

STEM AWARDEES MEETING

November 29th & 30th, 2022
Le Méridien Charlotte | #BWFSTEM2022

BURROUGHS
WELLCOME
FUND 



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November 29th & 30th, 2022



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INTRODUCTION

We hope that this STEM Education Awardees Meeting provides you with an opportunity to engage with others who share the same passions and interests in cultivating the next generations of young scientists.

For the past 25 years, the Burroughs Wellcome Fund has championed educational efforts in North Carolina through investments in STEM education. Since 1996, BWF has invested more than \$100 million to

support initiatives and networks in STEM education. In addition to funding, BWF provides opportunities for interactions with colleagues and engagement with the broader community of educators and grant recipients across other BWF STEM education programs.



LOUIS J. MUGLIA, MD, PHD
BWF PRESIDENT AND CEO

ABOUT THE BURROUGHS WELLCOME FUND

The Burroughs Wellcome Fund serves and strengthens society by nurturing a diverse group of leaders in biomedical sciences to improve human health through education and powering discovery in frontiers of greatest need.

BWF's financial support is channeled primarily through competitive peer-reviewed award programs to degree-granting institutions in the U.S. and Canada on behalf of individual researchers. To complement these competitive award programs, BWF also makes grants to nonprofit organizations conducting activities intended to improve the general environment for

science. BWF believes that a diverse scientific workforce is essential to the process and advancement of research innovation, academic discovery, and public service.

Governed by a Board of Directors composed of distinguished scientists and business leaders, BWF was founded in 1955 as the corporate foundation of the pharmaceutical firm Burroughs Wellcome Co. In 1993, a generous gift from the Wellcome Trust, enabled BWF to become fully independent from the company, which was acquired by Glaxo in 1995.

AGENDA

Purpose: To convene and provide opportunities for educational exchanges and capacity building for the Burroughs Wellcome Fund's Science/STEM Education award recipients including – Student STEM Enrichment Program Directors, Career Awards for STEM Teachers, FastTrack Scholars/Teachers, Singapore Math Pilot Teachers/Principals, select Ad Hoc Awardees, and Strategic Partners.

MONDAY, NOVEMBER 28 NEW DIRECTORS MEETING ONLY

- 10:00 am – 5:00 pm **Registration** | [Carolina Ballroom Foyer](#)
- 2:00 – 5:00 pm **SSEP New Directors Meeting** | [Mecklenburg 3](#)
Presenters:
STEM Network and Ecosystem Reps
Evaluators, Dr. Adrienne Smith and Dr. Rebecca Zulli-Lowe
- 5:00 – 5:30 pm **Break**
- 5:30 – 7:00 pm **Dinner with New Directors** | [Craft City Social Kitchen](#)

TUESDAY, NOVEMBER 29

- 9:00 am – 5:00 pm **Registration** | Carolina Ballroom Foyer
- 10:00 – 11:30 am **Workshop 1** | Governor’s Ballroom 2 & 3
Two-way street: Constructing pathways with K-12 and higher education
AAAS Inclusive STEMM Ecosystems for Equity & Diversity
(Dr. Shirley Malcom, Dr. Travis York, Suzanne Thurston)
- 11:30 am – 12:00 pm **Networking and Reflection Time** (Box Lunch Provided)
Carolina Ballroom Foyer
- 11:30 am – 1:00 pm **Workshop 2** | Governor’s Ballroom 2 & 3
North Carolina Society for Hispanic Professionals
TuPortal STEM
Description: Learn culturally sensitive approaches to promote the participation and enrollment of Hispanic students in STEM programs as well as other STEM-related resources.
In this presentation, you will learn ways to reach out to a broad Hispanic audience, build effective partnerships, and strategies to engage this population and encourage Hispanic students to pursue careers in STEM fields.
Presenters:
Rocio Anderson (NCSHP)
Dr. MariaRosa Rangel (NCSHP)
- 1:00 pm – 3:00 pm **Poster and Exhibit Setup** | Carolina Ballroom
- 3:30 pm – 4:30 pm **Conference Poster Session And Displays** | Carolina Ballroom
Networking – Group A
 - Student STEM Enrichment Program Directors and Career Awardees for STEM Teachers will share their work
 - Select Organization Booths/Displays

AGENDA

- 4:30 pm – 5:30 pm **Sewa Beats** | [Symphony Ballroom](#)
- 5:30 pm – 6:30 pm **Conference Poster Session And Displays** | [Carolina Ballroom](#)
Networking – Group B
- Student STEM Enrichment Program Directors and Career Awardees for STEM Teachers will share their work
 - Select Organization Booths/Displays
- 6:30 pm – 8:00 pm **Dinner** | [Mecklenburg 1 & 2](#)
Welcome & BWF Overview
Alfred Mays, Senior Program Officer
Dr. Lou Muglia, President & CEO
About the STEM Awardee Meeting
Dinner Panel – NCTeachers of the Year
Leah Carper (2022)
Eugenia Floyd (2021)
Maureen Stover (2020)
Moderator: Dr. Yvette Huet (UNCC)
- 8:00 pm – 10:30 pm **Post Dinner Networking** | [CJ's Lounge](#)
An opportunity for informal information sharing and networking across program grant areas and geographic regions
(Complimentary beverages included)

WEDNESDAY, NOVEMBER 30

- 7:00 am – 3:00 pm **Registration** | Carolina Ballroom Foyer
- 7:00 am – 11:00 am **Poster and Exhibit Breakdown** | Carolina Ballroom
All posters and exhibits must be removed from the room by 3:00 pm
- 7:30 am – 8:30 am **Buffet Breakfast** | Mecklenburg 1 & 2
- 8:30 am – 8:40 am **Opening Remarks and Introduction of Guest Speaker**
Mecklenburg 1 & 2
Alfred Mays, BWF Senior Program Officer
General Meeting
- 8:40 am – 9:45 am **Keynote Speaker** | Mecklenburg 1 & 2
Captain Barrington Irving
Founder and CEO
Flying Classroom
Q&A to follow presentation
- 9:45 am – 10:00 am **Break**
- 10:00 am – 10:50 am **General Session A** | Mecklenburg 1 & 2
Topic 1: Leveraging resources within the BWF Network
Highlights of select STEM programming and strategies
Presenters:
Disabilities in STEM – Joann Blumenfeld
NCCAP – Wayne Capps
- 10:50 am – 11:00 am **Break**

AGENDA

11:00 am – 11:50 am **General Session B** | [Mecklenburg 1 & 2](#)

Topic 2: Public Education Update – Policy and Legislation and Educational Equity and Opportunity

A presentation on key policy issues in the state as well as various initiatives the Public School Forum is involved in to advance educational opportunity in North Carolina (both in and out of school)

Presenters:

Dr. Lauren Fox (Public School Forum of NC)

Dr. Deanna Townsend-Smith (PSF – Dudley Flood Center)

Ashley Kazouh (PSF – Dudley Flood Center)

11:50 am – 12:00 pm **Break**

12:00 pm – 1:30 pm **Lunch** | [Mecklenburg 1 & 2](#)

STEM for All

A panel consisting of individuals who are active with ushering inclusiveness and belonging into practice through outreach and addressing systems change

Moderator: Dr. Joseph Graves

Panelists: Dr. Crystal Harden, Dr. Stephani Page, Rep. Ricky Hurtado

1:30 pm – 1:45 pm **Break**

1:45 pm – 3:15 pm

Concurrent Sessions (*Breakouts per award program*)

Roundtable Discussions: Student STEM Enrichment Program Awardees | [Mecklenburg 1 & 2](#)

Facilitators:

Dr. Yolanda Comedy (SSEP Advisory Committee)

Dr. Connie Locklear (SSEP Advisory Committee)

Program Evaluators:

Dr. Adrienne Smith

Dr. Rebecca Zulli-Lowe

Roundtable Discussions: Career Awards for STEM Teachers Program | [Governor's 2 & 3](#)

Facilitators:

Dr. Angela Quick (CAST Advisory Committee)

Dr. Lauren Kendall (program evaluator)

Awardee Networking Space | [Governor's 4 & 5](#)

3:30 pm

Adjournment

KEYNOTE SPEAKER

CAPTAIN BARRINGTON IRVING

FOUNDER AND CEO
FLYING CLASSROOM

Captain Barrington Irving, born in Jamaica and raised in the inner city of Miami, he rejected college football scholarships to pursue a career in aviation. In 2007, Captain Irving became the first black person to fly solo around the world, a feat which enlisted him in the Guinness Book of World Records. As a celebrated aviator, Barrington has been recognized by world leaders and has received a Congressional Resolution for his pioneering work in STEM education and workforce development. In 2012, Captain Irving was named National Geographic Emerging Explorer. Documenting his historical achievements, Scholastic published Captain Irving's riveting autobiography, *Touch the Sky*, which aims to inspire underrepresented kids to pursue their dreams. Captain Irving is also a proud recipient of the 2019 NBAA American Spirit Award from the National Business Aviation Association.

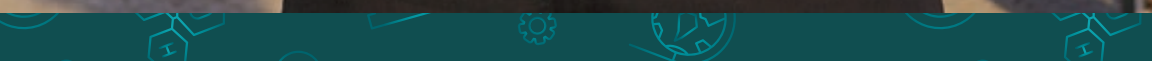
Through his platform, Captain Irving founded The Flying Classroom and Experience Aviation to invest, inspire and empower young professionals in STEM+ and aviation careers. The Flying Classroom, LLC, launched in 2013, is a K-12 integrative STEM+ supplemental curriculum to educate and connect young professionals to STEM+ and aviation careers. Through a proprietary platform, students can explore over 70 STEM-focused global expeditions and have access to 165 interactive and virtual lessons.

Experience Aviation, founded in 2005, is a 501-C3 non-profit organization based at Opa-Locka Executive Airport that utilizes Aviation to build STEM skills in students to address the shortage of STEM professionals by engaging in STEM-related industry challenges. It brings hands-on, project-based, and interactive STEM experiences to the youth, such as building hovercrafts, aircraft, and supercars across the nation.

Capt. Irving believes anyone can achieve their highest self through aviation and STEM+.



STEAM CLASSROOM
Captain Barrington Irving
Founder & Captain
Guinness World Record Holder
STEM+ Ambassador





SPEAKERS AND PANELISTS

ROCIO ANDERSON

PRESIDENT

NC SOCIETY OF HISPANIC PROFESSIONALS



Rocio Anderson is a seasoned strategist, and program development and implementation expert, specializing in organizational capacity building, education, and outreach initiatives. She has made it her personal and professional goal to be part of organizations with programs that engender change in systems and positively affect the lives of North Carolinians. Rocio has served in leadership roles for programs applying evidence-based interventions, promising best practices at the provider and community levels. She has led efforts to bridge communications and create recommendations between communities and stakeholders affecting policy and decision-making on the delivery of health care, human and social, and public safety services that impact health and social outcomes. Rocio has built and managed community health workers programs that expand capacity and enhance the delivery of culturally and linguistically appropriate services in urban and rural areas in North Carolina.

Rocio has fulfilled almost 20 years of learned experiences in private, public, and non-profit health and human services, education, emergency management, and public safety programs across North Carolina.

Rocio is an appointee of Governor Roy Cooper's Advisory Council on Hispanic/Latino Affairs and currently serves as its secretary. She is also a recipient of the 2019 Diamante Latino Award in Health in Science. While humbled to have been recognized for these distinguished honors, Rocio understands they represent a charge and responsibility to further the efforts of organizations such as the NC Society of Hispanic Professionals to improve the educational outcomes of underrepresented Hispanic students and families in North Carolina who do not have equitable access to higher education options and resources. Rocio holds degrees in Physics-Mathematics and Business Administration.

Rocio resides in Holly Springs with her husband Shawn, her sons Fabrizio and Carmine, and their beloved teacup Chihuahua Bristol.

JOANN BLUMENFELD

CATALYST AND GIST PROGRAM DIRECTOR
SCIENCE HOUSE, NORTH CAROLINA STATE UNIVERSITY



Blumenfeld is a 20-year Wake County Public School System veteran teacher of K-12 special education, middle and high school science and middle school language arts. Because of her passion to help those who are typically underserved, over 95% of her students were from Black, Indigenous, People of Color (BIPOC) communities, low-income and had disabilities.

Blumenfeld has written curriculum and presented at over 25 conferences to help her fellow educators help their students. She has published many articles about her program and advocates for changes to support students with disabilities in STEM. She is the founder and program director of Catalyst, a national, award-winning high school program designed to create STEM opportunities for students with disabilities, located at the Science House at NC State University. Blumenfeld recently launched and serves as program director of a second program, which is a National Science Foundation Grant, Connecting Students with Autism to Geographic Information Systems and Technology (GIST), which introduces ninth and tenth grade students to the growing field of drone piloting.

Blumenfeld has been a Kenan Fellow, a NASA Educator Ambassador, a North Carolina Science Leadership Fellow, a National Science Teachers Association Beginning Teachers Dow Fellow and a World View Global Music Fellow. In 2022, she was selected by Time magazine as an Innovative Teacher and for the Friday Medal from the Friday Institute of Educational Innovation and has received other educator awards including The Henry Ford's Innovation Nation Teacher Innovator Award, the North Carolina Council for Exceptional Children's Teacher of Excellence award, the North Carolina Department of Public Instruction's 2018 Wake County Educator of Excellence Award and the North Carolina Association for Biomedical Research's Distinguished Teaching Award in STEM Education at the 2016 Bridging the Gap conference. Ms. Blumenfeld's passion is to make a diverse, inclusive and innovative STEM Workforce.

WAYNE CAPPS

STEM COORDINATOR

THE NORTH CAROLINA CENTER FOR AFTERSCHOOL PROGRAMS



Wayne graduated from UNC Chapel Hill with a bachelor's degree in Environmental Studies and has spent over 10 years making STEM education more accessible, engaging, and fun for learners of all ages. With a focus on out of school learning opportunities he has helped develop and manage a wide variety of STEM education programs across the state of North Carolina. Wayne has a particular interest in training and assisting fellow educators in science communication and the delivery of STEM content to varied audiences. To continue in his persistent efforts to

increase access to STEM learning in North Carolina, Wayne obtained a master's degree in Elementary Education and Teacher Leadership from Elizabeth City State University and has brought those skills to the North Carolina Center for Afterschool Programs. He strongly believes that everyone is a lifelong learner and that providing exciting, engaging, and meaningful STEM experiences to young learners outside the classroom can have a lasting impact on how they perceive and engage with STEM throughout their lives.

LEAH CARPER

BURROUGHS WELLCOME FUND NC TEACHER OF THE YEAR 2022
NC DEPARTMENT OF PUBLIC INSTRUCTION



Leah Carper is the 2022 Burroughs Welcome Fund North Carolina Teacher of the Year. She has been a High School English Teacher for Guilford County Schools since 2006.

She earned an Associate's Degree from Davidson County Community College, a Bachelor's Degree in secondary English Education from The University of North Carolina at Greensboro, and a Master's Degree in Educational Leadership from Queens University of Charlotte. She has a NC teaching license as well as a NC principal's license. As the NC Teacher of the Year, Leah serves on various

commissions on the state level and is an advisor to the State Board of Education.

Leah has won many awards in her teaching career including Guilford County Schools Rookie Teacher of the Year in 2007, the 2018 and 2020 Guilford County Schools PTA Outstanding High School Educator Award, and holds the record as the only 3-time winner of Northern Guilford High School's Dancing with the Faculty event.

She has been married since 2005 and is the proud mother of three children who are all students in NC public schools. She enjoys volunteering for her church, singing karaoke, planning parties, and roller skating. She utilizes social media to share teaching ideas and strategies that work in the modern classroom.

YOLANDA L. COMEDY

CONSULTANT
SELF EMPLOYED



Yolanda L. Comedy is an independent consultant working on science, technology, engineering and mathematics (STEM) policy issues, including the STEM workforce; cybersecurity; and business strategy.

Previously she was the Director of the American Association for the Advancement of Science (AAAS) Center for Advancing Science & Engineering Capacity, where she directed a number of programs, including the AAAS-Lemelson Invention Ambassadors Program, Mason Award and Mentor awards.

Dr. Comedy also previously worked for the White House, serving as a Senior Policy Analyst for both the President's Committee of Advisors on Science and Technology and the President's Information Technology Advisory Committee; and IBM working in strategic philanthropy, governmental programs and business consulting on issues such as K-12 education reform; high-performance computing and U.S. competitiveness; and business strategy. Dr. Comedy obtained her Ph.D. from Indiana University in Political Science, specializing in public policy and international development.

EUGENIA FLOYD

BURROUGHS WELLCOME FUND NC TEACHER OF THE YEAR 2021
CHAPEL HILL-CARRBORO CITY SCHOOL DISTRICT



Ms. Eugenia Floyd has been teaching fourth grade for eight years in the Chapel Hill-Carrboro City Schools district. A 2005 graduate of East Chapel Hill High School, in Chapel Hill, North Carolina, Ms. Floyd is a product of the school system in which she teaches. She obtained her Bachelor of Arts degree in History from the University of North Carolina at Greensboro. Following graduation, she became a teacher assistant at Morris Grove Elementary School within the Chapel Hill-Carrboro City Schools district. Her time assisting in the classroom played a great role in her making the decision to obtain her teaching license. She completed her K-6 teacher certification at North Carolina Central University in 2013. That same year, Ms. Floyd began her career as a fourth grade classroom teacher at Mary Scroggs Elementary School.

