Written Testimony of

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Former President of the American Meteorological Society

Before the Committee on Science, Space, and Technology of the United States House of Representatives

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Understanding, Forecasting, and Communicating Extreme Weather in a Changing Climate

2318 Rayburn House Office Building

Washington D.C.

Clarity on Extreme Weather-Climate Change Attribution, Messaging, and Steps Forward

Key Takeaway Points

Your constituents, my fellow citizens, and my two kids feel the impacts of extreme weather in their lives and "kitchen table" issues. It's not about polar bears or the year 2080.

- Attribution studies affirm that the influence of climate change is found in contemporary extreme weather events affecting the United States.
- Extreme weather events impact people, infrastructure and processes more than "average" events. Our agricultural, energy, water, transportation, public health, and national security institutions are at risk, and this ultimately affects American households and beyond. We must message the risks and impacts with such context in mind rather than using distant and abstract concepts.
- Robust science and technology resources must be sustained at local to federal levels.
- We must keep a close eye on the well-being of vulnerable populations and disparities in climate resiliency.

Introduction

I would like to thank Chairwoman Eddie Bernice Johnson and her colleagues on the Science, Space, and Technology Committee for an opportunity to share my thoughts and expertise on contemporary extreme weather and its context within a changing climate. In 2013, I sat before the Senate Environment and Public Works Committee on a similar topic.[1] Two key messages that I delivered to the Committee at that time were:

- Climate change is increasing the probability of extreme events, and in some cases may be strengthening their intensity or increasing their frequency (i.e. we are loading the dice towards more Sandy or blizzard type storms)

- There is strong evidence that increases in some types of extremes are linked to human-induced climate change, notably extreme heat, coastal flooding, and heavy downpours.

For other types of extremes, such as tornadoes, current evidence is much more limited

Since 2013, there is nothing that I would change about those statements except amplifying and affirming them with greater vigor.

While in elementary school, I did a science project called "Can A 6th Grader Predict The Weather?" As a child, I was in awe of the weather but naively never understood that it could fundamentally alter the lives of families, disrupt our economy, take human lives, or threaten national security. I was just a boy from Canton, Georgia making weather instruments from things around the house and charting local weather patterns. That passion for the weather set the course for my educational and professional career. However, the blinders of youthful naivety are gone. Extreme weather within a changing climate is one of the most pressing concerns of this generation and those to come. From my lens as a scientist, professor, and the former president of the American Meteorological Society (AMS), I would like to discuss extreme weather attribution, messaging, and pathways forward.

Contemporary Extreme Weather Within the Context of Climate Change

Earlier this month, talented colleagues at the National Hurricane Center and National Weather Service monitored Hurricane Dorian. Dorian was a human tragedy for parts of the Bahamas because it stalled in that region as a major hurricane with powerful winds, storm surge, and multiple feet of rainfall.[2] Dorian eventually paralleled the U.S. coast as forecasted and created challenges for the East Coast of the United States. Dorian joins Michael, Harvey, and Maria as billions dollar+ weather events that took the lives of people. Their names will be retired, and people will ask how they are connected to climate change. These storms certainly

exhibited characteristics of processes reported in the scientific literature: Rapid intensification[3], stalling[4], and higher sea levels within storm surges[5]. However, the process of extreme weather attribution must be carefully considered without hype, speculation, and social media debates.

Many of these same questions are posed about recent heat waves, fires in Alaska, flooding, and drought activity impacting agricultural lands. In 2016, I served as a co-author on a study conducted by The National Academies of Sciences, Engineering, and Medicine[6] called "Attribution of Extreme Weather Events in the Context of Climate Change." A key finding from the report is that scientific studies are able to provide some degree of attribution with moderate to high confidence for certain weather events (Figure 1). I should caution that it is irresponsible to link singular events to climate change with the "ill-posed" question, "Was that hurricane, flood, or drought caused by climate change?" However, confidence is growing that the fingerprint of climate change is firmly seen in extreme temperature events (e.g. extreme heat and lack of extreme cold events). Attribution of extreme rainfall, hydrological drought, and hurricanes are found in the moderate confidence category. There is little to no confidence in attribution of tornadic storms or Nor'easter-Mid-latitude cyclone type storms.

The American Meteorological Society recently weighed in on Attribution in its Information Statement on Climate Change[7]:

> *"Heavy precipitation (e.g., maximum daily precipitation in consecutive 5-year segments) has increased in both intensity and frequency since 1900, especially in the eastern half of the United States and notably in the Northeast. Areas that receive limited precipitation, sometimes called drylands, are increasing in area. The combination of warmer temperature and reduced precipitation in some regions has increased the risk of drought and drought-related impacts. There is evidence that wildfire seasons are increasing*

globally and areas where wildfires occur are expanding…The number and intensity of Atlantic hurricanes have both increased since the early 1980s, but much of this increase may be due to natural variability of the atmosphere and ocean. Furthermore, there is little trend or even a decrease in hurricane activity in other ocean basins, so the global trend, if there is one, is not clear. There is evidence that ocean warming is providing more energy to make hurricanes more intense….There is no sign of an increase in the most violent U.S. tornadoes (those rated EF4 or EF5 on the Enhanced Fujita Scale). However, there is evidence that annual U.S. tornado activity has become more variable since the 1970s, with larger tornado outbreaks separated by longer periods of below-average tornado frequency."

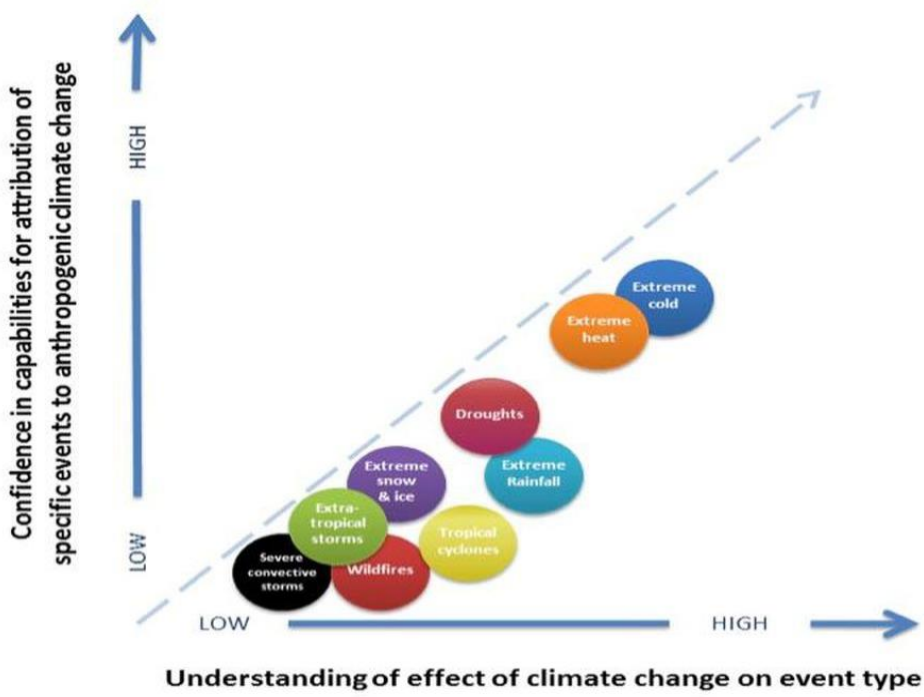

Fig. 1 Confidence, based on current literature, in extreme weather linkages to climate change (NAS, 2016).

Our methodology for confidence in the National Academies study relied on sound physical principles, consistent observational evidence, and the ability for numerical models to reproduce the event. These "three legs of the stool" served as the benchmarks in our review of studies and scientific methodologies. Many events ranked lower on the confidence scale may ultimately end up higher as the science evolves. There is emerging literature that may increase our confidence going forward. For example, the best consensus on hurricanes and climate change points to less frequent but stronger storms. However, emerging studies find that hurricanes are stalling more frequently as we witnessed with Imelda (2019), Harvey (2017), Dorian (2019), and Florence (2018).

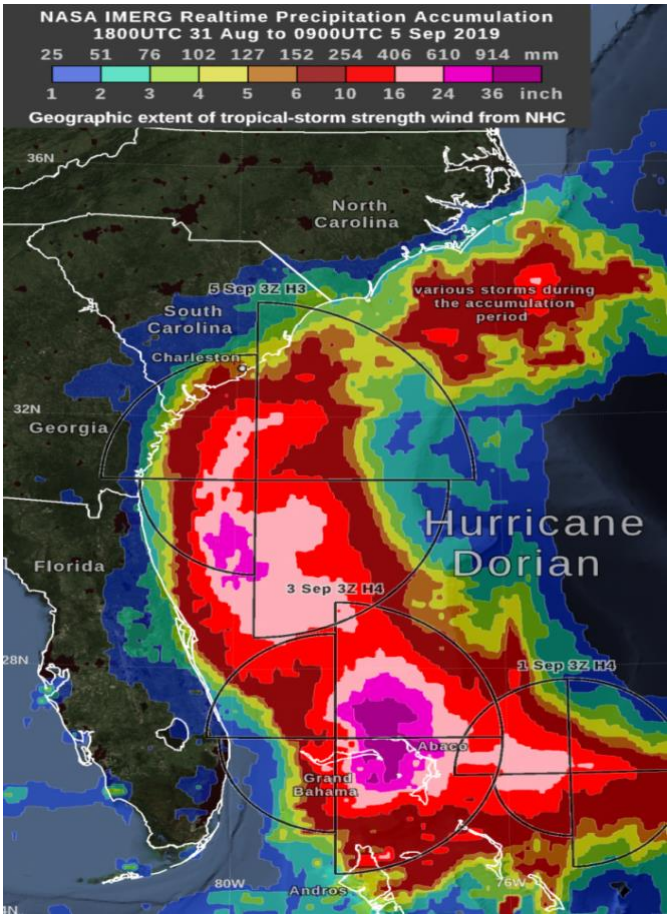

Fig. 2 Rainfall footprint of Hurricane Dorian (2019) as measured by NASA satellite-based instrumentation associated with the Global Precipitation Measurement Mission (GPM).

Indeed, climate changes naturally and always has. I assure you that every climate scientist of significance understands this fact. It is often amusing when people remind degreed scientists of this fact in the mall, at dinner or on social media. It is not an "either/or" proposition. It is an "and" proposition. Grass grows naturally, but it grows very differently when soil is fertilized. Our climate is being fertilized by increasing levels of greenhouse gases (GHGs) in our atmosphere, and I want to be crystal clear here that GHGs are the dominant source for warming.[8] Suspended particulates (aerosols)[9] and land use changes[10] related to deforestation, urbanization, and agriculture also play important roles in changes being observed from local to global scale. All aspects of the Earth's system, including weather, are responding. For example, NOAA recently updated what constitutes a 100 or 1000 year event in Texas because of changes in rainfall intensity.[11] This will have implications on the National Flood Insurance Program and infrastructure design.

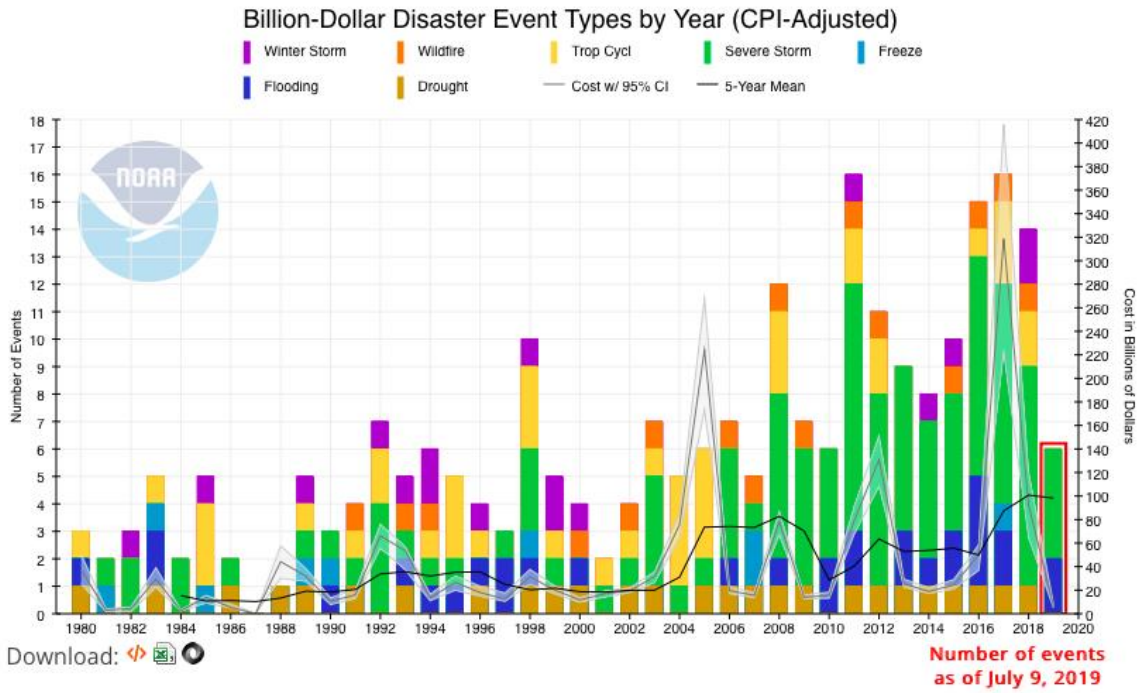

Fig. 3 Trends in billion-dollar disasters (Source: NOAA-NCEI).

Messaging Emergencies in the Extreme Weather-Climate Change Connections

In 2018, there were 39 billion-dollar+ disasters. According to the annual report of Aon, a leading insurance broker, insured dollars totaled $90 billion, which is the fourth highest inflation-adjusted number of such events on record.[12] Of those events, the United States tallied 16 of them, the most of any country and second-highest on record according to Dr. Jeff Masters.[13] The U.S. experienced 20 billion-dollar+ weather disasters in 2017. As a reference, there were only 28 billion dollar events within the entire decade of the 1980s according to data from the National Oceanic and Atmospheric Administration and NBC News.[14] Trends certainly indicate an uptick in both weather disasters (Figure 3) and infrastructure[15]. This suggests that the United States faces amplified and compounded risks from extreme weather, population pressures, and wealth.

At a time in which national emergencies are being discussed in Washington, D.C., I argue that climate change has reached the level of a national emergency or crisis. It is imperative that we speak on the topic in such terms rather than distant or abstract references that may not resonate with the average U.S. citizen. I like polar bears and butterflies, but climate messaging must firmly be anchored in how extreme events affect our water supply, public health, infrastructure, energy systems, food supply, and national security.

In 2018, Hurricane Michael devastated my home state of Georgia, and my heart ached for the hard-working families whose pecans, peanuts, bell peppers, and cotton were lost.[16] As tragic as the losses were for my state, it is important that we connect the dots for people that when they go shopping for peanut butter or t-shirts they may feel the impact of that extreme weather event

in their personal budgets. The 2018 National Climate Assessment report warned that climate change could have a significant negative impact on the U.S. economy and its Gross Domestic Product.[17]

My approach to communicating the climate crisis to the public, stakeholders, and policymakers is to utilize analogies, familiar stories, and common language. I recently served on a panel with former Georgia Congressman Lindsay Thomas. During his remarks, the former Congressman cited a scripture from the same text that I read:

> *All streams flow into the sea, yet the sea is never full. To the place the streams come from, there they return again.* -- ***Ecclesiastes 1:7 (New International Version)***

This text perfectly captures the hydrological or water cycle that most of us learned about in 4th grade. It is a cycle in perfect harmony and balance until human intervention started to disrupt it. More intensive downpours associated with climate-enhanced moisture availability, sustained downpours and melting snowpacks are overwhelming flood protection and stormwater management systems. The Environmental Protection Agency website discussion[18] from 2017 warned:

> *"In many areas, climate change is likely to increase water demand while shrinking water supplies. This shifting balance would challenge water managers to simultaneously meet the needs of growing communities, sensitive ecosystems, farmers, ranchers, energy producers, and manufacturers. In some areas, water shortages will be less of a problem than increases in runoff, flooding, or sea level rise. These effects can reduce the quality of water and can damage the infrastructure that we use to transport and deliver water."*

Water availability and infrastructure resiliency are issues that would seem immune from partisan ideology. Water is essential to life and doesn't understand the concept of "liberal" or "conservative."

I am a climate scientist, but I am a husband, father, and community citizen like other Americans. We care about our children, their health, and our great nation. The graphs, charts, and jargon can be a distraction. The climate emergency affecting families is real and must be conveyed in relatable terms.

Some Ideas To Move Forward

I am a scientist trained to understand how our atmosphere works and how to predict its changes. My expertise does not lie in the 2, 4 or 6 year political cycles that you have to think about. However, I am grateful for this opportunity to serve my country through my expertise. I would like to offer the following ideas as steps forward:

1. **Keep scientific observation and modeling capacity robust**.

