Marsh. 110th Annual Meeting of the Association of American State Geologists, Rehoboth Beach, DE, June 2018.

Determination of Future Sea-Level Rise Planning Scenarios for Delaware. Delaware River Basin Commission (DRBC) Flood Advisory Committee, Trenton, NJ, April 2018.

Storms, Climatology, and Changing Conditions in Delaware. Guest panelist. Delaware Resilient and Sustainable Communities League (RASCL) Climate Summit, Dover, DE, November 2017.

Past Observations and Future Projections of Climate in Delaware. Delaware March for Science and Our Earth, Newark, DE, April 2017.

Delaware Coastal Flood Monitoring System. Delaware River Basin Commission Flood Advisory Committee, Trenton, NJ, May 2016.

The Delaware Coastal Flood Monitoring System. MACRI Coastal Flooding Workshop, Clayton Hall Conference Center, Newark, DE, September 2015.

Monitoring Severe Weather and Flooding Hazards in Delaware's Environment. US Army Reserve Force Policy Committee (ARFPC), Bethany Beach National Guard Training Site, September 2015.

The Delaware Coastal Flood Monitoring System and Other Related Research, Inaugural meeting of the Mid-Atlantic Coastal Resiliency Institute (MACRI), Wallops Island, VA, August 2014.

Demonstration of the Delaware Coastal Flood Monitoring System, Delaware Emergency Management Agency (DEMA), Smyrna, DE, Summers 2012 and 2013.

A Coastal Flood Monitoring and Early Warning System for Delaware. Delaware Geological Survey Research Symposium, Newark, DE, April 2013.

The Delaware Coastal Flood Monitoring System, Delaware Sea-Level Rise Advisory Committee Meeting, St. Jones Reserve, April 2013.

University of Delaware's Offshore Wind Energy Workshop. Guest panelist, Queen Theater, Wilmington, DE, November 2011.

Open Geospatial Information: Trends and Technology. Plenary presentation at UD Geospatial Research Day, Newark, DE, November 2009.

A New Campus Mapping Initiative at the University of Delaware. Building and Maps Team, June 2008.

Drupal: A Content Management System, UD Web Developer Group and CMS Committee, Dec 2007.

GIS Portals and Web Mapping Services. Guest panelist at Northeast Map Organization (NEMO) Annual Conference, New York, NY, June 2007.

Potential role of the Delaware DataMIL (real-time online mapping) in emergency management and e911 projects. Delaware e911 Committee, Delaware Emergency Management Agency, Smyrna, March 2003.

The Delaware DataMIL: Delaware's Geography Network and contribution toward The National Map. University Consortium of Geographic Information Science (UCGIS) Winter Meeting, Presentations to members of US Congress, Washington D.C., February 2003.

Status of Geographic Information Systems in Delaware. University of Delaware, Center for Remote Sensing seminar series, Newark, DE, November 2002.

Publishing Geospatial Data in Delaware. Delaware Geographic Data Committee, Dover, DE, Aug 2002.

The Delaware DataMIL. Plenary presentation at the ESRI User Conference (12,000+ attendees), San Diego, CA, July 2002.

The Delaware Data Mapping and Integration Laboratory (DataMIL). Plenary presentation at the Delaware State GIS Conference, Rehoboth Beach, DE, April 18, 2002.

The Delaware Data Mapping and Integration Laboratory (DataMIL). Plenary presentation at the ESRI Federal User Conference, Washington, D.C., April 3, 2002.

The Delaware Data Mapping and Integration Laboratory (DataMIL). Briefing to the USGS Cooperative Topographic Mapping (CTM) Group, USGS Headquarters, Washington, D.C., March 20, 2002.

The Delaware Data Mapping and Integration Laboratory (DataMIL). USGS The National Map Developer's Workshop, EROS Data Center, USGS, Sioux Falls, SD, March 6-8, 2002.