Since the start of her career, Ms. Floyd's personal experiences in school have played a pivotal role in her teaching philosophy. She truly believes that every student can learn and having high expectations of her students is vital to their academic growth. Ms. Floyd's teaching philosophy and high expectations are evident in her student data and within her classroom atmosphere. Ms. Floyd doesn't just expect her students to grow, but she also has this expectation for herself. When the Chapel Hill-Carrboro City Schools partnered with Elon University to assist a cohort of teachers in earning a gifted certification, Ms. Floyd jumped at the opportunity to grow in her craft. After obtaining her certification from the program, she continued on to graduate with a Master's degree in Gifted Education in 2020 from Elon. During this same school year, Ms. Floyd was named the 2021 Burroughs Wellcome Fund North Carolina Teacher of the Year. Ms. Floyd continues to advocate and support both students and teachers as a speaker, panelist, and advisor to several boards including the North Carolina State Board of Education. Eugenia Floyd is currently working as an Equity Specialist for Instructional Equity for the Chapel Hill- Carrboro City School district.

LAUREN FOX

SENIOR DIRECTOR OF POLICY AND RESEARCH
PUBLIC SCHOOL FORUM OF NC



Dr. Lauren Fox is the Senior Director of Policy and Research at the Public School Forum of North Carolina. Lauren has more than fifteen years of education research and policy experience at the local, state, and national levels. Her work at the Forum involves guiding research, policy analysis, and advocacy efforts to support an equitable system of public education in North Carolina, with a particular focus on school funding; racial equity; teacher recruitment, retention, and support; and fair and effective accountability systems.

Prior to joining the Forum, Lauren lived for ten years in New York City, where she worked as a researcher and consultant for a number of organizations including The Public Good, the Center for Understand Race and Education, the Ford Foundation, the New York Civil Liberties Union, and the U.S. Department of Justice. Lauren earned her Ph.D. in Sociology and Education with a concentration in Education Policy from Columbia University's Teachers College and her undergraduate degree from UNC Asheville. She grew up in Charlotte, NC and is a proud graduate of the Charlotte Mecklenburg School System.

JOSEPH L. GRAVES, JR

PROFESSOR OF BIOLOGICAL SCIENCES, DEPARTMENT OF BIOLOGY
NORTH CAROLINA A&T STATE UNIVERSITY



Dr. Joseph Graves, Jr. received his Ph.D. in Environmental, Evolutionary and Systematic Biology from Wayne State University in 1988. In 1994 he was elected a Fellow of the Council of the American Association for the Advancement of Science (AAAS.) In 2012, he was chosen as one of the “Sensational Sixty” commemorating 60 years of the NSF Graduate Research Fellowship Award. In 2017, he was listed as an “Outstanding Graduate” in Biology at Oberlin College; and was an “Innovator of the Year” in US Black Engineer Magazine.

His research in the evolutionary genomics of adaptation shapes our understanding of biological aging and bacterial responses to nanomaterials. He is presently Associate Director/co-PI of the Precision Microbiome Engineering (PreMiEr) Engineering Research Center of Excellence (Gen-4 ERC) funded by the National Science Foundation (2022-2027). His book on nanomaterials is entitled: *Principles and Applications of Antimicrobial Nanomaterials*, (Amsterdam NE: Elsevier), 2021.

His books on the biology of race are entitled: *The Emperor’s New Clothes: Biological Theories of Race at the Millennium*, Rutgers University Press, 2005 and *The Race Myth: Why We Pretend Race Exists in America*, Dutton Press, 2005; with Alan Goodman, *Racism, Not Race: Answers to Frequently Asked Questions*, Columbia University Press, 2021. *Racism, Not Race* was named by Kirkus Reviews as “One of the Best Non-Fiction 2021” and to its “Best Books About Being Black in America 2021”. Finally, his biopic work entitled, *A Voice in the Wilderness: A Pioneering Biologist Explains How Evolution Can Help Us Solve Our Biggest Problems*, (New York: Basic Books), 2022.

He leads programs addressing underrepresentation of minorities in science. He had aided underserved youth in Greensboro via the YMCA chess program. He has also served on the Racial Reconciliation and Justice Commission, and COVID Vaccination Task Force of the Episcopal Diocese of North Carolina. He also served as the science advisor to the Chicago, New Brunswick, and Methodist of Ohio Theological Seminaries through the AAAS Dialogues of Science, Ethics, and Religion (DoSER) program.

CRYSTAL HARDEN

DIRECTOR OF PROGRAM AND INCLUSION INITIATIVES
MOREHEAD PLANETARIUM AND SCIENCE CENTER



Dr. Harden supervises diversity and inclusion initiatives as well as all program initiatives for Morehead, including the North Carolina Science Festival, outreach and onsite programming. Before joining Morehead in 2008, she served as an educational consultant for the California Department of Education. Dr. Harden holds a bachelor's degree in chemistry from NC Central University and a master's degree and doctorate in education from UNC-Chapel Hill. She served as an expert on mobile science programs for the US Department of State in Amman,

Jordan. In addition, she was awarded the Outstanding Informal Educator Award in Science, Mathematics, and Technology Education by the North Carolina Science, Mathematics, and Technology Education Center. Dr. Harden has almost 30 years of experience in science education including equity in STEM efforts.

YVETTE M. HUET

DIRECTOR

UNIVERSITY OF NORTH CAROLINA- CHARLOTTE ADVANCE FACULTY AFFAIRS



Dr. Yvette M. Huet is Director of the UNC Charlotte ADVANCE Faculty Affairs and Diversity Office, Professor of Applied Physiology, Health and Clinical Sciences and Co-Interim Vice Chancellor for Research and Economic Development. She is the UNC Charlotte PI of the 2018 NSF AGEP-NG award. Her current research interests generally include health disparities and women of color in the academy. Previously she has published on the role of estrogen in immune function and liver disease; the effects of neonatal exposure to environmental estrogens on adult

disease; and the roles of estrogen and nitric oxide in early pregnancy. She earned B.A. degrees in Human Biology and Microbiology from the University of Kansas; her Ph.D. (with Honors) in physiology from the University of Kansas Medical Center (First Latina graduate and recipient of National Science Foundation Minority Graduate and Ford Foundation Dissertation Fellowships) and a Postdoctoral Fellowship with Monsanto Company. She has served in various other leadership roles including Interim Chair of Kinesiology and Graduate Director for the doctoral programs in Biological Sciences and Health Services. Dr. Huet provides consultation to academic institutions and societies on transformative leadership, mentoring, cultural competency, communications, negotiations, and programming for faculty, postdoctoral fellows and students to be both successful and thrive in higher education environments. She is currently President Elect of the Society of Senior Ford Fellows and State Chair-elect of the NC ACE Women's Network.

REP. RICKY HURTADO

NORTH CAROLINA REPRESENTATIVE
DISTRICT 63



A son of working-class immigrants, Ricky Hurtado grew up in rural North Carolina and is a product of public schools. Ricky is the Co-Founder of LatinxED, an organization investing in Latinx leadership and educational equity across North Carolina. He also serves on Governor Cooper's DRIVE Task Force on education equity and teacher diversity and is a commissioner of My Future NC, an initiative focused on college attainment across the state. He currently serves as the NC House Representative for District 63 in Alamance County.

Previously, Ricky Hurtado spent time as a consultant and policy analyst for nonprofits and foundations across the country. He also served as an Instructor at UNC-Chapel Hill's School of Education. He has been recognized for his efforts to expand educational opportunity for all, being named a Forbes Magazine 30 Under 30 in Education. Ricky received his undergraduate degree from UNC-Chapel Hill and a graduate degree from Princeton University.

ASHLEY KAZOUH

ASSOCIATE DIRECTOR

THE DUDLEY FLOOD CENTER FOR EDUCATIONAL EQUITY & OPPORTUNITY



Ashley is the Associate Director for the Dudley Flood Center for Educational Equity and Opportunity at the Public School Forum of North Carolina. In this position, Ashley guides policy and research priorities related to racial equity, manages the Flood Center Fellowship program, and oversees the programmatic efforts of the Flood Center. Her current research has centered around strengthening the teacher pipeline, focusing on understanding the barriers within licensure policies and requirements that prevent candidates, especially those from diverse

backgrounds, from entering the teaching workforce within North Carolina. Ashley is also a member of the Governor's DRIVE Task Force, charged with creating a plan of action to increase racial, ethnic, and linguistic diversity within North Carolina's educator workforce.

CONNIE LOCKLEAR

DIRECTOR OF INDIAN EDUCATION
PUBLIC SCHOOLS OF ROBESON COUNTY



Dr. Connie Locklear is the Director of the Title VI Indian Education Program for the Public Schools of Robeson County of North Carolina. Dr. Locklear has spent her entire professional career in education. She has taught middle school, high school and college level mathematics. Dr. Locklear has served in many capacities; she has worked as a school based curriculum specialist and a district wide curriculum supervisor in the areas of mathematics and science. Dr. Locklear also spent many years working with the North Carolina Teacher Academy where she provided professional development opportunities to teachers at the local, regional, state, national, and the international level where she had the honor to present at the World's Indigenous Peoples Conference in 2014. She holds a bachelor's and master's degrees in mathematics education as well as an Educational Specialist and Doctor of Education Degree in Curriculum and Instruction.

Dr. Locklear has served in many different capacities. In 2017, she was appointed to the Professional Educational Preparation and Standards Commission by the NC General Assembly. In addition to her appointment, Dr. Locklear currently serves as 2nd Vice-President for the National Indian Education Board of Directors, is an advisory board member for the Dudley Flood Center for Educational Equity and Opportunity, is an Ambassador for the Public Broadcast Network, as well as a member of the UNCP School of Education Advisory Board. Her previous work has included serving as Chairperson of the Burroughs Wellcome Fund Student Service Enrichment Program, member of the NC Science, Mathematics, and Technology Education Center Board, member of the Intertribal Talking Circle Substance Abuse Prevention Native Youth Community Partnership Grant, member of the UNC-Pembroke First American Teacher Education Advisory Board, and former Chairperson of the State Advisory Council on Indian Education. In her current capacity, she works closely with the Lumbee Tribe to provide various educational opportunities to American Indian students. Dr. Locklear is an enrolled member of the Lumbee Tribe of North Carolina. She and her husband have two children who are both married and four grandchildren. She is the daughter to Joe (deceased) and Gladys Locklear.

SHIRLEY MALCOM

DIRECTOR, SEA CHANGE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Shirley Malcom is senior advisor and director of SEA Change, an institutional transformation initiative, at the American Association for the Advancement of Science (AAAS). In her more than 40-year tenure at the Association she has worked to improve the quality and increase access to education and careers in STEM for all women, BIPOC men (Black, Indigenous and People of Color), persons with disabilities and other marginalized groups.

Dr. Malcom is a trustee of Caltech and regent of Morgan State University, an HBCU in Baltimore, MD. She is a former member of the National Science Board, the policymaking body of the National Science Foundation, and served on President Clinton's Committee of Advisors on Science and Technology. Malcom, a native of Birmingham, Alabama, received her PhD in ecology from Penn State, masters in zoology from UCLA and bachelor's with distinction in zoology from the University of Washington. She has been recognized for her work and service by all of these institutions, as recipient of the Distinguished Alumni Award from Penn State (2001), the UCLA Medal (2015), and Alumna Summa Laude Dignata of the University of Washington (1998). In addition, in 2022, Penn State recognized Malcom by naming a building in its Innovation Park in her honor. Malcom is an elected fellow of the AAAS and a member of the American Academy of Arts and Sciences. She holds 17 honorary degrees and is the 2021 recipient of the Gold Key Award of Sigma Xi.

Malcom, former high school science teacher and university faculty member, serves on the boards of the Heinz Endowments, Kavli Foundation and Public Agenda. She chairs the board of NMSI, the National Math-Science Initiative. In 2003, Malcom received the Public Welfare Medal of the National Academy of Sciences, the highest award given by the Academy.

STEPHANI PAGE

DIRECTOR OF STRATEGIC INITIATIVES
WOMEN IN ENGINEERING PROACTIVE NETWORK



Stephani Page is a scientist and STEM equity professional who has nearly 20 years of interdisciplinary academic research experience. She earned her doctorate in Biochemistry and Biophysics from the School of Medicine at the University of North Carolina at Chapel Hill. Dr. Page is a proud graduate of North Carolina A&T State University with a bachelor's and master's in Chemical Engineering and Biology, respectively. Her research has been recognized by the Biophysical Society, the American Society for Biochemistry and Molecular Biology, and the

American Heart Association. Throughout her career, Dr. Page has been committed to diversity, equity, and inclusion in the academy and STEM. She is the creator of the #BLACKandSTEM community which has a social media following of nearly 20,000. For nearly 15 years, she has contributed to several major efforts around equity in STEM working with entities such as the National Institutes of Health, the National Science Foundation, and the National Academies of Sciences, Engineering, and Medicine. Dr. Page has been committed to science education, policy, communication, and engagement through entities such as the National Science Board, Morehead Planetarium and Science Center, Dragon Con, and South by Southwest (SXSW). Dr. Page has been recognized for her work in mainstream outlets including Fast Company, NPR, and Nature. In her current role, Dr. Page serves as the Director of Strategic Initiatives for the Women in Engineering ProActive Network (WEPAN), a nonprofit centered on advancing cultures of inclusion and diversity in engineering ecosystems since 1990. Dr. Page is responsible for strategic planning and implementation of programs for WEPAN and its key initiatives along with management of WEPAN's strategic partnerships and professional development programs.

MARIAROSA RANGEL

DIRECTOR OF FAMILY AND COMMUNITY ENGAGEMENT
WAKE COUNTY PUBLIC SCHOOL SYSTEM



Dr. MariaRosa Rangel has over twenty-five years of educational experience. She obtained her Bachelor's Degree in Bilingual/ Bicultural and Elementary Education from the Northeastern University of Chicago, Illinois and her Master's Degree in School Administration and Doctoral Degree in Education from North Carolina State University. She has served as a third-grade Bilingual teacher, a GED instructor, Spanish / ESL Teacher, an Assistant Principal, a district wide LEP/ Dual Language Coordinator, and a Senior Administrator for Latino Outreach.

Currently, Dr. Rangel serves as the Director for Family and Community Engagement in the Office of Equity Affairs for the Wake County Public School District (WCPSS). She is responsible for the planning, developing and coordinating family and community activities/events and programs to improve student's academic achievement; oversees the District Family Academy which offers FREE workshops and educational events for WCPSS families in various schools and community sites throughout Wake County. Dr. Rangel also provides Cultural Proficiency staff development to WCPSS faculty and staff.

Dr. Rangel is active and well respected within the Latino community. She serves as the Board Chair of Director for the North Carolina Society of Hispanic Professional, Chair for the NC. Governor's Advisory Council on Hispanic/Latino Affairs, Chair for the Wake PTA Council DIE Subcommittee, Board of Directors Member and Secretary for the NC Education Corp, Board of Directors Member for the Marble Museum, Board of Directors Member of the Kramden Institute, Member for the N.C. Adelante Education Coalition, Member for the Consulate General of Mexico Local IME Scholarship Committee, Member of ALPES (Alianza Latina Proeducación en Salud), and Member of the Capítulo Raleigh Red Global MX (Raleigh Mexican Global Chapter).

Dr. Rangel's work within the Latino community is to be noted since in December 2017, she was recognized as the Latino Leader for the Week by WARL- HOLA NC – FOX 50. In October 2013, she was honor with the Latino Diamante Award in the education category. In addition to the Latino Diamante honor, she received the "Orgullo de Nuestra Comunidad" (the Pride of Our Community) award given by Univision 40 to recognize the outstanding Hispanic leaders in the community. ***Her biggest recognition was issued on September 7, 2018***, where she was awarded the Ohtli Award by the Consul General of Mexico Remedios Gómez Arnu for her longstanding contribution to the NC Latino families.

MAUREEN STOVER

BURROUGHS WELLCOME FUND NC TEACHER OF THE YEAR 2020
NORTH CAROLINA VIRTUAL PUBLIC SCHOOL



Maureen Stover is a high school science teacher at the North Carolina Virtual Public School. In addition to her role as a teacher, Maureen is the 2020 Burroughs Wellcome Fund North Carolina Teacher of the Year (NCTOY), a 2021 National Teacher of the Year finalist, and a 2022 National Educators Association California Casualty Excellence in Teaching awardee. Before her position as the NCTOY, Maureen taught biology, earth and environmental science, and advancement via individual determination (AVID) at Cumberland International Early College High School in

Fayetteville, Cumberland County, North Carolina. She has taught at the elementary, middle and high school levels and worked as an educational consultant for the National Science Teaching Association. Maureen earned a Bachelor of Science in biology from the United States Air Force Academy, Class of 1997, a Master of Arts Education in curriculum and instruction with an emphasis in science, technology, engineering, and mathematics (STEM) from Adams State University in Colorado, a Master of Arts in Teaching in secondary science from Western Governors University North Carolina, and a Leadership Certificate in STEM education from Teachers College Columbia University. As an educator, Maureen is dedicated to improving the educational opportunities for every student through equitable education initiatives and seeks to provide clear pathways for students to successfully enter the career or college program of their choice upon graduation from high school. Before becoming a teacher, she served as an Intelligence Officer in the United States Air Force.