Diverse observations are essential when meteorologists are diagnosing the atmospheric and oceanic conditions that may lead to rapid intensification of a hurricane or sustained flooding. NOAA, NASA, and other satellite datasets are critical for diagnosing extreme weather in real-time, but these datasets are also assimilated into our numerical weather prediction models. Denial studies have shown, for example, that the forecast for Hurricane Sandy would have been terrible if satellite datasets were left out of the models.[19] I chair NASA's Earth Science Advisory Committee. NASA along with federal, international, and private partners continue to provide vital Earth system observations of Earth. NASA is currently implementing the Decadal Survey plan recommended by the National Academies. The agency has initiated several studies and

issued calls to the community in support of ensuring that vital observations of the weather-climate system continue and are advanced.[20]

NOAA and the National Center for Atmospheric Research (NCAR) recently signed agreements to establish, according to a federally issued press release[21], "*a new partnership to design a common modeling infrastructure (EPIC) that will be transparent and easy to access and use by public and private researchers, including academia and industry. By leveraging efficiencies and synergies, reducing duplication of effort, and creating shared model repositories, future research advances will more quickly benefit the public through better weather and climate forecasts."* Challenges with rainfall forecasts in Tropical Depression Imelda in Texas (2019) and rapid intensity changes observed with Hurricane Michael (2018) affirm the need for the EPIC framework. I believe EPIC is a positive step to ensure a more nimble and responsive U.S. weather model capability as we keep pace with or attempt to surpass other global modeling efforts.

To improve extreme weather prediction in the 5 to 14 day time window, we must also aggressively maintain our high performance computing and data assimilation resources. Such capacity will also improve emerging sub-seasonal to seasonal forecasting capabilities critical to agricultural, energy, and other applied needs. We need the fastest supercomputers available to accommodate this generation's volume of observational data and computational codes needed to advance our predictive capabilities. We know what is needed. We just need the continued support.

Advances in small or cube satellite technologies and precision instrumentation aboard research aircraft at NASA and NOAA enable nimble and efficient measurements required to address specific aspects of extreme weather prediction. For example, hurricane track forecasts

have steadily improved in recent decades while intensity forecasts have lagged behind.[22] Scientific interrogation of the processes within the eyewall of hurricanes and beneath the surface will likely move us forward.

It is also important that we find a compromise on the use of the electromagnetic spectrum used for telecommunications and weather so that vital observations assimilated into weather prediction models are not degraded.[23] The efficacy of modern day weather models is highly dependent upon temperature, water vapor, and other satellite-derived fields.

As important as the technology of extreme weather forecasting is to the enterprise, it is clear that a "good forecast" easily becomes a "bad forecast" if people are not consuming, understanding or acting upon the information. Investments in social sciences (psychology, communication, sociology, equity studies, economics) at the intersection of extreme weather will hopefully help prevent tragedies that could be avoided. As we move toward a Weather Ready Nation, science increasingly plays a role as a decision support service with regard to how use-inspired research initiates, O2R, and how to frame forecasts for utility services, state and municipal governments, emergency management, water management, public health, and so forth.

2. Learn from Best Practices In Regional or Stakeholder Efforts

In Georgia, through the support of the Ray C. Anderson Foundation, I am participating in a unique consortium called the Georgia Climate Project.[24] The effort was called out by the 2018 National Climate Assessment as a potential best practice to be replicated in other states and jurisdictions. Our goals are: (a) Synthesizing what is known and analyzing what is not in order to improve understanding of climate impacts and solutions in Georgia, (b) Fostering a constructive, nonpartisan discussion about how climate change affects Georgia and what can be done about it, (c) Working with partners to enable Georgians to take practical steps to respond to climate

change and its impacts, and (d) Bringing together experts working to understand and act on climate. We will host the Georgia Climate Conference in November to assess where these efforts are and to move forward. While such regional actions can move the needle on science and policy, they do not replace the vital federal role in providing observational platforms, models, research grants, policy and international diplomacy.

3. Understand risk, vulnerability, and resiliency.

A common question that I often receive is "So what do we do about climate change and extreme weather?" Mitigation strategies centered on reducing carbon emissions have been the dominant themes along with adaptation strategies. My focus is increasingly on aspects of risk, vulnerability, and resiliency. I am particularly concerned about the "Extreme Weather-Climate Gap." Disparities in income, social status, and other factors that lead to marginalized groups mean that hurricanes, floods, or heat waves have disproportionately adverse impacts on certain populations. Such vulnerable populations have elevated risks in terms of health, resiliency, and economic well-being when facing extreme weather events.[25]

This is clearly apparent when you look at a cross section of how communities recovered after Hurricane Katrina and Harvey, respectively. The other aspects of resiliency involve urban and rural infrastructure. AT&T, for example has been a leader in its efforts to address climate resiliency, in part because they understand their own vulnerabilities.[26] The U.S. Navy is constantly thinking about resiliency as its facilities struggle with sea level rise and a generation of more intense hurricanes.[27] More locally, major cities and small, rural towns face degradation to transportation, water-delivery, and agricultural systems. The Institute for Resilient Infrastructure Systems (IRIS) at the University of Georgia, of which I am a part of, is starting to

think about such issues but will require adequate resources to think about such challenges in innovative ways.[28]

Concluding Thoughts

In summary, anthropogenic climate change superimposed onto the naturally varying climate system has created an era of extreme weather events foreseen by past studies in the scientific literature. Climate scientists, in most cases, typically try to be measured with messaging and objective in their analyses . However, the climate system itself is sounding the alarms with the current generation of heat waves, floods, and storms.

- Attribution studies affirm that the influence of climate change is found in contemporary extreme weather events affecting the United States. They will continue to advance to better understand the connections between climate change and extreme weather events with the goal of improving predictive capability and building in resiliency to our societal frameworks.
- Extreme weather events impact people, infrastructure and processes more than "average" events. Our agricultural, energy, water, transportation, public health, and national security institutions are at risk, and this ultimately affects American households and beyond. We must message the risks and impacts with such context in mind rather than distant and abstract concepts.
- Robust science and technology resources must be sustained at local to federal levels.
- We must keep a close eye on the well-being of vulnerable populations and disparities in climate resiliency.

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Biographical Sketch
Dr. J. Marshall Shepherd
University of Georgia

Dr. J. Marshall Shepherd is a leading international expert in weather and climate and is the Georgia Athletic Association Distinguished Professor of Geography and Atmospheric Sciences at the University of Georgia. Dr. Shepherd was the 2013 President of American Meteorological Society (AMS), the nation's largest and oldest professional/science society in the atmospheric and related sciences. Dr. Shepherd serves as Director of the University of Georgia's (UGA) Atmospheric Sciences Program and Full Professor in the Department of Geography where he was a previous Associate Department Head. Dr. Shepherd is also the host of The Weather Channel's Award-Winning show Weather Geeks, a pioneering Sunday talk podcast/show and a contributor to Forbes Magazine. Dr. Shepherd is the 2019 Recipient of the AGU Climate Communication Prize and the 2018 recipient of the prestigious AMS Helmut Landsberg Award for pioneering and significant work in urban climate. In 2017, he was honored with the AMS Brooks Award, a high honor within the field of meteorology. Ted Turner and his Captain Planet Foundation honored Dr. Shepherd in 2014 with its Protector of the Earth Award. Prior recipients include Erin Brockovich and former EPA Administrator Lisa Jackson. He is also the 2015 Recipient of the Association of American Geographers (AAG) Media Achievement award, the Florida State University Grads Made Good Award and the UGA Franklin College of Arts and Sciences Sandy Beaver Award for Excellence in Teaching. In 2015, Dr. Shepherd was invited to moderate the White House Champions for Change event. He is an alumni of the prestigious SEC Academic Leadership Fellows program. Prior to UGA, Dr. Shepherd spent 12 years as a Research Meteorologist at NASA-Goddard Space Flight Center and was Deputy Project Scientist for the Global Precipitation Measurement (GPM) mission, a multi-national space mission that launched in 2014. President Bush honored him on May 4th 2004 at the White House with the Presidential Early Career Award for pioneering scientific research in weather and climate science. Dr. Shepherd is a Fellow of the American Meteorological Society. Two national magazines, the AMS, and Florida State University have also recognized Dr. Shepherd for his significant contributions. Dr. Shepherd was the 2016 Spring Undergraduate Commencement speaker at his 3-time Alma Mater, Florida State University. He was also the 2017 Graduate Commencement speaker at the University of Georgia.

Dr. Shepherd is frequently sought as an expert on weather, climate, and remote sensing. He routinely appears on CBS Face The Nation, NOVA, The Today Show, CNN, Fox News, The Weather Channel and several others. His TedX Atlanta Talk on "Slaying Climate Zombies" is one of the most viewed climate lectures on YouTube. Dr. Shepherd is also frequently asked to advise key leaders at NASA, the White House, Congress, Department of Defense, and officials from foreign countries. In February 2013, Dr. Shepherd briefed the U.S. Senate on climate change and extreme weather. He has also written several editorials for CNN, Washington Post, Atlanta Journal Constitution, and numerous other outlets and has been featured in Time Magazine, Popular Mechanics, and NPR Science Friday. He has over 90 peer-reviewed scholarly publications. Dr. Shepherd has attracted $3 million dollars in extramural research support from NASA, National Science Foundation, Department of Energy, Defense Threat Reduction Agency, and U.S. Forest Service. Dr. Shepherd was also instrumental in leading the effort for UGA to become the 78th member of the University Corporation for Atmospheric Research (UCAR), a significant milestone for UGA and establishing UGA's Major in Atmospheric Sciences.

Dr. Shepherd currently chairs the NASA Earth Sciences Advisory Committee and was a past member of its Earth Science Subcommittee of the NASA Advisory Council. He was a member of the Board of Trustees for the Nature Conservancy (Georgia Chapter), National Oceanic and Atmospheric Administration (NOAA) Science Advisory Board, Atlanta Mayor Kasim Reed's Hazard Preparedness Advisory Group United Nations World Meteorological Organization steering committee on aerosols and precipitation, 2007 Inter-governmental Panel on Climate Change (IPCC) AR4 contributing author team, National Academies of Sciences (NAS) Panels on climate and national security, extreme weather attribution, and urban meteorology. Dr. Shepherd is a past editor for both the Journal of Applied Meteorology and Climatology and Geography Compass, respectively.

Dr. Shepherd received his B.S., M.S. and PhD in physical meteorology from Florida State University. He was the first African American to receive a PhD from the Florida State University Department of Meteorology, one of the nation's oldest and respected. He is also the 2nd African American to preside over the American Meteorological Society. He is a member of the AMS, American Geophysical Union, Association of American Geographers (AAG), Sigma Xi Research Honorary, Chi Epsilon Pi Meteorology Honorary, and Omicron Delta Kappa National Honorary. He is also a member of the Alpha Phi Alpha Fraternity, Inc. and serves on various National Boards associated with his alma mater. Dr. Shepherd co-authored a children's book on weather and weather instruments called Dr. Fred's

Weather Watch. He is also the co-founder of the Alcova Elementary Weather Science Chat series that exposes K-5 students to world-class scientists. Dr. Shepherd is originally from Canton, Georgia. He is married to Ayana Shepherd and has two kids, Anderson and Arissa.

Curriculum Vitae

Dr. J. Marshall Shepherd
Department of Geography, Full Professor with Tenure
Associate Head, Department of Geography
Director, UGA Atmospheric Sciences Program
Georgia Athletic Association Distinguished Professor of Geography and Atmospheric Sciences
Host, Weather Channel Weather Geeks
Weather and Climate Contributor, Forbes

President, American Meteorological Society (2013)

Other Affiliations/Titles: Institute for Resilient Infrastructure Systems,
UGA Water Resources Faculty, College of the Environment, the joint UGA-U.S. Department of Agriculture (USDA) Southern High Resolution Modeling Center (SHRMC), and the UGA Initiative for Climate and Society

Tenure Status:	Tenured (2009)
Graduate Faculty Status:	Appointed to Full Graduate Faculty at University of Georgia, March 2006 Appointed to Graduate Faculty at Purdue University, July 2008
Highest Degree:	Ph.D. Physical Meteorology, Florida State University, Tallahassee, Florida, 1999

Academic Positions

August 2011-Present	Full Professor, Georgia Athletic Association Distinguished Professor of Geography and Director, Atmospheric Sciences Program, University of Georgia
January 2017-May 2018	Associate Head, Department of Geography
January 2006-2011	Associate Professor, University of Georgia

Other Professional Employment

1991-1992	Meteorological Technician, NOAA-NWS, Tallahassee, Florida.
1991-1993	Consulting Meteorologist, Metropolitan Weather Solvers, Tallahassee, Florida.
1991-1993	Research Assistant, Mesoscale Meteorology Group, Florida State University, Tallahassee, Florida.
1993-1993	Research Meteorologist, Science Systems and Applications, Inc., Lanham, Maryland.
1993-2005	Research Meteorologist, NASA Goddard Space Flight Center, Greenbelt Maryland. (including GPM Deputy Project Scientist and a 1-year Detail at NASA Headquarters,)

RESEARCH AREAS AND EXPERTISE

My research seeks to understand aspects of Earth's hydrometeorological and hydroclimate system (i.e. cloud systems, thunderstorms, hurricanes, precipitation) using advanced satellites, experimental aircraft, radars, and sophisticated computer models. I also explore the physical, human, and socio-economic aspects of extreme weather and global climate change. I am also interested in innovative strategies to infuse research data into applications, outreach, and instructional communities.

Urbanization and the Weather-Hydroclimate System: The overarching goal is to characterize possible urban-related (land cover, anthropogenic heating, and pollution) influences on spatio-temporal variability in the hydroclimate and to pose sound physical explanations for such interactions using in-situ and remote sensing data and numerical models.

Tropical Precipitating Systems: The overarching research goal is to characterize and quantify precipitation within tropical precipitating systems. An extension of this research examines whether the contribution of tropical cyclones is changing in response to natural or anthropogenic climate change.

Extreme Weather and Climate Events: The goal of this research is to examine the relationship between extreme climate events and extreme manifestations of weather. This is a fertile area of research as the Inter-governmental Panel on Climate Change continues to project increased frequency and/or intensity of extreme water cycle events.

Climate Vulnerability: The goal of this research is to quantify current and future vulnerability of human populations, particularly under-represented groups, to long-term and episodic climate change events. This research was stimulated via a partnership with the USDA Forest Service.

Innovative Applications of Physical Geographic and Climate Data: This track encompasses a wide variety of research interests related to integrating weather and climate data/analysis into decision support systems and societal applications. Examples of this work include funding by the U.S. Forest Service (USFS) to explore the socio-political, weather, air quality, and health implications swirling around the long-running conflict between residents of the Newton community in Gainesville, Georgia and industrial pollutant sources. Other projects investigate the complex coupled human-natural system in urban environments and implications for public health. Recent projects have also explored the use of Multi-User Virtual Environments to teach Geosciences and expose minorities to STEM.

Diversity in the Atmospheric Sciences: Numerous activities and a grant from the National Science Foundation have forged a new area that straddles education and outreach. We are developing innovative strategies for broadening the exposure of under-represented groups to climate science.

SUMMARY OF KEY LEADERSHIP POSITIONS

During my career, I have exhibited key leadership positions at the International and National Levels. A sample of my leadership activities includes:

2017-2018 Associate Head, Department of Geography, University of Georgia. In this role, I served as the deputy administrator in the Department and an ex-officio member of the departmental advisory committee. My responsibilities included scheduling departmental courses, managing faculty teaching schedules, strategic planning for external awards, and other tasks as designated by the Department Head.

2017- Present Chair, NASA Earth Science Advisory Committee: The NASA Earth Science Advisory Committee is one of the FACA mandated committees that advises the agency. I served as chairman of this committee and facilitated relevant activities in that role.

2016-2017 SEC Academic Leadership Fellow: I was selected as one of four faculty leaders at the University of Georgia to participate in the SEC's Leadership Fellows program. This program selects potential Academic leaders and immerses them within 1-year leadership and higher administration program with peers at UGA and across the SEC schools.

Director, Atmospheric Sciences Program, University of Georgia (Current): In this role, I direct the AMS and Federally-credential atmospheric sciences program. The program addresses the needs of students interested in studying meteorology or climate science. Under my leadership, the University of Georgia became the 78th membership of the University Corporation for Atmospheric Research (UCAR) and a member of the WSI National Lightning Network. From 2008-2015, our program faculty has attracted over $12 million dollars in extramural grants, contributed over 110 peer-reviewed journals, and provided key experts to the media and nation on weather and climate topics. For example, in February 2013, I briefed the U.S. Senate Committee on Environment and Public Works and in 2015 briefed members of the Congress and White House staff. My colleagues and I are also frequently sought for major media appearances or Opinion Editorials. Our program is also notably regarded on the UGA campus and is well supported by University Administrators, including President Jere Morehead. In 2015, we proposed a new Atmospheric Sciences major at the University of Georgia. The program was approved by the State Board of Regents in August 2016. I also secured the program's first major donor and endowment. In 2016, we partnered with the Office of Preparedness to make UGA the first SEC member of the WeatherSTEM network.

President of the American Meteorological Society (2013): The American Meteorological Society is one of the leading professional societies in the world, dedicated to weather, climate, and related sciences. As President of the

organization, I was elected by the nearly 14,000 members and preside over the AMS Executive Council and Executive Committee, which overseas the organization and its multi-million dollar budget and portfolio. I also provided vision and leadership on issues of the day facing the weather, climate, and related communities. AMS publishes several of the highest rated and cited journals in weather and climate fields and is seen as a key broker of information and leadership on weather/climate issues of the day. In this role, I also served as the U.S. representative to the International Federation of Meteorological Societies (IFMS). I also chaired the Executive Council and Executive Committee and led the annual performance review of the Executive Director.