The State of GIS in Delaware. UD Department of Geography seminar series, February 15, 2002.

An Overview of the Delaware DataMIL, Delaware Geological Survey, Newark, DE, December 2001.

The Delaware DataMIL. Delaware State Mapping Advisory Committee, Newark, DE, October 2001.

The Delaware DataMIL: Data Mapping and Integration Laboratory. Delaware Geographic Data Committee (DGDC) meeting, Dover, DE, August 2001.

Introduction to GIS, co-presented to the UD Nursing Department, Morris Library Lunchtime Lecture Series, University of Delaware, Newark, DE, April 2001.

How to Organize Problem Solving Sessions and Making Sense of Student Feedback. Session co-presenter, Annual Graduate Student Orientation Teaching Assistant Conference, Center for Teaching Effectiveness, University of Delaware, Newark, DE, August 1998.

Research Life as a Graduate Student. Delaware Organization of Undergraduate Geographers (DOUG), Newark, DE, March 1997 and May 1998.

Teaching Laboratory Sciences. Guest panelist, Annual Graduate Student Orientation Teaching Assistant Conference, Center for Teaching Effectiveness, University of Delaware, Newark, DE, August 1995.

PRESS AND MEDIA COVERAGE

Interviewed and quoted through several media outlets, including *FactCheck.org*, *Delaware Public Media: Delaware's source for NPR News*, *DelawareOnline - The News Journal*, *DelmarvaNow*, *Cape Gazette: Covering Delaware's Cape Region*, *WRDE – Delmarva's NBC Affiliate*, *Chesapeake Bay Journal*, *WHYY.org*, *UDaily – University of Delaware News Service*

Interviewed by numerous students for UD coursework and student newspaper *The Review*.

News brief video on sea-level rise in Delaware for UDaily news service,
<https://www.youtube.com/watch?v=xNa7OLaW7K0>

Documentary video “How Sea Level Rise is Affecting Delaware?” UD student network STN49.

WORKSHOPS (DEVELOPED/TAUGHT)

Fifth National Climate Assessment (NCA5) Public Engagement Workshop, Coastal Effects Chapter (virtual), sponsored by US Global Change Research Program, January 2022.

Severe weather and coastal flooding training workshop for Delaware Emergency Management Agency (DEMA), Newark and Smyrna, DE, October 2018 and November 2019.

Delaware Environmental Sensing Symposium. Sponsored by Delaware DNREC Delaware Coastal Programs, Clayton Hall Conference Center, Newark, DE, January 2017.

Workshop on Integrating Coastal Flood Research, Modeling and Monitoring to Improve Coastal Resiliency in the Mid-Atlantic. Sponsored by Mid-Atlantic Coastal Resilience Institute (MACRI), Delaware Sea Grant, and the University of Delaware, Clayton Hall Conference Center, Newark, DE, September 2015.

Delaware High Water Mark Workshop. Sponsored by Delaware Sea Grant, University of Delaware, St. Jones Reserve Training Facility, Dover, DE, November 2014.

Training workshop on the Delaware Coast Flood Monitoring System, for Delaware Emergency Management Agency (DEMA) and Kent County emergency management personnel, St. Jones Research Reserve Training Facility, Dover, DE, June 2011.

Google Maps Developer Technical Workshop, Delaware State GIS Conference, Sheraton Conference Center, Dover, DE, May 2007.

The Hitchhikers Guide to the Galaxy of Geospatial Metadata. Pre-conference workshop, Delaware State GIS Conference, Clayton Hall Conference Center, Newark, DE, June 2006.

Introduction to GIS. Two-day workshop to University of Delaware College of Marine and Earth Science (CMES) faculty, staff and students, Lewes, DE, January 2006.

Introduction to ArcGIS 9.0: Highlights and New Features. GIS@UD technical workshop, Newark, DE, May 2004 and April 2005.

Overview of the Geoprocessing Framework in ArcGIS 9. GIS@UD technical workshop, Newark, DE, November 2004.