SUZANNE THURSTON

DEPUTY DIRECTOR, INCLUSIVE STEMM ECOSYSTEMS FOR EQUITY & DIVERSITY
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Suzanne Thurston is the Deputy Director for the Inclusive STEMM Ecosystems for Equity & Diversity (ISEED) unit at the American Association for the Advancement of Science (AAAS). Thurston has supported and led AAAS education projects for over 20 years. Her work focuses on creating inclusive STEM opportunities and career pathways for all learners, youth through higher ed. Her current portfolio includes programs that support incredible women in science who are working to inspire middle school girls (IF/THEN Ambassadors) and that identify outstanding STEM non-fiction books for young children through adults (AAAS/Subaru Book Prize.) She also oversees programs that provide tools to use primary literature to teach about science research (Science in the Classroom), that support STEM career opportunities for university students with disabilities (Entry Point!), and that provide a community for people who want to share and learn more about broadening participation in STEM (Open Forum for Broadening Participation.) Thurston believes all students should have opportunities for transformative, meaningful, and culturally representative science experiences throughout their education so they can see themselves as scientists, engineers, inventors, storytellers, and science advocates.

DEANNA TOWNSEND-SMITH

SENIOR DIRECTOR

THE DUDLEY FLOOD CENTER FOR EDUCATIONAL EQUITY & OPPORTUNITY



Dr. Deanna Townsend-Smith has been working in education for over 20 years. In 2014, she earned her doctorate in Educational Leadership. She has worked and gained expertise in a variety of roles, including as a teacher, mentor, new teacher coach, administrator and, most recently, as the Director of Board Policy and Operations for the North Carolina State Board of Education.

In her capacity as Senior Director, Dr. Townsend-Smith advances and expands the current programmatic and policy efforts of the Dudley Flood Center for Educational Equity & Opportunity to achieve its mission of addressing issues of systemic racism by advocating for structural changes in policy and practice to build an equitable education system that meets the social, emotional, and academic needs of NC's diverse student population.

TRAVIS T. YORK

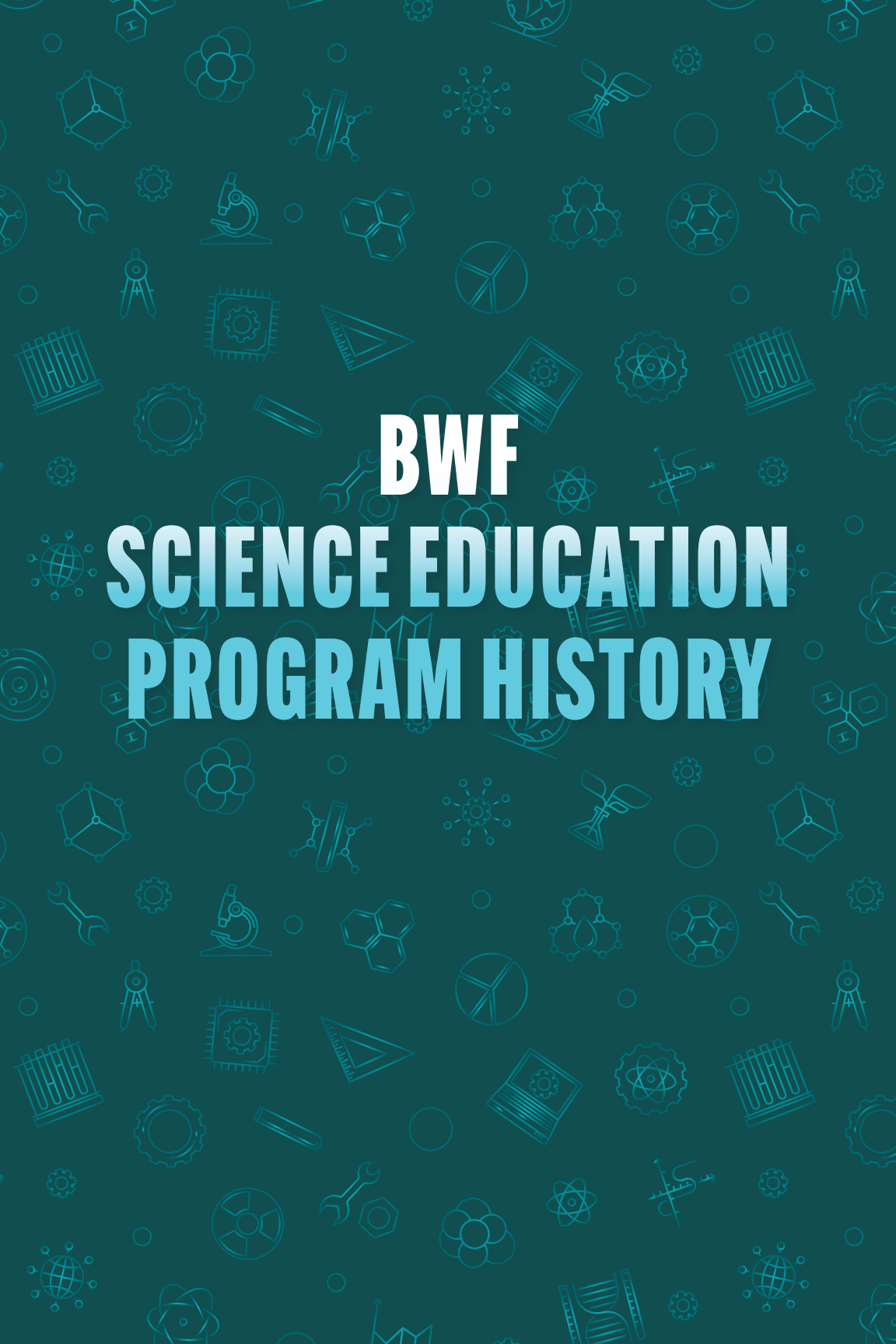
DIRECTOR, INCLUSIVE STEM ECOSYSTEMS FOR EQUITY & DIVERSITY
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Travis T. York, Ph.D., is the Director of Inclusive STEM Ecosystems for Equity & Diversity (ISEED) at the American Association for the Advancement of Science (AAAS). Dr. York's research and work focus on catalyzing and sustaining systemic change and transformation to achieve inclusive and equitable access and progress through STEM pathways into the STEM workforce. Within AAAS, Dr. York provides leadership to a talented team who collaborate to create change in over 24 grant-funded projects and initiatives spanning all STEM fields and the entire educational pathway including AAAS's SEA Change Initiative, AAAS S-STEM REC, ARISE Network, Equitable Pathways Project, L'Oreal USA Women in Science Fellowships, and HBCU Making & Innovation Showcase.

Currently, Dr. York serves as the Principal Investigator of the AAAS Noyce, ARISE (Advancing Research and Innovation in the STEM Education of Preservice Teachers in High-Need School Districts), and AAAS *Improving Undergraduate STEM Education initiatives*, AAAS *Scholarships in STEM Resources and Evaluation Center*, and a new initiative *Catalyzing a Data Infrastructure to Support LGBTQ Inclusion in STEM*. Dr. York has authored numerous peer-reviewed articles and book chapters, and his most recent article, *Completion Grants: A multi-method examination of institutional practice*, is available in the *Journal of Student Financial Aid*. Dr. York is active in several professional associations and serves on the editorial review board of the *Journal of Diversity in Higher Education*.

Dr. York, a native of Charleston, South Carolina, received his Ph.D. in Higher Education Administration from The Pennsylvania State University, master's in Higher Education and bachelor's with distinction from Geneva College. Dr. York also studied at Oxford University's Keble College in 2003-04. Finally, Dr. York supports AAAS's Committee on Opportunities in Science (COOS), which advises the association on matters related to increasing the representation of women and minorities in science, engineering, and related fields.



BWF
SCIENCE EDUCATION
PROGRAM HISTORY

BWF SCIENCE EDUCATION PROGRAM HISTORY

BWF is committed to helping build systemic reform in science, technology, engineering, and mathematics education primarily in North Carolina. We focus on the following areas:

- **Informal Learning:** Student STEM Enrichment Program (SSEP)
- **Formal Learning:**
 - Career Award for STEM Teachers (CAST)
 - Singapore Math Community of Practice
 - Promoting Innovation in Science and Math
- **Public Policy and Research:** NC Institute for Education Policymakers/ NRC
- **Capacity/Partnership Building:** Annual Meetings/Workshops/Forums

Our initial investment in science education began in the informal learning environment with the establishment of the Student STEM Enrichment Program (SSEP) to engage scientists and science teachers in working with primary and secondary students in out-of-school time programs. We have reached every county (100) and many of the 115 school districts across North Carolina through SSEP.

In the formal education realm, BWF is working with the university system in North Carolina to produce quality teachers with degrees in science and mathematics who will teach K-12 students. We found that many teachers are unable to provide quality science learning in the classroom due to a lack of supplies and equipment. BWF is

helping teachers purchase these items and receive training to utilize them. We have also found that having teachers apply for small grants build their confidence in pursuing larger ones. Most teachers want to help their students succeed, but require external resources and training to do so. BWF offers the Career Award for STEM Teachers to advance the work of exceptional teachers and to help build the field of teaching. Promoting Innovations in Science and Mathematics (PRISM) provides teachers with resources and training to teach quality curriculum in their classrooms. Singapore Mathematics Pilot offers intense training for teachers who want to learn mathematics strategies used globally to give elementary students a strong

understanding of numbers and develop students' metacognition and positive attitudes towards mathematics.

Although the majority of our work in science education is done in our home state of North Carolina, BWF is engaged with national organizations including the National Research Council, National Science Foundation, Smithsonian Science Education Center, the STEM Funders Network, STEM Learning Ecosystems Community of Practice, and the American Association for the Advancement of Sciences to broaden our knowledge and to bring best practices to North Carolina.

The following sections provide details of our work in the STEM Education program area.



STUDENT STEM ENRICHMENT PROGRAM

BWF has invested over \$37 million in providing quality out-of-school time programs for students. The Student STEM Enrichment Program (SSEP) provides awards up to \$180,000 over three years to improve primary and secondary students' competence in science, nurture their enthusiasm for science, and interest them in pursuing careers in research or other science-related areas.

Established in 1996, SSEP is limited to North Carolina and intended to support projects that provide creative science enrichment activities for primary and secondary students who have shown exceptional skills and who are perceived to have high potential and interests in science. The program has been the cornerstone of BWF's investment in science education. Originally, the awards supported programs for middle and high school students, but expanded to elementary in 2009. Nearly 43,000 K-12 students have been reached in some way. Universities, colleges, public/private schools, museums, and non-profit community organizations are eligible to apply. For complete information and applications, visit www.bwfund.org. Following are profiles of current SSEP award recipients.

AMERICAN CHEMICAL SOCIETY

DIRECTOR: ANIBAL LOPES
ALOPESNC@BELLSOUTH.NET

PROJECT TITLE: PROJECT SEED

The American Chemical Society (ACS) Project SEED program gives economically disadvantaged high school students a unique opportunity to spend ten weeks in the summer working with scientists to conduct hands-on research. The NC section of ACS now supplements the Summer Program with an eight-hour per month, eight-month internship in Analytical Chemistry at Avazyme, Inc, its partner in Durham, NC. Avazyme mentored four students in the Spring semester (from Research Triangle & Panther Creek HS), three in the Summer Program (East Chapel High HS; two were virtual from other states). Three students (Rachitha Avatapally, Saanvee Sunkara, Orane Trebeau) have recently continued at Avazyme for the Fall semester. The summer intern, Yunjing Gao, presented a seminar on the Method Validation of Voxelotor at our Annual Symposium at the NCBiotech Center on August 12. The two virtual students, Troy Jones (Texas) and Darshil Vaishnav (California), presented their conclusions on Gas and Liquid Chromatography from ChromAcademy, a comprehensive bank of online training courses covering the entire analytical workflow. The nine Project SEED Summer Interns (mentored at Avazyme, NCCU, NCSU, and Duke) will present posters at our Annual NC-ACS Meeting on November 17.

ASSOCIATION FOR THE PRESERVATION OF THE ENO RIVER VALLEY

DIRECTOR: HILLARY HARRISON
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PROJECT TITLE: ENO RIVER ASSOCIATION SUMMER CAMP AND
YEAR-ROUND EDUCATION PROGRAMMING

Through outdoor and environmental education programs, the Eno River Association aims to address the need for increased exposure to STEM & environmental education for populations traditionally underrepresented in these fields. By doing so, we hope to increase the pursuit of careers and additional education in these fields by all students, as well as create advocates for future conservation and protection of natural resources.

The Eno River Association recognizes that creating opportunities for connection to the outdoors and natural resources ushers in a future full of stewards of those resources. Knowing and understanding environmental, biological, and climate sciences creates responsible inhabitants of this planet. This is best accomplished when individuals understand the impacts on their own community, and at a young age, they begin a lifetime of caring and a sense of responsibility for the world around them.

Eno River Association summer camps, iWalk the Eno, and Eno River Field Station, along with year-round education programs create opportunities for exploration and discovery that excite students' passion for science and nature, leading them to succeed in their science studies in the classroom and beyond.

AURORA FOSSIL MUSEUM FOUNDATION

DIRECTOR: CYNTHIA CRANE
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PROJECT TITLE: IMAGINE-NC

IMAGINE-NC (Integrating Mathematics And Geology IN Eastern North Carolina) has endeavored to increase interest in STEM careers for youth residing in rural areas of Eastern North Carolina. Through a collaboration between the Aurora Fossil Museum, geosciences and education faculty from East Carolina University (ECU), Beaufort County Schools, and Nutrien-Phosphate Aurora. Phase 02 of the IMAGINE-NC project builds on the momentum and success of the original IMAGINE-NC project and will continue the same structural features: (a) two, week-long, non-residential, summer STEM camps that will serve approximately 60 4th-8th graders each year; (b) weekend programs during the school year for students involving hands-on activities and presentations by local STEM professionals; and (c) the museum executive director and ECU faculty will visit participating schools and teachers several times during the school year to support their efforts to integrate and extend earth-science concepts into science and mathematics classes (e.g., Earth Day, Parent STEM night).

As in the original project, IMAGINE-NC will focus on Earth Science curriculum for grades 4 – 8. These topics include the study of fossils, weather, landforms, properties of materials, history of life, maps, the structure of the Earth, the hydrologic cycle, and geologic time. Using these topics as a context, mathematics activities will be used to support learning of the science along with important mathematics concepts taught in grades 4–8 (e.g., numbers, graphing, data analysis, and measurement). Activities will be aligned with the North Carolina Essential Standards for Science and the North Carolina Standard Course of Study for K – 8 Mathematics. Many activities developed for the original IMAGINE-NC grant will be extended, such as collecting and analyzing water samples and exploring new landforms using the augmented reality sandbox. However, new activities will be developed incorporating weather stations, 3D printing, Geographic Information System (GIS), and virtual reality to explore geological and mathematical ideas.

CAMPBELL UNIVERSITY

DIRECTOR: DR. TIMOTHY MARKS
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PROJECT TITLE: ACADEMY FOR EMERGING SCHOLARS EXPLORING CLINICAL RESEARCH AND PHARMACEUTICAL SCIENCE CAREERS

The Campbell University Academy for Emerging Scholars Exploring Clinical Research and Pharmaceutical Science Careers (AES) Program is designed to provide inquiry-based exploratory STEM experiences and build awareness of STEM-related careers in the life sciences and engineering for rural high school students.

The AES Program is comprised of three major components conducted sequentially. First is a series of targeted high school visitation sessions (September – December), followed by concurrent in-person and virtual workshops for in-school and home school students (January – May), and culminating in a 5 day in-person residential summer STEM experience on the campus of Campbell University (June). The AES Program will engage high school students located in Tier 1 and Tier 2 counties of North Carolina. The program will run for three years and reach approximately 2,775 high school students as well as their teachers and advisors.

Activities will include illustrative presentations by faculty and professional scientists, in-person and virtual laboratories, advanced hands-on inquiry-based STEM activities designed to stimulate scientific creativity, innovation, and real-world application. Faculty with diverse STEM backgrounds are involved in enhancing students' competence in STEM, promoting student enthusiasm for the life sciences and engineering, and increasing students' awareness of career paths in these areas.

CATAWBA COLLEGE

DIRECTOR: LUKE DOLLAR
LJDOLLAR17@CATAWBA.EDU

PROJECT TITLE: GIRLS ON OUTDOOR ADVENTURE FOR LEADERSHIP
AND SCIENCE (GALS)

Girls on outdoor Adventure for Leadership and Science (GALS) is a free summer science program that integrates inquiry-based exploration, place-based education, and scientific principles to build scientific literacy, competence, and confidence in traditionally underserved populations. During a two-week summer backpacking trip, with follow-up activities during the school year, students who identify as female or gender non-conforming from underrepresented groups in STEM study ecology and earth science through inquiry-based exploration.

GALS' driving goal is to reduce the gender, racial, and socio-economic gaps in science by:

1. Expanding students' science literacy and content knowledge;
2. Building students' confidence and ability to pursue science studies and careers;
and
3. Increasing students' self-awareness, teamwork, and leadership skills.

The GALS summer program begins with groups of eight high school students backpacking through North Carolina's State and National Forests, which includes one of North America's most biodiverse ecosystems. During this two-week immersion, students learn through direct instruction, free exploration and experimentation, and guided inquiry. Students work individually and in small groups to explore and learn, culminating their experience in an independent research project. This project allows students to work through the scientific process, integrate technology and science, and present their research to family, friends, and Catawba College faculty, staff, and students.

COMMUNITIES IN SCHOOLS OF CAPE FEAR

DIRECTOR: LOUISE HICKS
LOUISE@CISCAPEFEAR.ORG

PROJECT TITLE: STEM AFTER SCHOOL

The goal of our STEM After School project is to provide safe, nurturing environments that foster innovative and creative learning while improving competencies in science and mathematics and motivating students to pursue careers in science-related areas. This project supports a **deeper** implementation of STEM activities during **existing** CIS Afterschool programs on the middle and high school levels in Pender County, as well as during our Summer Camps.