International and National Advisory Roles: I have served as a member of the Nature Conservancy (Georgia) Board of Trustees, Board of Climate Central, Mothers and Others for Clean Air Partnership Council, NOAA Science Advisory Board, NOAA Climate Working Group, Department of Energy ARM Science Board, NSF Advisory Committee for Environmental Research and Education, NSF Committee of Visitors, Biocomplexity Program, Earth Science Subcommittee of the NASA Advisory Council, Mothers and Others for Clean Air Partnership Council, National Center for Atmospheric Research (NCAR) Director Search Committee, University Space Research Association (USRA) Earth Science Advisory Board, Department of Energy expert panel on Cool Roof Initiative and Climate Change, NASA/NOAA/Howard University Programmatic Advisory Committees and 2 National Academy of Science Studies (i. Implications of Climate Change on National Security and U.S. Naval Operations and ii. Urban Meteorology). I have also served on a World Meteorological Organization advisory committee related to aerosols, clouds, and precipitation and the external review committee for NOAA's Climate Prediction Center and Hydrometeorological Prediction Center. I was also a contributing author to a chapter in the 2007 IPCC report (AR4). At the University level, I also served on the 2013 UGA Provost Search Committee, the Franklin College of Arts and Sciences Faculty Senate and the Center for Integrative Conservative Research (CICR) Executive Committee.

Host, Weather Channel WxGeeks (Current): Weather Geeks is a pioneering national Sunday talk show/Podcast by The Weather Channel. The show discusses contemporary weather and climate topics. The show has garnered strong critical reviews and an Award from the American Meteorological Society.

Ted Talks: I have delivered two TED X talks that together have nearly 2 million views. One was featured on the TED website.

Editorships: I have served as an editor for both the Journal of Applied Meteorology and Climatology (JAMC) and Geography Compass. I have also served as the Climatology Editor for the Wiley/Association of American Geographers (AAG) Encyclopedia of Geography and the Associate Editor for Weather at the IEEE-sponsored Earthzine.

Former Deputy Project Scientist, NASA Global Precipitation Measurement (GPM) Mission: While at NASA Goddard Space Flight Center, I served as the Deputy Project Scientist on a major NASA mission seeking to measure precipitation from space. GPM will improve weather, climate, and hydrological forecasting and is slated for a 2014 launch date. In this role, I was a part of the scientific leadership team that interfaced with the engineers, NASA Headquarters staff, and international partners. GPM is an approximately $1 billion dollar mission in aggregation.

INSTRUCTION AND CONTINUING EDUCATION

Courses taught in support of general physical geography curriculum within the Department of Geography and the Atmospheric Sciences Certificate program.

a. Description of Existing Courses Taught

ODY Odyssey Seminar-A freshman survey seminar started in Fall 2011. 1 hour. We explore concepts in Earth and climate observation from the vantage point of space.

GEOG 1112 (plus Honors Section (GEOG2120) occasionally). Introduction to Weather and Climate. 3 hours. Atmospheric composition and structure, clouds, precipitation, and atmospheric motion and winds. Organized weather systems, including air masses, fronts, and severe weather. Discussion of global climates includes circulation, wind systems, climate classification, and climate change. Typical enrollment: 88 to 300 students.

HON 1990H Honors College Seminar. 1 hour. Joint course with Warnell School of Forestry and Natural Resources. The course was a survey course on climate change and migratory birds and a pre-cursor to a course series funded by NASA (Shepherd as a co-Investigator).

GEOG 4140/6140. Satellite Meteorology/Climatology. 3 hours. Application of satellite remote sensing in meteorology and climatology. Applications include clouds, atmospheric water vapor and precipitation, the Earth's radiation budget, sea and land surface temperatures. Typical enrollment: 15 to 25 students.

GEOG 8120. Seminar in Climatology. 3 hours. Advanced topics in physical climatology such as climate change, microclimatology, urban climatology or synoptic climatology. Specific topics may vary. Topics that have covered include urban climate systems, cooling trends in the southeastern United States, climate policy, tropical meteorology, and Superstorm Sandy. Typical enrollment: 7 to 15 students.

GEOG 8290. Directed Problems in Physical Geography. 1-3 hours. Repeatable for maximum 9 hours credit. Advanced problems in physical geography. Topics vary.

GEOG 7000. Master's Research. 1-9 hours. Repeatable for maximum 45 hours credit. Research while enrolled for a master's degree under the direction of faculty members.

GEOG 7005. Graduate Student Seminar. 3 hours. Repeatable for maximum 45 hours credit. Advanced supervised experience in an applied setting.

GEOG 7300. Master's Thesis. 1-9 hours. Repeatable for maximum 45 hours credit. Thesis writing under the direction of the major professor. Non-traditional format: Independent research and thesis preparation.

GEOG 9005. Doctoral Graduate Student Seminar. 3 hours. Advanced supervised experience in an applied setting. This course may not be used to satisfy a student's approved program of study.

b. Description of New Courses Established by M. Shepherd

GEOG 4160/6160. Applied Climatology in the Urban Environment. 3 hours. (New Course Using Modification to existing Applied Climatology Course Name and Number). The interaction of the urban environment with the Earth's climate system including weather, climate, hydrology, carbon cycle, nitrogen cycle, and societal activities. The course also provides an opportunity for students to participate in an urban climate field experiment. Typical enrollment: 15 to 25 students.

GEOG 4170/6170. Mesoscale/Radar Meteorology and Climatology. 2 hours + 2 hour lab. (New course, Spring 2010). Fundamental theory, analysis, and exercises on mesoscale weather phenomena and principles of radar meteorology. A major topical focus will be thunderstorms, mesoscale convective systems, and tornadic supercells. This course fills a gap in our Atmospheric Sciences Certificate curriculum. Our Atmospheric Sciences Certificate already meets major community benchmarks of the National Weather Service and AMS, but feedback from students and faculty establish the need for a course that addresses fundamentals of radar meteorology and mesoscale processes. Typical enrollment: 15 to 25 students.

Odyssey Seminar. Studying the Earth From the Perspective of Space. 1 hour. Freshman seminar examining all aspects of Earth system science from the perspective of space. The course will expose freshmen to current topics, methods, and discussion and integrate a significant writing component.

c. Other Instructional and Teaching Contributions

Climatology Laboratory: Key organizer and developer of new laboratory space acquired by the Department of Geography to support the growing climate group. The space includes 6-8 computer workstations, a projection and display system for weather discussions and lectures, a flat-screen monitor, and storage space for field equipment and demonstration kits. The lab has been an invaluable resource for instruction, graduate defenses, student community building, and research collaboration meetings.

Teaching Evaluations: The department uses a scoring system ranging from 1 to 5 points, with a score of 1 being the best score possible, 3 being an average score, and 5 being the worst score possible. This evaluation form changed in 2001 and now asks students to evaluate instructors in eight areas related to teaching effectiveness. My ratings are consistently at or near 1.0.

Innovative strategies: Through funding from the UGA Office of STEM (2015), we developed innovative strategies to use Multi-User Virtual Environments to teach Geosciences concepts. This project evolved into an NSF ITEST proposal involving Geography, Anthropology, and the College of Education.

Through funding from the Northeast Georgia Partnership for Reform in Science and Math (PRISM), I developed inquiry-based modules and lessons based on a realistic climate modeling system called EdGCM. These lessons are now an integral part of the instructional format of the Introduction to Weather and Climate laboratory (GEOG1112L). In developing these modules, we used the concept of today's students as "digital natives" and argued that learning tools must leverage their comfort level and exposure to new digital media.

Co-PI on a NASA-funded effort in the Warnell School of Forestry to create a three-course sequence on aspects of observing and modeling climate change-migratory bird relationships. My role is to provide lectures and resources on climate and guidance on integration of climate models like EdGCM. We developed a prototype Honors (HON 1990H) course that was team-taught for the first time in Spring 2010.

In 2006-2007, the AMS Online Weather Course, Module, and Tools were also introduced to the Geography Department's resources.

Founded Weather-Climate Science Chat Series with Alcova Elementary School (Gwinnett County) in 2013, http://www.gwinnettdailypost.com/news/2013/nov/13/alcova-fourth-graders-video-conference-with/

(With Dr. John Knox) Developed an nationally-innovative graduate seminar course on Superstorm Sandy only a few weeks after the hurricane affected parts of the United States in the Fall of 2012. Their course was taught in the Spring of 2013 and was arguably the only course of its kind. The course was also completely blogged by both instructors: http://deconstructingsuperstormsandy.blogspot.com

Instructional Resources: Through my funded research, Department of Geography instructional resources/capacity were augmented with the renewal of the Idrisi Taiga software system (4/09) and the acquisition of a Dustrak air quality monitor to support micrometeorological studies (2008).

1. RECOGNITION AND OUTSTANDING ACHIEVEMENTS

2019 AGU Climate Communication Prize
2018 University of Florida Journalist in Residence (November)
2018 UGA 1st Year Odyssey Seminar Teaching Award
2018 AMS Helmut E. Landsberg Award
2017 ESRI GIS Paper of the Year (shared award)
2017 AMS Charles Franklin Brooks Award
2016 Selected as SEC Academic Leadership Development Program Fellow
2016 Florida State University, Spring Undergraduate Commencement Speaker
2015 Florida State University, Graduate Made Good (Highest Alumni Honor)
2015 AAG Excellence In Media Award
2015 Franklin College of Arts and Sciences General Sandy Beaver Award for Excellence in Teaching
2015 American Meteorological Society-National Weather Association C.L. Chandler Award to WxGeeks Team (shared with Weather Channel colleagues) for outstanding contributions to the community
2014 Distinguished UGA Athletic Association Professor in the Social Sciences Departments
2014 Captain Planet Foundation Protector of the Earth Award
2013 UGA Athletic Association Professor in the Social Sciences Departments
2011 Franklin College of Arts and Sciences Excellence in Diversity Leadership Award
2011 Promoted to Full Professor at the University of Georgia
2011 Received the AMS Charles Anderson Award
2011 Outstanding Alumni Award, FSU Black Alumni Association

2010 Awarded tenure at the University of Georgia
2010 Nominated to attend 2010 UGA Teaching Academy Faculty Symposium
2009 Inducted as a Fellow of the American Meteorological Society**
2007 Contributing Author to Nobel Prize Winning IPCC AR4**
2005 Black Enterprise Magazine "Hot List"
2005 Network Journal Magazine "Forty under 40" recipient
2004 Recipient of Presidential Early Career Award for Scientists and Engineers (**PECASE**)**
2004 NASA.GSFC Group Award for Contributions to the JASON Project
2004 Special Act Award (NASA OES)
2003 Peer Award for Scientific Research
2002 Recipient of NASA New Investigator Program Award
2001 Laboratory for Atmospheres Outreach Award
2001 NASA/GSFC Group Achievement Award
2001 Special Act Award for superior performance of a special act (Horizon team)
2001 Special Act Award for superior performance of a special act (Outreach Initiatives)
NASA Performance. (FY03,FY00,FY98,FY97,FY96,FY95,FY94)
1999 1st African American to receive PhD in Meteorology from Florida State University**
1999 NASA/GSFC Special Act Award for superior performance
1999 NASA/GSFC Group Achievement Award-AGS Imager Team
1987-1993 American Meteorological Society (AMS)/TRW Industry Fellow
National Science Foundation (NSF) Fellow Competition (Honorable Mention)
Dolores Auzene Fellow (FSU).
Leslie N. Wilson Assistantship Recipient (FSU)
National Achievement Scholar
American Geological Institute Scholar
Chi Epsilon Pi Meteorology Honorary
Omicron Delta Kappa National Honorary
Who's Who Among College Students
Outstanding College Student of America
1990 National Collegiate Forecast Winner (Burlington, VT period).
1987 High School Valedictorian, Cherokee High School

SCHOLARLY ACTIVITIES

2. PUBLICATIONS

*** Stringent Peer Review, **Invited and/or Carry Prestige and Recognition**

Books Authored or Co-Authored

2016 National Academies of Sciences, Engineering, and Medicine. 2016. Attribution of Extreme Weather Events in the Context of Climate Change (includes **J.M. Shepherd as an author**). Washington, DC: National Academies Press. DOI: 10.17226/21852.

2014 Bortz, F. and **J.M. Shepherd**, 2014: Dr. Fred's Neighborhood Weather Watch. McGraw-Hill Publishers. 98 pp. 2nd Edition.

2012 National Research Council Committee on Urban Meteorology, 2012: Urban Meteorology: Scoping the problem, Defining the Need (includes **J.M. Shepherd as author**). The National Academies Press, Washington, D.C. http://www.nap.edu/catalog.php?record_id=13328.

2011 National Research Council Committee on National Security Implications of Climate Change for U.S. Naval Forces (includes **J.M. Shepherd as author**), 2011: National Security Implications of Climate Change for U.S. Naval Forces, The National Academies Press, Washington, D.C., 226 pp. http://www.nap.edu/catalog.php?record_id=12914

2000 Bortz, F. and **J.M. Shepherd**, 2000: Dr. Fred's Neighborhood Weather Watch. McGraw-Hill Publishers. 98 pp.

Books Edited or Co-Edited

Chapters in Books

2019 Shepherd, J.M., S.J. Burian, M. Jin, C. Liu, and B. Johnson, 2019: Two decades of urban hydroclimatological studies have yielded discovery and societal benefits. Satellite Precipitation Measurement Edited by V. Levizanni, C. Kidd, D. Kirschbaum, C. Kummerow, K. Kummerov, and J. Turk

2019 Shultz, J. M., J. P. Kossin, J. M. Shepherd, C. Ettman, J. M. Ransdell, G. V. Desir, and S. Galea, 2019: Tropical cyclone impacts on island-based populations: The 2017 Atlantic hurricane basin's perfect storm season. Submitted to the Oxford Handbook of Complex Disaster Risks, Shultz, J. M., Rechkemmer, A., Johnson, N. (eds.). New York, NY, Oxford University Press. (Submitted)

2017 Andersen, T., **and J.M. Shepherd**, 2017: The Brown Ocean Effect: Re-intensification of Landfallling Tropical Cyclones. Hurricanes and Climate Change, In: Collins J., Walsh K. (eds) Hurricanes and Climate Change. Springer, Cham. 117-134. doi: https://doi.org/10.1007/978-3-319-47594-3_5

2016 Mitra, C. **and Shepherd, M**., 2016: Urban Precipitation: A global perspective. The Routledge Handbook of Urbanization and Global Environment Change. Edited by Karen C. Seto and William Solecki, Routledge, 581 pp.

2014 **Shepherd, M.** 2014: Space-based measurement of precipitation. Contributed essay in The Atmosphere, 13th Edition by Frederick Lutgens and Edward Tarbuck, Pearson, 466 pp.

2013 Hossain, F., A.M. Degu, A.T. Woldemichael, W Yigzaw, C. Mitra, **J.M. Shepherd**, and AHM Siddique-E Akbor, 2013: Water Resources Vulnerability in the Context of Rapid Urbanization of Dhaka City (a South Asian Megacity). Climate Vulnerability. Ed. Roger Pielke. Elsevier, 1570 pp.

2013 **Shepherd, J.M**., 2013: Impacts of Urbanization on Precipitation and Storms: Physical Insights and Vulnerabilities. Climate Vulnerability. Ed. Roger Pielke. Elsevier, 1570 pp.

2013 Vose, J., T.L. Mote, **J.M. Shepherd**, B. KC, and C. Strother, 2013: Framing the future in the southern United States: Climate, land use and forest conditions. Climate Change Adaptation and Mitigation Management Options. Eds. J. Vose and K. Klepzig. Routledge. pp 9-43.

2013 Quattrochi, D. with K. Dow, J. Gaffney, P. Long, S. McNulty, **M. Shepherd**, S. Shuford, and B. Stone 2013: Climate interactions with the built environment in the Southeast USA, in Climate of the Southeast United States: Variability, Change, Impacts, and Vulnerability, NCA Regional Inputs Report, Eds. K. Ingram et al. Springer, pp 86-108. DOI: 10.5822/978-1-61091-509-0_5

2010 ****Shepherd, J.M.**, J.A. Stallins, M. Jin, and T.L. Mote, 2010: Urban effects on precipitation and associated convective process. The Routledge Handbook of Human Ecology. Eds. Ian Douglas et al. Taylor and Francis Books, 688 pp.

2010 **Shepherd, J.M.**, 2010: Essay entitled "Urbanization and its effects on key atmospheric and surface water cycle." In Principles of Water Resources, 3rd Edition by T. Cech. John Wiley and Sons, Inc. 546 pp.

2010 ****Shepherd, J.M.**, W. Shem, M. Manyin, L. Hand, and D. Messen, 2010: Modeling Urban effects on the precipitation component of the water cycle. Invited chapter for the book: Geospatial Analysis and Modeling of Urban Environments. Eds. X. Yao and H. Jaing. Springer Book Series and GIScience, 445 pp.

2009 **Didier, T, P. Artaxo, S. Yuter, and Y. Kaufman with contributing authors **J.M. Shepherd**, Z Levin, U. Baltensperger, G. Feingold, 2009: Chapter 5: Observational studies of the effects of aerosols on clouds and precipitation, Assessment of the Effects of Pollution on Precipitation. Eds. Levin, Z., and W. Cotton. Commissioned by The World Meteorological Organization/IUGG. International Aerosol Precipitation Science Assessment Group (IAPSAG). Springer. 386 pp.

