

STEM Awardee Annual Conference

Washington Duke Inn | Durham, North Carolina | August 15, 2012



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Introduction

At the Burroughs Wellcome Fund (BWF), we have always believed that the best way to build the future of the biomedical research enterprise is to invest in people. We take pride in not only the careful selection of our awardees, but also in the stewardship of their BWF grants. We recognize that in addition to flexible funding, educators require time to network with colleagues to broaden their scope of what is global educational excellence.

It is toward this purpose that we convene those who hold our awards, so that they can share their experiences in reaching the next generation of young scientists. We provide opportunities for BWF science education award recipients to meet with others vested in teaching and learning in formal and informal environments, to interact with members of the program advisory committees and BWF staff, and to consider topics germane to the emergence of science, technology, engineering, and mathematics leaders.

BWF has invested over \$45 million in STEM education since 1996 to help build systemic reform primarily in North Carolina. You are a major part of the reform movement. We welcome you and trust that this meeting will be a productive experience for you.

About the Burroughs Wellcome Fund

The Burroughs Wellcome Fund is an independent private foundation dedicated to advancing the biomedical sciences by supporting research and other scientific and educational activities. Within this broad mission, BWF seeks to accomplish two primary goals—to help scientists early in their careers develop as independent investigators and to advance fields in the basic biomedical sciences that are undervalued or in need of particular encouragement.

Financial support is channeled primarily through competitive peer-reviewed award programs. Grants are made primarily to degree-granting institutions on behalf of individual researchers, who must be nominated by their institutions. To complement these competitive award programs, grants are also made to nonprofit organizations conducting activities intended to improve the general environment for science.

BWF was founded in 1955 as the corporate foundation of Burroughs Wellcome Co., the U.S. branch of the Wellcome pharmaceutical enterprise, based in the United Kingdom. In 1993, BWF received a \$400 million gift from the Wellcome Trust, the main entity in the enterprise, to become a fully independent foundation.

Agenda

Purpose: To convene and provide opportunities for educational exchanges and capacity building for the Burroughs Wellcome Fund's Science Education award recipients including—Student Science Enrichment Program Directors, Career Awardees for Science and Mathematics Teachers, FastTrack Scholars/Teachers, and Singapore Math Pilot Teachers/Principals.

8:00 – 8:30 a.m.

CONTINENTAL BREAKFAST

Room: President's Ballroom Foyer

8:30 – 8:35 a.m.

Welcome | Room: President's Ballroom II-IV

John Burris, Ph.D., BWF President

8:35 – 8:50 a.m.

Overview of the Burroughs Wellcome Fund Science Education Program; Agenda and Meeting Format; Introduction of Speaker

Carr Thompson

BWF Senior Program Officer

8:50 – 9:30 a.m.

Keynote Speaker:

James H. Johnson, Ph.D.

William Rand Kenan, Jr. Distinguished Professor

Kenan-Flager Business School

University of North Carolina at Chapel Hill

Biography in meeting materials

Questions and Answers to follow presentation

9:35 – 9:50 a.m.

BREAK

9:50 – 11:30 a.m.

POSTER SESSION | Room: President's Gallery

Student Science Enrichment Program Directors will share their work with other meeting participants.

11:45 – 1:30 p.m.

LUNCH AND TABLE DISCUSSIONS

Room: President's Ballroom I

(See nametag for assigned table seating)

(Career Award for Science and Mathematics Teachers will meet in the McGhee/Allen room for a working lunch)

Agenda continued on the next page.

1:35 – 3:30 p.m.

CONCURRENT SESSIONS

**Next Generation Science Standards Framework
and Application to Out of School**

Room: President's Ballroom II-IV

Heidi A. Schweingruber, Ph.D.

Deputy Director, Board on Science Education

The National Research Council, Washington, DC

**Common Core Mathematics Standards:
What does it look like in the classroom?**

Room: McGhee/Allen Room

Carol Midgett

Mathematics Facilitator

Partnership for Improving Mathematical

Understanding of Students and Teachers

3:30 p.m.

MEETING ADJOURNMENT

Keynote Speaker

James H. Johnson Jr., Ph.D.

William Rand Kenan Jr. Distinguished Professor
Kenan-Flager Business School
University of North Carolina at Chapel Hill

James H. Johnson Jr., Ph.D., is the William R. Kenan Jr. Distinguished Professor of strategy and entrepreneurship and director of the Urban Investment Strategies Center. His research interests include community and economic development, the effects of demographic changes on the U.S. workplace, interethnic minority conflict in advanced industrial societies, urban poverty and public policy in urban America, and workforce diversity issues.