Led by a STEM After School Project Coordinator and supported by a combination of teaching assistants and contracted STEM tutors, these enhanced programs engage students in activities aligned to Common Core and Essential Standards relevant to middle and secondary grades. Students have the opportunity to participate in hands-on, inquiry-based science, technology and math activities, which create and/or encourage interest in the sciences while improving the overall academic performance of participants. Activities include the Magic of Electricity, Vermicomposting, Embryology, Force & Motion, Ornithology, Archeology, and Building Engineering and Robotics. Additionally, *FIRSTLEGO* and *FIRSTTECH* teams are supported on the middle school level and compete in District competitions; while *FIRSTROBOTICS* teams help to keep high school students further engaged.

During Covid our programming was adapted to continue STEM enrichment activities across our six school sites. Through careful and creative planning with the school district we offered both afterschool programming to two different cohorts of students and learning labs during the school day to support students who were attending school remotely. This schedule granted us the opportunity to serve 405 students in grades 3rd – 12th. Our two elementary/middle school *First Teams* (Galaxy Bots and Penderlea Stingers) continued to meet weekly but did not compete. Instead, coaches utilized TechTerra Educations STEM in a Box for a full year of weekly STEM lessons including circuitry, electronics, engineering, coding, robotics, and stop motion animation. These lessons were designed to give them continued practice and pursue their excitement about creating, experimenting, and exploring new things.

This year, our Tech and Robotics teams are excited to go back to competitions and our STEM afterschool activities continue.

DUKE UNIVERSITY

DIRECTOR: DR. MARC SOMMER
MARC.SOMMER@DUKE.EDU

PROJECT TITLE: DUKE RESEARCH IN ENGINEERING PROGRAM

Top universities often expect students to have pursued advanced extracurricular study while in high school, making it an informal prerequisite to present a competitive application to such programs. We believe these barriers prevent many bright and talented young people, particularly those from underrepresented groups in STEM and first generation college students, from receiving equitable access to postsecondary STEM education and research experiences. The Duke Research in Engineering Program (DukeREP) proposes to address this problem by connecting high school students from the Durham, North Carolina community with research opportunities working directly with graduate students in Duke Engineering labs. Bypassing the informal network that may advantage students with existing privilege, our program has a fair and transparent application open to all local students, with priority given to students from underrepresented groups in STEM. DukeREP students gain valuable hands-on experience with engineering research, helping them to develop their self-concept as future scientists or engineers, as well as to present a highly compelling application to colleges or employers. In contrast to most high school internships or STEM enrichment activities, which are either free or in some cases, require payment, our program pays students a competitive stipend to work for the summer in a research lab. This makes it accessible to all students regardless of socioeconomic status.

The defining components of DukeREP are participant research experience and enrichment activities, and graduate student leadership and mentor training. Student engagement in labs is the heart of our program, and our enrichment activities are designed to provide additional support for our high school students in preparing for and envisioning themselves in future roles. DukeREP was founded and is run by Duke PhD students who volunteer their time to this program. Engineering grad student mentors provide approachable role models for their mentees, and through mentor training they learn inclusive mentorship and communication skills. By building upon these pillars, DukeREP is well-positioned to address STEM inequities in our local community and beyond.

DUKE UNIVERSITY

DIRECTOR: MEGAN MADONNA
MEGAN.MADONNA@DUKE.EDU

PROJECT TITLE: IGNITE

Ignite is a human-centered design education program established to promote creativity and problem-solving in future innovators. Middle and high school students are challenged to develop innovative solutions to problems that affect their local community, guided by the UN Sustainable Development Goals (SDGs) of good health, clean water, and clean energy.

Middle school students, or Ignite Learners, hone their design-thinking skills through guided inquiry. Through our hybrid program in partnership with the Museum of Life and Science, Learners engage in skill building, virtual interactive labs, and structured visits to the Museum's Tinkerlab to progress through the human-centered design process. As Learners, transition into high school, they may become Ignite Makers by engaging in more open-ended inquiry, design, and experimentation related to the SDGs. Duke Undergraduates, Trainers, mentor both Learners and Makers throughout the engineering-design process as they tackle global and local challenges. The overall framework of the Ignite program works towards our long-term goal to provide accessible and equitable opportunities for experiential learning in technology and engineering across learning levels.

DUKE UNIVERSITY

DIRECTOR: DR. DAVID JOHNSTON
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PROJECT TITLE: LIFTOFF IN ENC: A COMMUNITY COLLABORATION TO CONNECT LOCAL STEM RESEARCH AND COMMUNITY ORGANIZATIONS

This project will be a partnership between researchers at the Duke University Marine Lab with the local Boys and Girls Clubs of the Coastal Plain. This collaboration will allow us to more effectively deliver hands-on curriculum drawing from the robotics-based research conducted at the Duke University Marine Lab (DUML) in an effort to inspire and foster science and mathematics aptitude in middle school and high school students within our communities. Using the BGCCP centers, the programming will focus on student engagement within two rural counties (Carteret and Craven), having significant populations of economically disadvantaged families and underrepresented groups in STEM. The program emphasizes working with several smaller groups of students throughout the year, including several paid high school interns, with corresponding summer opportunities to help all the students build lasting relationships with the project team and associated members of the STEM community.

Programming will be community-centered, using the expertise of BGCCP staff to refine pre-developed activities and co-produce a robotics program through the BGCCP centers. We will have students learning about drones and other robotic tools and their use in robotic-based research. Students will use a variety of small drones to learn the basics of drone aviation and then use and program them to conduct research tasks. A series of science activities will draw from actual research being conducted by DUML to put students in the researchers' shoes and apply science and mathematical principles tied to NC Essential Standards and Standard Course of Study to answer research questions. These activities will expose students to a variety of interdisciplinary topics and technologies beyond robotics, including the use of virtual reality headsets to have students experience virtual field excursions from 360 video collected from drone flights in various locations including Antarctic whale surveys. These activities will help set the stage for multi-day summer research experiences, where students will have the opportunity to come to DUML and see, first-hand, coastal resource issues. They will then work with the project team to conduct their own robotics-based research projects, evaluate their data, and communicate results to peers, scientists, and parents.

EAST CAROLINA UNIVERSITY

DIRECTOR: RHEA MILES
MILES.R@ECU.EDU

PROJECT TITLE: DISCOVERIES IN EARTH SCIENCE PROGRAM

Discoveries in Earth Science (DES) Program engages elementary, middle, and high school students (grades 2 to 11) with blindness or visual impairments (BVI) in eastern North Carolina in creative hands-on activities in Earth science. The participants use assistive and adaptive tools to conduct Earth science activities, including identifying geologic specimens and materials, recognizing geologic and geomorphological features, reconstructing geologic history, reading simple geologic maps, determining physical properties of geologic materials, and measuring water quantity and quality parameters. Exposure to these activities nurture these students' enthusiasm and confidence to conduct scientific investigations. The DES program works with this marginalized population to provide them with opportunities and the capacity to conduct science investigations in Earth science.

EAST CAROLINA UNIVERSITY

DIRECTOR: RANJEET AGARWALA
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PROJECT TITLE: RENEWABLE ENERGY AND GREEN MANUFACTURING
ACADEMY FOR RURAL MIDDLE SCHOOL STUDENTS IN
EASTERN NORTH CAROLINA

The College of Engineering and Technology (CET) at East Carolina University (ECU) will partner with middle schools in rural eastern North Carolina (ENC) to offer summer camps focused on renewable energy and green manufacturing. The objectives of this educational opportunity are to a) excite students about pursuing professional and research careers in science-related areas; b) enhance students' proficiencies in science and mathematics; and c) encourage and motivate students to persist with science and mathematics education through scientific inquiry based hands-on learning. The students will learn about various renewable energy technologies such as solar, wind, and hydrokinetics through experiential hands-on learning modules. The students will work in team-based renewable energy labs, gather and analyze data, and use and calculations to derive results. These results will help students understand the basic principles governing generation and usage of renewable energy.

The students will also learn about green manufacturing such as waste reduction, recycling, and remanufacturing using intuitive and inquiry-based learning. Inquiry-based laboratory experiments, combined with field trips, will help students connect theory with practice and applications. All the project educational activities will be aligned with the North Carolina Standard Course of Studies. Working collaboratively with STEM East, NCSHP, middle school teachers, and parents we will make a concerted effort to recruit underserved and unrepresented STEM oriented middle school students. Parents and teachers will be invited to the opening and closing camp ceremonies. Opening ceremonies will include a camp orientation for the students, parents, and teachers. During the closing ceremony, the students will present posters summarizing what they have learned during the camp.

ELIZABETH CITY STATE UNIVERSITY

DIRECTOR: DR. TIMOTHY GOODALE
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PROJECT TITLE: INTRODUCING NORTH CAROLINA YOUTH TO MARINE
SCIENCE CAREERS AND CRITICAL ISSUES

Introducing North Carolina Youth to Marine Science Careers and Critical Issues aims to provide innovative technology enhanced experiences focused within the field of marine science for middle school students in northeast North Carolina. Within this two-year project two cohorts of 40 middle school students (80 total) will partake in a weeklong summer colloquium. Marine Science topics will be integrated within the middle school STEM fields as follows: Science: Polar Ice Melting and Impact on Water Chemistry and Ocean Currents; Technology: Remote Sensing in Sea Level Change and Erosion; Engineering: Coastal Resilience; Math: Population Dynamics and Fisheries Management.

In addition, during the summer colloquium students will be exposed to potential maritime careers and fields of study. Within this summer experience middle school students will choose an area of interest to further research with support of project personnel. Once the next academic year begins, the middle school students will collaborate with a “near peer” mentors that are undergraduate pre-service science teachers that are interning within or nearby to their schools. They will work with their mentor to develop a research project to present at the Region 1 science and engineering fair at East Carolina University and the project Marine Science Symposium.

ELON UNIVERSITY

DIRECTOR: MARK ENFIELD
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PROJECT TITLE: ELON EXPLORERS

Elon Explorers encourages middle school students to develop understandings of science and science process skills through inquiry-based biology investigations. The proposed Elon Explorers project expands on two pilot years of summer-only programs that demonstrated program capacity to foster student enthusiasm for science and communicating their science understandings. The proposed project will expand Elon Explorers to a year-round program, engaging middle-school students in discussions of science in a community context, visits with professional scientists and undergraduate researchers, and field-based ecological studies of insects. The project includes monthly Science Cafés with students and their families, a one-day spring institute, and a week-long summer camp for up to 24 Alamance Burlington School System middle school students each year. Monthly Science Cafés, which we call Science Slices, provide recurring learning opportunities for students, will relate to students' in-school learning during the academic year, and will occasionally include visiting experts (e.g. researcher or person from local science industry). The one-day spring-break institute will prepare students for sustained inquiry during an immersive week-long summer camp.

During the summer camp on the Elon University campus, students will observe, describe, and collect insects from different kinds of ecosystems in the North Carolina Piedmont. They will contribute to an ongoing, professional research study on the population genetics of a focal species. In addition to field experiences, students will curate museum-style insect collections to keep. Students will develop college and career readiness by engaging in campus-based summer programming with Elon's Office of Admissions, interacting with high school students engaged in a college access program (Elon Academy), and meeting Elon Undergraduate Researchers. The week-long summer camp culminates with participants giving TED-talk style presentations on their learning. We hope, with permission, to house students' presentations in an online digital library so that Elon Explorers become ambassadors about their learning to other students, teachers, and the public. The goals of the summer program are for students to: build enthusiasm and experience with the practice of science through field-based investigations, learn to make sense of observations and data, learn to communicate science findings, and, in the process, develop college and career readiness.

FAYETTEVILLE STATE UNIVERSITY

DIRECTOR: DR. JUSTIN GRAHAM
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PROJECT TITLE: FAYETTEVILLE STATE UNIVERSITY'S STEM ENRICHMENT AND EXPLORATION CAMP (FSU-SEEC)

There are a limited number of hands-on opportunities for high school students to explore STEM and related careers. The opportunities that do exist for high school students are typically unpaid and not a top choice for underrepresented and economically disadvantage students that benefit from paid opportunities. Instead, students decide to find employment in a minimum wage job instead of following their passion for STEM. This creates an educational and experience gap compared to their peers who are not affected by financial concerns. Therefore, the proposed project to establish the Fayetteville State University STEM Enrichment and Exploration Camp (FSU-SEEC) aims to address this gap. The proposed project will establish a four-week summer camp with a monthly Saturday academy available to Cumberland County minority high school students interested in STEM. This three-year project is designed to engage cohorts of twenty-four students to foster enthusiasm for science and communicating their science understandings.

The summer camp will be hosted on the campus of Fayetteville State University and directly address the inequities of marginalized groups by assessing the amount of science capital local high school students and ensuring we enhance, cultivate, and grow their science capital and foster their science identity. To achieve this objective, we will use microbiology and geospatial science to deliver science capital. STEM activities will be conducted in four phases which will provide a robust and dynamic range of learning opportunities for students. These activities range from virtual reality pedagogy, hands on scientific applications in the laboratory, microbiology focused research project, in the field geospatial training, and seminars with STEM professionals to learn about STEM careers. Collectively, this summer camp will develop student understandings of science and the scientific process through inquiry-based science, technology, and math.

We aim to cultivate interest and confidence for students to follow STEM aspirations which will lead to a more diverse STEM field. The funding of this proposal will not only aid in STEM development in historically marginalized groups in Cumberland County but will serve as a model for other colleges to use to enhance STEM development in their respective school districts.

INNER BANKS STEM CENTER

DIRECTOR: ALVIN POWELL
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PROJECT TITLE: EXPLORING RENEWABLE ENERGY SOURCES USING
ARTIFICIAL INTELLIGENCE

This environmentally relevant and timely project will introduce at-risk students to three (3) types of renewable energy: (1) Radiant Solar Energy, (2) Wind Energy, and (3) Hydro Energy. The students will be exposed to Artificial Intelligence (AI) software to gain an understanding of how AI can overcome technological shortfalls of renewable energy sources and conduct data gathering. In addition, the students will learn about careers in research, and/or science related areas like geoscience, oceanography, meteorology, geology, Artificial Intelligence, and environmental engineering. This project will feature a stimulating curriculum that will use visualization methodologies, hands-on, project-based experiments, basic data-mining research components and role playing as an entrepreneur designing a renewable energy facility.

The participating students will be divided into groups of three called a "Team." Each Team will be assigned a location in the United States, designated by an IBSC member, to build a renewable energy facility. The students will then have to select one of the energy sources being explored herein and formulate an hypothesis regarding which renewable energy selection would work and be cost effective. The students will have to explain their decision when they make a presentation to an investment banker group (played by IBSC staff) to obtain funding for their project. The students will be required to use scientific inquiry, data analysis, and critical thinking to validate their hypothesis. Parents will be invited to visit at designated times throughout the program.

The world-wide demand for inexpensive, energy efficient, renewable sources of energy will only increase in the future. The United States is adopting a national initiative to reduce its dependency on fossil fuels. The unpredictability of weather systems and energy storage shortfalls are two key vulnerabilities that can adversely impact the use of renewable energy as a replacement for fossil fuels absent additional research. The need exists for a program like this that will encourage students to consider academic options and careers in the areas this project will expose them to. In addition, the students will have an opportunity to take field trips and meet professionals in the industry.

KINETIC MINDS

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PROJECT TITLE: JUNIOR SCIENTIST ACADEMY

The Junior Scientist Academy (JSA) is an opportunity for students to build STEM skills through hands-on challenges that will translate into career readiness. Kinetic Minds, Inc. is partnering with the Housing Authority of the City of Goldsboro (HACG) to reach underrepresented populations including girls, minorities, economically disadvantaged, and students with disabilities. Through the JSA, students will achieve: (1) improvement in science and mathematics, (2) a deeper passion and joy for science and mathematics through facilitated learning challenges, (3) a heightened interest in pursuing a science related career and/or a career in research. This program will recruit rising 5th – 9th graders based upon 7 criteria for participation. JSA participants will complete three weeks of summer camp, focusing on three core components: engineering, coding, and life science. All the student activities will involve hands-on lessons that challenge participants to problem-solve, build STEM skills, work in groups, and improve math and science competency. Opportunities will include building a model hovercraft, learning how to program their Ozobot, and examining animal and plant specimens. In addition, JSA students will connect with and hear from scientists in the region in person or virtually as they work on their career paths project. The yearlong program will utilize the career path project as an activity to further JSA student goals in STEM. Students will utilize their time in the Saturday JSA sessions to continue with more engineering projects, master and reach higher coding levels with EVO, and increase their engagement in the life sciences. JSA participants will also take a field trip to the Challenger Learning Center and Riverbanks Zoo in Columbia, SC to further develop their understanding in the 3 core areas of the JSA. A culminating event will occur in May of 2023 open to the public for students to showcase what they accomplished through yearlong participation in the JSA.

MCCLINTOCK PARTNERS IN EDUCATION

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PROJECT TITLE: PATHWAYS SUMMER SCIENCE CAMP

McClintock Partners In Education (McPIE) provides Pathways Summer Science Camp. This camp typically engages 200 students each summer in two weeks of hands-on STEM discovery with follow-up opportunities throughout the school year. Pathways directly aligns with CTE Pathways at the high school level within Charlotte Mecklenburg Schools. Due to COVID-19, programming during the summers of 2020/2021 was deferred. However, rising 6th grade students were back in camp this summer!

