IMPACTS

Inspiring Meaningful Programs and Communication Through Science

2020

FINAL REPORT

NORTH CAROLINA
GlaxoSmithKline
FOUNDATION

IMPACTS

Inspiring Meaningful Programs and Communication Through Science

OVERVIEW

With state, national, and international recognition for its innovative and effective practices, the Inspiring Meaningful Programs And Communications Through Science (IMPACTS) initiative grew out of Morehead Planetarium and Science Center's statewide efforts to reach all North Carolinians through the annual North Carolina Science Festival. IMPACTS was designed to recruit and train a diverse cohort of science ambassadors to share their passion for their work with different audiences in exciting and inclusive ways. Thanks to the vision and generous funding from the North Carolina GlaxoSmithKline Foundation Board, IMPACTS grew from an idea in 2015 to dynamic training programs serving over 230 science professionals and engaging tens of thousands of North Carolinians.

PROGRAM COORDINATION

Thanks to the North Carolina GlaxoSmithKline Foundation funding, Morehead was able to hire a strongly credentialed Community Engagement Specialist, Tamara Poles, to manage the IMPACTS program, train scientists and STEM professionals in science communication, and coordinate community events across North Carolina. Poles worked closely with Jonathan Frederick, Director of the North Carolina Science Festival, and Crystal Harden, Director of Programs at Morehead Planetarium and Science Center, to shape and adapt the IMPACTS program as it evolved throughout the four years. The program was supported by an external evaluator, Dr. Karen Peterman

CONTACT

North Carolina Science Festival

Morehead Planetarium and Science Center

The University of North Carolina at Chapel Hill

Campus Box 3480
Chapel Hill, NC 27599-3480

www.ncsciencefestival.org

ncscifest@unc.edu

919-843-8329

TAMARA POLES
Community Engagement Specialist
tapoles@email.unc.edu

JONATHAN FREDERICK
Senior Manager, Programs & Strategic Partnerships
jfred@unc.edu

CRYSTAL HARDEN
Director of Program and Inclusion Initiatives
charden@unc.edu

TODD BOYETTE
Director of Morehead Planetarium and Science Center
todd_boyette@unc.edu

Dear North Carolina GlaxoSmithKline Foundation Board of Directors:

Since its inception in 2016, the North Carolina GlaxoSmithKline Foundation funded program, Inspiring Meaningful Programs and Communication Through Science (IMPACTS), has grown into one of Morehead Planetarium and Science Center's most successful initiatives. This groundbreaking science communication program received both national and international recognition and exceeded our expectations reflected in the grant proposal.

During the implementation of this program, we recognized the importance of representation and its positive impact on the community. More than 230 scientists—recruited from diverse backgrounds and trained in inclusive education practices—participated in science communication trainings and public events that reached over 47,000 participants statewide. We targeted diverse areas of the state including rural counties to engage underserved communities with representative local scientists to dispel misconceptions of what a scientist looks like. In doing so, we hoped to inspire the next generation of diverse scientists. Our evaluation data shows that the participation of diverse scientists was meaningful for both them and for audiences of all ages.

Despite the pandemic of 2020, the IMPACTS scientists showed dedication and perseverance to fulfill their passion for science outreach. The IMPACTS program coordinator led webinars for IMPACTS scientists to learn how to share their science using digital media. As a result, scientists created over 50 educational YouTube videos that have been shared with the public accompanied with corresponding lesson plans and instructions on how to conduct the experiments at home.

Due to the massive success of the IMPACTS program, we are pleased to announce that we have received a $1 million dollar grant from the North Carolina GlaxoSmithKline Foundation to conduct a communication program that focuses on community college faculty, staff, and students engaging their community.

Thank you for your continued support of Morehead's vision for a more inclusive science education landscape in North Carolina.