Using ArcSDE and ArcIMS to Support Teaching, University of Delaware, Newark, DE, Fall 2004.

Using the RDMS Nationwide Geocoding Service and General Geocoding Techniques in ArcGIS, University of Delaware, Newark, DE, Fall 2004.

Introduction to ArcIMS and WMS Web Mapping Services: What Are They and How Can I Use Them? Pre-conference workshop, Delaware State GIS Conference, Dover, DE, April 2004.

Introduction to Web Mapping Services. GIS@UD technical workshop, Newark, DE, March 2004.

Introduction to ArcGIS Spatial Analyst. GIS@UD technical workshop, Newark, DE, Spring 2003.

Hydrologic Modeling using GIS. GIS@UD technical workshop, Newark, DE, November 2002
G.NET: Case Studies of GIS State Programs that Build the Spatial Data Infrastructure, John Callahan (co-presenter representing Delaware), ESRI International User Conf, San Diego, CA, July 8-12, 2002.

Introduction to ArcIMS: A Hands-On Approach. GIS@UD technical workshop, Newark, DE, September 2002.

Internet Mapping using ArcIMS. Two-day seminar to the USGS Mid-Continent Mapping Center, USGS Central Region, Rolla, MO, August 2002.

GIS Career Student Workshop. University of Delaware, Newark, DE, November 2001.

Introduction to Internet Mapping using ArcIMS. GIS@UD technical workshop, Newark, DE, June 2001.

Intermediate ArcView. Full-day training workshop, Pennsylvania State GIS Conference, Harrisburg, PA, June 2000.

The Delaware NSDI Metadata Clearinghouse: An Overview and Demonstration, co-presented a workshop on the creation, use, and distribution of metadata, Delaware State GIS Forum Conference, Clayton Hall Conference Center, Newark, DE, March 1999.

Co-presented workshops on “How to Organize Problem Solving Sessions” and “Making Sense of Student Feedback” as part of the Annual Graduate Student Orientation Teaching Assistant Conference, organized by the Center for Teaching Effectiveness, University of Delaware, August 1998.

Introduction to GIS. Technical workshop designed for the Center for Drug and Alcohol Studies (CDAS) and Disaster Research Center (DRC), Newark, DE, July 1997.

K-12 ACTIVITIES

Service to K-12 Students:

- Interview for 7/8th Grade S.T.E.A.M. Project, Cab Calloway School for the Arts, DE, 2020.
- Climate and Weather, 3rd Grade, Hillside Elementary, Montclair, NJ, 2020.
- Climate and Weather, 6th Grade, Simon Baruch Junior High School, Manhattan, NY, 2020.
- Introduction to GPS and GIS, Jr/Sr High School Marine Science class, Newark Charter Jr/Sr High School Marine Science class, Newark, Delaware, 2019.
- Field work demonstration at Peterson Wildlife Refuge, Newark Charter Jr/Sr High School Marine Science class, Newark, Delaware, 2019.
- Dinner with a Scientist, Climate and “Normal” Weather, 6th Grade, NCS, 2017.
- Dinner with a Scientist, **Weather and Remote Sensing**, 5th Grade, NCS, 2016.
- Career Night, Hurricane Sandy Preparedness & Response Careers, 5th Grade, NCS, 2013.
- Weather Observation Methods on the Surface and from Space, 4th Grade classes, NCS, 2012.