Dr. Johnson coauthored “The Economic Impact of the African American Population on the State of North Carolina” and a study on the economic impact of North Carolina’s Hispanic population. With support from the Russell Sage Foundation, Dr. Johnson published research on the economic impact of Sept. 11 on U.S. metropolitan communities. Currently he is researching the economic and employment impact of white collar job shifts offshore on U.S. competitiveness.

Dr. Johnson examines the causes and consequences of growing inequality in American society, particularly as it affects socially and economically disadvantaged youth; entrepreneurial approaches to poverty alleviation, job creation, and community development; interethnic minority conflict in advanced industrial societies; and business demography and workforce diversity issues. Fast Company profiled him in “Hopes and Dreams.”

He has published more than 100 scholarly research articles and three research monographs and has co-edited four theme issues of scholarly journals on these and related topics. His latest book is “Prismatic Metropolis: Inequality in Los Angeles.” Dr. Johnson received his Ph.D. from Michigan State University, his MS from the University of Wisconsin at Madison and his BS from North Carolina Central University.

Other Speakers

Heidi Schweingruber, Ph.D.

**Deputy Director, Board on Science Education
National Research Council**

Heidi Schweingruber, Ph.D., is the Deputy Director of the Board on Science Education at the National Research Council. As deputy director, she coordinates and oversees all of the work of the board and has presented widely on its behalf. She served as study director for a congressionally mandated review of NASA's pre-college education programs, which was completed and released on the Fall of 2007. She co-directed the study that produced the 2007 report *Taking Science to School: Learning and Teaching Science in Grades K-8*. She was a primary author on the practitioner's version of this report titled, *Ready, Set, Science! Putting Research to Work in K-8 Science Classrooms* (2008) which won a 2008 distinguished achievement award from the Association of Educational Publishers for resources in professional development. She also served as a research associate on *America's Lab Report: Investigations in High School Science* (2005).

Prior to joining the NRC, Dr. Schweingruber worked as a senior research associate at the Institute of Education Sciences in the U.S. Department of Education. In that role, she served as a program officer for the preschool curriculum evaluation program and for a grant program in mathematics education. She was also a liaison to the Department of Education's Mathematics and Science Initiative and an adviser to the Early Reading First program.

Previously, she was the director of research for the Rice University School Mathematics Project, an outreach program in K-12 mathematics education which serves schools and districts in the greater Houston area. During that time, she taught in the psychology and education departments and worked as an evaluation consultant to two NSF funded education projects in the university. Prior to that, she was a post-doctoral researcher with the Center for Academic and Readings Skills at the University of Texas, Houston Health Science Center, where she worked on a longitudinal study of early reading skills and instruction for low-income, minority students. She holds a Ph.D. in psychology (developmental) and anthropology, and a certificate in culture and cognition from the University of Michigan.

Carol Midgett

Mathematics Facilitator

Partnership for Improving Mathematical Understanding of Students and Teachers

Carol Midgett is a National Board Certified Teacher who has taught first through eighth grades for more than 27 years. She has also been a lecturer at the University of North Carolina Wilmington. She currently serves as Mathematics Facilitator for the Partnership for Improving Mathematical Understanding of Students and Teachers (PIMUST), a \$1,000,000 Mathematics and Partnership Grant.

Midgett holds certifications in gifted education, elementary education, mentoring, and a master's degree in Curriculum and Instruction. She is a trainer for Lenses on Learning, a professional development program for principal leadership developed by EDC. She is a NC Presidential Awardee in Elementary Mathematics. She has authored and co-authored many articles in juried mathematics and research journals. Midgett has contributed to numerous books on assessment, process writing, cognitive coaching, professional development, and mathematics. She has presented at state, regional, national and international conferences in Japan, China, and Russia.

Midgett served on the NCTM Standards 2000 prek-2 Writing Team, the NCTM Assessment Addenda Writing Team, and participated in the NCTM project to implement the Geometry Standards. She currently co-chairs the state K-5 mathematics curriculum review team and is a member of the NC Strategic Planning Committee for Mathematics and Science. Midgett has received grants, organized, coordinated and directed numerous teacher enhancement projects in mathematics, science, and National Board Support. She served on the Early Childhood Generalist Standards Revision Committee for the National Board for Professional Teaching Standards and was lesson development coordinator for NCTM's Illuminations website from 2000-2005.