Kind regards,

Todd Boyette
Director, Morehead Planetarium and Science Center

Crystal Harden
Director of Program and Inclusion Initiatives

> **"I would never forget the look of an 8th grader (like my 13-year old self) asking if it was really me who was going to give the science class on bioenergy to her and her friends. I could see in her face that she was debunking her implicit biases without realizing it."**
>
> **- Dr. Daniela Jones**
> **IMPACTS Graduate**

IMPACTS AT A GLANCE

Total numbers for four years (Aug 2016 through May 2020)

47,061
TOTAL NUMBER OF PARTICIPANTS IN OUTREACH EVENTS

SYMPOSIUM STYLE EVENTS

1,787 PARTICIPANTS | **14** EVENTS

SCHOOL CLASSROOM VISITS

15,043 STUDENTS | **179** EVENTS

COMMUNITY EXPO STYLE EVENTS

30,231 PARTICIPANTS | **31** EVENTS

232
Scientist Participants

163
Program Graduates

67
Impactor Training Workshops

35
Supplemental Professional Development Workshops

313
Other scientists participated in other IMPACTS professional training workshops and presentations

51
YouTube Scientist Videos

2
Impactor Highlight Videos

1
UNCP cohort Impactor Podcast

The IMPACTS Story

The North Carolina Science Festival, produced by Morehead Planetarium and Science Center, began in 2010 as the nation's first statewide science festival. By 2015, the Festival had served over one million people through over two thousand public science events. Evaluation data indicated that participants who had engaged with scientists rated events as better and more meaningful than those who did not interact with scientists. Additionally, participants qualitatively valued the events even more when they engaged with scientists that resembled themselves. In light of this data, the Festival team endeavored to expand its science communication efforts to highlight scientists more representative of North Carolina's population.

Funded by the North Carolina GlaxoSmithKline Foundation, Inspiring Meaningful Programs and Communication Through Science (IMPACTS) was a state-wide public science communication training and outreach initiative. This application-based program selected elite scientists that represented North Carolina's diverse population and vast STEM careers. Once trained, scientists practiced and honed their skills in science communication by engaging the public through three different styles of outreach programs. The Festival was the perfect vehicle to host the IMPACTS program due to its diverse partners that helped to identify potential scientists as well as to host hands-on science events. The Festival was able to add new partnerships during the program, increase its effectiveness in serving diverse audiences, and further expand the way we think about science outreach. For example, IMPACTS scientists brought content to non-traditional science events such as Pembroke Day in southeastern NC, The Art of Cool Festival, a Durham-based HipHop and R&B event, and Elizabeth City's Potato Festival, a massive street festival in northeastern NC.

> **"When members of the public are able to interact with scientists and engineers, their self-perceptions of overall expo ratings, how much they are learning, how much they feel inspired, and how much fun they are having become significantly more favorable. ... These results underline the need to train STEM professionals in effective public outreach and science communication. Further research on public-scientist interactions is needed to inform effective communication training."**

Boyette, T. and Ramsey, J. R. (2019). ***'Does the messenger matter? Studying the impacts of scientists and engineers interacting with public audiences at science festival events'. JCOM 18 (02), A02.***

Building the Program with Key Partners

In order to reach key areas of North Carolina, we identified four areas of the state where we would recruit scientists and organize events. In each location, we worked with dedicated partners that helped provide valuable resources that enabled the program to grow.

SOUTHEASTERN COHORT

Leadership staff at the University of North Carolina at Pembroke helped to forge a model partnership for IMPACTS, deepening annual Festival engagement efforts and local celebrations of STEM professionals on and around campus. New community partnerships were forged with the Robeson County Public School's Indian Education Department and the Arts Council of Scotland County.

NORTHEASTERN COHORT

Elizabeth City State University, Port Discover Science Museum, East Carolina University, Chowan University, the College of the Albemarle, and Gates County Schools were all engaged to recruit scientists and participate in public events.

TRIAD COHORT

North Carolina Agricultural and Technical State University (NC A&T) and the University of North Carolina Greensboro were valuable partners in recruiting scientists and hosting events. The NC A&T and UNCG Joint School of Nanoscience and Nanoengineering was instrumental both in hosting workshops and largescale community events, as was Winston-Salem State University. A new partnership with Graham Middle school aided in incorporating IMPACTS scientists into their 6th grade curriculum.

TRIANGLE COHORT

As its parent university, UNC-Chapel Hill was an obvious partner for the Festival team. We also forged new partnerships with North Carolina Central University (NCCU)—launching a new cohort on that campus—and deeper partnerships with Duke University and UNC-TV.