SGTB serves as a gateway program for 100 incoming 6th graders who spend two weeks investigating science. Using Camp Invention and Discovery Education, students are introduced to life and physical science concepts. With Friday Field Trips to UNC-Charlotte and Brand RPM, students learn about future college opportunities/careers, and the science of screen printing on textiles. Campers screen-print their own t-shirts to take home!

In Career Track (CT) Explorers (will be reincorporated summer 2023), 100 rising 7th and 8th graders experience hands-on science learning by choosing three of four paths for their two-week camp: Ten80 Racing – the science behind NASCAR; Eat Your Lab Work – science and math of cooking; Design Squad – engineering in McClintock’s new Innovation Lab; Medical Mysteries – biomedical sciences and health; SpherO Bot – coding; and Robotics. Friday Field Trips provide a chance to see science at work and learn about careers.

During the academic year, students participate in STEM-related clubs as part of McPIE’s Tuesday Family Night program – a time to continue hands-on learning and interact with STEM professionals. Both SGTB and CT Explorers are aligned to the CTE Pathway at East Mecklenburg High School. This pipeline ensures that McClintock students have an opportunity to find their passion in middle school and continue that STEM passion on through high school and beyond.

MEREDITH COLLEGE

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PROJECT TITLE: PERSIST: PIPELINE ENHANCEMENT TO RETAIN STUDENTS
VIA INCLUSIVE STEM TRAINING

Disparities in career attainment in STEM fields have been observed for both women and underrepresented minorities and have contributed to challenges associated with promoting and maintaining a diverse STEM workforce. To address these challenges, PERSIST will provide 80 rising 10th-12th grade females demonstrating STEM interest and potential with a STEM early intervention program that includes a two-week simulated biomedical industry summer experience infused with inclusivity and professionalism training as well as academic year programming for bioscience career exploration, mentoring, and professional networking opportunities. The summer learning experience will enable students to earn 3 college credits via a project-based curriculum using active learning and inquiry-based approaches focused on two phases of the FDA drug development process (Drug Discovery, Clinical Research) and including guest lectures and interactive discussions with leading drug development and clinical research scientists from local pharmaceutical companies and contract research organizations. During the academic year, students will be provided six in-person weekend workshops covering bioscience career exploration led by industry experts and providing the opportunity for continued faculty and peer mentoring, as well as career networking with research scientists.

NORTH CAROLINA A&T STATE UNIVERSITY

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PROJECT TITLE: GLOBAL STEM SCHOLARS INSTITUTE

The **Global STEM Scholars Institute** (GSSI) is a year-round program designed to strengthen students' understanding of and competencies in Math and Science and increase the number of students from disadvantaged populations who consider STEM careers. Upward Bound students who have expressed interest in STEM careers will engage in summer and academic year enrichment programming, while exploring the 14 NAE Grand Challenges. The GSSI integrates research-based, hands-on academic programming related to the 14 Grand Challenges into the existing and successful Upward Bound program. Scholars' summer and academic-year enrichment activities will be augmented with professional development and hands-on and/or virtual activities.

After participating in the GSSI Summer Institute, students engage in academic enrichment programs in English, Math, Science, foreign language, and cultural awareness offered through the Upward Bound program. Academic programs are held on campus from mid-September through mid-April, on Tuesdays from 6:00 PM until 8:00 PM, and involve 44 contact hours during a 22-week academic year. GSSI participants will also have an opportunity to enhance their skills in math and science through weekly academic year tutorial sessions in the Upward Bound program, and engage in review classes to reinforce the learning that took place during summer hours. GSSI participants may also participate in Grand Challenge-related activities such as competitions, seminars and workshops offered through the College of Engineering Grand Challenges Scholars Program.

NORTH CAROLINA A&T STATE UNIVERSITY

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PROJECT TITLE: THE STEM OF POLYMERS: A SUMMER PROGRAM IN STEM EXPLORATION FOR MIDDLE SCHOOL STUDENTS

North Carolina Agricultural and Technical State University and STEMantics are partnering to present The STEM of Biopolymers. Using a Project-Based Learning approach, the students will be challenged to create a biodegradable plastic to replace common six-pack rings. The creation of a safe, accessible biopolymer (Teaching Channel, 2016) made from corn starch, glycerin, vinegar and water serves as the central activity. All activities will be standards-aligned and taught by licensed science and math teachers. Some overarching concepts include heat, elasticity, friction, graphing, and tensile strength. Skills, such as writing, public speaking, inquiry, and communicating results are emphasized as well. The “Think, Make, Try, Refine Model” will formally introduce students to mathematical processes, scientific innovation, and problem-solving. The students will be provided with snacks and a hot lunch. We anticipate hosting 24 students for five days twice over the summer, thus, impacting 48 students per year. Academic follow-ups will be held twice in the fall and twice in the spring. Increasing STEM career awareness is facilitated by tours of A&T facilities, meetings with careers services specialist, a tour of Core Technology Molding Corporation, and interactions with STEM professional.

NORTH CAROLINA STATE UNIVERSITY

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PROJECT TITLE: CRECER: CULTIVATING RESEARCH EXPERIENCES WITH
COMMUNITY ENGAGED ROOTS

Lack of diversity represents a loss of talent. The fields of STEM (Science, Technology, Engineering, and Mathematics) badly need the input of talented, diverse people. Hispanics/Latinx are 16% of the population, but make up only 6% of workers in science and engineering occupations (www.nsf.gov/statistics/wmpd). By 2050, a third of our nation's population will be Hispanic/Latinx as this minority group triples in size and will account for most of the nation's population growth through 2050. To expand interest in STEM fields, as well as diversify the workforce, we must expose students to STEM-focused education, research, and careers. It is vital that these students' interests are sparked and that they are prepared for the completion of challenging and time-demanding STEM courses, majors, and pursuits. CRECER (Cultivating Research Experiences with Community Engaged Roots) seeks to create a sustainable environment for Hispanic/Latinx students to become the next generation of fruitful contributors to the STEM workforce, the economy, and the collective success of our state and nation. Through their enrollment in the program, Hispanic/Latinx high school students from Lee and Chatham Counties will participate in an authentic research experience that spans an intensive residential research experience at NC State, ongoing independent research and engagement in community-based CRECER 4-H Clubs during the academic year, and annual research presentations at local science fairs and a community-based CRECER Festejo de Ciencia y Familia. Although the research project will evolve over the three-year program, the research question will remain focused on understanding how microbial communities contribute to agriculture. Specifically, students will use next-generation DNA sequencing to identify the microbes living in soil from farms in their community and design and carry out experiments to test how these microbes affect plant growth and crop yield. CRECER will use mentors, real-world research, and hands-on learning to educate Hispanic/Latinx high school students and their families about the possibilities of what a STEM career can be. By anchoring the program in the communities being served, CRECER participants will become ambassadors for science and research in their communities, and the reach of the program will go far beyond the students participating in the program.

NORTH CAROLINA STATE UNIVERSITY

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PROJECT TITLE: FALLS LAKE PARTNERS IN FORENSIC SCIENCE II

Falls Lake Partners in Forensic Science II is a three-year renewal project designed to engage eighth/rising ninth grade students in the upper Neuse River watershed in STEM, information technology, and career education, including hands-on experiences in “forensic” investigative aquatic science. The program (65 contact hours per student) foundation is a partnership between the Center for Applied Aquatic Ecology (NCSU) and Wake County Public Schools represented by eighth grade science/math teachers Ms. Katherine Price (Moore Square Magnet Middle School) and Mrs. Dawn Navarro (East Garner Magnet Middle School. Inner-city Moore Square has 130 eighth graders (47% minorities; nearly one-third on free/reduced lunches). East Garner, in a fringe rural setting, has 440 eighth graders (84% minorities; 59% on free/reduced lunches). Both schools are in NC’s top 20% most diverse middle schools, and both rely upon Falls Lake for their drinking water. Overall project goals are to encourage underprivileged/under-represented minority, female, and special needs youths to understand direct connections between water quality (WQ), healthy aquatic life and healthy people; improve student competence in STEM; and inspire students to pursue STEM careers, highlighting inquiry-based aquatic science and water resource management. Specific project objectives in each year are to: 1) Kindle students’ interest in aquatic science, first through interactive presentations and participatory workstations for all 8th grade science students, emphasizing the importance of Falls Lake to their everyday health and the health of their families and friends; 2) Excite students and their teachers about aquatic science by providing hands-on field and aquatic science laboratory experiences in summer sessions (up to 15 students per session, 2 sessions per summer) and 4 Saturday sessions during the academic year; 3) Inspire students to pursue STEM careers through direct interactions with aquatic specialists and with other SSEP PIs and students; and 4) Provide related classroom activities, career information, and references to enhance teachers’ skills in teaching aquatic science. All planned activities will be designed to address the three major goals of BWF’s SSEP, and will be correlated to Goals 8E.1.1.–8.3.1.4 of the NC Essential Science Standards.

NORTH CAROLINA STATE UNIVERSITY WILSON COLLEGE OF TEXTILES

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PROJECT TITLE: TEXPLORE – SUMMER ENRICHMENT AND SATURDAY
ACADEMY PROGRAM

The TEXplore Summer Enrichment and Saturday Academy (TEXplore) is a three-year project designed to engage a cohort of approximately 30 rising 7th and 8th-grade students of Gaston and Catawba County in STEM and the textiles industry, through hands-on learning experiences in diverse textile STEM-related disciplines. The North Carolina State University Wilson College of Textiles has a unique relationship with rural North Carolina (NC) and the potential to expand access to STEM-related programs to rural students. This project partners middle school students in two NC Tier 2 counties, Gaston College and Catawba Valley Community College and the North Carolina Mathematics and Science Education Network Pre-College Program (NC-MSEN PCP). The activities involved in TEXplore will occur one week during the summer and periodically throughout the academic year on Saturdays. Students will learn about three unique STEM disciplines in the textile industry over three years by learning, applying and reinforcing scientific processing and investigative skills. This will occur through engaging and fun hands-on laboratory experiments and demonstrations at the Wilson College of Textiles in forensics, sustainability, smart textiles or personal protective equipment (PPE).

PARTNERSHIP FOR APPALACHIAN GIRLS' EDUCATION

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PROJECT TITLE: PAGE: CREATING INNOVATIVE STEM EDUCATION FOR GIRLS
IN APPALACHIA

The Partnership for Appalachian Girls' Education ('PAGE') was founded in 2010 as a program, and launched in 2020 as a North Carolina nonprofit, to create new ladders of educational opportunity for girls who are growing up in vulnerable communities in Appalachian North Carolina.

Our project is a three-year expansion of learning opportunities in two STEM areas: science and technology. Our goal is to provide innovative STEM opportunities for girls in grades 6-10, so that adolescent girls in Appalachian North Carolina will develop new skills and aspirations in science and technology and be better positioned to explore STEM in college and future careers.

Our three-year project addresses the following specific goals:

- To expand our menu of place-based science learning activities that (a) make productive use of Appalachian people, places, and plant life; and (b) support critical inquiry, extended science talk, exploration, and theorizing.
- To create new opportunities for girls to engage in meaningful and creative ways with technology and digital learning.
- To expand the opportunities that Appalachian girls have for summer STEM learning and enrichment, while deepening their learning and engagement with STEM and technology across the school year.
- To connect and disseminate our programs and program participants with local, state, and global communities; fostering the widest possible impact.

In Year 1, our participants have discovered space and the night sky with astronomer Miriam Fuchs, explored plant science and created Illustrated Lab Journals in a popup garden classroom, and gained skill using new technologies and digital tools by creating digital stories.

Our mission in PAGE is to inspire and empower girls through innovative education, so they can achieve their desired futures and become young leaders for a changing Appalachia.

PISGAH ASTRONOMICAL RESEARCH INSTITUTE

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PROJECT TITLE: 3D PLANETS

The Pisgah Astronomical Research Institute (PARI) seeks to expand the 3D Planets program, originally developed through support of the Burroughs Wellcome Fund. Following the initial creation and instances of the program, PARI has continued to conduct 3D Planets workshops in their original form, as summer camps, as shorter weekend long workshops, and has integrated the concepts mastered and utilized in the program in other education offerings such as designing rockets and other space craft, robotics, and the creation of a large variety of educational models. Further, PARI has adjusted the original curriculum with renditions for a wider audience and has refined our original approach in many areas. We feel it is an appropriate time to launch a new, dedicated series of 3D Planets workshops throughout the state of North Carolina to bring all we have learned to a new batch of learners.

PARI plans to engage middle school aged students in creating 3D tactile maps of planetary surfaces using the technology of 3D modeling and printing. We have observed that a student who draws a three dimensional image of a lunar crater, for example, and then watches it being built layer-by-layer, will be excited by their ability to understand science and use technology. The young scholars' enthusiasm for science and math using a new innovative technology increases.

Students participating in 3D Planets will be fully engaged in learning about the surfaces of planets and geographical markers, while using a relatively young technology that is sure to be part of their futures. Working in a technologically innovative area, students will be mathematically translating a real data from NASA spacecraft to a three dimensional tactile surface map. This process improves the students' competence not only in math, but also improves their spatial visualization

skills – the students’ ability to mentally rotate, twist, or invert pictorially presented visual stimuli. The 3D planetary surface maps with labels in Braille designed and printed by the young scholars will be put on display at their local science museums, public libraries, and schools for interactive use. The 3D Planets Scholars will have created a new venue for visually impaired individuals to participate in astronomy. We think that the connection between doing planetary surface science and finishing with a product to impact the public will encourage students to consider science-related careers.

Two hundred forty middle school age kids will participate over three years. During the summer months and year-round school breaks, groups of twenty to thirty middle schoolers will work with PARI staff for one week. The workshop will be presented at nine cooperating North Carolina museums libraries, and similar informal education centers, with summer programs held at PARI.

In past renditions of this program, the focus of the project has been on middle school girls. There is general agreement that gender differences in spatial skills-mental rotation are not biologically based, but are influenced by experience and environment. PARI seeks to expand that aspect in order to offer a larger and more diverse reach to all students and improve their spatial thinking skills, while using what we have learned with the program in the past to continue to effectively motivate each individual. We feel confident in our ability to do this, especially as our staff has remained well practiced in the materials involved, we now have a well-maintained collection of equipment, and costs of 3D printing related supplies have significantly decreased since the program’s inception.

PROJECT SCIENTIST

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PROJECT TITLE: HANDS-ON STEM CLUB FOR GIRLS

In year one of the hands-On STEM Club for Girls, three cohorts of fifteen girls each will participate in the after school program at Allegra Westbrooks, Independent Regional, and Sugar Creek library branches. These branches are located in under-resourced areas of Charlotte.

Each girl will have her own kit containing everything needed for the hands-on STEM activities involved in each session of STEM Club. Instruction is delivered virtually by a trained teacher and additional virtual help is provided by a trained intern. Project Scientist interns are female college students majoring in education or a STEM field. Each library branch has the technology to provide a large screen and projector so the girls can see and hear their teacher and interact with each other and with the teacher.

At each of the three library branches, a trained Charlotte Mecklenburg Library associate will be available onsite to get the girls settled in, provide a snack, and be on hand during the session to provide technical or other assistance as needed.

Each two-hour session includes time for socializing and a snack provided by Project Scientist, followed by a virtual visit from a female STEM role model. After the introduction and role model Q&A, the girls will participate in the 75-minute virtual portion of the program, which consists of a hands-on STEM activity to introduce, examine, and test STEM concepts aligned with Next Generation Science Standards and the North Carolina Science Standard Course of Study. The sessions conclude with a wrap-up led by the Project Scientist teacher, and a library associate will be available to get the girls packed up and dismissed.

PUBLIC SCHOOLS OF ROBESON COUNTY

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PROJECT TITLE: KIDS WHO CODE ROBOTICS

When I look at the faces of students in our district, I see the future. However many of our students will not have the same opportunities as others. How do we even start to prepare our students for jobs that have yet to be created? We start by giving all students a foundation in coding, programming, and robotics. The purpose of the “Kids Who Code Robotics” is to provide this opportunity for all second-grade students in our district. By focusing on the second grade, we are building upon a child’s natural curiosity and helping lay the educational foundation by engaging them in rigorous grade-level instruction in computer science, coding, math, ELA, and Science. Using the FIRST program which builds on core values such as collaboration, critical thinking, problem-solving, and how to respect others, we are preparing our students to be successful in the future. When I look at our students, I see their potential and want to offer them the same opportunities as other districts. This program is addressing the inequity that results from most robotic programs if they occur during summer camps or after school or in bigger, wealthier districts. Many of our students are not afforded the luxury of attending these events and therefore become even more underrepresented in STEM fields. This can lead to bright eager students who never see themselves in a STEM career. They never get the opportunity to learn and explain their learning to others. This program will allow all students access to robotic instruction and coding as well as give students the opportunity to explore STEM careers. Kids who Code Robotics may be the spark in the eye of a child that leads to the world’s best discoveries. Why not our students, why not now?

STUDENT U

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PROJECT TITLE: EXPLORE FEARLESSLY INITIATIVE

Student U will continue enhancing the integration of STEM into its middle and high school programming through the “Explore Fearlessly Initiative.” One of Student U’s six core values is to Dream Fearlessly. We encourage each of our students to dream ambitiously about their future, and then to work to make those dreams come true. We believe firmly that all of our students must have the adequate knowledge, skills, and exposure to pursue and dream fearlessly about STEM careers. The Explore Fearlessly Initiative is Student U’s STEM counterpart to its ‘Read Fearlessly Initiative,’ which was created eleven years ago to enhance literacy skills through culturally relevant and engaging texts. We also believe that our students deserve to have the same level of intention in designed programming when it comes to science and mathematics in order to explore fearlessly. Therefore, the primary goal of the Explore Fearlessly Initiative is to encourage students to be curious, to ask questions and approach those questions as scientists, mathematicians, and researchers, to hypothesize, design experiments, and to explore fearlessly. In partnership with the Student STEM Enrichment Program, Student U will continue improving upon culturally relevant and engaging STEM learning opportunities and experiences from the sixth grade through twelfth grade.