Training and Education to K-12 Teachers:

- Introduction to GPS and GIS, Gunning Bedford MS, New Castle, DE, 2002.
- Integrating GPS and GIS Workshop, DGA, Fifer Middle School, Camden, DE, 2001.
- Geography and Technology workshop, co-developed/taught 3-day workshop for Delaware Geographic Alliance Technology Institute, University of Delaware, July 23 – 25, 2001.
- Teaching Geography with Technology: A Special Summer Institute for Delaware State Teachers, co-developed/co-taught two-week 3 credit course, July 1999.
- Geography and Technology in the Classroom with Special Focus on the ArcView Geographic Information System, workshop as part of the Advanced Teacher Institute held at the University of Delaware, Delaware Geographic Alliance (DGA), 1998.
- Geography and Technology with Special Focus on the ArcView Geographic Information System, St. Mark’s High School, Delaware Geographic Alliance (DGA), Wilmington, DE, 1998.
- ArcView GIS, designed for the Delaware Geographic Alliance (DGA) as part of a two-week training session given to Delaware K-12 school teachers, 1997.

Miscellaneous:

- Newark Charter School Parent Council, 2016 – 2018.
- Helped write and proctor exams for the **Delaware Science Olympiad: Remote Sensing Event** – Division C, High School level, 2003 – 2012.
- Member of the DGDC GIS in Education Committee, 2005 – 2009.
- Willis, Dawn, Jacqui Wilson, and John Callahan, 1999. Teaching Geography with Technology: A Special Summer Institute for Delaware State Teachers, *Proceedings of the 84th Annual Meeting of the National Council of Geographic Education*, Boston, MA, November 3 – 6, 1999.

APPLICATION DEVELOPMENT AND TECHNICAL SKILLS

Programming languages:	Matlab, Python, R, PHP, Fortran, Javascript, VB/ASP
GIS software:	ArcGIS Desktop, ArcInfo, QGIS, GDAL/OGR, IDV, SAGA GIS, ENVI, ERDAS IMAGINE, MapServer, GeoServer, ArcIMS/ArcGIS Server
Stat/Misc Packages:	JMP Pro, USGS Hydroclimate, USACE HEC-DSSVue, FEMA HAZUS-MH, GrADS, McIDAS-X, LaTeX, Photoshop/GIMP Website development, CMS management, Database management
Developed web applications:	Delaware Coastal Flood Monitoring System, 2013 – present http://www.coastal-flood.udel.edu DGS public website, 2009 – 2021 http://www.dgs.udel.edu Delaware Geologic Information Resource (DGIR), 2011 – 2021 http://maps.dgs.udel.edu Delaware Aerial Imagery Tile Server, 2014 - 2016 Delaware Data Mapping and Integration Laboratory, 2001 – 2015 Delaware Geospatial Information Clearinghouse, 2001 - 2008 Delaware Census Mapper, 2001 - 2008 UD Buildings and Maps viewer, 2000 – 2007

ADDITIONAL TRAINING

Write Winning Grant Proposals for USDA, NSF, and NIH, presented by Grant Writers' Seminars & Workshops, in association with University of Delaware Career Development Office, June 2021.

Machine Learning in Python for Environmental Science Problems, AMS Short Course, American Meteorological Society (AMS), April 2021.

Making Sense of Climate Science Denial (<https://www.edx.org/course/making-sense-of-climate-science-denial>), Massive Open Online Course (MOOC), University of Queensland, Australia, Fall 2020.

FEMA E172 HAZUS for Flood instructor-led training course. Sponsored by Delaware Emergency Management Agency and Delaware Dept of Technology and Information, Dover, DE, 2014.

Numerous meteorology online courses from UCAR COMET Community Programs (MetEd)
Numerous GIS courses from ESRI Virtual Campus

GIS Portal Toolkit training course, ESRI, Redlands, CA, 2005.

Introduction to Geodatabases, ESRI. University of Delaware GIS Lab, Newark, DE, 2002.

Introduction to ArcSDE with Oracle Database training class, ESRI, Redlands, CA, 2000.

Microsoft Active Server Pages/SQL Server Development, King of Prussia, PA, 2000.

