



2021 Carolinas Climate Resilience Conference May 10 – 12, 2021

Final Conference Report

Hosted by the Carolinas Integrated Sciences & Assessments



2021 Carolinas Climate Resilience Conference



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Acknowledgements

We thank everyone who contributed to the success of the 2021 Carolinas Climate Resilience Conference. The conference would not have been possible without the support of [planning committee members](#), session organizers and moderators, speakers and presenters, CISA team members, and students. We are grateful for the time they gave to help plan and execute the event.

We also owe our thanks to UofSC Continuing Education and Conferences, ACS Sound and Lighting, Scott Brown Media Group, the Durham Convention Center, and the Socio team. These organizations were essential in providing extensive logistical support to ensure the hybrid event ran smoothly for all attendees and presenters.

The conference would not have been possible without the support of all our generous [sponsors and exhibitors](#). We greatly appreciate their contributions to the success of the event.

A full list of planning committee members and sponsor organizations can be found in the [Appendix](#).

Conference Motivation and Goals

The idea for a [Carolinas Climate Resilience Conference](#) (CCRC) originated from research conducted by the [Carolinas Integrated Sciences & Assessments \(CISA\)](#) team in 2010 and 2011. The study, which served as a [technical input](#) to the Third National Climate Assessment (NCA), included interviews with stakeholders, decision makers, and other climate practitioners in the Carolinas to understand how climate information is accessed and shared. Opportunities for in-person discussion and networking were identified as the primary way individuals learned about and exchanged climate data and information and ways to incorporate it into their work. A primary goal of the CCRC was to provide a setting for this network to engage in meaningful dialogue on climate issues.

As the impacts of extreme weather events and evidence of climate change continue to grow, so too does our understanding of the challenges we face in adapting to these changes. Building resilience to these impacts is an important step in preparing to successfully address current and future pressures. As identified in the NCA technical report, building a network of communities engaged in climate adaptation is a significant part of increasing the region's resilience.

Since the first convening in 2014, the Carolinas Climate Resilience Conference has played a key role in creating a network of adaptation practitioners to respond to the threats posed by climate change in our region. The CCRC provided a place to share experiences and knowledge about opportunities, resources, and local initiatives across a range of professions and regional experts.

The CCRC was created to foster real-world solutions to the climate challenges we face in the region, and we actively solicited presentations beyond research findings. The 2021 CCRC successfully supported on-the-ground climate resilience efforts by providing attendees with an opportunity to share lessons learned, discuss resources and tools for incorporating climate information into their work, and identify opportunities for collaboration.

Hosting the 2021 conference as a hybrid event enabled us to expand opportunities for participation during the COVID-19 pandemic. We offered registration and travel support to 30 community leaders, including 5 youth advocates who spoke about their experiences during the "Empowering Youth to Contribute to Climate Resilience Efforts in their Communities" session. This financial support totaled \$9,950.

Creating a Successful Hybrid Conference

The CCRC, held every two years since the first conference in 2014, was originally scheduled for October 2020. Because of the COVID-19 pandemic, the conference planning committees decided to postpone the three-day conference until May 2021, to reduce potential public health threats for attendees. CISA hosted the fourth CCRC as a hybrid event, attracting 323 attendees and nearly 200 speakers.

In-person attendees gathered at the Durham Convention Center in Durham, NC where multiple strategies were implemented to maintain social distancing and reduce risks, including mask requirements for all indoor events.

To create a shared space for networking and interaction between in-person and remote participants, we utilized the [Socio virtual conference platform](#). Live video was streamed from the convention center to the Socio platform. Virtual attendees were able to view conference sessions in real time which allowed

for more engagement between in-person and virtual attendees. The platform provided options for participants to connect directly via chat functions or one-on-one video chat options. The chat function was also available during all conference sessions and actively used by participants to ask questions of speakers and engage in discussion with one another.

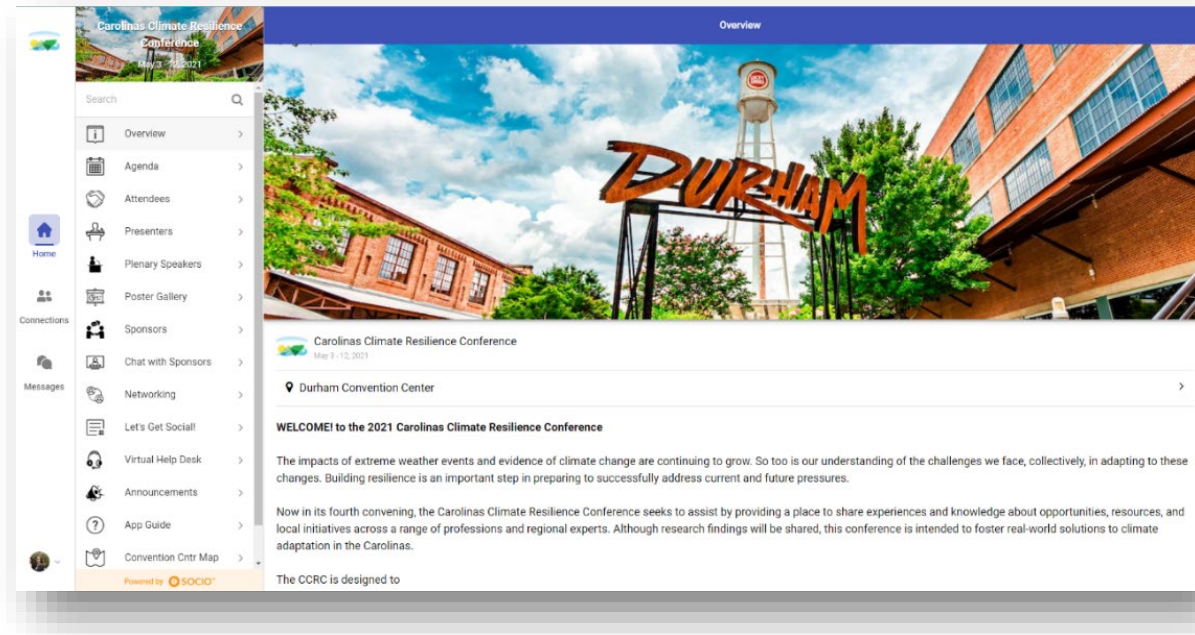


Figure 1: This screenshot shows the landing page for the CCRC virtual conference platform hosted by Socio. Through the platform, remote attendees were able to livestream conference sessions, network via chat and video conferencing, and access virtual sponsor and exhibitor booths and the poster gallery.

The Socio platform also provided a space to showcase sponsor profiles. Each sponsor received a virtual sponsor booth where attendees could access their website, view available resources, connect to sessions during which sponsor representatives were speaking, or chat directly with sponsors in video conference rooms during designated networking breaks.