2008 *Mitra C., **Shepherd J.M.**, and Jordan T. R., 2008: Assessment and dynamics of the urban growth in the city of Kolkata, India. Eds. A.K. Dutt, V. Wadhwa, B. Thakur, and G.M. Pomeroy. Social Geography for the 21st Century. (Contract with) Concept Publishing Company. New Delhi (In Press).

2008 Reynolds, S., Burian, S., **Shepherd, J.M.**, and Manyin, M., 2008: Chapter 7: Urban induced rainfall modifications on urban hydrologic response. In: Reliable Modeling of Urban Water Systems. Edited by W. James et al. Computational Hydraulics International. Guelph, Ontario, CA. pp. 99-122.

2008 **Hou, A.Y., G.S. Jackson, C. Kummerow, and **J.M. Shepherd**, 2008: The Global Precipitation Measurement Mission. Precipitation: Advances in measurement, estimation, and prediction. Edited by Silas Michaelides. Springer. 540 pp.

2007 * and **Lead Authors: Trenberth, K.E., P.D. Jones, P. Ambenje, R. Bojariu, D. Easterling, A. Klein Tank, D. Parker, F. Rahimzadeh, J.A. Renwick, M. Rusticucci, B. Soden and P. Zhai Contributing Authors: R. Adler (USA), L. Alexander (UK, Australia, Ireland), H. Alexandersson (Sweden), R. Allan (UK), M.P. Baldwin (USA), M. Beniston (Switzerland), D. Bromwich (USA), I. Camilloni (Argentina), C.

Cassou (France), D.R. Cayan (USA), E.K.M. Chang (USA), J. Christy (USA), A. Dai (USA), C. Deser (USA), N. Dotzek (Germany), J. Fasullo (USA), R. Fogt (USA), C. Folland (UK), P. Forster (UK), M. Free (USA), C. Frei (Switzerland), B. Gleason (USA), J. Grieser (Germany), P. Groisman (USA, Russian Federation), S. Gulev (Russian Federation), J. Hurrell (USA), M. Ishii (Japan), S. Josey (UK), P. Kållberg (ECMWF), J. Kennedy (UK), G. Kiladis (USA), R. Kripalani (India), K. Kunkel (USA), C.-Y. Lam (China), J. Lanzante (USA), J. Lawrimore (USA), D. Levinson (USA), B. Liepert (USA), G. Marshall (UK), C. Mears (USA), P. Mote (USA), H. Nakamura (Japan), N. Nicholls (Australia), J. Norris (USA), T. Oki (Japan), F.R. Robertson (USA), K. Rosenlof (USA), F.H. Semazzi (USA), D. Shea (USA), **J.M. Shepherd** (USA), T.G. Shepherd (Canada), S. Sherwood (USA), P. Siegmund (Netherlands), I. Simmonds (Australia), A. Simmons (ECMWF, UK), C. Thorncroft (USA, UK), P. Thorne (UK), S. Uppala (ECMWF), R. Vose (USA), B. Wang (USA), S. Warren (USA), R. Washington (UK, South Africa), M. Wheeler (Australia), B. Wielicki (USA), T. Wong (USA), D. Wuertz (USA), 2007: Observations: Surface and Atmospheric Climate Change. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Eds. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller. Cambridge University Press, Cambridge. United Kingdom and New York, NY, USA, 235-336. **Note: The Intergovernmental Panel on Climate Change shared in the Nobel Prize (2007).**

2007 **Imhoff, M., L. Bounani, and **J.M. Shepherd**, 2007: The gray wave. Our Changing Planet: A View from Space. Eds. Robin G. Williams, Kim Partington, Claire Parkinson, and Michael D. King. Cambridge University Press. 500 pp.

2007 **Smith, A., G. Asrar, Y. Furuhama, A. Ginati, C. Kummerow, V. Levizzani, A. Mugnai, K. Nakamura, R. Adler, V. Casse, M. Cleave, M. Debois, J. Durning, J. Entin, P. Houser, T. Iguchi, R. Kakar, J. Kaye, M. Kojima, D. Lettenmaier, M. Luther, A. Mehta, P. Morel, T. Nakazawa, S. Neeck, K. Okamoto, R. Oki, G. Raju, **J.M. Shepherd**, E. Stocker, J. Testud, and E. Wood, 2007: International Global Precipitation Measurement (GPM) program and mission: An overview. Measuring Precipitation from Space - EURAINSAT and the future. Eds. V. Levizzani, P. Bauer, and F. J. Turk. Springer, 611-653.

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2018 Haupt, S., B. Kosovic, S. McIntosh, F. Chen, K. Miller**, M. Shepherd**, M. Williams, and S. Drobot, 2018: 100 Years of Scientific Research at AMS, 100 years of Progress in Applied Meteorology. Part III: Additional Applications. AMS Monograph, *https://doi.org/10.1175/AMSMONOGRAPHS-D-18-0012.1*

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2003 Tao, W.-K., R. Adler, D. Baker, S. Braun, M.-D. Chou, M. Jasinski, Y. Jia, R. Kakar, S. Lamg, W. K.-M. Lau, B. Lynn, M. Karyampudi, Z.-X. Pu, **J.M. Shepherd**, J. Simpson, D. Starr, Y. Wang, W. Weinman and P. Wetzel, 2003: Regional scale modeling at NASA Goddard Space Flight Center. Recent Research Developments in Atmospheric Science. *Research Signpost*. Volume **2**, 52 pp.

Journal Articles (Peer-Reviewed)

2019 Williams, M., A. Grundstein, and **J.M. Shepherd**, 2019: Interepochal changes in temperature, humidity, and precipitation associated with increasing irrigation in the coastal plain of Georgia, USA. Atmosphere (Submitted).

2019 **Shepherd, J.M.,** A. Thomas, J. Santanello, J. Yoo, and P. Lawston, 2019: Warm corm structure maintenance over land: A case study analysis of Cyclone Kelvin. *Journal of Southern Hemisphere Earth Systems Science.* (In Review)

2019 Johnson, B., M. Williams, and **J.M. Shepherd**, 2019: Urbanization and winter precipitation: a land surface sensitivity analysis for Urban Climate. *Urban Climate*. (Submitted)

2019 Bosma C., D. Wright, Ph.D., P. Nguyen, J. Kossin, D. Herndon, and J.M. Shepherd, 2019: An intuitive metric to quantify and communicate tropical cyclone rainfall hazard. *Bulletin of the American Meteorological Society* (AMS). (In Review).

2018 Rudd, M.A., A.F.P. Moore, D. Rochberg, L. Bianchi-Fossati, M.A. Brown, D. D'Onofrio, C.A. Furman, J. Garcia, B. Jordan, J. Kline, L.M. Risse, P.L. Yager, J. Abbinett, M. Alber, J.E. Bell, C. Bhedwar, K.M. Cobb, J. Cohen, M. Cox, M. Dormer, N. Dunkley, H. Farley, J. Gambill, M. Goldstein, G. Harris, M. Hopkinson, J.-A. James, S. Kidd, P. Knox, Y. Liu, D.C. Matisoff, M.D. Meyer, J.D. Mitchem, K. Moore, A.J. Ono, J. Philipsborn, S. Saha, P.J. Schramm, K.M. Sendall, F. Shafiei, **M. Shepherd**, V. Sims, J. Teebken, and A.N. Worley. 2018. Climate research priorities for policy-makers, practitioners, and scientists in Georgia, USA, *Environmental Management*, Volume 62, Issue 2, pp 190–209.

2018 Debbage, N., and **J.M. Shepherd**, 2018: Determining the influence of urbanization on the spatiotemporal characteristics of runoff and precipitation during the 2009 Atlanta flood using a coupled land surface-atmospheric model. *J. of Hydrometeorology*. (In Press)

2018 Shultz J.M. **J.M. Shepherd**, I. Kelman, A. Rechkemmher, and S. Galea, 2018: Mitigating tropical cyclone risks and health consequences: urgencies and innovations, *The Lancet: Planetary Health*, Vol. 2, Issue 3, PE103-E104, DOI:https://doi.org/10.1016/S2542-5196(18)30021-4

2018 Shultz J.M. J.P. Kossin, **J.M. Shepherd**, Ransdell, R. Walshe, I. Kelman, and S. Galea, 2018: Hurricane risks, health consequences, and response challenges for small island based populations: Observations from the 2017 Atlantic hurricane season. *Disaster Med Public Health Prep*. https://doi.org/10.1017/dmp.2018.28

2018 Nair., U., Rappin, E., Foshee, E., Smith, W., Pielke Sr., R., Mahmood, R., Case, J., Blankenship, C., **Shepherd, J.M**., Santanello, J., and D. Niyogi, 2018: Influence of Land Cover and Soil Moisture based Brown Ocean Effect on an Extreme Rainfall Event from a Louisiana Gulf Coast Tropical System, *Scientific Reports* (Submitted).

2017 Williams, Marcus D., Hawley, Christie M.S., Madden, Marguerite, and **Shepherd, J. M.,** 2017: Mapping the spatio-temporal evolution of irrigation in the Coastal Plain of Georgia, USA. *Photogrammetric Engineering & Remote Sensing.* 83(1): 57-67. 11 p. https://doi.org/10.14358/PERS.83.1.57.

2017 Johnson, B., and **J.M., Shepherd,** 2017: An urban-based climatology of winter precipitation in the Northeast United States. *Urban Climate*. Accepted.

2017 Debbage, N., and **J.M., Shepherd** 2017: The influence of urban development patterns on streamflow characteristics. *Water Resources Research*. Submitted.

2017 Ray, P.S., and **J.M**, **Shepherd,** 2017: Tracking a hurricane center and eye radius with incoherent radar. *International Journal of Remote Sensing*. Submitted.

2017 Grundstein, A., **J.M. Shepherd**, P. Miller, and S. Sarnat, 2017: The Role of Mesoscale-Convective Processes in Explaining the 21 November 2016 Epidemic Thunderstorm Asthma Event in Melbourne, Australia. *J. Appl. Meteor. and Clim*. *https://doi.org/10.1175/JAMC-D-17-0027.1*

2017 Niyogi, D., M. Lei, C. Kishtawal, P. Schmid, and **J.M. Shepherd**, 2017: Urbanization impacts on the summer heavy rainfall climatology over the Eastern United States. *Earth Interactions*. Doi: 10.1175/EI-D-15-0045.1

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2010 Advisory Committee for Environmental Research and Education. 2010.Transitions and Tipping Points in Complex Environmental Systems. A Report by the NSF Advisory Committee for Environmental Research and Education. 56 pp.

2009 **Shepherd, J.M.**, 2009: Urbanization. Encyclopedia of Climate and Weather, 2nd Edition. Ed. Stephen Schneider, Oxford University Press (Accepted).

2009 **Shepherd, J.M.**, 2009: Atmospheric Remote Sensing. Encyclopedia of Geography. Ed. Barney Warf, Sage Reference (Accepted).

2008 **Shepherd, J.M.** with contributions from T.L. Mote, September 2008: Op-Ed on Hurricane Season: Warming Revs Into Action. *Atlanta Journal-Constitution*.

2007 **Shepherd, J.M**., 2007: Contributor to article on Hole Punch Clouds. *National Geographic* (West Edition), September Issue.

2006 **Shepherd, J.M.**, June 11th, 2006: Op-Ed on Hurricanes and Global Warming, *Atlanta Journal-Constitution.*

2005 **Shepherd, J.M**., 2005: "Can Cities Make Rain?" *Weatherwise* magazine. Volume **58**. No. 5 (September/October Issue).

2003 **Shepherd, J.M.**, D. Herring, J. Halverson, R. Gutro, and G. Huffman, 2003: "The Big Picture." *Weatherwise*, Vol. **56**, No. 1 (Jan./Feb Issue).

2003 Birk, R., D. Steitz, **and J. M. Shepherd**: 2003: Earth Observation Summit. Earth Observation Magazine. Vol. **12**.

1999 **Shepherd, J.M.**, 1999: Rainfall morphology in semi-tropical convergence zones. Submitted in partial fulfillment (May 1999) of a Doctor of Philosophy in Meteorology at Florida State University, Tallahassee, Florida 32306. 130 pp.

1992 **Shepherd, J.M.**, 1992: A radar reflectivity-based algorithm for tropical cyclone location. Submitted and accepted on Nov. 24th, 1992 in partial fulfillment of a Master's Degree in Meteorology at Florida State University, Tallahassee, Fl. 32306.

3. GRANTS RECEIVED

Current Grants

(08/01/19-7/31/20)

UGA Presidential Interdisciplinary Seed Grant, Building a National Center of Excellence for Nature-Based Infrastructure Solutions (UGA Budget, $147,700)

(06/01/19-07/31/2020) (0.33 month)

Ray C. Anderson Foundation, Drawdown Georgia via Sub-Award from Georgia Institute of Technology. UGA PI (UGA Budget, $110,241)

(07/01/19-06/30/24) (TBD)

NOAA, Cooperative Institute for Satellite Earth System Studies" (CISESS). UGA PI (UGA Budget, up to $1 million)

12/03/2018-02/29/20 (1.0 month, cost share)

U.S. DOI/GWRI, Assessing Georgia Water Resources Using Satellite Data and Novel Precipitation Metrics. PI. (UGA Budget, $17,942)

06/04/18-01/01/19 (0.2 month)

NSF, Planning Grant: Engineering Research Center for Control of Urban Thermal Environment (CUTE). Co-PI (UGA Budget, $18,506)

05/15/18-04/30/2021 (0.0 month)
Ray C. Anderson Foundation, Georgia Climate Project. Co-PI (UGA Budget, $89,131)

07/01/2017-6/30/21 (0.25 month)
NASA,The Impact of Soil and Surface Moisture on Tropical Cyclone Reintensification Over Land. PI. (UGA Budget, $316,516).

01/01/15-12/31/18 (0.0 month, cost shared)
NASA, USIP, Digital Orbital Analysis of Water Resources for Georgia. Co-I with multiple investigators. PI Mishra. (UGA Budget, 446,218)

01/01/15-12/31/17 (0.0. month, cost share)
USAF/AFRL University Nanosat Program, GeorgiaSat-1. Co-I with multiple investigators. PI Mishra. (UGA Budget, $147,465)

Pending Grants

None at this time

Past Funded Grants

07/01/2017-6/30/19 (1.0 month)
USFS, Role of Climate in the Appalachian Fire Outbreak. PI. (UGA Budget, $50,000)

01/01/16-12/31/18 (1.0 month)
NASA, The Energy---Water---Food Nexus within the backdrop of an urbanized globe: How Can GPM help? PI. (UGA Budget, $473,358)

03/01/2017-02/28/18 (1.0 month, cost share)
U.S. DOI/GWRI. Quantifying the relative contributions of the physical mechanisms responsible for the Atlanta 2009 Flood. PI Shepherd with Co-I Neil Debbage. (UGA Budget, $40,440)

07/01/12-06/30/16 NSF, RCN-SEES Urban Heat Island Network. Co-I with multiple investigators (UGA Budget, $25,243).

10/01/2015-9/30/2016 (0.1 month) UGA Office of STEM. Enhancing and Diversifying Geosciences Instruction Through Popular Gaming Platforms and Multi-user Virtual Environments. Co-I with Suzanne Pilaar Birch, Jerry Shannon, and Tom Mote. (UGA Budget, $7910)

01/06/2015-01/05/2016 (0.0 month) Franklin College of Arts and Sciences Office of Inclusion and Diversity Leadership. Co-I with Suzanne Pilaar Birch, Hilda Kurtz, and Jennifer Rice. Diversity in Geography Careers Seminar and Engagement Series (UGA Budget, $3000)

10/07/13-10/6/15 (0.00)
Exploring Water Sustainability in Cities: A Course Module Linking Geoscience, Engineering, and Society, Funded through Carleton University (prime sponsor NSF through a $10 Million Dollar, 5-year grant to Carleton College's Science Education Resource Center (SERC) is the recipient of a $10 million, five-year National Science Foundation (NSF) grant to create a national STEP Center that will prepare students who can leverage the geosciences to address societal challenges including natural hazards, resource issues, and environmental impacts. The center will conduct project InTeGrate: Interdisciplinary Teaching of Geoscience for a Sustainable Future), PI with Co-PIs M. Jha, M. Shepherd, G. Richard

11/1/2014-10/31/2016 (Initial 2 years funded, ~2.65 M)
NSF, LTER: The Interacting Effects of Hydroclimate Variability and Human Landscape in the Southern Appalachian Mountains. Multiple Co-Is (UGA Budget, $8,080,620).

01/01/13-12/31/16 (1.0 month)
NASA, Process studies and a new framework for optimizing and managing global urban water systems in the GPM era. PI. (UGA Budget, $455,521)

2012-2015 NASA, Combining satellite data and models to assess the impacts of urbanization on the continental United States surface climate. Co-I with L. Bounana, M. Imhoff, D. Quattrochi, et al. (UGA Budget, $170,687).