SOLICITED CONFERENCE POSTERS AND PRESENTATIONS

- Prediction of Storm Surge in the Delaware Inland Bays using Machine Learning Methods, John Callahan (presenter), Data Science Symposium 2021, University of Delaware, November 2021.
- Skew Surge and Coastal Flooding from Tropical Cyclones in the Delaware and Chesapeake Bays for 1980 – 2019, John Callahan (presenter), Daniel Leathers, and Christina Callahan. American Meteorological Society (AMS) 101st Annual Meeting, 19th Symposium on the Coastal Environment, January 2021.
- Total Water Levels, Storm Surge, and Inundation Frequency along Delaware's Coasts, John A. Callahan (presenter). Delaware Wetlands Conference, Wilmington, DE, January 2020.
- Vulnerability of Stored Soil Carbon in Delaware's Coastal Wetlands, Daniel L Warner (presenter), John A Callahan, and Tom McKenna. Delaware Wetlands Conference, Wilmington, DE, Jan 2020.
- LiDAR Vertical Bias Assessment and Digital Elevation Model Correction of Tidal Salt Marshes in Delaware (poster), Catherine Medlock (presenter), Thomas E. McKenna, John A. Callahan, and Daniel Warner. Delaware Wetlands Conference, Wilmington, DE, January 2020. (**Awarded best student poster.**)
- Influences of Atmospheric and Oceanic Teleconnections on Delaware Coastal Storm Frequency and Intensity, 1951 – 2018 (poster), John Callahan, Nicholas Butler, and Jeremy Chapman. Grand Challenges in Water Sustainability Symposium: Science, Management and Policy for Water, Delaware National Estuarine Research Reserve, Dover, DE, June 2019. (**Awarded 2nd place student poster competition.**)
- A Hybrid Approach for Incorporating High-Resolution LiDAR DEMs into USGS StreamStats at the State Level (poster), Daniel Warner, John Callahan, and Beatrice O'Hara. Association of American Geographers (AAG) Annual Meeting, Washington, D.C., April 2019.
- A Hybrid Approach for Incorporating High-Resolution LiDAR DEMs into USGS StreamStats at the State Level (poster), Daniel Warner (lead), John Callahan, and Beatrice O'Hara. Human and Climate Series II: Future of Water in the Mid-Atlantic: Agriculture, Restoration and Technology Symposium, Stroud Water Research Center, Avondale, PA, March 2019.
- Towards a hydrological characterization of Delaware Bay Tidal Wetlands - Elevation and tidal channels (poster). Tom McKenna (lead), Catherine Medlock, and John Callahan. Delaware Applied Coastal Research Symposium, Clayton Hall Conf Center, Newark, DE, March 2019.
- A Dendroecological Investigation of the Demise of the Atlantic White Cedar Freshwater Tidal Wetland in Kent County, Delaware, Stephanie Stotts (presenter), Olivia Gullede, and John Callahan. Delaware Applied Coastal Research Symposium, Clayton Hall Conf Center, DE, March 2019.
- Update to USGS StreamStats for Delaware, Beatrice O'Hara (presenter) and John Callahan. Delaware Estuary Science & Environmental Summit, Cape May, NJ, January 2019.
- Determining Flow Paths for Flooding and Draining in Slaughter Beach, Delaware (poster), Thomas McKenna (lead), John Callahan, Kevin Brinson, David Huntley, and Damaris Slawik. Delaware Emergency Management Agency. Delaware Estuary Science & Environmental Summit, Cape May, NJ, January 2019.
- Determination of Future Sea-Level Rise Planning Scenarios for Delaware, John Callahan (presenter). Delaware Wetlands Conference, Wilmington, DE, January 2018.
- Top Coastal Flooding Events in Delaware, John Callahan (presenter). Delaware Wetlands Conference, Wilmington, DE, January 2018.
- An Improved Digital Elevation Model for St. Jones and Blackbird Creek Reserves, John Callahan (presenter). Delaware Wetlands Conference, Wilmington, DE, January 2018.