Student Science Enrichment Program Profiles

BWF has invested over \$22 million in providing quality out of school time programs for students. The Student Science Enrichment Program 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. Universities, colleges, public/private schools, museums, and non-profit community organizations are eligible to apply. The deadline for SSEP is April 16, 2013. For complete information and applications, visit www.bwfund.org. The following are SSEP award recipients:

Appalachian State University

Department of Mathematical Sciences

Director: Todd Abel, Ph.D.

Assistant Professor

Appalachian State University Department of Mathematical Sciences

Boone, NC

abelta@appstate.edu

Project: *Appalachian: Merging Math and Science in Intentional Natural Gains*
(AMMASING)

The AMMASING Project is a year-round program that targets 15 to 20 high school students from across the state and 10 teachers per year and focuses on the serious shortage of highly qualified mathematics and science teachers in North Carolina. The program provides significant pre-professional and educational opportunities for students interested in teaching careers by bringing together student participants from Summer Ventures in Science and Mathematics and ASU's Math Camp with in-service teachers. Participants initiate their year-long study with a five-day institute during the summer on ASU's campus. Purposeful activities focus the study of mathematical topics and scientific applications typically taught, but often not understood; collaborative study of scientific problems requiring the use of mathematics to solve, and analyzing teaching and learning through formal lesson study and a Design Research methodology. During the program, participants complete a series of investigation and application problems to find solutions, explanations, and extensions implemented and managed on the Project website; attend NCCTM meetings; and participate in a problem/investigation capstone meeting at Appalachian State University.

Carolina Electric Vehicle Coalition

Director: Eric Ryan
Executive Director
EV Challenge
eric@ev-challenge.org

Project: *The EV Challenge High School Program: Promoting Science Education through Renewable Transportation Technologies*

The EV Challenge provides an exciting and dynamic educational experience for high school students around the state. This nationally recognized program is a year long, interdisciplinary educational experience that focuses on the important relationship between science, technology, engineering, and mathematics concepts, energy conservation, personal transportation choices, and a healthy environment. During the course of a school year students are involved in the design and conversion of a full-size electric vehicle. In the spring, all participating schools bring the vehicles together for an exciting two-day competition.

Cherokee Middle School

Director: Bette Fitzgerald
Project Coordinator
Cherokee Middle School
Cherokee, NC
bettefitzgerald@yahoo.com

Project: *Cherokee Science Investigation*

The “CSI: Cherokee Science Investigation” program is a summer camp for middle school Cherokee students. The program provides a two-week long early summer camp for students to excel in the sciences: Ecology, Environmental Chemistry, Biology, Geology, and Chemistry. The program also offers a week-long technology and engineering camp dealing with robotics in late summer. To provide a continuum of learning, students who attend the early summer camp attend a fall and spring Saturday Academy. Cherokee Central Schools fund a robotics team to compete in LEGO League tournaments throughout the year.

Approximately 30 percent of all middle grades students each summer have the opportunity to connect their culture with the natural world. Student participants in this program have an opportunity to expand their scientific knowledge by learning through research and hands-on investigations. They use environmental science equipment to analyze reservation conditions. They collect and analyze data in the field as well as become exposed to scientific equipment in the lab, such as the projection microscope. Students learn how to safely conduct environmental and chemistry experiments with the help of trained professionals, as well as travel to nearby Western Carolina University and other universities for a broader exposure.

Durham Academy

Director: David Howard Lineberger Jr.

Teacher

Durham Academy

Durham, NC

howard.lineberger@da.org

Project: *MONS (Mars Outreach for NC Students)*

MONS (Mars Outreach for North Carolina Students) is a unique and innovative year-round program at Durham Academy for high school students. During their involvement in the MONS program, students take part in several ongoing research projects studying the red planet. The program has grown out of a long-standing collaboration between Dr. Jeffrey Moersch of the University of Tennessee-Knoxville and Durham Academy's Upper School science teacher, Howard Lineberger. Dr. Moersch is a veteran science team member of several of NASA's Mars missions, including the THEMIS (Thermal Infrared Emissions Spectrometer) instrument aboard the Mars Odyssey spacecraft and of the MER (Mars Exploration Rover) science team.

MONS students conduct original experimental design and research that contributes to the ongoing study of the red planet. MONS staff, which consists of veteran scientists and educators, is uniquely qualified to carry out this extraordinary program. Through the work of the MONS staff and interested scientists, 53 Triangle students have learned how real research is done and 38 Triangle students have authored or coauthored published scientific works. MONS students work at high academic college levels and some have become independent researchers although they still are high school students.