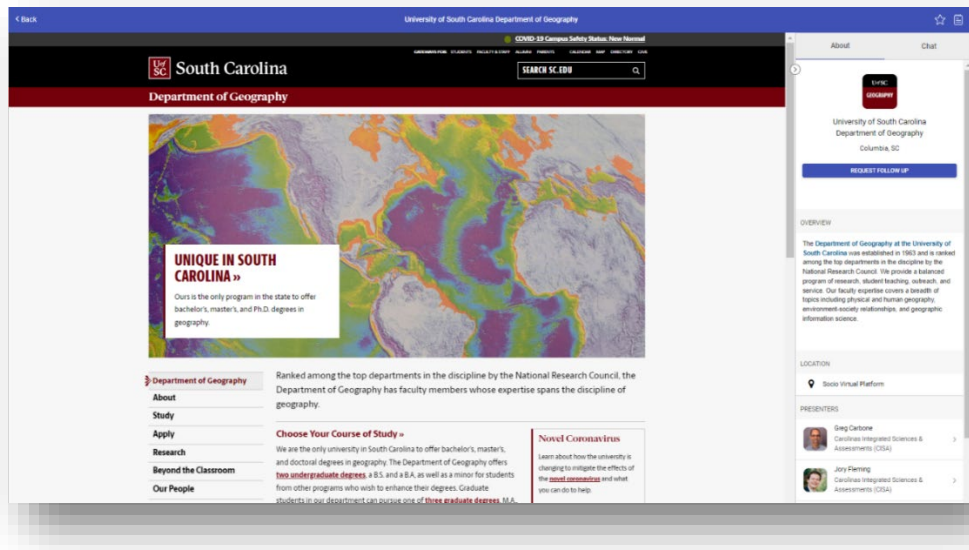


Figure 2: Virtual booths in the Socio platform allowed sponsors to share information about their organizations through links to their website and online resources and to showcase speakers sharing their work at the CCRG.

We used [Wonder](#) to create a more casual networking space for virtual attendees. During coffee breaks and meals, virtual participants were encouraged to log in to Wonder via the Socio app to video chat with other attendees. Icebreaker questions were used to lead attendees into different breakout rooms where they could gather with fellow colleagues around specific topics, such as climate impacts of concern.

We created a virtual poster gallery in the Socio app to make poster presentations accessible for both in-person and virtual attendees. A thumbnail of all posters was displayed in the gallery, which participants could “visit” to read the full poster abstract, access a larger view, and chat directly with poster presenters. Poster authors also gave 5-minute lightning presentations to share their work during the first day of the conference.

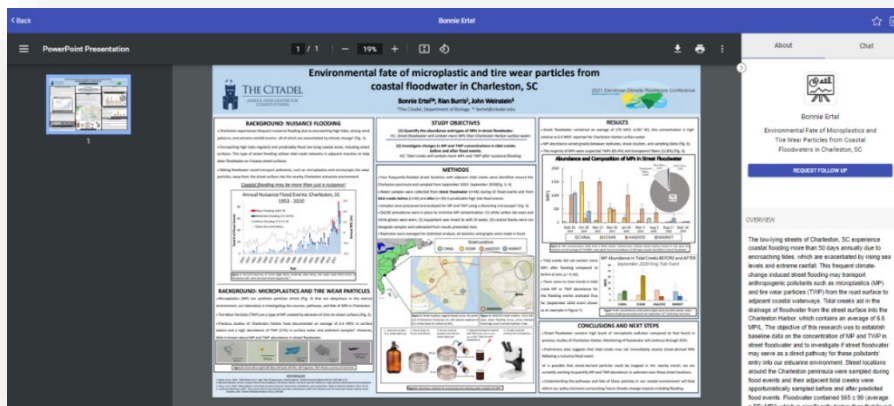


Figure 3: The virtual poster gallery allowed participants to view the full abstract and PDF of each poster presentation and connect directly with the poster author via the Socio app.

The virtual conference platform also allowed us to record all sessions and presentations. Recorded sessions were available via the Socio app until August 31, 2021. This provided an opportunity for attendees to view many more sessions and presentations than would have been possible at an in-person only event. All recorded sessions are archived on the [CISA YouTube channel](#).

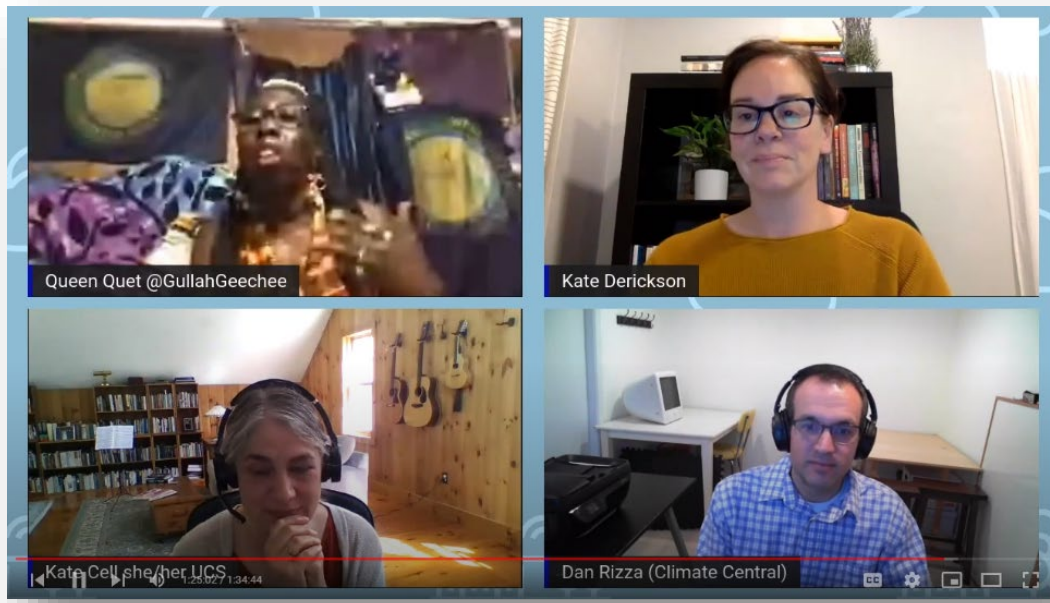


Figure 4: Virtual conference speakers in the session, "Living Resiliency: An Interactive Cultural Environmental Circle from the Sea Islands of the Gullah Geechee"

Although the Socio virtual conference platform allowed us to offer either in-person or virtual participation for conference attendees and speakers, managing logistics for a hybrid event required many additional steps to ensure conference sessions ran smoothly and all participants were supported. For instance, the CISA team hosted a technology check for each of the 41 conference sessions. This included developing training materials for speakers to familiarize them with the virtual technology and scheduling a dry run of the full conference with 200+ speakers, session moderators, and facilitators. Coordination with the A/V team was also critical to the success of hybrid sessions.

Facilitating interactions between in-person and virtual attendees and speakers during conference sessions also presented challenges. While the Socio platform provides opportunities for virtual attendees to engage with one another via chat or one-on-one video chat, virtual attendees were not able to unmute themselves to ask questions orally. Therefore, we also asked in-person attendees to communicate via the chat window to create a shared space for all attendees. This required in-person attendees to use their laptops or cell phones to post questions during conference sessions. Although we were able to coordinate the technology, it was less than ideal for creating discussion amongst in-person attendees.

The CISA team also created a [series of training videos](#) demonstrating various features of the Socio virtual conference platform which were shared with conference participants to help familiarize them with features specific to the CCRC program, such as the virtual networking platform.

2021 Conference Attendance

Attendance at the 2021 CCRC was higher than the previous three convenings, likely in part due to the virtual participation option which reduced participation costs and provided event access for individuals with limited or no travel budgets. We also saw an increase in participation by state and local government representatives, the private sector, NGOs, and community groups (see Figure 4, below). Of the 323 attendees, 93 people registered as in-person attendees and 230 registered virtually.

Participants by Organization 2014-2021 CCRC



Figure 5: This chart shows the number of participants at each CCRC displayed by organization type. In addition to higher attendance at the 2021 CCRC, we also saw an increase in local and state government representatives, the private sector, and community groups.