> **"Our experience with the team from Morehead has been first rate. They meet deadlines, keep commitments, are effective organizers and stewards of funds, and help put together wonderful science engagement opportunities. ... I have found them to be highly skilled at helping scientists learn to explain complicated ideas in dynamic and meaningful ways ... As Dean, I have integrated several community outreach programs into our operational culture at UNC Pembroke. IMPACTS has been one of our most successful. I can speak first hand to the professionalism and impact these programs are having on our community."**
>
> Dr. Jeff Frederick
> ***Dean of College of Arts and Sciences at UNC Pembroke***

Impactor Preparation

The IMPACTS program utilized the Pacific Science Center's *Portal to the Public* curriculum as the initial framework for its training. The program was able to grow and evolve its curriculum based on the outreach conducted within the state. Ultimately, the program was structured for scientists to train at two workshops and an annual professional development and networking meeting that included a practice activity showcase. Consultations and feedback with program staff were also an integral part of the scientist preparation. Impactors then participated in three outreach events in order to graduate the program and become eligible for additional unique professional development and outreach opportunities.

IMPACTOR TRAINING

IMPACTOR ACTIVITY CONSULTATIONS AND FEEDBACK

ANNUAL MEETING

TRAIN THE TRAINER OPPORTUNITIES

Morehead Staff and Alumni Impactors were eligible to become an IMPACTS co-presenter and to deliver workshops to the new cohorts.

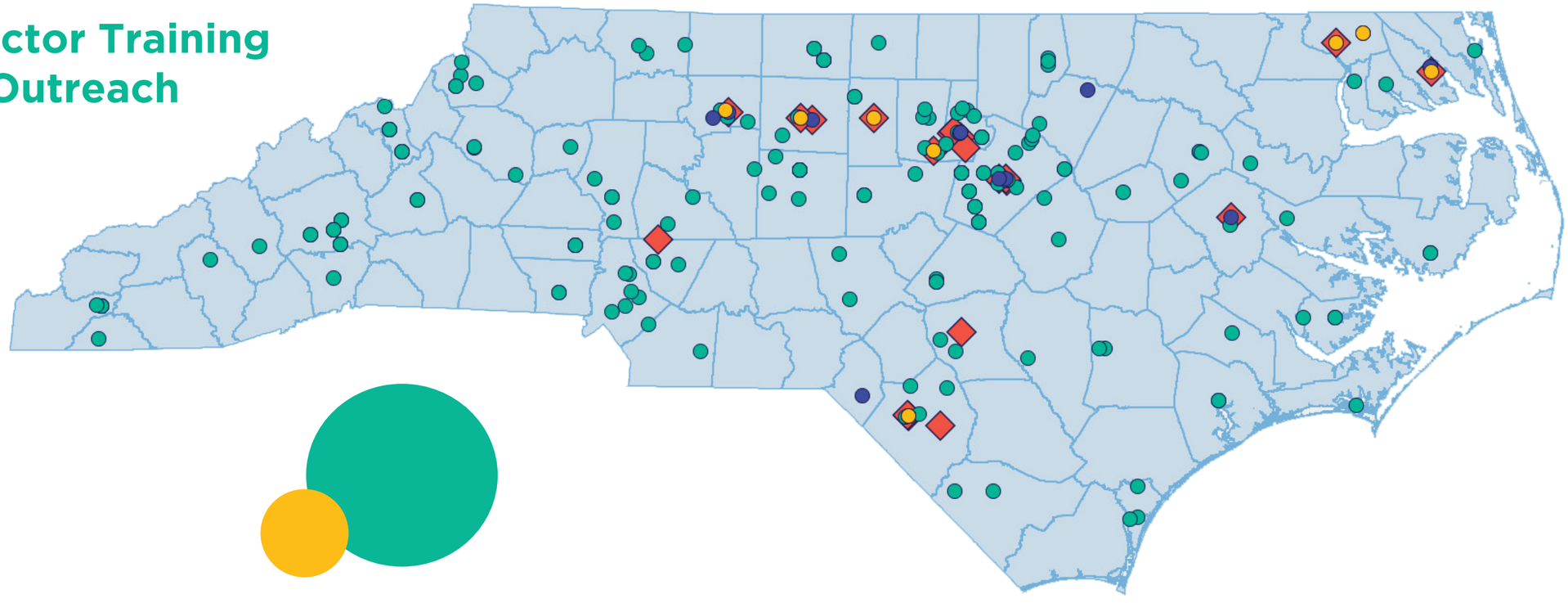
SHARING YOUR SCIENCE WITH MEDIA WORKSHOP

In collaboration with UNC-TV and Duke University, the program provided a media training on how to communicate science on TV, radio, and online news services. UNC-TV hosted the workshop and provided a tour and professional advice for dozens of scientists who were also able to practice their interviewing skills live on the screen.