Over the next three years, Student U will continue the Explore Fearlessly Initiative for our 350 middle and high school students. With this support, the Burroughs Wellcome Fund provides a comprehensive seven-year experience to ensure students have the competency and the desire to pursue careers in STEM fields. This project will be integrated into each stage of our current middle and high school programming, which includes Summer Academy for rising sixth through tenth graders, Middle and High School Year-Round Program for afterschool support, and Summer Internship Program for rising eleventh and twelfth graders. By equipping students with the skills needed to access higher-level STEM material while also providing opportunities to apply their knowledge to scientific and mathematical concepts in the real world, the Explore Fearlessly Initiative will foster deep, authentic enthusiasm for STEM.

UNIVERSITY OF NORTH CAROLINA-ASHEVILLE

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PROJECT TITLE: "INSECTS EVERYWHERE: CLOSING THE STEM ACHIEVEMENT GAP FOR MIGRANT CHILDREN"

The children of migrant workers in western North Carolina face incredible challenges as they seek a Science, Technology, Engineering, and Mathematics (STEM) education that will prepare them for career success. Insects Everywhere will assist in closing the STEM achievement gap for Migrant Children in western North Carolina through an annual summer camp program, school-year field trips, and roundtable discussions that engage students in STEM concepts through the lens of insects, expose students to academic and career opportunities in STEM, and prepare students to meet the challenges facing them as they pursue higher education and STEM careers. Insects Everywhere is led by Drs. Filgueiras and Viera, two University of North Carolina Asheville (UNCA) education professionals who are Latin American, multilingual, have overcome personal obstacles to serve in higher education, and who have decades of experience leading and organizing K-12 educational programs across the US. Insects Everywhere partners closely with Buncombe County Schools' (BCS) K-12 STEM education program and Migrant Education Program, which works closely with migrant students and their families. Through this partnership, Insects Everywhere will be able to reach, recruit, and engage middle and high school students in rural underserved areas of western North Carolina. Insects Everywhere will develop students' scientific inquiry, critical thinking, and problem-solving skills through individual and team-based, experiential STEM activities, grow students' enthusiasm for STEM through thoughtful and meaningful experiences in entomology, introduce students to technology, scientific equipment, and instrumentation, and facilitate college and STEM career readiness events in which students and their families are provided with key information to enable student success.

UNIVERSITY OF NORTH CAROLINA-CHAPEL HILL INSTITUTE FOR THE ENVIRONMENT

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PROJECT TITLE: STEM EXPERIENCES IN THE LAB AND FIELD (SELF) FOR
ROBESON EARLY COLLEGE HIGH SCHOOL STUDENTS

Robeson Early College High School (RECHS), located in Robeson County, NC, provides ~200 highly motivated students with an opportunity to take college-level coursework. Robeson County has a more diverse population than many NC counties (with about 41% of the population identifying as American Indian/Alaska Native and about 24% identifying as African American). Approximately 30% of the county population lives in poverty. Despite access to an enriched learning environment, RECHS students lack opportunities for meaningful STEM (Science, Technology, Engineering, and Mathematics) experiences outside of their classrooms. Educational research, however, has shown that field and research experiences, along with high quality mentoring, increase access to STEM careers. For these reasons, the UNC Institute for the Environment (UNC-IE), in partnership with Robeson Community College (RCC), proposes STEM Experiences in the Lab and Field (SELF), a program designed to engage 130 RECHS upperclassmen in environmental science and health-focused field and research experiences.

UNC-IE's Center for Public Engagement with Science and the Robeson Community College (RCC) Science Department will plan and implement a two-week summer field study (for 24 students each year) followed by a series of field trips during the academic year (for 20 students each year). STEM faculty from the University of North Carolina at Chapel Hill (UNC-CH) also will host a total of 18 students in their labs and provide mentorship for 5-week summer research experiences.

Components of the summer field study will include the following: data collection and investigation at field sites; sessions with scientists to learn about the research process; and an introduction to Geographic Information Systems (GIS). During the summer research experience at UNC-CH, RECHS students will be paired with an environmental health or geoscience faculty mentor and will work in their labs for 30 hours/week, conducting research alongside the lab team. Additionally, geology field trips will be offered during the academic years. Two day-trips and one overnight camping experience to locations of ecological, geological, and/or hydrological significance in North Carolina will provide opportunities for hands on, minds on learning. Students will also meet scientists conducting field research and begin to think about research as part of STEM.

UNIVERSITY OF NORTH CAROLINA-PEMBROKE

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PROJECT TITLE: KIDS IN THE GARDEN

In the Kids in the Garden program, we use garden-based learning strategies to study pollination conservation and pollen using STEAM. We connect to the culture of the region we serve through storytelling and the growing of food or sustainable agriculture. Robeson County is currently in 50% agricultural production and the region has a rich history of growing food and storytelling connected to the Lumbee Tribe. Beekeeping and herbal remedies are common local practices. In addition, migrant children and their families bring a rich history to the region around food and storytelling. We connect these valuable histories to the science of the study of bees and pollen to bridge these historical practices with the latest scientific research. Since so little is known about native bees, the data that the students produce in the program including the undergraduate and graduate students involved are new and novel and add to the scientific community's understanding of these critical topics. When researchers, middle school and high school students, and college students work together around common research topics, all benefit from the interactions that take place as a result of the program.

VALENCE ROBOTICS

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PROJECT TITLE: VALENCE ROBOTICS FIRST ROBOTICS COMPETITION

Valence Robotics is a nonprofit focused on building up students of all backgrounds to become the next generation of STEM leaders through the FIRST® Robotics Competition and parallel ventures.

Valence Robotics was established in October 2021 as an effort by students to found a team for the FIRST® Robotics Competition (FRC) an international high school robotics program. From January to April, known as the build season, students work to design, build, and program a robot before entering into competitions. During this time, students gain experience with a range of tools, from industry-level computer-aided design software to professional machinery to high-level programming languages.

While the competitive season is an important part of FRC, the rest of the year is just as vital. During the offseason, students focus on other initiatives in order to sustain the team: recruitment and training, fundraising, and outreach. Our team strives to give students of all backgrounds the opportunity to develop their skills, so as a team we are always looking to recruit new members. We emphasize new member training, ensuring that everyone has the same opportunities, regardless of their robotics experience and technical skills. Another important part of the offseason is fundraising. Teams have to raise funds to pay for competition registration, building materials, tools, transportation, and other logistics. These expenses usually end up being tens of thousands of dollars; this money is obtained through grants, sponsorships, and donations. Through team fundraising, students build critical soft skills, such as professional communication, public speaking, writing, and networking. Beyond providing valuable experiences for members, our team strives to make an impact on our community through outreach. This includes many different projects, mostly aimed at younger students and children, including robotics summer camps and workshops to help prepare them for the future and introduce them to STEM.

From mechanical design to programming to brand development to fundraising to project management, Valence Robotics provides opportunities for highschool students to grow in both technical and business fields of their choosing. In this way, Valence Robotics greatly helps to prepare students for their future, whether they plan to pursue engineering or not.

WAKE COUNTY PUBLIC SCHOOL SYSTEM

DIRECTOR: PAUL DOMENICO
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PROJECT TITLE: EXPLORING STEM CAREERS

Six STEM related high school Career Academies in the Wake County Public School System will each provide cohorts of 12 rising 8th grade students "Exploring STEM Careers," a STEM enrichment opportunity that includes annual summer camps and offsite learning experiences during the school year. Career Development Coordinators and student interns will mentor the 8th graders and support them as they engage in hands-on, inquiry-based science, accessing relevant and rigorous science curriculum, increasing their achievement in science disciplines, nurturing their enthusiasm for science, and acquainting them with science career opportunities.

Camp activities will involve hands-on learning related to Engineering and Advanced Manufacturing, Health Sciences, Biomedical Science, Engineering, and Information Technology and Cybersecurity. While all six camps will be given the same real world challenge, specific STEM activities will be related to the focus of each respective Career Academy. For example, students attending the camp at a biomedical Career Academy may focus on a project related to nutrition and disease, while those at an engineering/advanced manufacturing Career Academy might focus on an assistive device or toy. Students will employ the scientific method as they gather data, test an idea, analyze and document findings, and revise and reflect on their work through the use of digital portfolios. The summer camps will culminate in a showcase event, where students present their design solutions to their peers, parents, staff members of partner organizations, and members of the Career Academy Advisory Boards.

This project will build students' soft and scientific skills through simulating real world practices. They will experience how teams work, how projects are efficiently managed, practice effective ways to communicate, and how to apply creativity and critical thinking to solve problems. They will learn the engineering design process and gain insight about the relevance of STEM knowledge and skills in addressing real world challenges. This experience will also give them a look into the world of learning and career possibilities available to them through the Career Academies.

WAKE FOREST UNIVERSITY

DIRECTOR: REBECCA ALEXANDER
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PROJECT TITLE: WF LEAP (LAB EXPERIENCES: ACADEMICS AND PROFESSIONS)

WF LEAP is a paid, lab-based, summer internship program for high school students attending one of six Title I high schools in the Winston-Salem Forsyth County Schools. The program, located at Wake Forest University (WFU), targets underrepresented minority students who otherwise would not be able to have a mentored STEM-based internship. This experience directly links to a student's desired career in place of working a more traditional summer job. WF LEAP prioritizes students who display curiosity, resilience, and a desire to explore topics with which they may not have experience, as opposed to those who simply display strong academic achievement.

The first cohort of 12 WF LEAP interns spent June 21-July 29, 2022 at Wake Forest. Over the course of six weeks, each student worked with two WFU co-mentors (a faculty member and a graduate or undergraduate student) who introduced the intern to the foundations of their discipline and about the research conducted in the lab. All interns learned how to maintain a lab notebook, fundamental lab safety, and use of specialized instrumentation. Each intern also developed and completed a project that was shared at the end of the summer in a symposium attended by all participating interns, their mentors, and their parents.

Professional development and career exploration across STEM disciplines is a foundational element of LEAP, and interns completed several workshops on college and career readiness, resume development, and building a strong professional network. Having completed the summer portion of the program, the first cohort of 12 interns continues to engage with LEAP through special activities, like a book signing and conversation with Neil deGrasse Tyson, as well as the first of two required Saturday Academies. Below is a collection of photographs and news clippings covering LEAP's incredibly successful first summer.

WAKE FOREST UNIVERSITY HEALTH SCIENCES

DIRECTOR: STANFORD HILL
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PROJECT TITLE: ISTEM: A PIEDMONT TRIAD INITIATIVE

Wake Forest University School of Medicine's Center of Excellence for Research, Teaching and Learning (CERTL) created two comprehensive STEM satellite programs for cohorts of middle school students at schools within the Piedmont Triad of North Carolina by partnering with Davidson and Surry County Schools to create "iSTEM: A Piedmont Triad Initiative." This partnership delivered STEM-based yearlong programs through an inquiry-based learning (IBL) model that aligns with the North Carolina Standard Course of Study, including a weeklong summer intensive STEM experience within each district and a yearlong follow-up program. The follow-up program consisted of two visits to the Bowman Gray Center for Medical Education in Winston Salem, North Carolina for a fall and a spring summit, quarterly STEM Saturday activities, and quarterly progress report meetings with their school administrators in their home schools to monitor their academic progress and guide them toward more rigorous STEM-related courses. The fall and spring summits connected student participants with STEM students, professionals, and faculty from Wake Forest University School of Medicine. The STEM Saturday events took place quarterly in each of the partnering schools led by the STEM teachers from the summer experience component. A yearlong project-based learning component launched during the summer experience that is continued throughout the school year via Google Classroom. The project component culminates at the end of the school year with a presentation to their parents, teachers and administrators, and CERTL staff. This program has served 140 middle school students over the course of the grant from these two low-wealth school districts to improve their knowledge of STEM-based content and improve their academic performance in order for them to enroll in higher-level STEM classes and possibly pursue careers in STEM-related fields.

WEST WILKES HIGH SCHOOL

DIRECTOR: JENNIFER LEBLANC
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PROJECT TITLE: A CRYPTOLOGY/CYBERSECURITY EXPERIENCE FOR RURAL HIGH SCHOOL STUDENTS

Securing the Future is a year-long cryptology/cybersecurity experience that emphasizes leadership and inclusion in computing. The program is designed to encourage 10th-12th grade students in rural Appalachia to pursue careers in cybersecurity, computer science, or applied mathematics. Throughout the year participants have the opportunity to engage in hands-on problem solving challenges, develop their ability to collaborate on difficult tasks, and gain valuable leadership experience in STEM. The program aims to cultivate interest and confidence in students who are traditionally underrepresented in technology and computer science fields. Appalachian State University and InfusionPoints, a local cybersecurity firm, are partnering with West Wilkes High School to lend expertise and real world connections to the program. The program activities include: a team building/leadership boot camp, six cryptology workshops, trips to Appalachian State and InfusionPoints, three challenge days, and a two week travel study to the NSA in Maryland, the Bletchley Park Codes Centre in England, and the Enigma Center in Poland. A vital component of the program is creating an inclusive STEM community with a global outlook. The goal is for each participant to realize that their input adds value to their team, community and society as a whole. Security in computing is of national and global importance and equity in computing is key to diverse contributions to the computing world.

WESTERN CAROLINA UNIVERSITY

DIRECTOR: PAUL YANIK
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PROJECT TITLE: PEARO: PROVIDING EQUITABLE ACCESS TO ROBOTICS OPPORTUNITIES

Guided by the goals of Western Carolina University's (WCU's) strategic plan, 2020 Vision, the proposed program aims to (1) fulfill the educational needs of the State and region, and promote regional, economic and community development, (2) engage with external partners to facilitate community leadership initiatives for development, and (3) support realization of experiencebased learning. Toward these ends, the proposed program titled PEARO: Providing Equitable Access to Robotics Opportunities will be a collaboration between WCU and FIRST North Carolina to recruit, train, and support high school students and their adult mentors in forming FIRST Robotics Competition (FRC) teams. The program will target schools in North Carolina's seven westernmost counties including Cherokee, Clay, Graham, Jackson, Macon, Swain, Transylvania, as well as the Eastern Band of Cherokee Indians (EBCI) nation.

FIRST North Carolina holds a four-event annual FRC competition season at sites across the state, plus a state championship event. PEARO will facilitate the formation of seven competition teams over its three-year duration (3, 2, and 2 teams per year, respectively). Through the program, WCU and FIRST will recruit and host teams and their adult mentors at Saturday Institutes to be held in the facilities of WCU's College of Engineering and Technology. Each Institute will consist of four Saturdays across September and October. During the Institute, teams will receive instruction in robot design and fabrication, basic electrical theory (wiring for motors, sensors, and controls), programming, and project management. Teams will be instructed by WCU faculty with assistance from WCU Graduate Assistants, and veteran FRC participants. Rookie teams participating in an Institute will return during the subsequent year of PEARO to pass on their learning to newly recruited rookie teams. PEARO will provide financial support for the Saturday Institutes, startup materials and tools for all teams, stipends for adult mentors, travel to FIRST competitions, and event registrations.

If funded, PEARO will provide a proven platform for students in underserved high schools to develop competencies in STEM topics, an appreciation for the practical applications of their new knowledge, and confidence in professional skill areas including leadership and problem solving. Through the process, they will gain a vision of their future as university students who become STEM professionals, all while having fun and working as a team.



CAREER AWARDS FOR STEM TEACHERS

BWF has awarded nearly \$4.6 million for 27 Career Awards for STEM Teachers since the program's inception in 2010. The award provides \$175,000 over five years to support the careers of North Carolina public school teachers who make significant contributions to enhancing student knowledge in STEM.

The Career Awards for STEM Teachers seek to advance the field of teaching by identifying and developing a cadre of well-prepared K-12 teachers in STEM. Candidates must be currently licensed North Carolina public school STEM teachers who teach in grades K-12. The next deadline for applications will be Fall 2024. For complete information, visit www.bwfund.org.

Following are biographies of Career Award for STEM Teacher recipients.

TOMIKA ALTMAN

ELEMENTARY INTERVENTION COORDINATING TEACHER
WAKE COUNTY PUBLIC SCHOOL SYSTEM
TOMIKA.ALTMAN@GMAIL.COM



Tomika graduated, magna cum laude, with a B.A. in Sociology and a B.S. in Family and Consumer Sciences with a concentration in Child Development and Family Relations from North Carolina Central University. She also obtained her M.Ed in Specialized Education with an emphasis in Learning Disabilities and Reading from the University of North Carolina at Greensboro, as well as, her Master's in School Administration from North Carolina Central University. She is also the recipient of the Burroughs Wellcome Fund PRISM Grant; NC Central

University 40 Under 40 Award for Significant Contributions in Education; NC Science Teachers Association, District Three, Outstanding Elementary Teacher of the Year; NC Council of Teachers of Mathematics, Durham Public Schools, Elementary Teacher of the Year and AIG Teacher of the Year; Durham County Soil and Water Conservation Teacher of the Year; and the National Council of Teachers of Mathematics Emerging Teacher-Leaders and Future Leader Annual Meeting Attendance Awards Recipient.