Other Changes and Improvements in 2021

Before CCRC planning began, we reviewed the previous conference’s evaluation survey results and consulted with planning committee members to identify ways to improve the conference. Several new elements of conference planning and program development were incorporated in 2021 based on this feedback.

Planning Committees

There were three separate planning committees this year, each with distinct responsibilities. [Steering Committee](#) members represented leadership from local, state, and regional organizations involved in climate adaptation in the Carolinas. They are well connected to the network throughout the region and were integral in creating a “big picture” vision for the conference. They helped to identify key topics, themes, and pressing issues to be incorporated into the conference program. They also provided suggestions to improve the conference format and experience for attendees, based on their own participation in and planning of other virtual events.

A [Plenary Committee](#) was formed to help plan the opening session, a plenary on Day 2, and closing session. Plenary committee members incorporated the vision of the Steering Committee into the themes for each of the three sessions. By adding this new Plenary Committee to the conference planning team, we were able to diversify the topics and recruit speakers through shared responsibility more efficiently than in previous years when the CISA team primarily planned all plenaries.

The [Program Committee](#) was responsible for developing the abstract submission process, reviewing all abstracts, and developing the final conference program. The 2021 submission process was redesigned to solicit training and workshop style sessions and symposia in addition to individual presentation abstracts.

Programmatic Improvements

Presentation formats which were used in previous years to organize sessions around different types of climate adaptation work (e.g., sharing lessons learned, research findings, case studies) were replaced with [cross-cutting themes](#) to help develop a conference program around topics to help advance climate adaptation in the region. The program committee also guided changes to session formats for the hybrid event. Based on previous virtual meeting and conference experiences during the pandemic, we opted to schedule shorter sessions and longer breaks. We also received far more abstracts than we were able to accept. To accommodate several of the workshop-style abstract submissions, we hosted four virtual pre-conference workshops the week before the main event. Workshops were designed as skill-building sessions and integrated audience interaction through small group discussion, polling, and other virtual engagement opportunities. We also incorporated two lightning talk sessions on Day 1 of the conference, to accommodate more of the individual presentation submissions.

The full conference agenda is available at <https://cisa.sc.edu/ccrc/agenda.html>. A list of all speakers can be accessed at <https://cisa.sc.edu/ccrc/speakers.html>. This information is also available in the Appendix.

The Student Poster Competition was a new addition to the 2021 CCRC program. Nine student posters were judged by three different volunteers. Scores for each poster were based on visual appearance (logically organized, effective display of project findings and key points), content, and the student’s short oral presentation. The Savannah River National Laboratory provided sponsorship to support gift cards for the top three student poster presenters. Bonnie Ertel (The Citadel) received first place for her poster, “Environmental Fate of Microplastics and Tire Wear Particles from Coastal Floodwater in Charleston, SC.” There were two runners up. Lauren Grimly (UNC Chapel Hill) for “Flood Hazards at the River-Coastal Interface of Carolina Watersheds” and Meredith Hovis (NC State University) for “Discounted Cash Flow and Capital Budgeting of FloodWise, a Pilot Water Farming Program in Eastern North Carolina.”

Expansion of Professional Development Credits

We provided up to 12 continuing education credits to certified floodplain managers, licensed engineers and surveyors, and planners free of charge. Continuing education credits provide additional justification for members of these professional associations to attend events such as the CCRC. Although rates vary depending on the number of hours and types of credits, the CEUs had the potential to save attendees several hundred dollars in training fees. For instance, a 1-hour webinar training hosted by the Association of State Floodplain Managers (ASFPM) averages \$30¹. This equates to an estimated \$360 savings for an ASFPM member who received 12 credit hours for attending the CCRC. We provided CEUs to 15 attendees.

Carolinas Regional Adaptation Leadership Award

We once again partnered with the [American Society of Adaptation Professionals](#) to present the [Carolinas Regional Adaptation Leadership Award](#) (RALA). The RALA recognizes individuals who have distinguished themselves in the climate adaptation field through exceptional leadership. It acknowledges that deliberate, proactive adaptation, preparedness, and resilience-building is a change process, a deviation from business-as-usual, and a courageous act of doing something new and different. At its heart are individuals who make this change happen, sometimes with very few resources. The RALA recognizes distinguished adaptation leaders who approach their work in a strategic, sophisticated, well-informed, inclusive, and effective way.

The [2020 Carolinas RALA](#) was awarded to Queen Quet, Chieftess of the Gullah/Geechee Nation for her efforts to bring climate awareness and increase resilience for the Gullah/Geechee. Albert George, Sushma Masemore, and Lori Ziolkowski were also represented as nominees for the award. [Queen Quet and the other nominees](#) were recognized during ASAP's October 28, 2020 network meeting and during the CCRC's opening plenary.

Conference Program

Pre-Conference Workshops

Pre-conference workshops were hosted the week prior to the full conference. Trainings and workshops were added to the 2021 call for abstracts to offer attendees more hands-on learning opportunities. Because of the higher number of abstract submissions, the program committee opted to host the 2 ½ hour workshops in advance of the full conference, to give attendees an opportunity to participate in more sessions. One workshop was held each day, from Monday, May 3 through Thursday, May 6.

Are You Ready for Climate? Planning for Extremes Using CISA Tools and Services

In this workshop the CISA team demonstrated several tools to support climate-related decisions and planning (e.g., watershed based planning, hazard mitigation planning, public health decision making). Attendees received hands-on guidance on using the tools and had opportunities to ask questions of tool developers. We also shared examples of how we collaborate and work one-on-one with communities and local groups to help them plan for climate change. Attendees learned about CISA resources and expertise available to communities and example strategies for integrating climate adaptation into planning processes and activities in which they are already involved.

¹ <https://www.floods.org/training-education/online-training/asfpm-webinars/>

Principles of Quality Climate Adaptation and Resilience Practice

In this workshop attendees used [American Society of Adaptation Professionals' \(ASAP\) Living Guide to the Principles of Climate Change Adaptation \(Living Guide\)](#) to holistically consider how they are integrating principles of quality climate change adaptation into research or practice. Attendees heard from Carolinas-based adaptation and resilience practitioners about how they are putting these principles into action. Attendees assessed what changes they can make in their individual work or the work of their organization to better integrate the principles and developed a personalized tool to help them keep these considerations top of mind in their daily work.

Tapping into a Community Knowledge: A Strategy to Bring Equity to Climate Resilience Initiatives

The River Network walked attendees through their new "[Community-Led Research Toolkit](#)" and familiarized them with toolkit components and the fundamentals of using community knowledge to make climate resilience initiatives more equitable. The River Network team began by sharing what community-led research is and how to conduct this type of research through the stages of community engagement. Various methods to employ in community-led research include remote crowdsourcing, community mapping exercises, and person-to-person surveying.

Creating Regional Extreme Heat Resilience Plans

Extreme heat is one of the deadliest threats of climate change. However, unlike hurricanes or floods, almost all its deadly impacts can be mitigated with effective advanced planning. This workshop brought together regional stakeholders to discuss current best practices in extreme heat preparedness. Speakers shared examples of ongoing work in North Carolina, Arizona, and New York to accelerate the process of creating a coordinated extreme heat plan across the Carolinas.

Plenary Sessions

Plenary sessions were hosted at the start of the full conference on May 10 (Day 1), to open the program on May 11 (Day 2), and to close out the conference on May 12 (Day 3). Speakers represented a diversity of backgrounds and perspectives and shared the inspiring work they are doing to combat the threats of climate change in our communities.