Fieldwork and Dataset Preparation to Create an Improved Digital Elevation Model for St. Jones and Blackbird Creek Reserves (poster), Catharine Medlock (lead), Naomi Bates, Thomas McKenna, and John Callahan. Delaware Wetlands Conference, Wilmington, DE, January 2018.

Determination of Future Sea-Level Rise Planning Scenarios for Delaware, John Callahan (presenter). Coastal GeoTools Conference, Charleston, SC, February 2017.

Delaware Joins the National Ground-Water Monitoring Network, A.S. Andres (presenter), T.E. McKenna, C. He, D.R. Wunsch, and J.A. Callahan. National Ground Water Association Summit, April 25, 2016, Denver, Colorado, April 2016.

Real-time Monitoring and Analysis of Coastal Storms in Delaware (poster), Christina Callahan (lead), John Callahan, Kevin Brinson, and Daniel Leathers. Rising Seas and Extreme Events on Vulnerable Coasts: A Symposium Honoring Brian F. Atwater, USGS, BENJAMIN FRANKLIN MEDALIST in Earth and Environmental Science, Newark, DE, April 20, 2016.

Characterization and Application of 2014 Delaware LiDAR Data (poster), Naomi Bates (lead) and John Callahan. Rising Seas and Extreme Events on Vulnerable Coasts: A Symposium Honoring Brian F. Atwater, USGS, BENJAMIN FRANKLIN MEDALIST in Earth and Environmental Science, Newark, DE, April 20, 2016.

Analysis of Tides and Storm Surge from Observations Records in the Delaware Inland Bays, John Callahan (presenter). Coastal GeoTools Conference, Charleston, SC, April 2015.

Tide Gage Observations of Coastal Inundation in the Delaware Inland Bays, John Callahan (presenter). Delaware Estuary Science & Environmental Summit, Cape May, NJ, January 2015.

Development of a High Water Mark Database and Display System for Coastal Flooding Events in Delaware (poster), John Callahan (lead), Tina Callahan, Kevin Brinson, Dan Leathers, and Hunter Brown. Delaware Estuary Science & Environmental Summit, Cape May, NJ, Jan 2015.

Tsunami Inundation Mapping for the Upper East Coast of the United States (poster), Babak Tehranirad (presenter), James T Kirby, Fengyan Shi, Saeideh Banihashemi, Stephan T Grilli, Annette Grilli, Tayebeh Tajali Bakhsh, and Chris O'Reilly, AGU Annual Conference, San Francisco, Oct 2014.

Map Services, Metadata, and More: Delaware Geological Survey Participation in the United States Geoscience Information Network (USGIN), John Callahan (presenter). USGS/AASG Digital Mapping Techniques (DMT) Conference, Newark, DE, June 2014.

The Delaware Coastal Flood Monitoring System (poster), Christina Callahan (lead), Dan Leathers, Kevin Brinson and Linden Wolf. Delaware National Estuarine Research Reserve (DNERR) Research Symposium, Dover, DE, March 2014.

Changing Vessel Routes Could Significantly Reduce the Cost of Future Offshore Wind Projects (poster), Kateryna Samoteskul (lead), Jeremy Firestone, John Callahan, and James Corbett. Society for Benefit-Cost Analysis (SBCA) 2014 Annual Conference and Meeting, March 2014.

Changing Vessel Routes to Open Areas for Wind Development Could Generate Significant Societal Benefits (poster), K. Samoteskul (lead), J. Firestone, J. Callahan, and J. Corbett. American Wind Energy Association (AWEA) Offshore Wind Power Conference, Providence, RI, October 2013. (**Awarded best student poster.**)

Costs and Benefits of Rerouting Vessel Traffic to Open Shallow Waters for Offshore Wind Development (poster), Kateryna Samoteskul (lead), Jeremy Firestone, John Callahan, and James Corbett. American Wind Energy Association (AWEA) Wind Power Conference, Chicago, IL, May 2013.