TEACHING DIVERSE AUDIENCES WORKSHOP

In collaboration with the North Carolina Department of Public Instruction and the Governor Morehead School, IMPACTS hosted multiple workshops that taught scientists and Morehead staff how to better accommodate diverse audiences such as deaf, hard of hearing, blind, and deaf/blind patrons.

Impactor Training and Outreach



IMPACTOR TRAINING

Scientist training workshops, professional development, and networking meetings.

> This program has not only contributed to my improvement in science outreach and science communication professionally, but it has also allowed me to connect with many other like-minded individuals and work towards making science more accessible. ... I consider myself fortunate to have had Tamara as my mentor in the program and will continue to use the skills I gained in this program throughout the rest of my life."
>
> —Shannon Speer
> *PhD Candidate*

CLASSROOM VISITS

Each scientist was matched with a middle school teacher, which resulted in 179 Classroom Visits reaching 15,043 students in about one third of our NC counties. Scientists were able to share their excitement for STEM by discussing their personal story and leading fun science activities. This was a great way for students to see and interact with scientists and to learn that they can be scientists, too!

> Students were so excited about meeting a real scientist and someone who [is] just a regular person. Many of my students decided they wanted and very well could be a scientist after the scimatch day."
>
> —Gabrielle Martin
> *Hayesville Middle School Teacher*

FIELD TRIPS

A total of 1,787 pre-registered grade 4-7 students attended 14 symposium style events where an IMPACTS scientist delivered the Keynote Address while others led concurrent sessions about their journeys and their research and performed engaging hands-on activities.

> It is such a powerful experience for our students to see scientists that look like them so they can be inspired to do science, too. This event has greatly impacted our students. Thank you!"
>
> —Debra Cheap
> *Graham Middle School Teacher*

COMMUNITY EVENTS

Impactors participated in 31 community events of varying sizes by setting up a table or display and engaging 30,231 visitors as they walked through public event spaces. Some events were traditional science expos while others brought science to a general community event.

> The training and networking opportunities, as well as our co-sponsored community events, have made a real impression in our area of the state. It has been a pleasure to see our community at large get excited about STEM, and it's important for our diverse population to know that scientists come in all shapes and sizes."
>
> —Dr. Richard Gay
> *Associate Dean and Associate Professor of Art History, College of Arts and Sciences at UNC Pembroke*

Impactors in Community Events outside of the classroom

During the IMPACTS program, the Festival was able to increase its effectiveness in serving diverse audiences and further expand the way we think about science outreach outside of the classroom. As a result, the symposium and expo style events were refined in response to the needs of the cohorts. Additionally, we recognized an opportunity to expand to audiences that would not typically attend a science-related event by bringing science to existing local community events.

The Southeastern Cohort collaborated with the Public Schools of Robeson County's Indian Education Department to provide 100 Native American grade 7 students throughout the county the opportunity to take a field trip to the campus of UNCP and engage with scientists throughout the day. They also participated in different community events to engage diverse audiences in STEM despite the devastating impact of two hurricanes. At the UNCP Family Day, they helped UNCP student's families explore STEM activities as they toured campus. And they collaborated with UNCP and the Arts Council in Laurinburg in order to set up their first ever Science Street during their Laurinburg Spring Fest.

The Northeastern Cohort collaborated with the on-campus magnet middle school at Elizabeth City State University to host a symposium the first year. For the three subsequent years, in order to reach rural schools and provide them with unique resources and experiences to enhance their education, they collaborated with Gates County Schools to provide a symposium event for all grade 4-5 students at each of their elementary schools. They also participated in the Earth Day event at ECU, which is a collaboration with the local Boys and Girls clubs and afterschool programs, as well as in the North Carolina Potato Festival in Elizabeth City, which draws 30,000 people to the region.

"The students enjoyed meeting a real person they see as a scientist. Also, her story of how she came to be a scientist inspired students who struggle with school. Students had a lot of questions about how she changed careers and what brought her to her research.