The Climate Challenges We Face and Our Inspiration to Act

The opening plenary included a panel discussion to help climate resilience practitioners think about how to cultivate hope and personal resilience as they work with communities to address climate change impacts in both the short- and long-term. Four speakers shared different perspectives and experiences working in the climate adaptation field, what motivates them, and how their own resilience informs their engagement with others.

The session facilitator, Susannah Tuttle, shared her thoughts on the importance of hope in her work with North Carolina Interfaith Power & Light. Kaylah Brathwaite shared stories of climate change impacts in rural and isolated regions, highlighting damages to her home in St. Croix from oil refineries and how it has impacted her and her family. Reverend Dawn Baldwin-Gibson shared the story of Peletah Ministries and their engagement with youth and the community around climate change and its impacts, which was motivated by Hurricane Irene. The speakers discussed the importance of partnerships, environmental stewardship, and education at all levels as essential elements to increase resilience. Susi Moser talked about how climate work affects us on both a professional and personal level. She ended the session with a call to implement a lasting, active hope in our work to address the climate crisis.

State and Local Risk Assessment and Resilience

Speakers in the Day 2 plenary, which was moderated by North Carolina’s Chief Resilience Officer, Amanda Martin, highlighted state-level work to build climate resilience and on-the-ground efforts in local communities in the Carolinas. Education about climate change and how it will impact communities was a key theme discussed by all four speakers. State-level speakers Sushma Masemore (NC Department of Environmental Quality) and Tom Mullikin (South Carolina Floodwater Commission) discussed how NC Governor Roy Cooper’s Executive Order 80 has been implemented and findings from the SC Floodwater Commission, respectively. Ray Funnye (Georgetown, SC) and Mayor Don Hardy (Kinston, NC) shared ways in which their local governments are assessing risks and developing adaptation strategies. The full set of panelists discussed steps both levels of government are taking to work towards implementation.

When asked what the role for government is in building resilience, Masemore recommended a “whole of state” approach rather than a “whole of government” approach noting that individuals across the state and at various levels of governance should be involved in understanding climate change; where we are, where we are headed, and how to prepare. Funnye, Director of Public Services for Georgetown County, SC, suggested that the first step in creating resilient communities is education. He is implementing this in Georgetown through a training program for County employees. Tom Mullikin agreed that the issues of coastal erosion, nuisance flooding, and riverine flooding need to be solved with a community approach through education and awareness.

When asked how socially vulnerable and marginalized communities should be integrated into resilience planning, Mayor Hardy also emphasized the importance of education. In some situations, it comes down to going door-to-door in vulnerable areas, explaining risks to citizens and options to reduce those risks. Masemore added that those who are most vulnerable often have the least ability to move out of harm’s way during natural disasters and how we need to prioritize work to create different outcomes.



Figure 6: During the Tuesday morning plenary, session moderator Amanda Martin and Mayor Don Hardy (top left) participated as in-person speakers while Ray Funnye, Sushma Masemore, and Tom Mullikin joined from their offices.

Climate Communications through the Arts

The Day 3 closing plenary included artists sharing their work to motivate action on climate change through music, puppetry, painting, and fabric arts. [Melody Hunter Pillion](#), a broadcast news journalist and public history PhD student at NC State University, served as moderator.

[Mary Edna Fraser](#) creates silks that display the geography of regions impacted by climate change. She mentions that her art often has an element of angst or frustration directed at the impacts of climate change. Dr. April Hiscox is a geography professor at the University of South Carolina. She teaches class concepts through the medium of quilting and other ways students can express themselves through art. [Judy Twedt](#) uses music to articulate scientific concepts through a medium which attracts listeners beyond the scientific community. Judy has produced musical scores of various climate phenomenon, such as melting arctic sea ice, to bring them a new life and new audience. Donovan Zimmerman directs [Paper Hand Puppet Intervention](#). He crafts puppets of subjects such as, the sun, sky, birds, and other animals. He uses the medium of puppetry to anthropomorphize the often-overlooked elements of nature and asks viewers to see the natural environment with a new lens.

The four artists shared knowledge of creative and innovative strategies to communicate and visualize climate-related information with their diverse audiences. They described how their works were created and shared the impact they would like their art to have.

Concurrent Sessions

Major events leading up to the 2021 CCRC, including the COVID-19 pandemic, social justice movement, and extreme weather, present the adaptation community with both challenges and opportunities as we look towards a more resilient future. Lessons learned and research on these issues and their connections to climate change in the Carolinas were included as session and presentation topics. Concurrent sessions included 28 oral presentations, 22 lightning talks, 20 symposia, and 18 poster sessions simultaneously held in-person and virtually. Sessions were organized around the cross-cutting themes designed by the conference planning committees:

Actionable Climate Science

Understanding the data is one thing, applying it for real-world decision-making takes additional experience and expertise. Speakers shared examples of how adaptation in the Carolinas has been supported through applied climate science and methods for understanding, assessing, and evaluating the nature of climate risks and impacts in the Carolinas.

Climate Resilience Planning and Recovery

From hurricanes and flooding to extreme heat and drought, lessons learned from past extreme events in the Carolinas provide valuable information to improve future resilience. Presentations on this topic discussed work to incorporate recent extremes and future climate considerations into planning and recovery strategies.

Collaborative Climate Adaptation

Partnerships and collaboration are key to effective climate adaptation. Speakers shared holistic approaches to adaptation in the Carolinas, such as cross-sectoral collaboration, regional planning efforts, and public/private partnerships.

Communication and Engagement

Effectively communicating risk, opportunity, resilience, and adaptation in the face of climate change was a common theme throughout many of the sessions. Creative messaging and visualization strategies through art, music, and cultural preservation are used to inspire action. And strategies to effectively engage diverse perspectives are key to a more inclusive approach to climate adaptation.

Economics of Climate Adaptation

These speakers shared information about finance, funding, and investment mechanisms to support climate adaptation strategies as well as understanding the cost of inaction.

Equitable Adaptation

Development and implementation of equitable, community-driven solutions to climate impacts in the Carolinas were a common theme across presentations and sessions at the 2021 CCRC. Speakers share ways they are designing adaptation strategies that address vulnerabilities, multiple hazards, and compounding stressors.

Policy, Governance, and Law

These speakers discussed strategies for adapting local and state regulations to support the implementation of adaptation strategies in the built and natural environment as well as strategies for working with elected officials.

The full conference program is available at: <https://www.cisa.sc.edu/ccrc/agenda.html>. Session recordings are archived on the [CISA YouTube channel](#).

Participant Feedback



Figure 7: In-person attendees practiced social distancing and wore masks to support a safe and healthy conference environment amidst the COVID-19 pandemic.

After the conference, we circulated an online evaluation to request attendee feedback about their 2021 CCRC experience. The survey was designed to provide insight about how well we achieved the goals of the conference, how attendees plan to utilize new information or connections they made at the event, and impressions of the hybrid format. The evaluation

was developed in collaboration with researchers at Virginia Tech as part of a broader study funded by the National Science Foundation to understand how to make hybrid climate conferences, like the CCRC, as effective as possible. Twenty-one percent of attendees responded to the survey (n=67).

Value in Attending

Ninety-one percent of respondents agreed or strongly agreed that the conference was worth the investment, given the time and expense required. In addition, 86% of respondents stated they are likely or very likely to attend a future conference, and 91% would recommend the CCRC to friends or colleagues.