2011-2014 Coweeta LTER (NSF/Gragson PI), Urbanization--Hydroclimate Feedbacks in the Appalachian--Piedmont Complex. PI (UGA Budget, $99,000)

2013-2014 Improving Teacher Quality Grants Program, Higher Education Title II Part A, PL – 107 – 110, Higher Education, Teaching Climate Change Science in Middle and High Schools. Co-I (Budget, $25,600)

2011-2012 NASA, The Brown Ocean Concept: A spatio-temporal and theoretical analysis of re-intensifying tropical cyclones over land. PI with graduate student Theresa Andersen (UGA Budget, $28,400).

2010-2013, NASA, Influence of Humans on Precipitation Variability, Climate, and the Water Cycle: Preparing for the GPM era. PI with co-PIs S. Burian and Menglin Jin (UGA Budget, $406,343).

2010-2013, NASA, Using geospatial data and field investigations to monitor effects of climate change on birds along elevational and latitudinal gradients Co-Investigator with J. Hepinstall, M. Conroy, R. Cooper (UFA Budget, $449,765).

2008-2013, Department of Energy/SRNL, FY 2009-FY2012, Project Title: Integrated Hydrologic/Hydrodynamic Modeling System for Collection of Pollutant Signatures. Co-Investigator with A. Grundstein (PI), J. Bollinger, T. Mote, T. Rasmussen, and others (UGA Budget, $750,000).

2012 UGA Provost Summer Research Award (UGA Budget, $5000).

2010-2012. U.S. Forest Service, Climate Change and Social Vulnerability in the Southeast U.S and Africa. Principal Investigator (UGA Budget, $15000).

2009-2012 U.S. Forest Service, Climate Change and Social Vulnerability in the Southeast U.S. Co-Investigator (UGA Budget, $22000).

2009-2012 National Science Foundation, Creating a Diversity Climate Network (D-ClimNet) to enhance the climate sciences pipeline of minority students from high school to graduate levels. Co-PI with L. Giroux and M. Raphael (UGA Budget, $58,418).

2007-2011-NASA Headquarters, FY 2006-2009, Impact of Humans on Precipitation Variability. Principal Investigator with co-investigators S. Burian (University of Utah) and M. Jin (University of Maryland) (UGA Budget, $390,000).

2009-2011-U.S. Forest Service, Regional Climate Simulations of Southern Forests. Co-Investigator with T. Mote (UGA Budget, 130K).

2009-2011-U.S. Forest Service, Evaluation of WRF Model for SHRMC Activities. Co-Investigator with T. Mote (UGA Budget, 30K).

2006-2009-NASA, FY 2006-2009, Impact of Humans on Precipitation Variability. Principal Investigator with co-investigators S. Burian (University of Utah) and M. Jin (University of Maryland) (UGA Budget, $390,000).

2010-Franklin College, Franklin Visiting Scholars Program. Travel grant for Dr. Dupigny-Giroux (Vermont) to visit UGA. ($1000).

2008-1010-NASA, Water and Energy Cycle, An observational and modeling study of a rare tornadic storm in a major central business district: Possible linkages to drought and urban land cover. Principal Investigator with co-Investigator D. Niyogi (Purdue) (UGA Budget, $45,632).

2007-2009-Defense Threat Reduction Agency, FY 2006-2008, Urban Enhancements to Meteorological Modeling and Observations. Co-Investigator with S. Burian (University of Utah) and M. Jin (University of Maryland) (UGA Budget, $85790).

2008-2009-US Forest Service, Assessing air quality and perceptions of environmental hazards in the Newtown Community: A prototype UGA-U.S. Forest Service Initiative on environmental justice and green space engagement. Principal Investigator with co-Investigators T. Mote, N. Heynen, and C. Johnson (UGA Budget, $7895).

2006-2007-Northeast Georgia Partnership for Reform in Science and Mathematics (PRISM) 2006-07 Improving Teaching and Learning of Science and Mathematics at the Undergraduate Level, 2006-2007, Enhancing Climate Change Science Education Through Inquiry-Based Concepts and Real-World Simulations Co-Investigator, Robert Hill (UGA COE) ($7790).

2006-2008-NASA Goddard Space Flight Center. Science Support for the Development of The NASA Global Precipitation Measurement Mission's Science Implementation Plan and Continuing Precipitation Science Team Activities ($55,000).

2006-2007-NASA Goddard Space Flight Center. Developing a Framework for Understanding the Titanian Methane Cycle using Remote Sensing Techniques Developed for Studying Earth's Water Cycle. PI: Dr. Marshall Shepherd (UGA), Co-I: Terence Doiron/GSFC/555, Co-I: Chris Ruf/University of Michigan ($75,000 in FY06 with possible FY07 extension, UGA Budget $5120).

2006-2007-NASA Headquarters. Extension of PECASE funding. The Impact of Urbanization on Climate: Integrated Modeling to Couple urban growth, land use change and weather-climate ($106,974).

2003-2006-NASA Headquarters. Research Opportunities for Precipitation Measurement Missions: Understanding the Impact of Urbanization on Short and Long Term Precipitation Variability and Land Surface Hydrologic Processes ($275,000).

2003-2006-NASA NRA-02-OES-05 Research Opportunities for Precipitation Measurement Missions.

The Impact of Precipitation Measurement Missions on Hydrologic and Water Resource Predictions. Co-I with PI C.P. Lidard (GSFC) and CO-I A. P. Georgakakos (Ga. Tech) (Unfunded co-PI).

2003-2005-NASA Headquarters. Impacts of Urban Surfaces on Rainfall Modification using Space-Based Rainfall Measurement, Numerical Models Simulations, and High-Density Gauge Validation: Science Impact, Applications, and Policy Implications. NASA New Investigator Program (300K/3 Years).

1999-2000-NASA GSFC. "Informal Science Education Supporting Weather Broadcasters On-Air with TRMM "Mini-Education Supplements" awarded by GSFC Director's Discretionary Fund (25K per year).

1994-1995- NASA Headquarters. Co-Investigator on proposal with Dr. Gerald Heymsfield and Dr. Brad Ferrier on research related to remote sensing of tropical mesoscale convective systems.

4. CONTRIBUTIONS OTHER THAN FORMAL PUBLICATIONS

Sessions Convened

2018 Organized Weather Balloon Launch and Vaisala Corporation Visit for Atmospheric Sciences Students
2017 Co-Organized UGA Eclipse Educational Event at UGA's Sanford Stadium
2015 Co-convener (with NSF RCN co-PIs) Urban Climate Institute, Athens, Georgia (July)
2015 Co-convener (with Dr. Kim Cobb, Georgia Tech) AAAS Science Communications Workshop (January)
2014 Co-convener 2nd Urban Climate Institute, Atlanta, Georgia as a part of NSF RCN (July)
2014 Co-Organized Franklin Scholars Speaking Engagement with PeachState LSAMP Program. Dr. Calvin Mackie (May)
2014 Co-Organizer (along with Dr. Chandana Mitra), 2014, Urban Weather and Climates: Assessments and Responses. Urbanization and Global Environmental Change (UGEC) conference. Taipei, Taiwan. (November)
2013 Co-Convener of 1st Urban Climate Institute, Minneapolis, Minnesota as a part of NSF RCN
2011 Co-Organizer, 2012 AMS Session on Hydroclimate Applications of GPM, New Orleans, LA.
2008 Co-Convener of Fall 2008 AGU Union Session on Urbanization and Climate Change.
2006 Co-Convener (along with Dr. Tom Bell of NASA) of Spring American Geophysical Union session, "Aerosols, Pollution, and Urbanization Effects on Precipitation." Baltimore, MD.
2004 Co-Organizer of AMS Short Course on Satellite Data Assimilation at Annual AMS meeting.
2003 Co-Convener of Fall 2003 AGU Union Session on Urbanization and Climate Change.

Invited Talks, Special Presentations, Affiliations and Activities (Present to 1999):

2019 Invited Speaker, TedX, Ledroit Park/AAAS Workshop (February)
2019 Invited Speaker, Global Change Program, Georgia Tech (February)
2018 Invited Speaker, NASA GSFC Scientific Colloquium (November)
2018 Invited Speaker, SEDAAG in Johnson City, Tennessee (November)
2018 Invited Speaker, University of Florida Climate Communications Workshop (November)
2018 Invited Speaker, HBCU Climate Conference at Xavier University (September)
2018 Invited Speaker, IAUC and AMS Urban Conference, CUNY (August)
2018 Invited Speaker, College of Charleston (April)
2018 Invited Speaker, Emergency Managers Association of Georgia in Savannah (April)
2018 Invited Speaker, President's Forum AAG Annual Meeting (April)
2018 Invited Speaker, US Science Festival (April)
2018 Invited Speaker, TedX UGA (March)
2018 Invited Speaker, Athens Rotary Club (March)
2018 Invited Speaker, Gwinnett County Science Fair and Host, Awards Ceremony (February)
2018 Invited Speaker, UGA Honors Program Luncheon
2018 Invited Speaker, UGA Founders Week Lecturer (January)
2018 Invited Speaker, Robert Ryan Symposium, AMS Annual Meeting (January)
2017 Invited Speaker, NSTA (December)
2017 Invited Speaker, NASA Smithsonian-IMAX (October)
2017 Invited Speaker, Robock Lecture, University of Wisconsin (September)
2017 Invited Speaker, Young Harris University Lecture (April)
2017 Invited Speaker, Emory University Lecture (March)
2017 Invited Speaker, IRIS Conference (March)

2017 Invited Speaker, Deaton Creek Democratic Party (March)
2017 Invited Speaker, Dillard Symposium of HBCU Climate Change Conference (March)
2017 Invited Speaker, OLLI Session (March)
2017 Invited Speaker, Georgia Water Resources Association (March)
2017 Invited Speaker, George Science Symposium (February)
2016 Invited Speaker, Athens-Clark County Democratic Party ((November)
2016 Invited Speaker, National Weather Association WxFest (September)
2016 Invited Speaker, Southwest Florida Chapter of the American Meteorological Society (April)
2016 Invited Speaker, University of South Florida Geography Department ((April)
2016 Invited Speaker, Congress and National Academy of Science for Extreme Weather Report Roll-Out (March)
2016 Invited Speaker, University of Missouri, LSSP 2016 (March)
2016 Invited Speaker, SECAPS University of South Alabama (March)
2016 Invited Speaker, AAAS Annual Meeting (February)
2016 Invited Speaker, GOES-R Short Course, Phoenix, AZ (January)
2016 Invited Moderator, U.S. Secretary of Commerce Pritzker and NOAA Administrator Sullivan, AMS Annual Meeting (January)
2016 Invited Moderator, Value Chain of Weather Panel, AMS Annual Meeting (January)
2015 Invited Speaker, Jackson State University, 40th Anniversary of Meteorology (November)
2015 Invited Speaker, GIPL Clergy Breakfast (November)
2015 Invited Speaker, Southeast Climate Consortium Meeting (October)
2015 Invited Speaker, AAAS 50th Anniversary of Climate Warning to US President (October)
2015 Invited Speaker, PeachState LSAMP Conference (October)
2015 Invited Speaker, EPA International Youth Symposium (September)
2015 Invited Speaker, National Black Nurses Association (July)
2015 Invited Participant, NASA Workshop on Scientific Challenges and Opportunities in the Weather Focus Area (April)
2015 Attended White House Science Fair (April)
2015 Invited Moderator, White House Champions of Change Event (February)
2015 Invited Keynote Speaker, Georgia Science Teachers Association (February)
2015 Invited AMS 23|5 Speaker, Phoenix, AZ (January)
2015 Invited Panelist, 10th Anniversary WAS*IS Panel, Phoenix, AZ (January)
2014 Invited Speaker, University of Illinois, Distinguished Ogura Lecture Series (October)
2014 Host, Weather Channel's Weather Geeks TV Show
2014 Featured as one of 97 Climate Scientists in 97 Hours of Consensus
2014 Invited Speaker, Mothers and Others for Clean Air Luncheon in Atlanta, Georgia (2014)
2014 Invited Speaker, Welcome to the Anthropocene Lecture Series, UGA (2014)
2014 Invited Speaker ICON Graduate Consortium Lecture Series, UGA (2014)
2014 Invited Speaker, Southern Extension Agent Climate Round-up, UGA (September)
2014 Invited Speaker, UGA Office of Institutional Diversity "Celebrate Diversity", UGA (September)
2014 Numerous Media Appearances for National Climate Assessment Rollout (May)
2014 Invited Speaker, Georgia Aquarium, Earthshare Leadership Breakfast, Atlanta, Georgia (April)
2014 Invited Speaker, Hall County Georgia Earth Day Program (April).
2014 Invited Speaker, Florida State Department of Meteorology, "Soil Moisture Implications for Extreme Weather" (April).
2014 Invited Speaker, Chi Epsilon Pi Banquet, Florida State University (April)
2014 Invited Plenary Speaker, AAG Presidential Forum, Tampa, Florida (April)
2014 Invited Speaker, CICR Sustainability Science Symposium and Workshop, UGA (February)
2014 Participated in White House "We the Geeks" Discussion on the Polar Vortex (January) http://www.whitehouse.gov/blog/2014/01/08/we-geeks-polar-vortex-and-extreme-weather
2014 Appearance on CNN discussing Winter Weather Extremes (February)
2014 Appearance on CBS Face the Nation discussing Winter Weather Extremes (February)
2014 Appearance on PBS NOVA Episode on Typhoon Haiyan (February)
2014 Hammond Lecturer at University of Tennessee (January)
2013 Appearance on CNN discussing Winter Extreme Weather (December)
2013 Sagan National Lecture, Ohio Wesleyan University (November)

2013 Appearance on PBS NOVA Episode on Superstorm Sandy (October)
2013 Invited Speaker, Joint 2013 EUMETSAT Meteorological Satellite Conference and the 19th American Meteorological Society (AMS) Satellite Meteorology, Oceanography and Climatology Conference, Vienna, Austria (September)
2013 Invited Speaker, European Meteorological Society, Reading UK (September)
2013 Appearance on CBS Face the Nation discussing extreme weather events (Summer)
2013 Invited Speaker, International Forum of Meteorological Societies, Reading UK (September)
2013 Luncheon Speaker, Greenlaw, Georgia State Bar (July)
2013 Short-Course on Climate Change Lecturer, AMS Broadcast Meteorology Conference, Nashville (June)
2013 Plenary Speaker, SE Climate Center Workshop on Decisionmaking and Uncertainty (February)
2013 Guest Speaker, AMS/NWA Local Chapter Meeting: The Urban Rainfall Effect (February)
2013 Senate testimony on climate change to Committee on Public Works and the Environment (February)
2013 UGA Physics Department Colloquium Speaker (January)
2013 APERO Lecturer (January)
2012 Interviewed in numerous media outlets in the wake of Superstorm Sandy (e.g. Time, Popular Mechanics NPR, Politico, and various local newspapers)
2012 Invited Speaker, Atlanta Botanical Gardens (August), Urbanization and Climate Change in SE.
2011 Invited Speaker at USFS National Climate Assessment Stakeholders meeting, Atlanta, GA (July)
2011 Invited Speaker, Peach State LSAMP Summer Student Orientation, Athens, GA (July)
2011 Invited Assembly Speaker UGA Upward Bound (June). Topic: Climate and Careers
2011 Invited Keynote Luncheon Speaker. "Urban effects on precipitation, storms, and flooding." Georgia Water Resources Conference, Athens, GA (April)
2011 Invited lecture "Urban effects on precipitation, storms, and flooding." West Central Florida Chapter of the American Meteorological Society and the University of South Florida's Department of Geography, Environment and Planning (April)
2011 Invited talk "Extreme urban flooding in the United States: An urban hydrometeorological perspective. AMS Annual Meeting, Conference on Planned and Inadvertent Weather Modification, Seattle, WA. (January)
2010 Invited climate lecture to UGA Peach State Louis Stokes Alliance for Minority Participation Freshman Seminar (July)
2010 Invited climate lecture to Fernbank Science Center Teacher Workshop in Dekalb County, GA (July)
2010 Invited lecture on urban precipitation at Coweeta Summer Symposium, Oslo, NC (June)
2010 Invited Panelist on Urban Climate at 2010 AAG Annual Meeting (April)
2010 Invited keynote speaker on Climate Change, Council of Science Editors Conference, Atlanta, GA. (May)
2009 Invited lecture on Climate Change to Athens Kiwanis Club
2009 Invited panel lecturer at public program at the National Academy of Science in Washington, DC
2008 Invited lecture on Georgia's Climate Change at Fernbank Museum of Nat. History, Atlanta, GA
2008 Invited lecture on Climate Change at Emmanuel College, Franklin Springs, GA
2008 Invited colloquium speaker, Florida State University, Department of Geography. Tallahassee, FL
2008 Invited Black History Month Speaker, U.S. Forest Service, Athens, GA
2007 Invited by Former GEOG1112 Student to deliver a Motivational Talk at Classic City High School, Athens, GA
2007 Invited lecture on Human Impacts on the Water Cycle at Duke University (Focus Program), Durham, NC
2007 Invited lecture at the Symposium on Evolution of Climate Modeling the Prediction of Climate Change and Science Policy in Boulder, CO
2007 Invited talk for Ohio State University Department of Geography Seminar Series. "How Cities Affect the Water Cycle." Columbus, OH
2007 Invited plenary speaker for the BHSI Spring Symposium: Climate, Ecology, and Infectious Disease. Athens, GA
2007 Invited speaker to Athens-Clarke County Republican Party Monthly Meeting. Topic of discussion: Climate Change
2006 Invited Speaker at NASA Goddard Space Center Engineering Seminar Series. Greenbelt, MD.
2006 Panel Discussant 4621 Geographic Dimensions of Hurricane Katrina Plenary Session 2006 AAG meeting. Chicago IL
2005 Guest lecturer at Smithsonian-GSFC Lecture Series —"What is going on with the

2004 and 2005 Hurricane Season?" Washington, DC

2005 Invited lecturer at the Philosophical Society of Washington's fall lecture series on Friday evening. Title- "How Cities Affect Weather and Climate". Washington, DC

2005 Invited talk on "Precipitation Measurement from Space" at the Goddard Memorial Symposium. Greenbelt, MD

2004 Invited presentation at East Carolina University Geography Department. Invited talk on "How Cities Create Their Own Rainfall and Storms," was part of Geography Awareness Week at East Carolina University in Greenville, NC

2004 Presented Lecture entitled "Are Cities Creating Their Own Rainfall" for the University of Maryland Baltimore County Center for Urban Environmental Research and Education and Department of Civil and Environmental Engineering Fall 2004 Seminar Series. Baltimore, MD

2004 Invited keynote speaker on the Evening of April 29th, 2004 at Riverside Elementary School's annual Math/Science Night

2004 Invited presentation on ongoing NASA research into Urbanization and Precipitation Variability at the University of Alabama-Huntsville

2003 Invited keynote Speaker at Cornell University for NASA Awareness Days. Ithaca, NY

2003 Invited speaker at NASA Days at Centennial of Flight Activities in Dayton, OH

2002 Invited speaker at the 2002 EOS IWG in Hunt Valley, MD on Nov 20th . "The impact of urbanization on the precipitation component of the water cycle: A new perspective."