—Rusell Paugh
Lucas Middle School Teacher

The Triad Cohort collaborated with Winston Salem State University for the first two years of events. Subsequently, they collaborated with Graham Middle School, a Title 1 school in Burlington NC, to directly serve 250 grade 6 students at a symposium each year. They also participated annually in one of the Triad's largest science events, the Science Everywhere Expo. This event takes place across the UNC Greensboro campus, allowing visitors to access labs and to explore the breadth and depth of STEM research.

The Triangle Cohort collaborated in the Morehead Planetarium and Science Center's STEMville Symposium, where 130 grade 4-7 students from the Triangle area participated each year. They also participated in the annual UNC Expo at the UNC Chapel Hill campus and the SciTech Expo at the North Carolina Museum of Natural Sciences. In addition, they partnered with The Art of Cool concert series and local STEM companies to create the Innovate your Cool Expo during the Hip-Hop and R&B music festival in Durham with each participating organization creating an interactive STEM experience for Durham Public School students and teachers. Durham Bulls mascot Wool E Bull even participated in STEM that day!

IMPACTS Program Graduation

At the end of every year, the IMPACTS program hosted a graduation dinner in each cohort area around the state in order to celebrate the achievements of the new graduating IMPACTS scientists.

"The icing on the cake is when you have the teacher asking the students if they would like to have me (Impactor) to be an assistant in all her science classes and you heard them all respond a big and exciting YES ! At that moment, you know you have not only inspired them through your personal background but also you have made science the most fun thing on Earth and then you can proudly say to yourself: Mission accomplished."

—Theo Noussi
IMPACTS Graduate

SCIENCE COMMUNICATION DURING THE GLOBAL PANDEMIC

At the time of the Covid-19 Stay-At-Home Order of March 2020, 83 IMPACTS scientists were trained and ready to conduct outreach. All the upcoming in-person events, however, were cancelled. As the Festival team decided to pivot to virtual content, an opportunity emerged for IMPACTS scientists to engage in virtual outreach. They were invited to participate in a webinar training on the basics of making science videos and performing distance learning classes and then to either create their own short video or present a live distance learning program to a group. Even while dealing with their own challenges related to the pandemic, the majority of scientists in the program participated.

"Working with the IMPACTS scientists has given me a new and fun way to engage with my afterschool students while our program is remote. Together, we get to learn, grow, ask questions, and broaden our horizons by hearing from scientists with diverse backgrounds and fields of study. It has been so exciting to see which students show up to each session, and to watch their eyes get big, or hear their laughter as the IMPACTS scientists explain a new topic or demonstrate an amazing concept. These virtual science sessions have provided an incredible way to feel connected during such an isolating time, and we are so grateful for how the IMPACTS program is bringing us together!"

—Jessica Vohwinkel
Morehead Afterschool
Program Coordinator

The IMPACT Continues

The following scientists continue to perform outreach activities

JAMES TAYLOR

University of North Carolina PhD Candidate

"Working with the IMPACTS program has been one of the most defining moments of my graduate school career. ... For me in particular, this experience directly led to me assisting in trainings for new cohorts of Science Impactors and the skills I gained from the IMPACTS program directly led to me excelling during my employment at the Museum of Life and Science, both of which were unique professional development opportunities I would not have gotten otherwise."

DR. CHRISTINA MARVIN

Lead Project Assistant at Wisconsin Alumni Research Foundation and Co-editor of Science Talk

"The IMPACTS program was one of the most influential experiences in my career development. ... I have since graduated with a PhD in Chemistry and am now a full time science communication specialist. Because of the experiences and mentorships in the IMPACTS program I had the opportunity to foster my communication skills early in my science career and these experiences have made me a better scientist and science communicator."

CHEQUITA BROOKS

East Carolina University PhD Candidate

"How I approach science communication has changed to be more inclusive and, well, impactful. ...I really can't say enough good things about the program and the free trainings that were made available to me which have allowed me to broaden my horizons and ways of thinking."

DR. SUSANNA HARRIS

CEO of PhD Balance, Science Communicator and Social Media Influencer

"Working with Tamara Poles during my PhD program through the IMPACTS program redefined my path as a scientist and a communicator. This was the first time I'd ever been coached in how to create truly engaging materials, how to promote discussion and prompt questions, and how to be confident in making and learning from mistakes. ... The biggest compliment I receive is that I am "able to communicate high-level science effectively with very different audiences" and this is almost wholly due to the training I received through IMPACTS."