Durham Public Schools

Director: Benjamin Downing
K-12 Science Specialist
Durham Public Schools
Durham, NC
benjamin.downing@dpsnc.net

Project: *Scientifica: DPS Nurturing Future Scientists*

Scientifica: DPS Nurturing Future Scientists is a science research program that provides student scholars opportunities to increase their awareness and appreciation of the variety of science careers and competitions by working with mentors, researchers, community programs/resources, student peers, and DPS teachers. The program provides students with these multiple opportunities to interact with scientists and the scientific community through ongoing monthly seminars, summer institutes, and internships. Students are actively recruited in the spring with emphasis placed on the ninth grade scholars, although students in grades 10-12 are not denied a place in the program. As students progress through the program, they have their prior experiences and relationships to develop a more sophisticated research design. The area of research and the depth of participation are determined by the student. This program encourages DPS students to enter competition based science programs and it provides opportunities that are not available during the normal school day. These programs include Science Olympiad, First Robotics, Real World Design Challenge and many others. Juniors and Seniors are given the chance to seek and obtain internships where they experience “real” scientists in university labs or they participate in corporate research.

Elizabeth City State University

Director: Thomas J. Rossbach, Ph.D.

Professor

Elizabeth City State University

Elizabeth City, NC

tjrossbach@mail.ecsu.edu

Project: *Teaching Earth Science to Inspire New Geologist*

Teaching Earth Science to Inspire New Geologist introduces 20 middle school students per year to the geological sciences during a two-week summer program and follow-up activities during the academic year. The project is centered in the Department of Chemistry, Geology and Physics at Elizabeth City State University. The goal is to increase student interest in the Earth sciences by intensive instruction in basic geological content prior to their required high school Earth science course. Workshops are offered to expose students to Earth processes and make them aware of geological processes and set them on a learning path to become the next generation of Earth scientists or other related careers. The academic year program provides teacher mentors with opportunities to implement summer workshop activities into their science classes and disseminate these activities with other teachers.

This project has four objectives: (1) Increase middle school students' knowledge about geology with a focus on minerals, rocks and fossils through their description and interpretation; (2) Engage students using their observational skills to identify and interpret various geological phenomena via hands-on learning in a laboratory situation, at outdoor selected locations, and at regional science museums; (3) Use computer technology to assist in learning Earth science via problem-based learning modules; and (4) Encourage students to consider science careers after high school by introducing them to Earth science-related activities at ECSU and to sponsor field trips so they can have first-hand experiences.

McClintock Partners In Education

Director: Linda Cagley
Vice President, Funding & Partnerships
McClintock Partners In Education
Charlotte, NC
ldcagley@aol.com

Project: *Sixth Grade Science Sleuths*

The Sixth Grade Science Sleuths project is a gateway summer and academic year program for incoming McClintock Middle School students. One hundred rising sixth grade students spend two weeks during the summer at McClintock Middle School participating in hands-on science activities through Invent Now's Camp Invention, utilizing Discovery Education and Math Forward technology, and exploring college and career options with Friday Field Trips. The Camp Invention segment provides 32-hours of proven hands-on, inquiry based programming to spark students' interest in science. Discovery Education's "Science Sleuths" module engages students with interactive video and online tools to work collaboratively in solving simulated crimes. Students use Texas Instrument's Math Forward program to solve real world, relevant problems. Friday field trips include a visit to UNC-Charlotte's College of Computing and Informatics and to the Police Academy's CSI Simulation Lab to learn about future opportunities and careers.

During the school year, students continue to use Discovery Education and Math Forward in the classroom. Beyond the classroom, they participate in STEM-related clubs during Tuesday Family Nights and/or in-school club time, which include other current offerings such as computer building, robotics, engineering, Future City, and a time to continue hands-on learning and interactions with STEM professionals and college interns pursuing STEM degrees.

North Carolina Coastal Pines Girl Scouts

Director: Cindy Kelley-Deaton
Program Executive
North Carolina Coastal Pines
Raleigh, NC
cdeaton@nccoastalpines.org

Project: *Girl Scouts Design and Discover*

Design and Discover, an inquiry-based, hands-on engineering and technology project to encourage and enhance middle and high school girls' experiences in science, technology, engineering, and mathematics (STEM). Project objectives are to enhance middle and high school girls' understanding of STEM processes, raise girls' interest in STEM, and create greater awareness for STEM careers. The curriculum was developed by the Intel Innovation in Education Group in collaboration with Girl Scouts of the USA and was based on research exploring why girls lose enthusiasm for STEM in the middle grades and how supportive environments can be created for learning science and engineering.