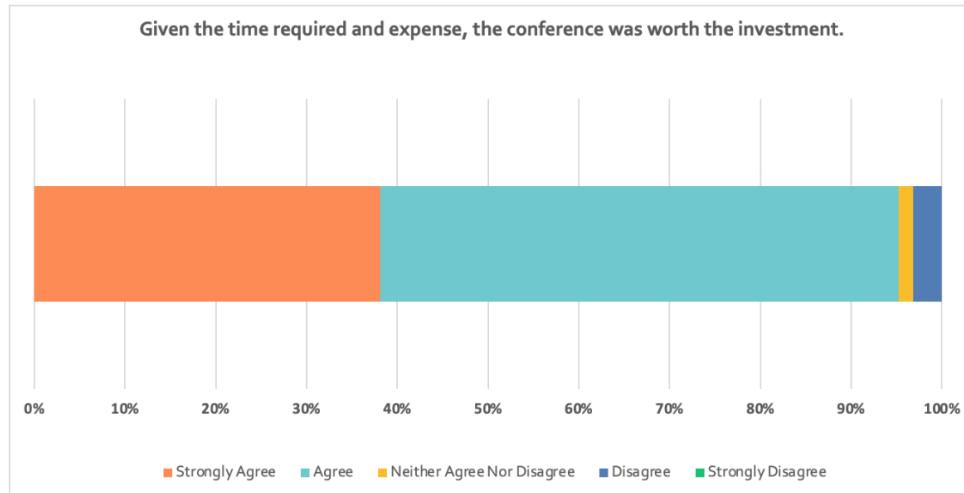


Figure 8: 2021 CCRC evaluation survey results demonstrating the perceived value of the conference by attendees. (n=66)

Achieving Conference Goals and Objectives

Most evaluation respondents indicated they learned about new resources or tools (90%), acquired new knowledge (94%), and had meaningful interactions with other attendees (75%). Fewer respondents indicated making new connections or meeting other participants with whom they might collaborate in the future. This may be attributed to the lack of interaction some attendees experienced as virtual participants. Although networking opportunities were made available to virtual attendees through the virtual conference platform, these features were not widely used during the event.

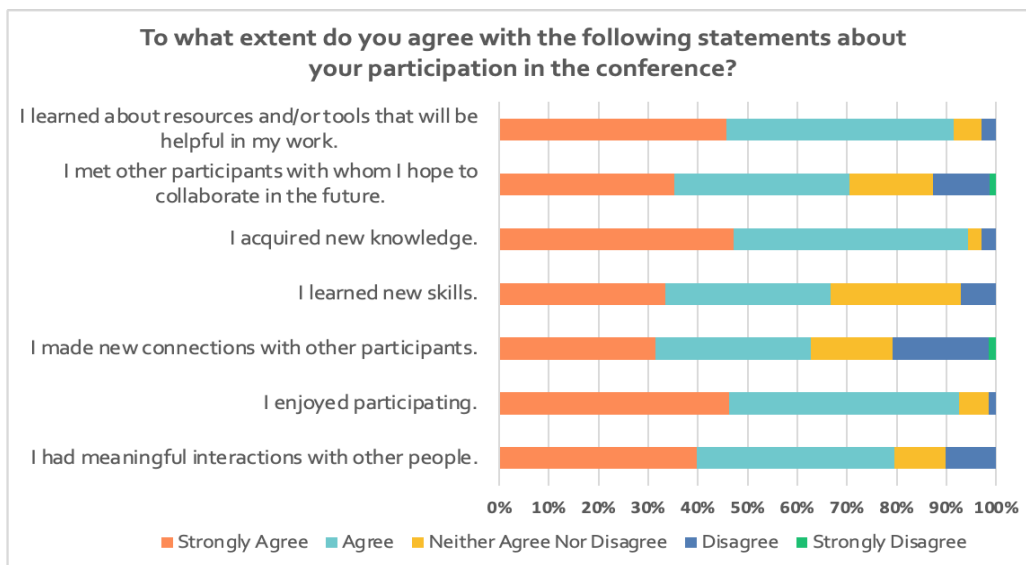


Figure 9: 2021 CCRC evaluation survey results showing the types of benefits attendees received through participation. (n=66)

Participant Takeaways

Applying something learned at the conference in their own work, and using resources to which they were introduced, were the top two action items identified by survey respondents (92% and 88%, respectively). Seventy-six percent of respondents also plan to collaborate with someone they met from the conference on future projects.

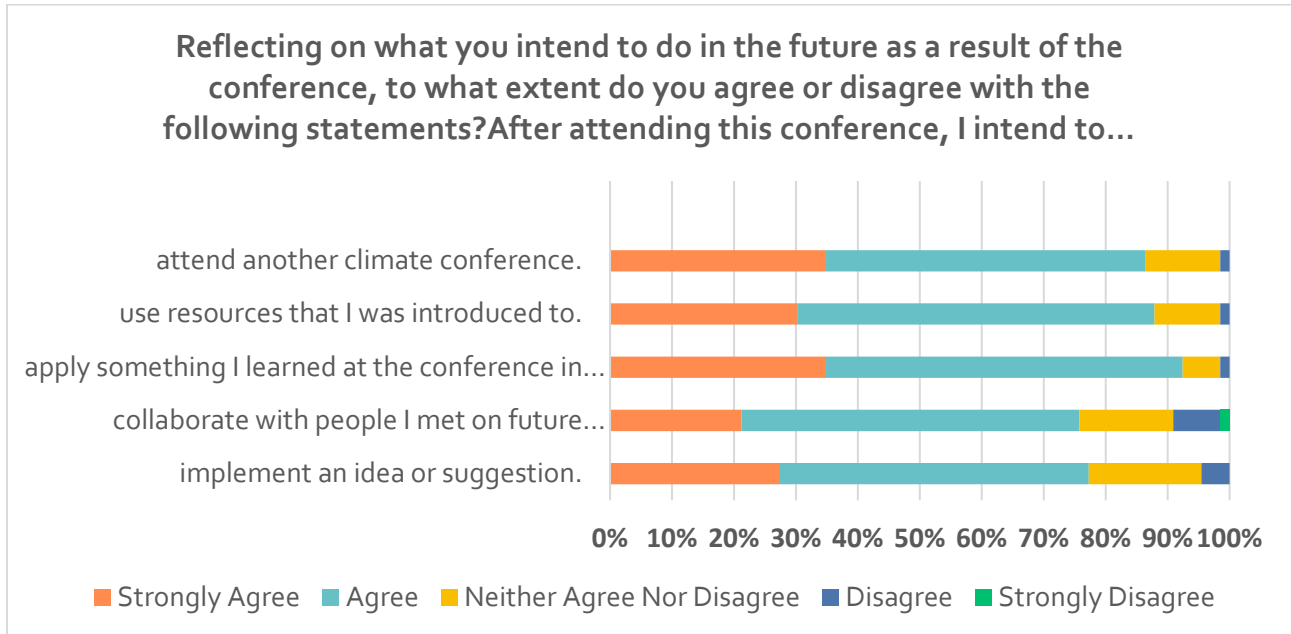


Figure 10: 2021 CCRC evaluation survey results showing actions attendees plan to take following conference participation. (n=66)

Attendees were also asked what information would be most useful to share with co-workers or colleagues. New connections, and case studies of other climate resilience work, were ranked as the two key takeaways attendees would share (66% and 76%, respectively), further contributing to an expansion of the network of climate adaptation practitioners in the region and shared strategies to increase resilience.

“I attended a session with research that directly applied to my graduate studies, and they were able to send me detailed information on their methods of analysis. This will significantly help me with my research.”