2002 Invited Seminar on Rainfall Anomalies in Houston and GPM Mission at the University of Virginia Department of Environmental Sciences. Charlottesville, VA

2002 Invited Seminars at Pennsylvania State University Meteorology Department: (1) An Investigation of the Influence of Urban Areas on Rainfall Using the TRMM Satellite and a Cloud-Mesoscale Model and (2) Towards A Global Precipitation Mission. State College, PA

2001 Invited Lecturer at Washington College in Chestertown, Maryland. The lecture was entitled "The Use of NASA's Earth Science Enterprise Satellites to Monitor Environmental Change

Other Speaking and Media Engagements (2011 to 1999)

2011 Interviewed by WCIU (Channel 26) in Chicago concerning 2011 Blizzard (February)

2010 Interviewed by Weather Channel for April 2010 Episode of Storm Stories about 2008 Atlanta tornado

2009 Interviewed by WXIA-TV (Atlanta) about historic Atlanta flooding in September 2009 (September)

2009 Interviewed by WFLA-TV (Tampa) about Hurricanes and Drought

2009 Featured on CNN International for Urban Climate Research

2008 Interviewed by Ivanhoe Media Services on Thunderstorm Asthma

2008 Expert lecturer on climate for NSF traveling PolarPalooza events (during the International Polar Year) in Atlanta, Georgia, Baton Rouge, Louisiana , and Raleigh, North Carolina

2007 Appeared on CBS Evening News discussing urban-induced rainfall

2007 Featured profile in Franklin Chronicle magazine

2007 Appeared on PBS' Georgia Weekly discussing 2007 hurricane season and climate change

2007 Featured profile in OVPR's Research Magazine Q&A segment

2007 Featured profile at Minority Environmental Leadership Development Institute's website: http://www.umich.edu/~meldi/4_profiles_minprof.html

2006 Presentation to Atlanta AMS Chapter on the UGA Atmospheric Sciences Program

2006 Interviewed by PBS Georgia Weekly on the 2006 Hurricane Season

2006 Interviewed by CBS 46 on August 10th, 2006 about research on urban-induced precipitation

2005 Numerous Presentations at NASA Goddard Space Flight Center to NASA Administrator, NOAA Administrator, National Weather Service Director International Delegations, Congressional Members, Staffers, and Agency Visitors

2005 Seminar on Earth's Changing Climate System to the University of Maryland-Baltimore County Physics-Earth Science Class of Amita Mehta. Baltimore, MD

2005 Seminar to the Sailing Group "Women Aboard" in Annapolis, MD

2005 Member of a NASA Delegation that Attended a Joint Meeting between the Laboratory for Atmospheres and Caribbean Climate Studies A NASA EPSCoR Project at the University of Puerto Rico, Mayaguez

2005 Panelist and Speaker at John F. Kennedy High School called "African-Americans in Science" Program

2004 Presentation to New York City Astronomy Students visiting NASA

2004 Interviewed by a PBS crew for a NOVA Program on the 2004 Atlantic Hurricane Season. The program aired on January 25th, 2005

2004 Interviewed by Maryland Public Television for a Special on Hurricane Isabel's Impacts on Maryland

2004 Two Presentations on NASA Precipitation Missions and Urban-Induced Weather for the Earth Explorers Institute Symposium held Monday-Thursday at NASA-GSFC and the Maryland Science Center

2004 Presentation/Moderator to NOAA-Department of Homeland Security Urban Meteorology Symposium (Sept. 22nd 2004, Rockville MD)

2004 Conducted Interviews with Major Media Organizations (Larry King Live, Today Show, NBC Nightly News, Fox News, CNN Lou Dobbs, BET Nightly News, and Numerous Local News Affiliates) to discuss how NASA is studying hurricanes during the 2004 Hurricane season

2004 Presentation to NASA Goddard Executive Council and Earth Science Directorate Management on Recent Satellite-Modeling study of Urban-induced Convection

2004 Presented a seminar entitled "NASA Efforts to Understand How Cities May Create Their Own Weather" at Bowie State University for the Department of Computer Science Seminar Series.

2004 Presented a seminar "Improving Weather Predictions: NASA's perspective and Implications for Energy Management" at George Washington University. Washington, DC

2004 Presentation on Houston Rainfall Anomalies at 1st HEAT planning meeting in Boulder, CO.

2003 Guest on National Public Radio with Kojo Nmandi. (September 2003)

2003 Presentation to Jason Rothenberg (White House Office of Management/Budget) on the benefits of NASA satellite data and models to improved weather forecasts

2003 Appearance in a NASA recruitment DVD entitled "As Only NASA Can"

2003 Presentation of NASA ESE Science Accomplishments at the Goddard Memorial Symposium at the Greenbelt Marriott

2003 Presentation Satellite Data in Weather-Climate Prediction to Dr. Margaret Leinen, NSF

2002 Presentation "A downscaling analysis of the urban influence of rainfall" at the 2002 NASA Land Use Land Cover Change Science Team Meeting at the University of MD Conference Center

2002 Presentation to White House Science Advisor John Marburger on NASA Precipitation Program

2002 Appeared on Public Interest with Kojo Nandhi (NPR) to discuss technology and weather

2002 Attended 2nd GPM Partnership Workshop in Tokyo, Japan (May 2002)

2002 Presentation at George Washington University Space Policy Institute Symposium "Economic Value of Improved Weather and Climate Information" (March 2002). Washington, DC

2002 Overview of NASA Earth Science Activities: Atmospheric Science Component for a training session for National Park Service park rangers in Washington, DC

2002 Organized and hosted the 1st GPM Applications Workshop (February 2002). Beltsville, MD

2002 Presentation entitled "Large Forecast Centers Using TRMM Real-Time Data" at the Annual Meeting of the American Association for the Advancement of Science. Washington, DC

2001 Served on Congressional Black Caucus Science Braintrust Panel (September 2001)

2001 NASA CAMEX-4 Press Briefing at Jacksonville, FL NAS to Discuss Role of TRMM in the Field Campaign

2001 Overview Earth Sciences presentation to Department of Defense Air Force Fellows and Office of Management and Budget. Greenbelt, MD

2001 Presenter and Panelist at the City of New York's Graduate Center Symposium on Science and Mathematics. New York, NY

2001 Presentation of NASA Earth Science Results to Delegation from Bahrain. Greenbelt, MD

2000 Presentation to Congressmen, NASA Administrator, and general public on remote sensing of weather and climate events at the Langley IMAX theatre of the National Air and Space Museum

2000 Presentation to Dr. Neal Lane, President Clinton's Science Advisor, and high-ranking NASA and Japanese officials highlighting the accomplishments of the Earth System Enterprise's TRMM and TERRA Spacecraft missions

1999 Presentation to White House Office of Science and Technology Policy and Office of Management and Budget officials on the capabilities in remote sensing for environmental monitoring

1999 Member of expert panel at the NASA's 5th Model Institutes of Excellence Symposium. A lecture entitled "On the role of climate and weather processes within the Earth System: Perspectives from Remote Sensing and Implications for the Next Generation of Earth Scientists

5. SUPERVISION OF STUDENT RESEARCH

Current
Doctoral Advisor to Mr. Andrew Michael Thomas
Doctoral Advisor to Mrs. Mariana Alfonso, University of Georgia
Doctoral Advisor to Ms Ansley Long, University of Georgia
Masters Advisor to Mr. Matt Warren, University of Georgia

Past:

Post-Doctoral Advisor to Dr. Theresa Andersen, University of Georgia
Doctoral Advisor to Mr. Brad Johnson, University of Georgia (Graduated in Fall 2018)
Dissertation: The impact of urbanization on regional scale climate and winter precipitation.
Doctoral Advisor to Mr. Neil Debbage, University of Georgia (Graduated in Spring 2018)
Dissertation: Urban flooding vulnerability: A multifaceted comparative assessment of the Charlanta Megaregion
Doctoral Advisor to Mr. Marcus Williams, University of Georgia (Graduated in Fall 2016)
Dissertation: The spatio-temporal evolution of irrigation in the Georgia coastal plain: Empirical and modeled effects on the hydroclimate
Doctoral Advisor to Dr. Amanda Schroeder, University of Georgia (Graduated in Summer 2015)
Dissertation: A spatio-temporal assessment of urban flooding within the United States.
Doctoral Advisor to Dr. Binita KC, University of Georgia (Graduated in 2014)
Dissertation: Spatio-temporal assessment of climate change vulnerability in Georgia
Doctoral Advisor to Dr. Theresa Anderson, University of Georgia (Graduated in August 2013)
Dissertation: The "brown ocean" concept: A spatio-temporal and theoretical analysis of intensifying tropical cyclones over land.
Doctoral Advisor to Dr. Chandana Mitra, University of Georgia (Graduated in May 2012)
Dissertation: The Dynamics of Urban Land Cover Growth in Kolkata, India and Potential Impacts on Pre-Monsoonal Precipitation: Project Impact or Natural Variation?
Masters Advisor to Mr. Kelly Harris, University of Georgia (Graduated in Spring 2018, Employed with NYC transportation consulting firm)
Thesis: An analysis of Atlanta road surface temperatures for the improvement of urban transit
Master's Advisor to Mr. Neil Debbage (Graduated in Aug 2014, U of GA doctoral program)
Thesis: Quantifying Urban Form Via Spatial Metrics and Its Climatic Implications
Master's Advisor to Mr. Fang Zhao (Graduated in May 2011, U of MD doctoral program.)
Thesis: Precipitation Changes Near Three Gorges Dam
Master's Advisor to Ms. Lauren Hand (Graduated in May 2008, employed by Dewberry, Inc.)
Thesis: An Investigation of Warm Season Rainfall Variability in Oklahoma City: Possible Linkages to Urbanization and Prevailing Wind
Master's Advisor to Ms. Yan Zhou (Graduated in Summer 2008, U of MD doctoral program)
Thesis: Atlanta's Urban Heat Island under Extreme Heat Conditions and Potential Mitigation Strategies
Master's Advisor to Mr. Michael Carter (Graduated in Spring 2009, Miss. State Univ. doctoral program)
Thesis: Mesoscale Circulations in the Urban-Coastal Environment: A Modeling Analysis and Assessment of Sensitivity to High Fidelity Representation of the Urban Canopy
Master's Advisor to Ms. Theresa Anderson (Graduated in Summer 2010, UGA doctoral program)
Thesis: A Climatological Analysis of Drought and Tornadic Activity in the Southeastern U.S.
Post-Doctoral Research Collaborations with Dr. Willis Shem (Currently at DOE/ORNL)

Served as a member of the following student committees:
Mr. Castle Williams Doctoral Committee (Current), Ms. Flavia Morales' Doctoral Committee (Current) Mr. Paul Schmid's Doctoral Committee, Purdue University (Current), Mr. Kyle Mattingly's Doctoral Committee (Current), Mr. Ian Boatman's Master's Committee (Current), Mr. Nick Morgan's Master's Committee, Mengshui Weng's Doctoral Committee (Current), Mr. Kyle Mattingly's Master's Committee (Graduated), Mr. Jordan McCleod's Master's Committee (Graduated), Mr. Jared Rackley's Master's Committee (Graduated), Ms. Jordan Pesses, Master's Committee (Graduated), Mr. Craig Ramseyer, Master's Committee (Graduated), Mr. Pete Campana, Master's Committee (Graduated), Ms. Laura Becker (Graduated), Mr. Matthew Lacke, Master's Committee

(Graduated), Ms. Elizabeth Smith, Master's Committee, Montana State University, (Graduated), Mr. Robert Shacklefood's Master's Committee (Graduated), Mr. Ian Chang, Master's Committee, Northern Illinois, Dr. Dean Hardy's Doctoral Committee (Graduated), Dr. Craig Ramseyer's Doctoral Committee (Graduated), Dr. Paul Miller's Doctoral Committee (Graduated), Dr. Victor Gensini's Doctoral Committee (Graduated), Dr. Lei Ming, Doctoral Committee (Graduated), Purdue University (Graduated), Dr. ByungYun Yang, Doctoral Committee (Graduated), Dr. Matt Hauer's Doctoral Committee (Graduated), Dr. Sergio Bernardes, Doctoral Committee (Graduated), Dr. Chris Furmhann, Doctoral Committee, University of North Carolina (Graduated), Dr. John Frye, Doctoral Committee, University of Georgia (Graduated), Dr. Joshua Durkee, Doctoral Committee, University of Georgia (Graduated), Dr. Sharon Ashley Doctoral Committee University of Georgia (Graduated), Dr. Sara Vieira Doctoral Committee at Georgia Tech (Graduated), Dr. Khalil Lezzaik's Doctoral Committee (Graduated), Dr. Dean Hardy's Doctoral Committee (Graduated).

Served as undergraduate research advisor for projects conducted by Toni Deanon, Alexandra Horst, David Nevius, and Michael Stewart.

Science Advisor for 3 NASA DEVELOP Projects from 2005 to 2013.

6. EDITORSHIPS AND EDITORIAL BOARDS

Current	Climatology Editor, Association of American Geographers (AAG) Encyclopedia of Geography.
	Weather Editor, Earthzine Magazine.
2007-2012	Editor, *Journal of Applied Meteorology and Climatology*. A leading journal in the field of meteorology and climatology and published by the American Meteorological Society.
2011	Guest Editor, *Earthzine* Magazine Spring Special Issue on Extreme Weather
2007-2010	Editor for *Geography Compass.*
2006-2007	Past member of the Editorial Board for *Geography Compass*.

7. CONVENTION/CONFERENCE PAPERS

Key Acronyms: Association of American Geographers (AAG), American Meteorological Society (AMS), American Geophysical Union (AGU), European Geophysical Union (EGU)

*Refereed paper associated with conference paper

2018 Udaysankar Nair, E. Rappin, E. Foshee, W. Smith, R. A. Pielke Sr., R. Mahmood, J. L. Case, C. B. Blankenship, **J. M. Shepherd**, J. A. Santanello, and D. Niyogi. Brown Ocean Effect on the Louisiana August 2016 Extreme Flooding Event. American Meteorological Society Annual Meeting. Austin, Texas.

2018 Debbage, N., and **Shepherd, J.M**., 2018: Quantifying the relative contributions of the physical mechanisms responsible for the Atlanta 2009 flood. American Meteorological Society Annual Meeting. Austin, Texas.

2018 Long, A., and **Shepherd, J.M**., 2018: Using Satellite-Derived Precipitation Measurements to Assess Water Resources on the Navajo Indian Reservation. American Meteorological Society Annual Meeting. Austin, Texas.

2018 Johnson, Bradford, and **Shepherd, J.M**., 2018: A WRF Model-Based Sensitivity Analysis of Urbanization on Winter Precipitation Type. American Meteorological Society Annual Meeting. Austin, Texas.

2017 Burian, S.J., Jha, M., Richard, G., **Shepherd, J.M**. (2017). "An interdisciplinary learning module on water sustainability in cities." *American Society for Engineering Education (ASEE) Annual Conference Proceedings*, 25-28 June, 2017, Columbus, OH, USA.

2017 Ahmed, W., Hansen, C.H., Goharian, E**., Shepherd, M.,** Ahmad, S., and Burian, S.J. (2017). "Data management and modeling for addressing the water-energy-food nexus in Pakistan." *ASCE-EWRI World Environmental & Water Resources Congress 2017*, Sacramento, California, USA, May 21-25, 2017.

2017 **Shepherd, J.M**., 2017: Satellite Remote Sensing and the Hydroclimate: Two Specific Examples of Improved Knowledge and Applications, American Geophysical Union, New Orleans, Louisiana.

2017 Johnson, Bradford, and **Shepherd, J.M.**, 2017: The Effects of Urban Clusters on Winter Precipitation, American Meteorological Society, Seattle, Washington.