The Delaware Coastal Flood Monitoring System, John Callahan (presenter). Delaware Sea-Level Rise Advisory Committee Meeting, St. Jones Reserve, Dover, DE, April 2013.

The Role of the Delaware Geological Survey in Support of Delaware's Planning and Preparedness for Hurricane Sandy, David Wunsch (lead), John Callahan, and Kelvin Ramsey. 48th Annual Meeting of the Geological Society of America – Northeastern Section, March 2013.

The Delaware Coastal Flood Monitoring System, John Callahan (presenter), Delaware Estuary Science and Environmental Summit, Cape May, NJ, January 2013.

Evaluation of Water Level Forecasts from Hydrodynamic Models in Delaware Bay (poster), Linden Wolf (lead), Kevin Brinson, Daniel Leathers, John Callahan, Weihan Chan, Alison Hayes. Delaware Estuary Science and Environmental Summit, Cape May, NJ, January 2013.

The Delaware Geologic Information Resource (poster), John Callahan (lead), David Wunsch, and Sandy Schenck. Delaware Estuary Science and Environmental Summit, Cape May, NJ, January 2013.

Tsunami Hazards on the US East Coast: Inundation Mapping and Tsunami Processes over a Wide Shelf (poster), Babak Tehranirad (lead), James T Kirby, Fengyan Shi, John Callahan, Jeffrey C Harris, Stephan T Grilli, Tayebeh S. Tajali Bakhsh, and Elise Estivals. American Geophysical Union Fall Meeting, December 2012.

Costs and Benefits of Rerouting Vessel Traffic to Open Shallow Waters for Offshore Wind Development (poster), Kateryna Samoteskul (lead), Jeremy Firestone, John Callahan, and James Corbett. American Wind Energy Association Offshore Wind Power Conference, Virginia Beach, VA, October 2012.

A Coastal Flood Monitoring System for Delaware, John Callahan (presenter), Kevin Brinson, Daniel Leathers, David Legates, and Linden Wolf. Association of American Geographers (AAG) Annual Meeting, New York, NY, April 2012.

A Web-based System for the Delivery of Hydrogeologic Data, Delaware Estuary Science and Environmental Summit, Cape May, NJ, February 2011.

A Prototype Coastal Flood Monitoring System for Delaware, John Callahan (presenter), Kevin Brinson, Daniel Leathers, David Legates, Linden Wolf, John Talley. Delaware Estuary Science and Environmental Summit, Cape May, NJ, February 2011.

Development of a GIS Database in a Marine Spatial Planning Context for Offshore Wind Power in Delaware, John Callahan (presenter), A. Bates, K. Samoteskul, J. Firestone, and J. Corbett. Delaware Estuary Science and Environmental Summit, Cape May, NJ, February 2011.

Comparative Quantitative Estimates of Decreased Encounter Probabilities in the Right Whale Habitat through Shifting Vessel Traffic, J.J. Corbett (presenter), J. Callahan, T. Callahan, and J. Firestone. Right Whale Consortium Annual Meeting, New Bedford, MA, November 2007.

The Delaware Geospatial Information Clearinghouse (oral presentation and poster), John Callahan (presenter) and Christina Callahan. Delaware GIS 2006 Conference, May 2006.

Integrating GIS into Wetland Functional Assessment. Whelchel, Adam W. (presenter) and John A. Callahan. Delaware GIS Conference, Rehoboth Beach, DE, April 2005.

The University of Delaware: A Self-Sustaining GIS Community, John Callahan (presenter) and Christina Callahan, 2003 ESRI Education User Conference, San Diego, CA, July 2003.

The Delaware DataMIL: Lessons Learned and Progress Made, John Callahan (presenter). ESRI International User Conference, San Diego, CA, July 2003.

The Delaware DataMIL: Delaware's Geography Network and Contribution Toward The National Map, John Callahan (presenter), Pennsylvania GIS Conference, Harrisburg, PA, June 2003.