In partnership with schools, the project is being implemented outside of the school day in a minimum of six settings in five counties within the Council's jurisdiction. Counties include Duplin, Granville, Nash, Onslow, Person, and Vance. Within these counties, the Council chooses a minimum of six schools for implementation. Each year, 120 middle and high school girls are recruited by self-identification, parent nomination, and recommendation of Girl Scout volunteers, teachers and/or counselors. Priority is given to girls who either lack local resources or are affected by the minority achievement gap. The program also provides a STEM summer resident camp session, and with support from IBM and many other sci/tech companies, hosts an event each fall to expose girls to women who are working in a variety of STEM fields locally.

North Carolina Mathematics and Science Education Network

Director: Felicia Umstead

Program Coordinator, PERSIST

North Carolina Mathematics and Science Education Network

Chapel Hill, NC

felicial@northcarolina.edu

Project: *Pre-College Experiences for Reaching Students Interested in Science Teaching (PERSIST)*

The Pre-College Experiences for Reaching Students Interested in Science Teaching (PERSIST) Scholars Program is a year-round program designed for 70 underserved ninth through twelfth grade students over three years to develop a greater understanding of the teaching process and acquire the fundamental skills needed for a science or mathematics teaching career. During an intensive two-week summer experience and subsequent follow-up Saturday activities, students, university faculty, National Board Certified Teachers, and pre-service teachers collaborate in a science and mathematics teacher recruitment project. The PERSIST Scholars Program has as its goals to:

- (1) Improve students' understanding of science and mathematics teaching by engaging them in rigorous, challenging, hands-on, inquiry-based advanced courses; academic advising; job shadowing; and seminars focused on teaching, communication, and leadership skills;
- (2) Forge partnerships between student participants and UNC faculty who serve as mentors/consultants in nurturing students' enthusiasm science/mathematics teaching;
- (3) Expose students to current information on science/mathematics-related baccalaureate programs that lead to teaching careers; and
- (4) Involve parents in workshops that examine and promote careers in mathematics/science teaching.

North Carolina School of Science and Mathematics

Director: Carole Stern

Outreach Specialist

North Carolina School of Science and Mathematics

Durham, NC

stern@ncssm.edu

Project: *Labs for Learning*

Labs for Learning (LFL), introduces 72 high-potential, high-interest underrepresented minority students to the wide-ranging field of biotechnology. The goals of the Labs for Learning initiative are: 1) To provide students with skill sets that prepare them for future success in mathematics/science courses and provide a basis for scientific problem-solving and scientific research skills. 2) To encourage interest in the bio-sciences and a career trajectory in a STEM career. 3) To provide substantive and extended support to students in a high school plan of study that provide the appropriate basis for college and success in a STEM career. LFL target students from six underperforming school districts in northeastern North Carolina. Students enter LFL as rising seventh graders and continue in the program through their 10th grade year. The program consists of an intensive two-week residential summer program on the NCSSM campus and academic-year activities at the students' home school. Collectively, the program offers classroom and laboratory instruction, academic planning and career guidance, as well as opportunities for instructors, students', and their parents to collaborate on the students' success.

North Carolina Society of Hispanic Professionals

Contact: Ana Maria Rodriguez-Bolchalk

Program Director, Good Stewards of the Environment
North Carolina Society of Hispanic Professionals (NCSHP)
Cary, NC
ana@thencshp.org

Project: *Good Stewards of the Environment Program*

The Good Stewards of the Environment Program is a year-round program that provides Hispanic students in seventh through ninth grades the opportunity to explore science as a career through the investigation of current negative impacts on our environment. The goals of the program are to excite students about science, to teach them the process of scientific investigation through research, experimentation, and discussion of current environmental issues, and to show them the possibilities in science as a career.

During the project, students make observations and conduct experiments in the field. For example, through a partnership with the North Carolina Division of Parks and Recreation, students explore lake food webs at Jordan Lake State Recreation area to understand their role in ensuring healthy waters, learn how good land management is important to restore and conserve water quality, and discover how the abiotic factors of an ecosystem effect the biotic factors through guided hikes and canoe trips. Students interact with scientists and engineers at the Environmental Protection Agency that has opened their eyes to possible careers in the science fields. At the end of the program, students have an opportunity to share their knowledge with their peers as true scientists through an awareness campaign poster session at the annual NCSHP Hispanic Student Education Summit.