BIANCA HOWARD, MS

Wake County Solid Waste Management

"Participating in IMPACTS has made me a better communicator and manager. Tamara and her colleagues at Morehead pushed me to think deeply about the different needs of audiences... I was forced to focus my ideas and think creatively about how to attract visitors to my activities...In our training sessions, the IMPACTS presenters created an atmosphere that was safe for trying different approaches, and I felt energized by meeting scientists from fields so unlike my own... I now encourage the outreach staff I supervise to develop more hands-on activities and to focus on one main idea instead of overwhelming festival attendees with information. IMPACTS has made a lasting impact on me!"

IMPACTS Program Evaluation

The IMPACTS program was assessed annually by an external evaluator, Karen Peterman Consulting. The IMPACTS program was designed to improve scientists' confidence and their intentions to conduct outreach in the future. Evaluation for the first three years therefore monitored pre-post changes in participants' self-efficacy for conducting outreach, and their intentions to continue providing outreach in the future. Impactors rated their increase in science communication skills and confidence to be improved at a statistically significant level after their year in the program. The vast majority also shared their intentions to continue providing outreach.

In the final year of the program, the focus of the evaluation was expanded to collect longer-term outcomes and impressions of the program from alumni selected randomly to participate in an interview focused on two primary topics: long-term outcomes of the program and long-term impressions of the program.

LONG-TERM OUTCOMES FOR IMPACTORS

Continued Science Outreach

The results from the interviews indicated that 95% of alumni have continued to do science outreach after the program. Most alumni provide outreach as part of K–12 in-school programs or through science festival events. Other venues include civic groups and churches, K–12 afterschool programs, research symposia, service-learning courses, continual education trainings and social media platforms. Most alumni stated that they continue to use strategies learned through the IMPACTS program when providing outreach.

Impactors reported that they continue to participate in outreach in an effort to help demystify science and dismantle notions of who can be a scientist. With regards to the latter, many hope to change perceptions of the science narrative by sharing their personal stories and potentially serving as a role model so that science is more accessible to youth of color, girls and youth in rural areas. Most Impactors believe that science outreach is an important part of their job and some stated that they participate in outreach in hopes of increasing science literacy.

Improved Self-Confidence and Other Related Benefits of IMPACTS

Most Impactors still reported having increased confidence in their own abilities one-to-three years later. When probed further about their experiences in IMPACTS, most alumni also shared confidence and pride in at least one of the specific outreach activities they created for the program and were proud of the influence they were having on students, excited by the connections they were making with students as well as the enthusiasm they saw during their presentations, and believed that they were making science seem less scary for youth.

> **"I think there's so many misconceptions about who scientists are and what scientists do, what it takes to be a scientist, that if we could break some of those down for anyone—for kids for sure, because I think getting them inspired and excited about science is important, but also for adults. I think if we had a more science literate public we would have different problems than we have now in terms of climate change and vaccinations and all kinds of science-based topics that people are not very well informed on."**

Barriers to Conducting Outreach

Though alumni have prioritized science outreach in different ways, most were also able to identify at least one major professional or personal barrier to conducting science outreach. Lack of time or failure to make science outreach a priority was both a professional and personal barrier. Other personal barriers mentioned included family expectations, lack of resources, English as a Second Language, poor public speaking skills and unknown blind spots that scientists may have. Several noted that science outreach and public service are not given priority in academia.

Communicating with Other STEM Professionals

An unanticipated and positive outcome of the program has been a ripple effect that begins with Impactors and then extends to their broader networks of STEM professionals. Almost all the Impactors reported sharing IMPACTS resources with others interested in outreach, which has extended the program's sphere of influence in new and dynamic ways. Two Impactors have even begun using resources from the program to help lead their own science communication workshops.

> **"You get different feedback and interaction when it's a group like that because everybody's coming from a different area, and their sharing of their experience and expertise helps you in moving forward [in several ways]—the area for working with the IMPACTORs, or the IMPACTS program, and then even in your personal and professional life."**

LONG-TERM IMPRESSIONS OF IMPACTOR TRAINING

All alumni believed that the training they received prepared them to meet program objectives. Most noted that the active learning strategies used by Project Coordinator and Consultants were a key component to their growth as science communicators. Impactors reported that they found creating the activities, talking about their research in ways the public could understand, and finding time to attend trainings and complete program requirements to be the most challenging for them. They felt very supported during the training process and noted that the Coordinator's excitement was consistent and encouraging.