Delaware Census 2000, Christina Callahan (presenter), Richard Sacher, and John Callahan. ESRI International User Conference, San Diego, CA, July 8-12, 2002.

GIS Day 2000 Activities for K-12 Students and Educators, John Callahan (presenter), Delaware State GIS Conference, Dover, DE, November 2000.

Workshop on Inquiry Learning, Center for Teaching Effectiveness, University of Delaware, October 1998.

Estimating Precipitable Water Fields Over the Amazon Basin Using GOES Imagery, John Callahan (presenter). Association of American Geographers Annual Meeting, Boston, MA, March 1998.

- A Regional-Scale Investigation of the Hydrologic Cycle in Amazonia Using a GIS, John Callahan (presenter). University Consortium for Geographic Information Science (UCGIS) Annual Retreat and Assembly, Bar Harbor, ME, June 1997.
- Solar Radiation Modeling in the Coterminous United States: A Case Study using GIS, John Callahan (presenter). University Consortium for Geographic Information Science (UCGIS) Annual Retreat and Assembly, Bar Harbor, ME, June 1997.
- Precipitable Water Estimation in the Amazon River Basin from Remotely Sensed Data, John Callahan (presenter). Association of American Geographers Annual Meeting, Fort Worth, TX, Mar 1997.
- Workshop on Active Learning Techniques, Center for Teaching Effectiveness, University of Delaware, November 1996.
- Precipitable Water Estimation in the Amazon River Basin from Remotely Sensed Data, John Callahan (presenter). Association of American Geographers Middle-States Division Annual Meeting, Philadelphia, PA, October 1996.

RESEARCH ASSISTANT EXPERIENCE

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| Sept 1998 - Sept 1999 | Research Data Management Services, University of Delaware, Graduate Research Assistant. Research and educational support to UD faculty, students and staff in GIS/mapping, geospatial modeling, web development and distribution of databases, GIS and demographic data management. |
| Sept 1996 – Aug 1998 | Department of Geography, University of Delaware, Graduate Research Assistant. Developed an idealized model of solar radiation reaching the land surface (using Fortran and GIS), including standard atmospheric profiles, cloud data from satellite ISCCP datasets, and parameterizations for cloud short and long-wave radiative effects. |
| Jun 1997 - Aug 1997 | Delaware Geological Survey, University of Delaware. GIS and IT programmatic consultant for a variety of projects, including creating large-scale plots for the Delaware Coastal Salinity Project, and writing Qbasic programs that connect to USGS stream gauges and dynamically plot river flow in near real-time. |
| Jun 1997 - Aug 1997 | Center for Drug and Alcohol Studies, University of Delaware. GIS, mapping, and statistical data analysis consultant for a variety of projects. |
| Jan 1996 - Dec 1996 | Department of Geography, University of Delaware, Graduate Research Assistant. Investigated hydrometeorological processes in the Amazon River Basin form in situ observations and remote sensing techniques. |
| Jun 1993 - Aug 1993 | State University of New York at Stony Brook, Nuclear Structure Laboratory. Research Experience for Undergraduates (REU) program. Experimental equipment setup and data analysis of Chlorine/Molybdenum - Neodymium nucleus-nucleus scattering. |

Dec 1992 - May 1993	Department of Chemistry, Temple University, Research Assistant. Thermosetting and curing of polymer resins. Received training on the FT-Raman Spectroscope.
Jun 1992 - Aug 1992	State University of New York at Stony Brook, High Energy Nuclear Physics. Research Experience for Undergraduates (REU) program. Studied proton-proton collisions in the D0 chamber at Fermilab.
Jun 1989 - Aug 1990	Naval Air Development Center, Warminster, PA. Mechanical Engineering Technician. Created and cured carbon fiber/graphite materials using in-house Autoclave. Prepared samples, performed visual and mechanical testing, documented results.
Dec 1990 - Jan 1991	
Jun 1991 - Aug 1991	