“It was inspiring to see the evolution of climate adaptation work that has gone on over the last number of years. An amazing group of people in this space, I'm honored to work alongside them.”

Feedback about the Hybrid Conference Format

Of the 67 attendees who responded to the survey, 14% attended in-person, 74% attended virtually, and 12% attended some sessions in-person and some virtually.

We received a variety of feedback about the hybrid conference format. The majority felt the conference planning committee did an exceptional job organizing the hybrid event, given the extenuating circumstances caused by the pandemic. Several respondents noted the benefits of providing access to the event for those unable to travel, which may become a requested option for future conferences and meetings. On the other hand, many respondents recognized the drawbacks of a virtual event including the limitations for networking opportunities, noting the value of in-person discussions. The selected responses below represent some of these views.

“I thought the organizers did a terrific job of creating a hybrid event and the Socio app was great. I think I would just prefer in-person generally. That said, I think the hybrid option does open up the event for people who would otherwise be precluded because of other commitments or money.”

“It was great to have the option to attend virtually since I would not have attended in person this year. There were technical difficulties especially with audio. It wasn't clear at first where the networking events were in the app.”

“It's entirely possible to have the feel of a live, in person conference in a well-organized, intentionally friendly and accessible online conference!”

Respondents were asked to rank which conference format they preferred between in-person, hybrid, and virtual. In-person was the top choice for 60% of respondents and the second choice for 30% of respondents. An all-virtual format was ranked last by 71% of respondents, demonstrating the value CCRC attendees place on in-person interactions.

Looking to the Future

The first Carolinas Climate Resilience Conference, hosted in 2014, drew attention to the threats posed by climate change in a region where climate resilience and adaptation were not widely viewed as a priority. With this initial convening, we began to knit together a community committed to rising to this challenge. In the following years the Carolinas experienced repeated landfalling hurricanes and tropical storms, drought and wildfire, mounting pressures from sea level rise, and catastrophic flooding, along with an unprecedented global pandemic. The impacts of these events, particularly on those with the fewest resources to respond, have shed new light on how climate change will leave its mark on all our communities.

The CCRC has become synonymous with resilience in the face of adversity, having been rescheduled in 2018 following the devastation of Hurricane Florence and a second time during the COVID-19 pandemic. The dedication of planning committee members, key CISA personnel, and all attendees demonstrates

the value of events such as the CCRC in creating a community that leverages our collective knowledge and expertise to increase resilience across the region.

Although CISA will no longer host the CCRC, our hope is that the network it has fostered will continue to thrive and lead the Carolinas in work to increase resilience to face the climate challenges ahead.



Figure 11: The CISA Team, from left to right, Jory Fleming and Daisy, Peng Gao, Amanda Farris, Ellie Davis Pierel, Kirstin Dow, Karen Beidel, Greg Carbone, Donovan Zimmerman (Paperhand Puppet Intervention), Kirsten Lackstrom, and Jordan Clark.

Appendix A: Planning Committee Members

Steering Committee

Member	Organization
Frank Alsheimer	NOAA National Weather Service Columbia, SC
Bill Crowell	Albemarle-Pamlico National Estuary Partnership
Kathie Dello	State Climate Office of North Carolina
Kirstin Dow	Carolinas Integrated Sciences & Assessments, University of South Carolina
Amanda Farris	Carolinas Integrated Sciences & Assessments
Jim Fox	NEMAC + FernLeaf
Tobin Freid	Durham County, NC
Cari Furiness	DOI Southeast Climate Adaptation Science Center
Beth Gibbons	American Society of Adaptation Professionals
Dana Haine	UNC Chapel Hill, Institute for the Environment
Kirsten Lackstrom	Carolinas Integrated Sciences & Assessments
Susan Lovelace	SC Sea Grant Consortium
Rick Luettich	DHS Coastal Resilience Center of Excellence
Steve McNulty	USDA SE Regional Climate Hub
Ellen Mecray	NOAA Regional Climate Services
Tancred Miller	NC Department of Environmental Quality, Division of Coastal Management
Hope Mizzell	South Carolina State Climatology Office
Geno Olmi	NOAA Southeast & Caribbean Regional Team
Robert Osborne	Black & Veatch
Anna Schwab	DHS Coastal Resilience Center of Excellence
Wayne Shuler	City of West Columbia, SC; SC Chapter of the American Planning Association
Gregory Sprouse	Central Midlands Council of Governments
Louise Vaughn	South Atlantic Landscape Conservation Cooperative
Susan White	NC Sea Grant, NC Water Resources Research Institute

Plenary Committee

Member	Organization
Chris Carnevale	Southern Alliance for Clean Energy
Ellie Davis	Carolinas Integrated Sciences & Assessments, University of South Carolina
Jory Fleming	Carolinas Integrated Sciences & Assessments
Rachel Jacobson	American Society of Adaptation Professionals
Kelly Larkins	Piedmont Triad Regional Council
Brian Magi	University of North Carolina Charlotte
Jared Rennie	North Carolina Institute for Climate Studies
Anne Richardson	Atrium Health
Rick Savage	Carolina Wetlands Association
David Shelley	Congaree National Park
Susannah Tuttle	NC Interfaith Power & Light
Ashley Ward	Internet of Water
Jessica Whitehead	NC Office of Recovery and Resilience

Program Committee

Member	Organization
Ekaterina Altman	University of South Carolina
Leah Blackwood	Carolinas Integrated Sciences & Assessments, University of South Carolina
Adam Bode	SC Department of Health and Environment Control, Office of Coastal Resources Management
Joy Brown	The Nature Conservancy, South Carolina Chapter
Jordan Clark	Carolinas Integrated Sciences & Assessments, University of North Carolina at Chapel Hill
Ferdouz Cochran	Carolinas Integrated Sciences & Assessments
Montana Eck	Southeast Regional Climate Center; University of North Carolina at Chapel Hill
Melissa Griffin	SC State Climatology Office
Suzanne Lea	East Carolina University
Emily McGraw	National Weather Service, Charleston Weather Forecast Office
Rebecca Ward	State Climate Office of North Carolina
Sarah Watson	Carolinas Integrated Sciences & Assessments, S.C. Sea Grant Consortium
Stewart Weinberg	Climate Reality
David Werth	Savannah River National Laboratory

Appendix B: Sponsors

A full list of sponsors with organizational information is available at <https://www.cisa.sc.edu/ccrc/our-sponsors.html>.