> **"I think their mentorship was foundational, and their encouragement. They're all seasoned science educators and they do a lot of different types of outreach, so they were able to bring experience to the table that many of us didn't have."**

The IMPACTS program was designed to provide training to scientists who are from groups that are under-represented in STEM fields. Most of the interviewees praised the diversity within their cohort and felt that experiencing the program with a diverse group of peers allowed them to learn from different perspectives as they shared experiences and feedback.

IMPACTS Program Evaluation Cont.

CONCLUSION

The evaluation results indicate that the IMPACTS program has been successful at helping scientists achieve both short and long-term outcomes in relation to their confidence in science communication. Importantly, the interviews conducted in the final year confirm that Impactors follow through on their short-term intentions to continue providing outreach after their program graduation.

Overall, IMPACTS alumni praised the program. The format, content, and program leaders were all seen as assets. Feedback was consistent across those who graduated from the program and those who dropped out. Those in the latter group referenced time constraints as their main reason for not completing the program. Alumni provided helpful feedback to consider regarding consistent communication, the use of Consultants, and additional supports that have the potential to help future Impactors be even more successful. While the IMPACTS program has concluded, the Morehead team has received funding from the NC GSK Foundation for a new, similar program which will benefit from following some of the recommendations shared by IMPACTS alumni.

IMPACTS around the globe!

NATIONAL

The IMPACTS initiative has been discussed at annual Science Events Summit (SES) meetings. Formerly known as the International Public Science Events Conference (IPSEC), the SES is the annual meeting of the Science Festival Alliance. This collaborative network of institutions, initiatives, and individuals have committed to work together to best serve communities through the festival format. During the 2017 IPSEC in Wisconsin, Karen Peterman presented data from two “New Studies on Science Festivals”, including work exploring how children engage with scientists. During the 2018 IPSEC in Florida, Tamara Poles presented the IMPACTS approach in a session “New Approaches to Communication Training.”

CANADA

Todd Boyette was invited to conduct the keynote address for the Canadian Association of Science Centers (CASC) 2018 Conference. He was encouraged to talk about how he is leading the charge in science communication with programs such as IMPACTS.

UNITED KINGDOM

Tamara Poles was invited to present at the UK Science Festival Network 2018 Conference and teach conference attendees how they can implement a science communication program in their area. After the conference, Poles was asked to present to the British Science Association staff and funders on how to implement a science communication program such as IMPACTS in their organization.

What’s next?

Due to the success of IMPACTS and thanks to new funding from the North Carolina GlaxoSmithKline Foundation, a new STEM community engagement program called FUTURES will be developed to collaborate with scientists, staff, and students at NC Community Colleges. The goal is to continue to leverage the foundational work of the IMPACTS initiative to further create opportunities for a greater variety of STEM professionals to engage the public and increase their understanding of STEM and its importance in everyday life.

Acknowledgements

North Carolina GlaxoSmithKline Foundation

Karen Peterman, PhD and Consultants - Karen Peterman Consulting

Dr. Richard Gay, Dr. Jeffery Frederick, and Janet Gentes at UNC Pembroke

Dr. Connie Locklear and team at Indian Education Department of Robeson County Schools

Dr. Heather Vance-Chalcraft and team at East Carolina University

Stephanie Merritt and 6th grade team at Graham Middle School in Alamance County

Joint School of Nanoscience and Nanoengineering,

Dr. Julie Horvath and Biological and Biomedical Sciences Department at North Carolina Central University

University of North Carolina-Greensboro

Gates County School District

Elizabeth City State University

Novozymes SciMatch funder

Denise Johnson and team at Winston Salem State University

D^2

UNC-TV

Martina Moore-Reid and Division of Services for the Deaf and Hard of Hearing at the NC Department of Health and Human Services

Duke University

The Arts Council of Scotland County

North Carolina A&T

Discovery Place

Fayetteville State University

Wake Forest Baptist Medical Center

William Fulton from Governor Morehead School

North Carolina Potato Festival Coordinators

Art of Cool and Innovate Your Cool Coordinators

NC State University

North Carolina Museum of Natural Sciences

Durham Public Schools

The Durham Hotel

Mexican Consulate

UNC Society for Advancement of Chicanos/ Hispanics and Native Americans in Science