Besides supporting elementary schools with their intervention endeavors as an Elementary Intervention Coordinating Teacher for Wake County Public Schools' Central Services' Intervention and Advanced Learning Services Department, Ms. Altman provides professional development to teachers that integrates STEM, literacy, and interventions.

She is a member of Sigma Gamma Rho Sorority, Inc. a LEGO Master Educator; serves on the Board of Directors for the NC Science, Mathematics, and Technology Center; Diversity and Equity Committee Chair for the NC Science Teachers Association; appointed to Governor Cooper's Teacher Advisory Committee; 100kin10k Teacher Forum, and writes STEM-based lessons activities for UNC-G, NCSU, and PBS-NC. She is also a STEM+C Engagement and Research Teacher Fellow at Virginia Tech University.

MICHELLE BEARD

ALLEGHANY HIGH SCHOOL
ALLEGHANY COUNTY SCHOOL SYSTEM
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After graduating college, Beard worked as a chemist for eight years, mostly in the environmental field, as well as pharmaceuticals. She taught six years of chemistry in southern California.

From there, she moved and taught in Phoenix, Az. for five years and then moved to Alleghany High School in Sparta N.C. where she currently teaches all levels of chemistry and physics. She feels fortunate to have earned the CAST and the PRISM grant from BWF as well as funding from DonorsChoose and is looking forward to using more

technology within her classroom to make her students better prepared for college and/or work.

KRISTA BRINCHEK

ABBOTTS CREEK ELEMENTARY SCHOOL
WAKE COUNTY PUBLIC SCHOOL SYSTEM
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Krista Brinckek continues to serve as the Science Specialist for K-5th grade at Abbotts Creek Elementary School in Raleigh NC. In her first year of the CAST Grant she was able to start her goal of increasing nature-based experiences for students and families while working towards reducing inequalities. 850 students were able to visit the local Nature Preserve to receive programs that were tailored to scaffolding and extending the NC Essential Science Standards through an environmental lens. The grant also allowed the construction of a large-

scale Learning Garden on campus where students learn standards through hands-on learning while also understanding the importance of closing the food loop. Community programs were implemented this past year helping families collect data through citizen science projects, as well as family StoryWalks to integrate literacy and science.

She has implemented professional development for teachers within her school and across the district that explore equity in green spaces, help foster excitement of utilizing outdoor place-based learning and provide opportunities to engage in deeper environmental literacy content knowledge. Her continued partnership with Environmental Educators of NC has helped advance these grant goals.

Mrs. Brinckek was recently recognized for the EPA's Presidential Innovation Award for Environmental Educators. She continues to strive to bring creative, equitable, rigorous curriculum to students within her school and across the district.

WALLY KEITH BURGESS

NORTHRIDGE MIDDLE SCHOOL
CHARLOTTE MECKLENBURG SCHOOLS
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Keith Burgess is a native of the Bronx, New York and a 2001 graduate of Johnson C. Smith University where he received his bachelors of science degree in Biology. In 2015, he changed careers to become a middle grades science teacher in the Charlotte-Mecklenburg School system. Keith is currently working on his PhD in Urban Education at UNC-Charlotte, where his primary research focuses on STEM enrichment for urban middle grades students. His research has allowed him to travel and present at both international and national education

conferences. In 2019 Keith was awarded a Kenan Fellowship for teacher leadership sponsored by North Carolina State University. Additionally, in 2020 he received the Visiting Doctoral Student Fellowship from the University of Vermont. Keith is a proud member of the 2021 BWF- CAST cohort.

AMANDA G. CLAPP

THE CATAMOUNT SCHOOL
OPERATED BY WESTERN CAROLINA UNIVERSITY IN PARTNERSHIP
WITH JACKSON COUNTY SCHOOLS
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Ms. Amanda Clapp teaches middle grades science at the Catamount School (TCS), Western Carolina University's (WCU) laboratory school. Additionally, she serves as an instructor of science education methods for the university. Ms. Clapp holds a bachelor's degree in Natural Resources Conservation and Physical Anthropology from the University of Massachusetts-Amherst and a master's in Primate Ecology and Evolution from The University of Texas at Austin. She is a 2019 Keenan Fellow and currently completing her second master's in STEM Education at WCU.

Before becoming a full-time educator, Ms. Clapp served as a naturalist at the Great Smoky Mountains Institute at Tremont and studied lemurs in Madagascar. Her teaching career includes middle grades science and high school Biology, Wildlife, and Earth Science within Jackson County Public Schools before joining TCS.

Ms. Clapp works to engage students in project-based science inquiry and is passionate about fostering high-quality science instruction in collaboration with other educators across the state. Her current focus is on place-based learning and student exploration of their home communities.

KIMBERLY CLARK

CHARLES D. OWEN HIGH SCHOOL
BUNCOMBE COUNTY SCHOOLS
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Kimberly Clark has been an educator in the Buncombe County Schools system for eleven years. She has enjoyed teaching mathematics at Charles D. Owen High School in Black Mountain for most of those years. In 2009, Kim took a break from the classroom to become Buncombe County Schools' first high school mathematics coach. For two years she collaborated with high school and middle school mathematics teachers, and other instructional coaches to improve teaching and learning. She worked directly with the mathematics curriculum specialist to promote teacher leadership and provide professional development in preparation for the transition to the Common Core. She returned to her classroom at Charles D. Owen High School in 2011 in order to apply what she learned in her experiences as a mathematics coach and to create a model classroom reflecting the Standards for Mathematical Practice. Kim is a 2001 graduate of Appalachian State University and she attained her National Board Certification in 2007.

Kim is very passionate about ensuring access to high levels of mathematics for all students. She believes that the first step to ensuring this access is through transforming the way teaching and learning take place in the classroom. She plans to use Burroughs Wellcome Funds to create meaningful professional development opportunities and classroom materials for herself and her colleagues as they continue to work on this transformation as well as implementing the Common Core.

Where are they now...

Kim is still enjoying teaching at Owen High School and continues to work with her colleagues to use research-based practices to provide quality instruction for students in mathematics.

RENATA CRAWLEY

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I currently teach 7th-grade science at West Middle School. I am the creator and coordinator of Full STEM Ahead. This is a mobile STEM program that visits schools during the academic year and works with students in communities of McDowell County during the summer months. This past summer, the STEM van traveled throughout McDowell and worked with 3rd-5th grade students on several projects. These included building robots, creating a mini garden, coding with ozobots, and conducting experiments on rocks and minerals. Full STEM Ahead has science kits available

for districts to use for summer programs and during the school year. These kits include Life science and Monarch Garden Kits. There will be other kits for Earth Science and Physical Science next school year.

MICHELLE ELLIS

HUNTER HUSS HIGH SCHOOL
GASTON COUNTY SCHOOLS
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Michelle Ellis is an 11 year teaching veteran. She started her career after she graduated Belmont Abbey College in 2002 with a degree in Elementary Education. After her rookie year as a 7th grade math teacher at York Chester Middle School, she transferred to Lingerfeldt Elementary School where she taught for nine years. During her tenure at Lingerfeldt, she developed an even greater perspective on how science should be incorporated more at the elementary level.

She became more involved in science education's curriculum and policies. She was chosen to work on the 5th grade science curriculum unit development team for NCDPI and was chosen as a North Carolina Science Leadership Association Fellow. During her time in elementary school, she completed her AIG and middle school science certifications. In 2012, Michelle completed her Master's in Education with a Specialization in Science K-8 from Walden University.

In the Fall of 2014, Ellis transferred to Hunter Huss High School to become a 9th grade earth and environmental science teacher. She is excited to use her award to further STEM education in the Gaston County School system. Her goal is to share the funding so that a STEM learning network can be built among middle and high schools. This way many economically disadvantaged students can benefit from the resources.

CHRISTOPHER FISHER

INDIAN TRAIL ELEMENTARY
UNION COUNTY PUBLIC SCHOOLS
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Christopher Fisher teaches a STEAM Lab at Indian Trail Elementary in Union County. In his classroom, K through 5 students design and build a vast array of products, many of which are motorized and codable. Fisher also specializes in facilitating student creation of stop-motion animation films that integrate content in all subject areas, and he is in his 5th year of coaching First Lego League Robotics teams.

Fisher is a graduate of Davidson College, and he earned a Master's degree from the University of Florida. He is a twice-renewed National Board Certified Teacher, is certified in Gifted Instruction, and was once his region's elementary Ben Craig Outstanding Educator Award Winner.

In his 25-year career Fisher has previously taught grades 2 through 5 and Academically Gifted Classes, served as an Arts Integration Coordinator, and coached Odyssey of the Mind. Additionally, Fisher mentored hundreds of his colleagues through multiple roles within the CMS National Board Candidate Support Program.

He is a runner and cyclist, and he has bicycled across the United States and finished an Ironman Distance Triathlon. He also enjoys playing guitar, traveling, and spending time with his wife, daughter, and two dogs.

GREGORY FISHER

MT. TABOR HIGH SCHOOL

WINSTON-SALEM/FORSYTH COUNTY SCHOOL DISTRICT

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Gregory Fisher is a mathematics teacher at Mt. Tabor High School in the Winston-Salem/Forsyth County School District. He graduated from Davidson College in 1994 with a B.S. in Mathematics. He earned his Masters of Education Leadership from Framingham State College in 2003 and his National Board Certification in Adolescent and Young Adult Mathematics in 2006.

Fisher has vast teaching experiences throughout the world. He taught ESL at middle schools in Japan and South Korea; high school mathematics in Mexico; and middle school mathematics in Brazil. In Winston-Salem, he has taught middle school Japanese, high school Physics, and various high school mathematics classes.

He is actively involved with the Winston-Salem Jaycees and fosters community service opportunities for his students. He also assists with the cross-country teams. He has also provided guidance and opportunities for his students to participate in national, state, and regional math contests.

He has facilitated workshops for his school district, North Carolina Honors and AP Conference, and for the North Carolina Council of Teachers of Mathematics state conference. He works with Winston-Salem State University to mentor teachers across the state. He earned the Winston-Salem/Forsyth County Secondary Mathematics Teacher of the Year in 2010. He plans to increase the community outreach programs and the resources for the district with the grant.

Where are they now...

I am in my 5th year teaching AP Statistics at the Winston-Salem Career Center. I have also taught AP Calculus AB for two years. I was a semi-finalist for WSFCS Teacher of the Year last year. I have been a reader for AP Statistics Exams the two previous summers. I have also continued to give workshops at regional and national math conferences. I was selected to Teacher Academy for WSFCS.

CAST provided me with a lot of leadership experience that I have continued to use within the district (leading workshops and mentoring) and school. I also gained a lot of knowledge that led me to be a better teacher.

BETSY FOREMAN

HOLLY TREE ELEMENTARY
NEW HANOVER COUNTY SCHOOLS
ELIZABETH.FOREMAN@NHCS.NET



Betsy Foreman is a dedicated fifth grade teacher with a proven background in improving student performance by developing creative and innovative lesson plans which use best teaching practices for diverse classroom settings. Additionally, she fosters a cohesive student-learning atmosphere by identifying children's individual and collective needs.

Foreman earned her teaching degree at Meredith College and received a B.A. in psychology from North Carolina State University where she graduated Magna Cum Laude.

Currently, she has been an educator at the elementary level for the past 16 years in New Hanover County. The majority of this time has been spent as a 5th grade science teacher. In 2005, she received New Hanover County's Walmart Teacher of the Year Award, has been a nationally board certified teacher since 2008 and in 2013, received certification to teach academically and intellectually gifted students.

Betsy provides professional development to teachers in New Hanover County and works closely with her county to enhance best teaching practices for other teachers. Foreman was a member of the Essential Standards Advisory Team to help 5th grade science teachers transition to the science essentials. She later helped to evaluate and improve New Hanover County's science kits and created digital learning boards that contain activities and background information for the science essentials in 2012. In 2016, she joined the New Hanover County Digital Learning Team and implemented the first digital science fair in her county.

HEATHER KAISER, EDD

CUMBERLAND ACADEMY K-5, VIRTUAL SCHOOL
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Heather Kaiser holds a B.S. in Elementary Education and Educational Ministry from Houghton College. Kaiser began her teaching career at Pauline Jones Elementary School in 1998 after moving from Southwestern NY to Fayetteville, NC. Over the years, Kaiser has taught children at almost every grade level from Kindergarten through 5th grade. In 2002, she received her M.Ed. in Educational Technology through Lesley University as well as achieving National Board Certification as a Middle Childhood Generalist.

After spending six years teaching 4th grade at two other Cumberland County schools, Kaiser returned to Pauline Jones Elementary in 2007, with a renewed ambition to make a difference in the lives of students who are most in need of caring and committed teachers. While serving as the science lab teacher, she was instrumental in the development of a community garden as well as gaining certification as a “green school”. Students benefited daily from the resources she secured through grants from various organizations.

With the CAST award, Kaiser developed “Stimulating Science Simulations” that engage students in learning about careers in Science, Technology, Engineering, and Mathematics through inquiry-based investigations embedded within role-play. These units are shared freely with other teachers via the Internet; making them easy to replicate in any classroom and on any budget.

In 2017, capitalizing on the support and funding of the Burroughs Wellcome, Heather completed her doctoral studies with a specialization in e-learning. Kaiser is frequently sought after to provide both face-to-face and online staff development that spans a variety of topics such as using quality tools, infusing rigor, best practices for teaching science, incorporating technology and mentoring beginning teachers. She has created dozens of “webinars” to assist teachers with the implementation of technology and replication of her teaching models.

She currently teaches 5th grade and serves as a teacher leader at Cumberland Academy K-5, an online school in Cumberland County. Kaiser was recently asked to serve as adjunct professor in the field of Instructional Technology for Methodist University; a role that she eagerly accepted. Additionally, she maintains an active presence connecting with educators on social media, continues to facilitate professional learning for other educators, has been appointed to various North Carolina advisory teams, and holds the elected position of president in her local professional organization.

KIRK M. KENNEDY

EAST DUPLIN HIGH SCHOOL
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Kirk Kennedy received his Bachelor of Science in Biology from the University of North Carolina at Chapel Hill and received his Master of Arts in Education from East Carolina University. He has been an educator in the Duplin County School system for twenty-two years. During this time, he has taught Biology, Honors Biology, and AP Biology at East Duplin High School. Also, he became East Duplin High School's first AP Biology teacher and has been the Science Department Chair for the last twenty years.

In 2015, Mr. Kennedy became the Lead Biology Teacher for the District in which he travels from to each high school in the district and helps provide support to the Biology teachers. He plans to use the funds from the Burroughs Wellcome award to help provide Biology teachers all over the district professional development opportunities and in class support. Also, he plans to purchase technology and lab equipment for his classroom that will help students explore the wonderful world of Biology.

Mr. Kennedy's tenure has included multiple honors and awards. He is a National Board Certified Teacher, a Kenan Fellow, and has been the Teacher of the Year twice. Also, he was the 2015 Outstanding 9-16 Educator Award in Science, Mathematics, and Technology Education. Aside from his work as a teacher, he enjoys spending time with his wife, April, and his two daughters, Ellison and Emory.

Where are they now...

Mr. Kennedy has just completed his 26th year of teaching Biology in Duplin County. Since the start of the pandemic, Mr. Kennedy has led numerous online PDs for teachers around the state in an effort to help them transition to online teaching. He believes that a blending of online and face-to-face instruction is the future of teaching.

KATIE MAULDIN MATTHEWS

HARDIN PARK SCHOOL
WATAUGA COUNTY SCHOOLS
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Katie Matthews began her teaching career in 1997. She taught kindergarten in Wake County and Richmond City Schools, VA. Since 2005 she has been teaching first grade in Watauga County Schools at Mabel Elementary, Valle Crucis, and currently at Hardin Park School.

Katie created the program Science PALS (Partnering in Active Learning through Science) with her BWF CAST grant. PALS pairs elementary students with intermediate or middle school students for weekly hands-on science investigations utilizing the 4 C's to increase rigor and build relationships in the classroom. Over the course of the grant, the program grew from 40 students, 2 teachers and 1 school in 2014 to over 750 students, 35 teachers, all 8 elementary schools in Watauga County Schools and 3 additional school districts in NC at the conclusion of the 2019-2020 school year.

Katie was named Watauga County Schools Teacher of the Year in 2012-2013 and NCSTA District 7 Outstanding Elementary Science Teacher in 2016. Katie was a 2018 recipient of the K-6 Presidential Award in Math and Science Teaching. During the summer of 2022, Katie was selected to be part of an inaugural group of educators who traveled with Steve Spangler to Iceland.

Katie has a B.A. in elementary education from the University of North Carolina at Chapel Hill and a M.Ed. in Curriculum, Instruction and Supervision from the University of North Carolina at Wilmington. She is certified K-6 in elementary education and is Nationally Board-Certified Early Childhood Generalist.

JENNIFER MICHELLE MCCARTHY

WEST CABARRUS HIGH SCHOOL
CABARRUS COUNTY SCHOOLS
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Where are they now...

Mrs. McCarthy just entered her 17th year in Cabarrus County Schools and her 1st year at West Cabarrus High School. The CAST award inspired her to use her leadership experience to enhance mathematics education in her school and district. She serves as the Mathematics Department Chair and on the School Improvement Team for West Cabarrus. In addition, she facilitates a district professional learning community for all AP Calculus teachers in Cabarrus County and continues to serve on the district Curriculum Writing Team. In 2021, she was awarded the Impact Through Education Award for her district and was then nominated for the PAEMST award.