2017 Debbage, N., and **Shepherd, J. M.**, 2017: Quantifying the relative contributions of the physical mechanisms responsible for the Atlanta 2009 flood. Southeastern Division of the American Association of Geographers Annual Meeting. Starkville, Mississippi.

2017 Debbage, N., and **Shepherd, J.M.**, 2017: The influence of urban development patterns on streamflow characteristics. American Meteorological Society Annual Meeting. Seattle, Washington

2016 **Shepherd, J.M**., A. Grundstein, and J. Knox, 2016: Are Bounce Houses Too Hot? AMS Annual Meeting, 7th Conference on Environment and Health, Phoenix, AZ

2016 Johnson, B., and **J.M. Shepherd**, 2016: Assessing urban impact on winter precipitation type using dual polarization radar, AMS Annual Meeting, 30th Conference on Hydrology, Phoenix, AZ

2015 Jennings, V., Chen, H. Floyd, M., **Shepherd, JM**, Wicker, L., Wolf, K., Zipperer, W. How to Successfully Present Research and Publish in Top Journals. Minorities in Agriculture, Natural Resources, and Related Sciences Annual Conference. 27 March 2015. Houston, TX

2015 Johnson, B., and **M. Shepherd**, Towards the Understanding and development of an urban-influenced climate framework. 95th American Meteorological Society Annual Meeting, Phoenix, AZ, 27th Conference on Climate Variability and Change.

2014 **Shepherd, M**. and S. Bernardes, 2014: Assessing Exposure of Infrastructure and Populations to Extreme Precipitation in the Southeastern United States. Southeastern Division of the AAG (SEDAAG), Athens, Georgia

2014 Andersen, T., **M. Shepherd**, and L. Bounoua, 2014: Using WRF-UCM to assess the impacts of an urban archipelago on weather in the Northeast US. AMS Annual Meeting, Atlanta, Georgia.

2014 KC, B., J. Bell, S. Kethireddy, E. Dobbs, J. Luvall, **J.M. Shepherd**, T. L. Mote, S. Goodrick, 2013. Infusing NASA satellite data to model air-quality for Southeast United States: A wildfire, aerosol transport, and respiratory health case study, 94th American Meteorological Society Annual Meeting, Atlanta, GA.

2014 Andersen, T., **J.M., Shepherd**, and L. Bounoua, 2014: Using WRF-UCM to assess the impacts of an urban archipelago on climate in the Northeast US. Poster. American Meteorological Society 94th Annual Meeting in Atlanta, GA, 11th Symposium on the Urban Environment, February 2-6

2014 Zhao, F., and **J.M. Shepherd**, 2014: Analyzing the Impact of the Three Gorges Reservoir on Local Precipitation with TRMM Satellite Data. 94th American Meteorological Society Annual Meeting, Atlanta, GA.

2014 Bloch, L., M. Faherty, L. Hample, J. Knox, V. Laux, T. Pastuszak, Z. Robbins, and **J.M. Shepherd**, 2014: Birds blown off course: HYSPLIT analysis of Northern Lapwing (NOLA) sightings in Massachusetts following Superstorm Sandy with application to citizen science. Presented at the American Meteorological Society (AMS) Annual Meeting, Atlanta, GA.

2014 Debbage, N. and **Shepherd, J.M**. April 2014. Urban Heat/Dry Islands: The Role of Density and Spatial Contiguity. Urban Climate and Environment Paper Session (Also Participated in Climate Specialty Group Student Paper Competition). Association of American Geographers Annual Meeting. Tampa Bay, Florida.

2014 Debbage, N. and **Shepherd, J.M**. February 2014. Quantifying Urban Form via Spatial Metrics and its Climatic Implications. Urban Energy and Water Balances Paper Session. American Meteorological Society Annual Meeting. Atlanta, Georgia.

2014 Debbage, N., Gonsalves, N., **Shepherd, J.M**., and Knox, J. February 2014. Superstorm Sandy and Voter Vulnerability in the 2012 US Presidential Election. Hurricane Sandy and the Built Environment Poster Session. American Meteorological Society Annual Meeting. Atlanta, Georgia.

2013 KC, B., **J.M. Shepherd**, M. Madden, and C. Johnson, 2013. Spatio-Temporal Assessment of Climate Change Vulnerability in Georgia, Invited Speaker in Hollings Marine Laboratory, NOAA, Charleston, SC, October, 2013.

2013 KC, B., **J.M. Shepherd**, and C. Johnson, 2013. Climate Change Vulnerability Assessment in Georgia, Georgia Environmental Conference, Jekyll Island, GA, August, 2013

2013 KC, B., **J.M. Shepherd**, and C. Johnson, 2013. Climate Change Vulnerability Assessment in Georgia ASPRS Conference, Baltimore, MD, March, 2013

2013 KC, B., J. Bell, S. Kethireddy, E. Dobbs, J. Luvall, **J.M. Shepherd**, T. L. Mote, S. Goodrick, 2013. Infusing NASA satellite data to model air-quality for Southeast United States: A wildfire, aerosol transport, and respiratory health case study, SOFOR GIS Conference, Athens, GA, December, 2013

2013 Applied Climatology Panel, AMS Annual Meeting, Austin Texas. Perspectives on Applied Climatology.

2012 Hossain, F., W. Yigzaw, A. Degu, A.T. Woldemichael, **J.M. Shepherd** and C Mitra, 2012: Remote

Sensing of Water Cycle and Land Use Patters to Understand Water Resources Vulnerability of an Asian Mega City, AGU Chapman Conference on Remote Sensing of the Terrestrial Water Cycle, Waikoloa Beach Marriott in Kona, Hawaii, USA, 19 February - 22 February 2012.

2012 **Shepherd, M**., and C. Strother, 2012: The "Ring of Asphalt" and changing precipitation in the Southern Appalachians, Coweeta LTER Summer Meeting, Otto, NC.

2012 Grundstein, A., B. Avant, S. Younger, A. Ignatius, T. Rasmussen, T. Mote, **M. Shepherd**, 2012: A Methodology for Hydrological Modeling in Data Poor Regions using TRMM Precipitation Data and MERRA Reanalysis Meteorological Data. AAG Annual Meeting, 24-28 February, New York, NY.

2012 Rasmussen T.C., A. Grundstein, T. Mote, **M. Shepherd**, A. Ignatius, B. Avant, S. Younger, 2012: Remote Sensing-Based River Fluxes, National Nuclear Security Administration (NA-22), U.S. Department of Energy, Washington D.C., December 1, 2012.

2011 Ignatius, A., A. Grundstein, T. Rasmussen, B. Avant, **M. Shepherd**, T. Mote, 2011: A Methodology for Hydrological Modeling in Data Poor Regions using Satellite-based and Reanalysis Meteorological Data. AAG Annual Meeting, 12-16 April, Seattle, WA.

2010 Ignatius, A., A. Grundstein, T. Rasmussen, T. Mote, and **M. Shepherd**, 2010: Utilizing Satellite-based Reanalysis Precipitation Data in Hydrological Modeling. AGU Annual Meeting, 13-17 December, San Francisco, CA.

2010 Avant, B., A. Ignatius, T. Rasmussen, A. Grundstein, T. Mote, and **M. Shepherd**, 2010: Coupling Tritium Release Data with Remotely Sensed Precipitation Data to Assess Model Uncertainties. AGU Annual Meeting, 13-17 December, San Francisco, CA.

2010 Ignatius, A., A. Grundstein, T. Rasmussen, T. Mote, **M. Shepherd**, J. Knox, J. Bollinger, A. Garrett, D. Hayes, 2010: The use of Merra reanalysis data and satellite-based precipitation estimates in hydrologic modeling. AAG Annual Meeting, 14-18 April, Washington, D.C.

2011 Chang, I., M. Bentley, and **J.M. Shepherd**, 2011: Spatial distributions of rainfall intensity maxima in intense tropical cyclones from the TRMM Multi-satellite precipitation analysis dataset. AGU Annual Meeting, San Francisco, Ca.

2011 Jin, M., R. Dickinson, and **J.M. Shepherd**, 2011: Using MODIS skin temperature to assess urban heat island and biosphere-land interactions, AGU Annual Meeting, San Francisco, CA.

2011 **Shepherd, J.M**., 2011: Current and emerging perspectives on urban hydroclimate interactions. NASA PMM Science Team meeting, Denver, CO (invited).

2011 Ignatius, A., A. Grundstein, T. Rasmussen, B. Avant, **J.M. Shepherd**, and T. Mote, 2011: A methodology for hydrological modeling in data poor regions using satellite-based and reanalysis meteorological data, AAG Annual Meeting, Seattle, WA.

2011 Zhao, F., and **J.M. Shepherd**, 2011: Precipitation changes near Three Gorges Dam. AAG Annual Meeting, Seattle, WA.

2011 Jin, M., **J.M. Shepherd**, and W. Zheng, 2011: Urban aerosol direct effect on surface temperature. AMS Annual Meeting, Seattle, WA.

2011 Andersen, T., and **J.M. Shepherd**, 2011: A climatological analysis of drought and tornadic activity in the southeastern United States, AMS Annual Meeting, Seattle, WA.

2011 Mote, T.L., **J.M Shepherd**, T.K. Anderson, B. KC, C. Ramseyer, 2011: Downscaling: Modeling global climate change effects locally. The Impact of Climate Change on Tribal Resource Management in the Southeast, Athens, GA.

2010 Shem, W.O., T.L. Mote, and **J.M. Shepherd**, 2010: Validation of NARCCAP climate products for forest resource applications in the southeast United States, American Meteorological Society, 18th Conference on Applied Climatology, Atlanta GA.

2010 Shem, W.O., T.L. Mote, and **J.M. Shepherd**. Validation of NARCCAP climate products for forest resource applications in the southeast United States, 2010: Fall meeting of the American Geophysical Union, San Francisco, CA.

2010 ***Shepherd**, J.M., T.L. Mote, S. Nelson, S. McCutcheon, P. Knox, M. Roden, and J. Dowd, 2010: An overview of synoptic, mesoscale and urban factors contributing to the disastrous Atlanta flood of 2009, 9th Conference on the Urban Environment, Keystone, CO.

2010 ***Shepherd**, J.M., T.L. Mote, S. Nelson, S. McCutcheon, P. Knox, M. Roden, and J. Dowd, 2010: An overview of synoptic and mesoscale factors contributing to the disastrous Atlanta flood of 2009, AAG Annual Meeting, Washington, DC.

2010 Ignatius, Amber, A. Grundstein, T. Rasmussen, T. Mote, **M. Shepherd**, J. Knox, J. Bollinger, A. Garrett, and D. Hayes, 2010: The use of MERRA reanalysis data in hydrologic modeling, AAG Annual Meeting.

Washington, DC.

2010 Ignatius, Amber, A. Grundstein, T. Rasmussen, T. Mote, **M. Shepherd**, 2010: Utilizing Satellite-based and Reanalysis Precipitation Data in Hydrological Modeling, AGU Annual Meeting, San Francisco, CA.

2010 Avant, B., Ignatius, Amber, T. Rasmussen, A. Grundstein, T. Mote, **M. Shepherd**, 2010: Coupling Tritium Release Data with Remotely Sensed Precipitation Data to Assess Model Uncertainties, AGU Annual Meeting, San Francisco, CA.

2010 Giroux L., M. Raphael, **M. Shepherd**, and T. Mote, 2010: Attracting and retaining minority students in the climate sciences - the Diversity Climate Network (D-ClimNet),AAG Annual Meeting. Washington, DC.

2010 **Shepherd**, J.M., 2010: Global evidence of hydroclimate changes due to urbanization, AMS Annual Meeting, Atlanta, GA.

2010 Sarnat, S., A. Grundstein, M. Klein**, J. M. Shepherd**, L. Naeher, T. L. Mote, and P. E. Tolbert, 2010: Examining vulnerabilities to thunderstorm-associated asthma in Atlanta, Georgia, AMS Annual Meeting, Atlanta, GA.

2010 Anderson, T., and **J.M. Shepherd**, 2010: A climatological analysis of antecedent drought and spring tornadic activity, AMS Annual Meeting, Atlanta, GA.

2010 Mitra, C., and **J.M. Shepherd**, 2010: Influence of urban land cover dynamics on pre-monsoonal precipitation in Kolkata, India, AMS Annual Meeting, Atlanta, GA.

2010 Shem, W., T.L. Mote, and **J.M. Shepherd**, 2010: Validation of Narccap climate products for forest resource applications in the southeast United States, AMS Annual Meeting, Atlanta, GA.

2010 *Carter, M., **J. M. Shepherd**, S. Burian, and I. Jeyachandran, 2010: Mesoscale circulations in the urban-coastal environment: a modeling analysis and assessment of sensitivity to high-fidelity representation of the urban canopy, AMS Annual Meeting, Atlanta, GA.

2010 Zhao, F. and **Shepherd, J.M**. Three Gorges dam management: in the face of altered Precipitation. Poster presented at the 2010 Lower Apalachicola-Chattahoochee-Flint (ACF) Water Conference and Summit: Managing reservoirs from a human and Ecological perspective, Bainbridge, Georgia.

2009 ***Shepherd, J. M.**, A. Grundstein, and T. L. Mote, 2009: Quantifying the contribution of tropical cyclones to extreme rainfall along the coastal southeastern United States. Inland Impacts of Tropical Cyclones Conference. Atlanta, Georgia.

2009 **Shepherd, M.**, S. Burian, and M. Jin, 2009: Can satellite-derived rainfall really detect urban rainfall anomalies? 89th Annual Meeting. Phoenix, AZ.

2009 ***Shepherd, M.**, D. Niyogi, T.L. Mote, and J. Entin, 2009: A climatological analysis associating spring tornadic activity with antecedent precipitation and drought in the Southeastern United States. 89th Annual Meeting. Phoenix, AZ.

2009 Burian, S., I. Jeyachandran, **M. Shepherd**, M. Carter, and M. Jin, 2009: Satellite-based approaches to determine urban characteristics: implications for NUDAPT and modeling. 89th Annual AMS Meeting. Phoenix, AZ.

2009 *Niyogi, D., **M. Shepherd**, M. Lei, W. Shem, and J. Entin, 2009: An observational and modeling study of a rare tornadic storm in a major central business district: Possible linkages to drought and urban land cover. 89th Annual Meeting. Phoenix, AZ.

2009 *Hand, L., and **J.M. Shepherd**, 2009: An investigation of warm season spatial rainfall variability in Oklahoma City: Possible linkages to urbanization and prevailing wind. 89th Annual Meeting. Phoenix, AZ.

2009 Mitra C, **J.M. Shepherd**, and T.R. Jordan, 2009: Assessment and dynamics of the urban growth in the city of Kolkata, India. 89th Annual Meeting. Phoenix, AZ.

2009 *Zhou, Y., and **J.M. Shepherd**, 2009: Atlanta's urban heat island under extreme heat conditions. 89th Annual AMS Meeting. Phoenix, Arizona.

2009 Carter, W.M., **J.M. Shepherd**, S. Burian, I. Jeyachandran, and M. Jin, 2009: Mesoscale circulations in the urban environment. 89th Annual AMS meeting. Phoenix, AZ.

2008 ***Shepherd, J.M.**, A. Grundstein, and T. L. Mote, 2008: Quantifying the contribution of tropical cyclones to extreme rainfall along the coastal southeastern United States. 2008 AAG Annual Meeting. Boston, MA.

2008 **Shepherd, J.M.**, 2008: Urban effects on Precipitation: Revisiting the 5-cities Study. 3rd TRMM International Science Conference. Las Vegas, Nevada.

2008 *__Shepherd, J.M.__, A. Grundstein, and T. L. Mote, 2008: Quantifying the contribution of tropical cyclones to extreme rainfall along the coastal southeastern United States. 88th Annual AMS Meeting. New Orleans, LA.

2008 Han, W., S. Burian, and **J.M. Shepherd**, 2008: Use of TRMM precipitation data to investigate urbanization effects on the water cycle. 3rd TRMM International Science Conference. Las Vegas, Nevada.

2008 Jin, M., **J.M. Shepherd**, and S. Burian, 2008: Urban aerosol effects and their direct effects on surface temperature. AGU Fall Meeting. San Francisco, CA, USA.

2008 Burian, S., **J.M. Shepherd**, M. Jin, and colleagues, 2008: Urban land surface characterization and aerosol adjustment enhancements to meteorological modeling. 12th Annual GMU Conference on Transport and Dispersion Modeling. Fairfax, VA.

2008 *Shem, W., and **J.M. Shepherd**, 2008: On the impact of urbanization on summertime thunderstorms in Atlanta: Two numerical model case studies. 2008 AAG Annual Meeting, Boston, MA.

2007 *__Shepherd, J.M.__, A. Grundstein, and T.L. Mote, 2007: Quantifying the contribution of tropical cyclones to extreme rainfall along the coastal southeastern United States. SEDAAG, Charleston, South Carolina.

2007 *__Shepherd, J.M.__, M. Manyin, and D. Messen, 2007: Projected regional climate changes in 2025 Houston due to urban growth. 2nd ICA Workshop on Geospatial Analysis and Modeling. Athens, GA. (Session Chair: Urban Modeling).