Ivvet Modinou, Head of Engagement/ Director of British Science Festival and the team at the British Science Association

Learn more about Morehead Planetarium and Science Center at moreheadplaneterium.org

Learn more about the NC Science Festival at ncsciencefestival.org

Learn more about the North Carolina GlaxoSmithKlineFoundation at ncgskfoundation.org

IMPACTS

Inspiring Meaningful Programs and Communication Through Science

The IMPACTS Initiative was made possible by the generous support of

NORTH CAROLINA
GlaxoSmithKline
FOUNDATION

Congratulations and special thanks to our IMPACTS scientists

Yara Abumohsen
Elnaz Ahani
Anelle Ammons
Jessica Amsbary
Keerthi Anand
Atin Angrish
Eli Azzi
Marianne Barrier
Yasmin Barrios
Lais Bastos Martins
Brenna Beckelman
Kelsie Bernot
Emily Beyer
Lexi Bounds
Sada Boyd
Taron Bradshaw
Chequita Brooks
Quinton Bruch
Andrew Camp
Kaitlin Campbell
Tia Carmon
Danielle Chappell
Ashlesha Chaubal
Haleigh Conley
Jessie Cook
Lindsey Costantini
Amanda Cox
Lisa Cremeans
Nildris Cruz-Diaz
Megan Damico
Briana Davis
Alex Deal
Parth Desai
Regina DeWitt
Chrisha Dolan
Wayana Dolan
Megan Doldron
Aja Duncan
Jasmine Edelstein
Mary Egbert
Marc Emerson
Selena English
Mohammad Fereydouni
Regina Fernandez Fernandez
Matt Fields
Christine Figan Crute
Rachel Force
Morgan Frost
Brittany Garvin-Hudson
Richard Gay
Lakshmi Gayitri Vhivulula
Thomas Gilliss
Sherette Godfrey
Lauren Goodman
Katherine Gordon
Katelyn Greene
Amy Gross
Kasia Grzebyk
Lisa Hailey
Iman Hamid
Emily Harmon
Susanna Harris
Carolina Herrera
Gail Hollowell
Alexis Hoopman
Julie Horvath
Bianca Howard
Brittany Huffman
Katherine Hunt
Vishwas Jadhav
Anitha Jayapalan
Rene Johnson
Kennita Johnson
Thomas Johnson III
Kimberly Jones
Daniela Jones
Carl Jurkowski
Joseph Kabbes
Jill Keith
Reginald Kelley
Ambalika Khadria
Shanta Kilgore
Zayna King
Bruce Kirchoff
Reina Kornmayer
Usha Kulkarni
Kaci Kuntz
Carolyn Lacey
Christie lee
Julienne Lim
Chad Lloyd
Juilee Malavade
Sara Maloney
Siva MandJiny
Diane Markoff
Nicholas Martinez
Christian McHugh
Lauren McRae
Abraham Meilich
Kelsey Miller
Elyse Miller
Anthony Monroe
Whitney Moorman
Melissa Morales
Katrina Morgan
Rachel Morrison
Corban Murphey
Ariel Myers
Erika Neave
Metika Ngbokoli
Bita Nickkholgh
Alexandria Niebergall
Theophraste Noussi
Jessica Obermeyer
Thomas Oweida
Christina Parker
DeJana Parker
Marsha Penner
Kathryn Picard
Maryam Pourtaghi
Ranga Rajan
Joanna Ramirez
Sophia Rammell
Jeromy Rech
Kameron Richardson
Kayla Riddick
Octavia Robinson
Melanie Rodriguez-Beltran
Checo Rorie
Alison Schaefer
Suzanne Setti
Kendra Settles
Nur Shahir
Cathy Silver Key
Lucretia Smith
Shannon Speer
Denise St. Jean
Sandra Stangeland-Molo
Rebeca Stiepel
Darrell Stover
Yi-hsuan Su
Anne Taliaferro
James Taylor
Stephanie Teeter
Joann Thomas
Kandace Thomas
Frank Tukur
Heather Vance-Chalcraft
Travis Varner
Erin Viere
Prashant Waiker
Crystal Walline
Linwood Webster
Emory Wellman
Tova Williams
Megan Williamson
Erika Wise
James Withrow
Michelle Wobker
Alex Woodell
Velinda Woriax
Erika Young