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American Society of Adaptation Professionals, North Carolina Division of Coastal Management, University of South Carolina Geography Department

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Bronze Sponsors

University of North Carolina-Charlotte Department of Geography & Earth Sciences, South Carolina State Climatology Office

Appendix C: Agenda

Pre-Conference Workshops

Monday, May 3

Workshop 1: Conference Kick-Off; CISA Research and Resources to Support Climate Resilience in the Carolinas

Tuesday, May 4

Workshop 2: Principles of Quality Climate Adaptation and Resilience Practice

Wednesday, May 5

Workshop 3: Tapping into Community Knowledge: A Strategy to Bring Equity to Climate Resilience Initiatives

Thursday, May 6

Workshop 4: Creating Regional Extreme Heat Resilience Plans

Monday, May 10

1:00 – 2:30 p.m. Opening Plenary

Climate Challenges We Face and Our Inspiration to Act

2:45 – 3:45 p.m. Concurrent Sessions

- 1A:** Poster Presentations
- 1B:** Planning for a More Resilient Future
- 1C:** Practical Policies for Flood Prevention
- 1D:** Carolina Climate Extremes
- 1E:** Coastal Community Health and Resilience

4:15 – 5:15 p.m. Concurrent Sessions

- 2A:** Student Poster Presentations
- 2B:** Lightning Talks: Community Health and Resilience
- 2C:** Lightning Talks: Flood Resilience
- 2D:** Lightning Talks: Climate in the Carolinas
- 2E:** Lightning Talks: Climate in Context

5:15 – 7:00 p.m. Networking Reception

In-person and virtual participation options were provided

Tuesday, May 11

8:30 – 10:00 a.m. Tuesday Plenary

State and Local Risk Assessment and Resilience

10:30 a.m. – Noon Symposia

- 3A:** Building Capacity for Climate Resilience in Albemarle-Pamlico Region Tribal Communities
- 3B:** Understanding Extreme Heat Risk in a Lowcountry Oasis: Engaging a Coastal Healthcare System in Climate-readiness Solutions
- 3C:** Climate Change Communications and Education
- 3D:** Wastewater Infrastructure Tipping Points: Climate Adaptation for Onsite (Septic) Systems

2:00 – 3:00 p.m. Concurrent Sessions

- 4A:** Creating Strategies for Equitable Adaptation
- 4B:** Resilient Infrastructure Design
- 4C:** Nature-Based Solutions for Flood Resilience
- 4D:** Advancing Long-Term Climate Resilience in Beaufort County, SC
- 4E:** Student Poster Presentations

3:30 – 5:00 p.m. Symposia

- 5A:** How Faith Communities are Key to Climate Resilience
- 5B:** North Carolina Resilient Communities Program – Enhancing Local and Regional Capacity for Resilience
- 5C:** Our Resilient Coasts: Mapping Resilient Lands, Flood Exposure, and Floodplain Values in the Coastal Carolinas
- 5D:** Empowering Youth to Contribute to Climate Resilience Efforts in their Communities: Lessons from the Field
- 5E:** Compound Coastal Water Events: A Multidisciplinary Approach to Resilience

Wednesday, May 12

8:30 – 10:00 a.m. Symposia

- 6A:** Living Resiliency: An Interactive Cultural Environmental Circle from the Sea Islands of the Gullah/Geechee
- 6B:** Zoomtowns and Floodplains: Development Density Impact on Resilient Towns
- 6C:** Systematic Tracking of Recovery: A Longitudinal Community-Resilience Focused Investigation in Lumberton, NC Following Hurricanes Matthew and Florence
- 6D:** Climatopia: A Children’s Game for Teaching Climate Disaster Resilience
- 6E:** Policies and Systems to Effectively Implement Resilience

10:30 a.m. – Noon Symposia

- 7A:** Grassroots Leadership Development for Resilience
- 7B:** Technical Session on Oceans and Human Health and Climate Change Interactions
- 7C:** Advancing Nature-based Stormwater Strategies in North Carolina
- 7D:** Charleston Vulnerability and Risk Assessment, Major Findings and Next Steps
- 7E:** Leveraging University and Government Collaborations to Support Coastal Resilience

12:30 – 2:00 p.m. Closing Plenary

Climate Communications through the Arts

Appendix D: Speakers

Last Name, First Name (Affiliation) Session

—A—

Allen, Mike (University of Florida) 7E
Altman, Ekaterina (University of South Carolina) 7B
Anderson, Mark (The Nature Conservancy) 5C
Andrews, Elizabeth (Virginia Coastal Policy Center, William & Mary Law School) 3A

—B—

Baldwin Gibson, Dawn (Peletah Ministries) Monday Plenary
Barg, Hannah (NC Museum of Life and Sciences) 5D
Barnes, Janice (Climate Adaptation Partners) 3B
Barnes, Janice (Climate Adaptation Partners) 7D
Barnett, Matt (LS3P Associates, American Institute of Architecture) 1B
Beckham, Tira (North Carolina State University) 2E
Boyles, Ryan (USGS Southeast Climate Adaptation Science Center) 7E
Braithwaite, Kaylah (Zero Hour) Monday Plenary
Branham, Jordan (UNC Chapel Hill) 2C
Brooks, Bjorn (North Carolina Institute for Climate Studies) 4A
Brown, Joy (The Nature Conservancy - South Carolina Chapter) 4C
Buchanan, Misty (NC Natural Heritage Program) 2B
Burdick, Samantha (NC Division of Coastal Management) 5B
Busch, K.C. (NC State University) 3C

—C—

Campbell, Leah (UNC Chapel Hill) 2B
Canfield, Chris (Conservation Trust of North Carolina) 6E
Carbone, Greg (University of South Carolina, CISA) Workshop 1
Castro, Brianna (Harvard University) 2B
Cawley, Max (NC Museum of Life and Science) Workshop 4, 3C
Cell, Kate (Union of Concerned Scientists) 6A
Clark, Jordan (UNC Chapel Hill, CISA) 2D
Conyers, Dallas (Southeast Climate Action Faith Leaders) 5A
Cordova Araujo, Karla (UNC Chapel Hill) 6D
Crawford, Shane (National Institute of Standards and Technology) 6C
Cabbage, Fred (North Carolina State University) 4C
Curtis, Scott (The Citadel) 5E

—D—

Daniel, Lauren (NC Department of Environmental Quality) 3C
Davis Lamb, Avery (Creation Justice Ministries, Duke University) 5A
Davis Pierel, Eleanor (CISA, University of South Carolina) 1E
DeMeo, Terry (USS North Carolina Battleship) 1B
DePolt, Kelley (East Carolina University) 5E
Dillard, Maria (National Institute of Standards and Technology) 6C
Dow, Kirstin (University of South Carolina, CISA) Workshop 1

Driscoll Derickson, Kate (University of Minnesota) 6A
Dumas, Christopher (UNC Wilmington) 2B
—E—
Emanuel, Ryan (NC State University, Lumbee Tribe of North Carolina) 3A
Ertel, Bonnie (The Citadel) 4E
Etheridge, Randall (East Carolina University) 2C
—F—
Fan, Huiying (Georgia Institute of Technology) 2B
Farris, Amanda (University of South Carolina, CISA) Workshop 1
Feken, Stacey (Albemarle-Pamlico National Estuary Partnership (APNEP)) 3A
Fleming, Jory (University of South Carolina, CISA) Workshop 1
Fly, Elizabeth (The Nature Conservancy) 5C
Flynn, Michael (North Carolina Coastal Federation) 1B
Fox, Jim (NEMAC+FernLeaf) Workshop 2, 7D
Fraser, Mary Edna (Artist & Musician) Wednesday Plenary
Freid, Tobin (Durham County, NC) Workshop 4
Fuchs, Matt (The Pew Charitable Trusts) 1C
Funnys, Ray (Georgetown County, SC) Tuesday Plenary
Furiness, Cari (USGS Southeast Climate Adaptation Science Center) 7E
—G—
Gallagher Adams, Elaine (LS3P Associates) 6B
Gao, Peng (University of North Carolina Wilmington) 2D
Goddard, Nicole (City of Raleigh, NC) 7A
Gray, Geneva (NC State University, EPA) 4E
Griffin, Melissa (South Carolina State Climatology Office) 1D
Grimley, Lauren (UNC Chapel Hill) 4E
—H—
Hagerty, Finn (University of South Carolina, SC State Climatology Office) 4E
Haine, Dana (UNC-Chapel Hill) 5D
Hallock, Lindsey (Cape Fear Public Utility Authority) 1C
Hamideh, Sarah (Stony Brook University) 6C
Hardy, Don (City of Kinston, NC) Tuesday Plenary
Harrison, Jane (North Carolina Sea Grant) 3D
Height, Tatiana (Partners for Environmental Justice) 7A
Helgeson, Jennifer (National Institute of Standards and Technology) 5E, 6C
Henshaw, Sarah (UNC Chapel Hill) 2A
Hernandez, Joshua (US Global Change Research Program) 1A
Hicks, Jeff (NEMAC+FernLeaf) 7D
Hill, Katie (University of Georgia) 3D
Hino, Miyuki (UNC Chapel Hill) 2C
Hiscox, April (University of South Carolina) Wednesday Plenary
Holloway, Blair (National Weather Service) 2D
Houston, Tamara (NOAA National Centers for Environmental Information) 4B
Hovis, Meredith (North Carolina State University) 2A