2007 *__Shepherd, J.M.__, M. Manyin, and D. Messen, 2007: The impact of current and future urbanization on coastal convective precipitation. AMS Forum: Climate Change Manifested by Changes in Weather. 87th AMS Annual Meeting. San Antonio, TX.

2007 **Shepherd, J.M.**, and T. Mote, 2007: Trends towards wetter hurricane basins. AMS Forum: Climate Change Manifested by Changes in Weather. 87th AMS Ann. Meeting. San Antonio, TX.

2007 Jin, M., **J.M. Shepherd**, L. Remer, et al., 2007: Urban aerosol effects on rainfall and clouds in USA and China. The Fourth International Ocean-Atmosphere Conference (COAA2007). Qingdao, China.

2007 *Shem, W., and **J.M. Shepherd**, 2007: Investigating the relationship between urban land use and precipitating convective systems over the Atlanta region. AMS 7th conference on urban environment. San Diego, California.

2007 Mitra, Chandana, and **J.M. Shepherd**, 2007: Assessment and modeling of urban sprawl in Kolkata. Annual AAG Meeting. San Francisco, California.

2007 Jin, M., and **J.M. Shepherd**, 2007: Urban aerosol impact on surface energy and hydrological cycles. . AMS Forum: Climate Change Manifested by Changes in Weather. 87th AMS Annual Meeting. San Antonio, TX.

2007 Jin, M. S J Burian, LA Remer, **J.M. Shepherd**, 2007 Urban aerosol effects on surface insolation and surface temperature. AGU Fall Meeting. San Francisco, CA.

2007 Jin, M. L. Remer, **J.M. Shepherd**, and S. Burian, 2007: Urban aerosol direct effect on surface skin temperature. A-Train-2007 Symposium. 22-25 October 2007. Lille Grand Palace, France.

2006 *__Shepherd, J.M.__, M. Manyin, and D. Messen, 2006: Projected regional climate changes in 2025 Houston due to urban growth. Special session called "Impact of Aerosols and Urbanization on Precipitation." Spring AGU Meeting. Baltimore, MD.

2006 *__Shepherd, J.M.__, M. Manyin, and D. Messen, 2006: Projected regional climate changes in 2025 Houston due to urban growth. AAG Annual Meeting. Chicago, IL.

2006 *__Shepherd, J.M.__, M. Manyin, and D. Messen, 2006: Projected regional climate changes in 2025 Houston due to urban growth. 6th Symposium on the Urban Environment at the 2006 Annual AMS meeting, Special session called "cities as agents of global change." Atlanta, Georgia.

2006 Niyogi, D., R.A. Pielke, Sr., J. Adegoke, H.I. Chang, T.Chase, E. Douglas, M. Gupte, C. Marshall, T. Matsui, P.C. Pyle, and **M. Shepherd**, 2006: Considering the role of aerosols and land-atmosphere interactions related to agriculture and urbanization in climate studies. AAG Annual Meeting. Land Cover/Land Use Session. Chicago, IL.

2005 **Shepherd, J.M.**, Burian, S, and S. Reynolds, 2005: Urban-induced precipitation and flooding. GPM International Partners Meeting. Tokyo, Japan.

2005 *Shannon Reynolds, Steven Burian, **J. Marshall Shepherd**, and Michael Manyin, 2005: The effect of urbanization-induced rainfall variability on hydrologic response: Linking mesoscale meteorological model output to an urban watershed model. Impacts of Global Climate Change World Water and Environmental Resources Congress. 2005 Raymond Walton - Editor, May 15–19, 2005, Anchorage, Alaska, USA.

2005 Pyle, P., D. Nigoyi, S. P. Arya, B. Wolfe, and **M. Shepherd**, 2005: The effects of urban land-surface processes on thunderstorm characteristics in the Indianapolis urban region. Fall AGU Session on Land Use/Land Cover Change, San Francisco, California.

2004 *__Shepherd, J.M.__, M. Manyin, S. Burian, and C. Garza, 2004: Status of NASA satellite, field observations, and numerical modeling addressing the impact of urbanization on short and long term precipitation variability. AMS Annual Meeting, Symposium on Planning, Nowcasting, and Forecasting in the Urban Zone. Seattle, WA.

2004 *Jin, M, **J. M. Shepherd**, and M.D. King, 2004: Urban aerosols and their interactions with clouds and rainfall: A case study for New York and Houston. Poster at AERONET workshop at Spain May 10-14.

2004 *Jin, M., **J.M. Shepherd**, and M.D. King, 2004: Urban modeling and urban aerosol-clouds-rainfall interactions. Invited seminar at NCEP OGP. April 20th. Camp Springs, MD.

2004 *Jin, M., **J.M. Shepherd**, and M.D. King, 2004: Urban land-atmosphere interactions using EOS, TRMM and NCAR modeling. Invited seminar at Beijing urban research center. June 22, 2004. Beijing, China.

2004 *Jin, M., **J.M. Shepherd**, and M.D. King, 2004: Urban aerosols and their interactions with clouds and rainfall: A case study for New York and Houston. Poster at MODIS workshop at Greenbelt, MD. July 13-15.

2003 **Shepherd, J.M.**, and S. Burian, 2003: A downscaling analysis of the urban influence of rainfall: TRMM satellite component. 12th Conference on Satellite Meteorology and Oceanography. Long Beach, CA.

2003 *__Shepherd, J.M.__, 2003: The impact of urbanization on the precipitation component of the water cycle: A new perspective. Observing and Understanding the Variability of Water in Weather and Climate. Long Beach, CA.

2003 *Burian, S., and **M. Shepherd**, 2003: "Influence of urban areas on diurnal rainfall patterns. Geological Society of America Abstracts with Programs. Vol. 35. Seattle, WA.

2002 **Shepherd, J.M.**, 2002: An investigation of the influence of urban areas on rainfall using a cloud-mesoscale model and TRMM Satellite. AMS 4th Conference on the Urban Environment. Norfolk, Va., May 17-20.

2002 **Shepherd, J.M.**, 2002: An investigation of the influence of urban areas on rainfall using a cloud-mesoscale model and TRMM satellite. GAPP/AMS Mississippi River Climate and Hydrology Conference. New Orleans, La., May 13-17.

2002 **Shepherd, J.M.**, 2002: An investigation of the influence of urban areas on rainfall using a cloud-mesoscale model and TRMM satellite. Spring AGU Meeting. Washington, D.C.

2002 **Shepherd, J.M.**, E.A. Smith, and A.V. Mehta, 2002: Towards the Global Precipitation Measurement (GPM) Mission: An International Partnership and Precipitation Satellite Constellation for Scientific Research and Applications on the Global Water/Energy Cycle. GAPP/AMS Miss. River Climate and Hydrology Conference. New Orleans, La., May 13-17.

2002 Smith, E., A. Mehta, and **M. Shepherd**, 2002: Science formulation of Global Precipitation Measurement (GPM). EGS XXVII General Assembly. Nice, France. April 21-26, 2002.

2001 **Shepherd, J.M.**, 2001: TRMM: Status of precipitation estimates and science highlights. 7th Int'l Conf. On Precipitation. Rockport Maine. June 30-July 2, 2001.

2001 **Shepherd, J.M.**, 2001: Rainfall modification by urban areas: Part I: Observations from space-borne rain radar aboard TRMM. 7th International Conference on Precipitation. Rockport Maine and 11th Conference on Satellite Meteorology. Madison, WI.

2000 **Shepherd, J.M.**, 2000: Sensitivity of diabatic heating profiles to environmental conditions under weak large-scale forcing. National Technical Association Annual Meeting. Hampton, VA.

2000 *__Shepherd, J.M.__, 2000: Rainfall morphology in semi-tropical convergence zones. Preprints of the 15th Conference on Hydrology. Long Beach, CA.

2000 **Shepherd, J.M.**, 2000: Addressing issues that society members face in their place of employment. Preprints of the 9th Conference on Education. Long Beach, CA.

2000 **Shepherd J.M.**, et al., 2000: Informal science education supporting weather broadcasters on-air with TRMM mini-education supplements. Preprints of the 9th Conference on Education. Long Beach, CA.

1999 *__Shepherd, J.M.__, 1999: Effects of moisture convergence characteristics on rainfall development in semi-tropical convergence zones. Preprints of the 23rd Conf. on Hurr. and Tropical Meteorology. Dallas, TX. 622-625.

1998 **Shepherd, J.M.**, 1998. On the improvement of model simulations using three-dimensional, heterogeneous water vapor fields in the initialization process. Preprints of the 10th Symposium on Meteorological Observations and Instrumentation and Observations. Phoenix, AZ.

1997 **Shepherd, J.M.**, 1997. Low-level moisture: Is it a convective control? Preprints of the 22nd Conference on Hurricanes and Tropical Meteorology. Ft. Collins, CO.

1995 *Heymsfield, G., **J.M. Shepherd**, and J. Spinhirne, 1995. Vertical precipitation structure obtained from ER-2 remote sensing observations for the COARE 22 February 1993 case. Preprints of the 21st Conference on Hurricanes and Tropical Meteorology. Miami, FL.

PUBLIC SERVICE

2018- Gwinnett County Public Schools Science Fair Advisory Committee
2017- Chair, NASA Earth Science Advisory Committee
2017- Members, NASA Advisory Committee Science Committee
2014- Partnership Council, Mothers and Others Against Air Pollution
2013-2016 Earth Science Subcommittee of the NASA Advisory Council
2016-2019 NASA Precipitation Measurement Missions Science Team
2016-2019 NASA-JAXA Joint Precipitation Measurement Missions Science Team
2016-2018 AMS Nomination Committee. (Chair, 2017-2018)
2012-2016 Project Associate for Urbanization and Global Environmental Change (UGEC) - an IHDP Core Project
2015-2016 National Academy of Sciences Panel on Extreme Weather-Climate Change Attribution
2015-2016 Nature Conservancy, Board of Trustees, Georgia
2015 NASA Precipitation Measurement Mission Panel
2012-2016 Past President, American Meteorological Society (AMS) and Executive Council Member
2012-2015 AAAS "What We Know" Panel
2013-2015 Board, Climate Central
2010-2014 AMS Membership Committee
2011-2014 NOAA Science Advisory Board
2012-2014 Department of Energy ARM Science Board
2014 UGEC International Conference Advisory Committee
2013 President of the American Meteorological Society
2013 Search Committee, National Center for Atmospheric Research (NCAR) Director
2011-2012 National Academy of Science Committee on Urban Meteorology.
2010 CENTRA War Game Scenarios on Climate and Security.
Past U.S. Department of Energy Cool Roofs Initiative Review Panel (nominated and selected)
2009-2010 External Review Panel for NOAA Climate Prediction Center/Hydrometerological Prediction Center.
2009-2012 Past Advisory Committees for Howard University NOAA Center for Atmospheric Sciences and NASA University Research Center.
2009 Past Member of International Writing Team for the American Meteorological Society Policy Statement on Inadvertent Weather Modification.
2008-2011 NOAA Climate Working Group (Key external advisory body to NOAA on climate science.
2009-2010 National Academy of Science Panel on Climate Change Effects on U.S. Naval Operations and National Security
2009-2010 NASA Goddard Earth Science Director Search Committee.
2009-2010 2010 Co-Program Chair, American Meteorological Society Annual Meeting, Atlanta, GA.
2006-2009 Member of the American Meteorological Society Executive Council.
2006-2008 Member of the American Meteorological Society Executive Committee.
2005-2008 Team member on World Meteorological Organization (WMO) Panel to assess the effects of natural and anthropogenic particles on precipitation.
2008-2009 Planning Committee for NASA Symposium on Earth System Science at 20 Years.
2008-2009 External Review Panel for NOAA ISET Program at North Carolina A&T University.
2008 Served on NASA Hurricane Science Program Review Panel.
2007 Member of Atmospheric Science and Climate Literacy (ASCL) Workshop Organizing Committee.
2006 Invited Panelist to testify before the National Academies of Science Review Panel for the

NASA Applied Sciences Committee.

1999-2009 Reviewer of Manuscripts for AMS Journal of Applied Meteorology and Climatology, AMS Journal of Hydrometeorology, Professional Geographer, Southeastern Geographer, Atmospheric Environment, Atmospheric Research, JGR-Atmospheres, Earth Interactions, Int. Journal of Climatology, Theoretical and Applied Climatology, Journal of Climate, The Professional Geographer, Geography Compass, Journal of Climate and Geophysical Research Letters, The Open Atmosphere Science Journal, International Journal of Applied Geospatial Research.

1999-2009 Reviewer of Proposals for Israel Science Foundation, Hong Kong Research Council, NASA, National Science Foundation (Physical Meteorology, Regional Geography, Geosciences Education), Department of Energy, National Oceanic and Atmospheric Administration.

2007-2009 Promotion Reviews for Dr. Menglin Jin (U of MD), Dr. Jeffrey Halverson (UMBC), Xiping Zeng (UMBC), David Sailor (Portland State).

2004 Chairman of NASA Laboratory for Atmospheres Peer Award Committee.

2003-2006 NASA Precipitation Science Team.

2001-2005 NASA Global Precipitation Measurement Mission (GPM) Deputy Project Scientist.

2002-2008 National Science Foundation Advisory Committee on Environmental Research and Education.

2004 NASA New Investigator Program Review Panel.

2004 Program Committee for 2004 Satellite Meteorology Conference.

2001-2003 Committee of Visitors for the Review of the NSF Biocomplexity in the Environment program.
Past Member of HEAT Inter-agency Planning Committee.
Past NASA Representative to User Requirements Sub-Group for the International Working Group Global Earth Observations.
Past Member NASA/GSFC Water Cycle Advisory Team.

2002-2004 AMS Committee on Satellite Meteorology (2002-2004).

2002 NASA Laboratory for Atmospheres Peer Award Selection Committee (2002).

1993-2005 Numerous NASA Committees: Code 900 DAAC Users Working Group, Technical Review Committee for Howard University Research Center, Source Evaluation Board (SEB) –Code 912.0 Support Contract Selection, GSFC Committee on Improving Communications with the Center Director, GSFC Committee to Standardize Promotion Criteria for Scientists, Goddard GSRP Fellowship Selection Committee.

1999-2001 Tropical Rainfall Measuring Mission (TRMM) Outreach Scientist (1999-2001).

1996-1998 Past chairman and member of the American Meteorological Society's Board on Women and Minorities (member from 1994-1998).

1996-2001 Past chairman of Earth Science Directorate Multicultural Diversity Advisory Council.

Memberships: American Meteorological Society (AMS), American Geophysical Union, Association of American Geographers (AAG), International Association for Urban Climate (IAUC), Sigma Xi.

OTHER SERVICE

2018- Drawdown Georgia Steering Team

2018- Ray C. Anderson Foundation Climate Advisory "Dream" Team

2015 Helped lead the proposal for new UGA Major in Atmospheric Sciences

2013 Invited Matt Parker (Savannah River National Laboratory) to Geography Colloquium Lecture

2012 Led UGA application process for University Corporation for Atmospheric Research (UCAR)

2010 Invited Dr. Franco Einaudi (NASA) to campus for the Inaugural Climate and Society Lecture

2010 Invited Dr. Lesley Ann Dupigny-Giroux (Vermont) under a Franklin Visiting Scholars Grant

2010 Invited Dr. Sharon Nicholson for Department of Geography Colloquium

2010 Attended UGA Teaching Academy Faculty Symposium (April 2010).

2009 Moderated session on Climate and Rainfall Variability at 2009 Georgia Water Resources Conference.

2008 Invited by Dean of the Franklin College of Arts and Sciences to attend Faculty Breakfast with UGA Provost Mace (August 2008).

2007 Invited Presentation to Franklin College CliCurCmate Change Advisory Board (October 15, 2007).

Administrative and University Service:

Chair, Atmospheric Sciences Lectuer Seach Committee (2018-)

Member, Faculty team solicited for BOR Chancellor Wrigley's review of President Jere Morehead (2018)
Member, UGA PRAC Committee (2017-)
Member of UGA Climate and Society Initiative Steering Committee (Current)
Member Georgia Athletic Association Board (Faculty representative) (2016-)
Member, UGA Stem Initiative Committee (Current)
Member of the 2013 UGA Provost Search Committee
Member of the Office of the Vice President Distinguished Research Professor Selection Committee (Chair, 2015, Served 2013 to 2015)
Past Member of the CICR Executive Committee
Past Member of Franklin College of Arts and Science Task Force on Diversity and Inclusion
Past Chair, Geography Department 5-Year Planning Committee
Past GEOG1112 Faculty Coordinator
Past Member of Department of Geography Search Committee, GIS and Remote Sensing Faculty Position
Served on Curriculum Committee, Admissions Committee, Academic Standards Committee, Diversity Committee
Past Departmental Website Committee chair
Departmental Colloquium Committee (2008-2009))
Departmental Advisory Committee (2007-2009))
Departmental Graduate Studies Committee (2009)
Departmental Representative to Faculty Senate (2006-2009)
Departmental Faculty Meeting Scribe (2006)
Worked with Dept. Head Brook, Prof. Mote, and Prof. Grundstein on the establishment of a new Departmental Climatology Laboratory (2006)
Completed CITI Course in the Protection of Human Research Subjects (#414503)
Faculty Marshall at Fall (2006) and Summer (2007) Commencement Activities
Chair, Physical Geography Faculty Search Committee (2007)
Served as a reviewer for 2008 Excellence in Research by Graduate Student Award (December 2007)