SONJA MCKAY

EXPLORIS MIDDLE SCHOOL
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SONJA.MCKAY@GMAIL.COM



Sonja McKay is a National Board Certified Teacher in Early Adolescence Mathematics. She earned a MEd in Middle Grades Mathematics Education from the University of North Carolina-Chapel Hill. She earned her undergraduate degree in Middle Grades Mathematics and Science Education as a Teaching Fellow at Appalachian State University.

Sonja McKay currently teaches seventh grade at Exploris Middle School, an innovative charter school in downtown Raleigh, North Carolina. Before moving to Raleigh in 2004,

Sonja taught sixth grade mathematics and science in Guilford County.

In 2010, Sonja McKay completed a two year Kenan Fellowship during which her students piloted STEM curriculum related to sustainability, consumerism, and packaging design. Sonja McKay's work through the CASM Award builds upon her Kenan Fellowship work in design thinking. Over the next five years, McKay will work with in-service and pre-service teachers to incorporate design thinking into student experiences that are authentic, issue-driven, and project-based.

Where are they now...

Sonja McKay is currently an AIG/Enrichment teacher at Lucille Hunter GT/AIG Magnet Elementary School in Raleigh, North Carolina. Prior to Hunter, Sonja McKay taught for over 15 years at The Exploris School, an innovative issues-based K-8 charter school.

McKay also worked to integrate design thinking into student learning opportunities at her school. In 2016, her student changemakers were invited to attend and present at the international "Be the Change" design thinking conference in Beijing, China.

BEVERLY OWENS

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From dinosaur digs in Wyoming, to exploring deep-sea habitats at the bottom of the ocean, exploring science is where I want to be! I love science, and I enjoy sharing science with my students. I am particularly interested in the interconnection between science, nature, and art.

I teach 11th grade chemistry at Cleveland Early College High School, where I also lead a Nature and Art Club, and was selected as the 2021 Teacher of the Year. I am a National Geographic Certified Educator, National Board Certified Teacher, and hold NC Environmental Education Certification.

An avid naturalist, I am currently pursuing a certificate in Natural Science Illustration through the Rhode Island School of Design.

I have a passion for experiential learning and global understanding, and I'm currently participating in several programs to increase capacity for global citizenship at the classroom level. The World View Exploring Indigenous Cultures Fellowship and the SDG Fellowship have helped me to meet some of my global learning goals. Through the Fulbright Japan-US ICT Teacher Exchange, I collaborated with teachers from the US and Japan to develop curriculum utilizing technology. As an NEA Foundation Global Learning Fellow, I traveled to Peru, and hiked at several archaeological sites including Machu Picchu. I also studied archaeology at Crow Canyon Archaeological Center, Mapping Nature Across the Americas as an NEH Scholar, and subseafloor sedimentology in Hawaii with the EARTH Program.

As a Kenan Fellow, I worked with a mentor at American Zinc Products, to learn about sustainability and the application of zinc products. I have participated in several at-sea research expeditions, including studying deep-sea coral habitats in the Atlantic Ocean on the *R/V Ronald H Brown*, and ground-truthing deepwater canyons off the Northeastern coast of the US on board the *FSV Henry B Bigelow* as a NOAA Teacher at Sea. I also served as a Science Communication Fellow on Titanic discoverer Dr. Robert Ballard's research ship the *E/V Nautilus*, where we explored brine pools in the Gulf of Mexico transited through the Panama Canal.

I recently published several articles through the American Association of Chemistry Teachers, Outdoor Education Collective, eSchool News, and National Geographic Education, as well as co-authoring the *MakerBot Educators Guidebook*, a book about classroom applications of 3D printing.

BRAD RHEW

COOK LITERACY MODEL SCHOOL
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Brad Rhew is a STEM Coach in Winston-Salem/Forsyth County Schools, NC. He currently serves on the NC Science Teachers Association as the District 5 Director. He also serves as a Science Fellows committee member and the membership chair for the NC Science Leadership Association. He is also the chair of the Urban Science Education Advisory Board. He works closely with his school district and state science leaders to increase hands-on inquiry-based learning in the science and STEM classroom. He was recently awarded the 2021 Jo Duckett

Wallace Elementary School Distinguished Service in Science Education at the North Carolina Science Teachers Association conference. He is currently working on his doctorate in Curriculum and Instruction through Gardner-Webb University.

MELAINE RICKARD

WESTERN ALAMANCE MIDDLE SCHOOL
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Melaine Rickard is an educator with twenty-four years' experience. She earned a BA in Middle Grades Education from Elon College with concentrations in English and Social Studies. Ten years into her career, she realized that science education, particularly inquiry-based science education, was her passion and gained certification in middle grades science. She is National Board certified in Early Adolescent Science and holds a master's degree in middle grades science education from UNC Chapel Hill. She is also AIG certified.

While she has taught all middle school grades and subjects, Rickard currently teaches gifted students. In this role, she gets to enrich and challenge students in her own class and to co-teach with all the core teachers in her school. Using this format, she plans to use the award to integrate STEM learning strategies into all subjects at her school.

Participating in an NSF-sponsored Research Experience for Teachers at NC State's FREEDM Systems Center, followed by a Kenan Fellowship, sparked her passion for STEM education. She shares her understanding of STEM at state-level conferences and in her school system via blended learning sessions and face to face workshops.

Currently, Rickard serves as the Events Planner for the NC Science Leadership Association and is Alamance County's Division A Regional Tournament director for Science Olympiad. She also coaches a newly formed robotics club at her school and directs a summer camp focused on Citizen Science for middle schoolers.

For fun, Rickard enjoys running, teaching group exercise classes, reading, and spending time with her family and pets.

Where are they now...

Melaine is currently involved in implementing STEM in many areas of her school. She coaches her school's successful FIRST Lego League Team and coordinates the district's Science Olympiad program. She is also currently involved in implementing her school's STEM enrichment program through intervention time while also facilitating a year-long, Kenan Fellows sponsored PD called STEMwork with teachers at her school.

JODI S. RIEDEL

WAKEFIELD HIGH SCHOOL
WAKE COUNTY PUBLIC SCHOOLS
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Jodi Songer Riedel teaches Agricultural Education and Family and Consumer Science classes at Wakefield High School in Raleigh, NC. Her program is a fusion of food science and horticulture applications. She has taught for 13 years, focusing on urban farming and the farm to fork continuum. While at Wakefield, she has obtained several grants to help fund and establish three vegetable gardens for the school grounds. She focuses on not only sustainable cultivation practices but also what to do with crops after they have been harvested. Students grow

vegetables, herbs, and fruits that are then harvested and used by the food science classes. Students learn how to use the commodities but also how to preserve them. As a Kenan Fellow, Governor's Teacher Network member and now the author of a national high school horticulture textbook, Jodi's passion is to create STEM lessons that get students hands dirty, bodies moving, and minds engaged.

Riedel's tenure includes multiple honors and awards. She is a National Board Certified Teacher, a North Carolina Governor's Environmental Educator, and a Teacher of the Year. Aside from her work as a teacher, she is an avid gardener and enjoys time with her family: 40 chickens, 5 goats, 2 ducks, 2 guinea hens, dogs, cats, fish, husband and son, William.

Where are they now...

Jodi Riedel spent 19 years in the classroom as an agricultural education teacher at Wakefield High School in Raleigh. She is now a senior lecturer in Horticultural Science at NCSU and a doctoral student in Agriculture and Extension Education. She credits her years in high school public education for developing and fine tuning her passion for STEM instruction.

JOHN D. SCARFPIN

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CRAVEN COUNTY SCHOOLS
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Mr. Scarfpin has been working in Craven County Schools for the past fifteen years as a STEM educator. For the past nine years he has been teaching Technology, Engineering, and Computer Science at Havelock High School. He completed his Bachelors degree in Math and Science Education at Ohio University, his Masters Degree in Instructional Technology Systems as UNC Charlotte, and is currently completing his doctoral studies in Technology and Engineering Education through North Carolina State University. Mr. Scarfpin was part of the 2015 CAST cohort.

SALLIE SENSENEY

MOUNTAIN HERITAGE HIGH SCHOOL
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Sallie Senseney has taught Biology, AP Biology, and Earth Science at Mountain Heritage High School since 2010. She is also an instructional coach. She returned to MHHS, her home high school, after earning an undergraduate degree in biology from the University of North Carolina at Chapel Hill. At UNC, she was a Burroughs Wellcome Fund Scholar in the UNC-BEST program. She earned her National Board Certification in 2014 and a master's degree in biology from Clemson University in 2017.

In the classroom, Sallie focuses on building relationships with her students in order to make science content relevant to them. She utilizes hands-on teaching strategies to engage students and uses her school's rural campus to study concepts like biodiversity, invasive species, and water quality.

Sallie has twice been recognized for excellence in teaching by Yancey County Schools and was the 2018-2019 Mountain Heritage High School Teacher of the Year. In 2019, she was recognized by the UNC School of Education as the Outstanding Young Alumna.

Sallie is using the Burroughs Wellcome Fund Career Award to create an Innovation Lab at her school, increase STEM learning opportunities for students, and strengthen science instruction by providing professional development to K-12 teachers in Yancey County Schools.

LINDSAY SMITH

NORTH CAROLINA SCHOOL OF SCIENCE AND MATHEMATICS
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Lindsay Smith has served in the teaching profession for the past twenty years and is a National Board Certified Teacher. She currently teaches AP Biology, Environmental Science, Ecology, and Aquatic Ecology at the North Carolina School of Science and Mathematics in Morganton, NC. Prior to NCSSM she was a member of the faculty at South Lake High School in Detroit, Michigan, served two terms as an Albert Einstein Distinguished Educator Fellow with the NOAA Office of Education in Washington, DC, and most recently was a teacher at Mooresville High School in

Mooresville, North Carolina. To connect her students to scientists and real-time data she has participated in the Ocean Exploration Trust Science Communications Fellowship, NOAA Teacher at Sea, and the NSF PolarTREC program. Through these experiences she traveled to Antarctica, the Bering Sea, Galapagos Islands, and the Caribbean Sea to bring real science into her classroom and encourage her students to be scientists too. As a founding faculty member of the NCSSM-Morganton campus, Ms. Smith looks forward to using her award to connect NCSSM students to the surrounding community by providing citizen science and service learning opportunities throughout the region.

LAUREN MCLEOD STRICKLAND

FOUR OAKS ELEMENTARY SCHOOL
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Mrs. Lauren McLeod Strickland is a 5th Grade Math and Science Teacher at Four Oaks Elementary School in Johnston County Public Schools. She is a National Board Certified teacher with over twelve years of experience in the K-5 classroom. She was Johnston County Public Schools' NCCTM Teacher of the Year in 2015 and a finalist for Johnston County Public Schools' Flame for Learning Award in 2011.

Lauren's passion is inquiry based math and science instruction. Her teaching is rooted in the idea that students should never be prematurely taught something they are capable of discovering for themselves. She is frequently called to facilitate professional development sessions in the areas of mathematics and science in her district and across the state. Lauren is a facilitator for the North Carolina Inquiry Science Collaborative Network. She has presented multiple sessions at the North Carolina Council of Teachers of Mathematics Conference and the Triangle High Five Math Summit.

Lauren plans to utilize the funds from this award to improve learning for students by deepening mathematical content knowledge of teachers, while focusing on best practices in instruction that will produce successful students, ready for life in an ever changing global society. Her plan of work centers around the establishment of Professional Learning Labs in which teams of teachers participate in professional development, engage in strategic planning around a common goal, observe instruction, give feedback, reflect, and revise teaching strategies. This innovative professional growth model utilizes relevant data and relationships between teachers to improve instruction for students by breaking down barriers between classrooms.

Lauren graduated, magna cum laude, with a B.S. in Elementary Education from Elon University where she was a North Carolina Teaching Fellow. She went on to obtain her M. ED. in Elementary Education with an emphasis in K-8 Mathematics Curriculum from North Carolina State University.

CLAUDIA WALKER

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Walker has been a teacher for thirty years, in three different Title I schools in Greensboro, North Carolina, and in New Jersey. For the last eighteen years, she has been teaching at Murphey Traditional Academy in Greensboro, a K-5 school of about 300 students. Claudia received her add-on Math Licensure for the state of North Carolina in May 2011. Claudia received National Board Teacher Certification in 2003, and National Board renewal in 2013. She has been trained in Singapore Math, was the grant writer and recipient for the North Carolina Singapore Math

Pilot Program in 2011, and is the Singapore Math Coach for her school. Claudia received a Career Award for Science and Mathematics Teachers from the Burroughs Wellcome Fund in 2010, and was selected by her peers as Teacher of the year for Murphey Traditional Academy in 2009 and 2015. She also received Outstanding Science Teaching Award from the North Carolina Science Teachers Association in 2014. She has implemented and received extensive training in Engineering is Elementary, a program from the Museum of Science in Boston through a partnership with the University of North Carolina Greensboro. She worked as an educator with the UBEATS: A BioMusic STEM Intervention for ESL Students in Guilford County. She received her BA degree from Rutgers University and her MA in Education, Curriculum and Technology from the University of Phoenix. In 2015, she traveled to Singapore as part of a group of STEM teachers for the Center for International Understanding - Go Global NC. She currently serves on the boards for the North Carolina Science, Mathematics, and Technology Education Center and the North Carolina Board of Science, Technology & Innovation at the North Carolina Department of Commerce.

ROLIE “ANDI” ADRIENNE WEBB

PROFESSIONAL LEARNING SPECIALIST

ARLINGTON PUBLIC SCHOOLS

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Burroughs Wellcome Fund CAST 2015-2021 awardee, Andi Webb, completed her Doctor of Education in Educational Leadership in May 2022 through East Carolina University. Her dissertation research focused on teacher retention for beginning teachers and new hires was selected by ECU to be shared with state legislators. Since becoming a Career Award for Science and Mathematics Teachers grant recipient, Dr. Webb has studied in Singapore through the Fulbright for Distinguished Awards in Teaching Program, with Fund for Teachers, and through the CAST. In 2017, she was named Fulbrighter of the Month. In 2021, Dr. Webb was named a

national awardee for the Presidential Awards for Excellence in Mathematics and Science Teaching through the White House Office of Science and Technology Policy and the National Science Foundation. During the 2018-2019 school year, Dr. Webb served as an Albert Einstein Distinguished Educator Fellow in the United States House of Representatives Education and Labor Committee Office. She was a member of the 2020-2022 North Carolina Science Leadership Association cohort and completed her North Carolina Environmental Educators Certification in 2022. Dr. Webb has served as an Earthwatch Teach Earth fellow and ambassador, Honeywell Educators at Space Academy fellow and ambassador, NOAA Teacher at Sea, and as a World View Global Leader. She is a National Board Certified Teacher in literacy/language arts. She was the 2012 NC Elementary Social Studies Teacher of the Year and served on the NC Governor’s Teacher Network in 2015. She recently served as an NEA Global Learning Fellow and a mentor for both Fulbright and Fund for Teachers and she was a 2021 National Teachers Hall of Fame Top Ten Finalist. Dr. Webb began her work with Singapore Math in Cumberland County Schools and continued in New Hanover County Schools. Most recently, Dr. Webb accepted a position as a Professional Learning Specialist with Arlington Public Schools in Arlington, Virginia. When not working in STEM, she enjoys spending time with those she loves, reading, and traveling. Dr. Webb has traveled to all seven continents with a focus on global/international education and sustainability. Her most recent work in Antarctica and in the Amazon Rainforest has impacted her tremendously and her goal is to continue working for a more sustainable environment, particularly for the people and animals that inhabit those regions. Dr. Webb is most grateful to Burroughs Wellcome Fund for their unending support and encouragement. She regularly advocates for STEM and international education and is always willing to share the powerful impact Burroughs Wellcome Fund has on teachers with anyone.

The background is a dark teal color with a repeating pattern of white line-art icons. These icons include various mathematical symbols like gears, compasses, triangles, and circles, as well as scientific symbols like a microscope, a test tube rack, a DNA helix, and a globe. The icons are scattered across the entire page, creating a dense, textured effect.

SINGAPORE MATHEMATICS COMMUNITY OF PRACTICE

The Singapore mathematics method is a pedagogical strategy adopted by a team of curriculum specialists in the Singapore Ministry of Education in the early 1980's to address the issue of students having difficulty with word problems in early years of school. It has since become a distinguishing feature of the Singapore primary mathematics curriculum and the mathematics strategies are also used in other countries.

Singapore mathematics became popular after the release of scores from the Trends in International Mathematics and Science Studies (TIMSS) first in 1995, and later in 1999, 2003, and 2007 that showed Singapore at the top of the world in 4th and 8th grade mathematics.

Following are profiles of current elementary schools participating in the Singapore Mathematics Community of Practice in North Carolina.

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Retired, High School and
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BWF

SCIENCE EDUCATION PROGRAMS

CAREER AWARDS FOR STEM TEACHERS

The CAST award provides \$175,000 over five years and is available to North Carolina teachers who have an outstanding performance record in educating children and who demonstrate solid knowledge of STEM content.

PROMOTING INNOVATION IN SCIENCE AND MATHEMATICS

The PRISM award provides up to \$3,000 for one year to cover the cost of equipment, materials, and supplies. An additional \$1,500 may be requested for professional development related to the implementation of new equipment or use of materials in the classroom. Awards are made to teaching professionals that hold a professional educator's license to teach in a North Carolina K-12 public school.

STUDENT STEM ENRICHMENT PROGRAM

The Student STEM Enrichment Program (SSEP) award provides up to \$60,000 per year for three years to support diverse programs with a common goal: to enable primary and secondary students to participate in creative, hands-on STEM activities for K-12 students and pursue inquiry-based exploration in BWF's home state of North Carolina. These awards provide up to \$60,000 per year for three years.

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