Huber, Kristiane (The Pew Charitable Trusts) 7C
Humphrey, Charles (East Carolina University) 3D
Hunter Pillion, Melody (Journalist & Historian) Wednesday Plenary
Hutchins, Matt (NEMAC+FernLeaf) 1A, 7D
—I—
Ingle, April (River Network) Workshop 3
—J—
Jacobson, Rachel (American Society of Adaptation Professionals) Workshop 2
Jones, Kim (Town of Bluffton, SC) 4D
Jones, Matthew (Hazen and Sawyer) 4C
—K—
Kearnan, Justin (LS3P Associates) 6B
Keith, Ladd (University of Arizona) Workshop 4
Koester, Merrie (USC Center for Science Education) 5D
Konrad, Chip (UNC Chapel Hill, Southeast Regional Climate Center, CISA) Workshop 1
Kops, Jason (East Carolina University) 2A
—L—
Lackstrom, Kirsten (University of South Carolina, CISA) Workshop 1
Lea, Suzanne (East Carolina University) 1E
Lewis-Gruss, Sharai (First Street Foundation) Workshop 2
Lipuma, Sarah (Duke University) 4E
Lundi, Daphne (NYC Mayor's Office of Recovery and Resiliency) Workshop 4
—M—
Magi, Brian (UNC Charlotte) 2E
Marshall, Tracey (Hazen and Sawyer) 2C
Martin, Amanda (NC Office of Recovery and Resilience) Tuesday Plenary, 5B
Masemore, Sushma (NC Department of Environmental Quality) Workshop 2, Tuesday Plenary
Maycock, Tom (NC State University, NC Institute for Climate Studies) 3C
McCallie, Grady (NC Conservation Network) 6E
McClelland, Jessica (Appalachian State University) 2E
McComb, Shelly (College of Charleston) 2A
McGinnis, Alexander (National Weather Service) 2D
McKain, Katie (City of Charleston, SC) 7D
McKee, Patricia (North Carolina State University) 4E
McNeal, Karen (Auburn University) 7E
Mecray, Ellen (NOAA) 2D
Merchant, Rob (Beaufort County, SC) 4D
Mico, Hannah (River Network) 7A
Miller, Shaleen (UNC Greensboro) 2E
Miller, Todd (The North Carolina Coastal Federation) 7C
Mizzell, Hope (South Carolina State Climatology Office) 1D
Moore, Rob (National Resources Defense Council, Inc.) 6E
Moser, Susanne (Susanne Moser Research and Consulting) Monday Plenary
Mukherji, Anuradha (East Carolina University) 5E

Mullikin, Tom (SC Floodwater Commission) Tuesday Plenary

—N—

Norred, Codi (Georgia Interfaith Power & Light) 5A

—O—

O'Driscoll, Mike (East Carolina University) 3D

Olander, Lydia (Duke University) 7E

—P—

Painter, Jocelyn (NC State University, Winnebago Tribe of Nebraska) 3A

Patel, Aashka (NEMAC+FernLeaf) 7D

Patterson, Virginia (NC State University) 1E

Payne, Heather (Seton Hall University School of Law) 4B

Pistiolis, Alexis (UNC Chapel Hill) 6D

Polich, Andrew (Lenoir-Rhyne University) 2A

Porter, Dwayne (University of South Carolina) 7B

Prat, Olivier (NC Institute for Climate Studies) 1A

—Q—

Quet, Queen (Gullah/Geechee Nation) 6A

—R—

Raabe, Peter (American Rivers) 6E

Rennie, Jared (NC Institute for Climate Studies) 1A

Rizza, Dan (Climate Central) 6A

Roach, Beth (NC Commission of Indian Affairs, Nottoway Indian Tribe of Virginia) 3A

Roberson, Ann (SC Department of Insurance) 1A

Robinson, Andrew (UNC Charlotte) 2E

Robinson, Joshua (Robinson Design Engineers) 5E

Rogers, Karin (UNC Asheville's National Environmental Modeling and Analysis Center) 1A

Rose, Caitlin (Triangle Clean Cities, Triangle J Council of Governments) 4B

Runkle, Jennifer (NC State University) 3B

—S—

Sandifer, Paul (College of Charleston) 7B

Satterwhite, Keshi (Ellerbe Creek Watershed Association) 7A

Savage, Rick (Carolina Wetlands Association) 4C

Schaffer-Smith, Danica (Arizona State University, The Nature Conservancy) 5C

Schmid, Keil (Geoscience Consultants) 5C

Schwaller, Nora Louise (University of North Carolina, Chapel Hill) 4A

Scott, Geoff (University of South Carolina, OHHC2I) 7B

Scott, Melissa (Duke University) Workshop 4

Shannon, Andrew (NASA DEVELOP National Program; Science Systems & Applications, Inc.) 1D

Smith, Tara Mei (Extra Terrestrial Projects) Workshop 4

Snyder, Maeve (North Inlet Winyah Bay NERR) 1B

Sutley, Elaina (University of Kansas) 6C

—T—

Tchamkina, Mary (Raftelis) 1C

Thomas, Sydney (UNC Chapel Hill) 6D

Todd, Mackenzie (NC Division of Coastal Management) 5B
Toledo, Diana (River Network) Workshop 3
Truesdale, Robert (RTI International) 4A
Tuttle, Susannah (NC Interfaith Power & Light / NC Council of Churches) Monday Plenary, 5A
Twedt, Judy (Musician) Wednesday Plenary
—V—
Van Wagoner, Philip (East Carolina University) 5E
Vila, Olivia (North Carolina State University) 4A
von Kolnitz, Christine (Medical University of South Carolina) 3B
—W—
Ward, Rebecca (State Climate Office of NC / NCSU) 3C
Warnell, Katie (Nicholas Institute for Environmental Policy Solutions, Duke University) 2C
Watson, Sarah (S.C. Sea Grant Consortium, CISA) Workshop 1, 4D
Watzin, Mary (NC State University) 7E
Werth, David (Savannah River National Laboratory) 1D
White, Holly (Town of Nags Head, NC) 3D
White, Susan (NC Sea Grant) 1E
Wilbert, Mark (City of Charleston, SC) 7D
Williams, Christopher (Coastal Carolina University, The Nature Conservancy) 2A
Williams, Nolan (Robinson Design Engineers) 5E
Willis, Rachel (UNC Chapel Hill) 6D
Wright, Roy (Insurance Institute for Business & Home Safety (IBHS)) 4B
—Y—
Yusuf, Wie (Old Dominion University) 1C
—Z—
Donovan Zimmerman (Paperhand Puppet Intervention) Wednesday Plenary