North Carolina State University

Director: JoAnn M. Burkholder, Ph.D

Director of the Center for Applied Aquatic Ecology
North Carolina State University Dept. of Plant Biology
Raleigh, NC
joann_burkholder@ncsu.edu

Project: *North Carolina Floating Classroom Program*

The North Carolina Floating Classroom Program is a three-phase project designed to engage ninth grade science students in Wayne County in STEM science content and career education. Phase one provides students with classroom visits by the Neuse Riverkeeper and classroom follow-up activities correlated to the Earth/Environmental Science curriculum. Phase two is a half-day water quality monitoring/research cruise on RV Humphries for selected students who participate in water testing and dockside activities. Students construct water quality monitoring devices and test water samples collected dockside. In Phase three, 15 highly interested students per year participate in a week-long summer research mentorship program receiving advanced content instruction in aquatic science, research technology, mapping, Geographic Information Systems (GIS), and guidance in scientific research design, technical writing.

Four follow-up Saturday sessions are planned for the academic year. Parents are encouraged to become involved in project activities, including a session aboard the RV Humphries and attend student research presentations. The first cohort of students serves as peer mentors to subsequent classes. The specific goals are to: 1) Expose the ninth grade students to aquatic science through hands-on/minds-on activities in the field and lab; 2) Provide classroom activities and instruction; 3) Select a cohort of 15 advanced ninth grade students for each of three additional summers; 4) Provide cohort students with instruction in scientific research and writing skills; 5) Provide cohort students with science content and teacher mentors for graduation projects; and 6) Provide cohort students with instruction and practice in presenting scientific research. Each year student cohorts complete graduation projects and enter at least one scientific research competition.

Shodor Education Foundation

Director: Robert M. Panoff, Ph.D.

President and Executive Director
Shodor Education Foundation Inc.
Durham, NC
rpanoff@shodor.org

Project: *Computing MATTERS: Sowing the Seeds of SUCCEED*

Computing MATTERS: Sowing the seeds of SUCCEED is a year-round program for middle school and high school students interested in computational science. Students learn authentic uses of computers in transforming science and mathematics education through the use of the internet and network technologies and by observing real-time manipulation of data representations on a computer screen and seeing how the end results take shape. Students in the Research Triangle area of North Carolina have long benefited from the workshops, apprenticeships, and internships offered by Shodor in Durham. Leveraging the model of SUCCEED workshops and the Mentor Center, Shodor is extending Computing MATTERS to counties near the coast, first in Pamlico and Carteret Counties, and then extending to Craven and Onslow students as the program develops.

Computing MATTERS allows middle school students to build and sustain an interest in science, mathematics, and technology through their high school years, and for high school students to see themselves being successful and happy pursuing studies in college and careers in STEM areas. Peer mentors include students from the North Carolina School of Science and Mathematics and college students and teachers from Carteret and Pamlico counties.

University of North Carolina-Chapel Hill Institute for the Environment

Director: Dana Haine
Science Educator
University of North Carolina-Chapel Hill
Chapel Hill, NC
dhaine@email.unc.edu

Project: *Climate Leadership and Energy Awareness Program*

The Climate Leadership and Energy Awareness Program (Climate LEAP) engages forty-eight 9th -12th grade students per year in Chapel Hill and Carrboro in interdisciplinary, hands-on and minds-on science and mathematics activities and provides opportunities to develop science communication and leadership skills. The goals of Climate LEAP are to: 1) increase students' knowledge and understanding of climate change science and the solutions proposed to address climate change; 2) increase student enthusiasm for science and mathematics by showing how climate change is relevant to their daily lives; 3) increase student interest in science careers by emphasizing emerging science and technology careers related to climate change, and 4) provide an opportunity for students to communicate their knowledge to others. Climate LEAP students participate in a one-week, non-residential Summer Institute on the UNC-CH campus and at least three out of four half-day Saturday Academies during the academic year. In addition, students conduct a climate change outreach project and receive community service hours towards their high school graduation requirement. Students have access to elementary-aged students in the MPSC Afterschool Program (MAP) or receive support to conduct outreach in an alternate setting.

University of North Carolina-Pembroke

Director: Teresa Oxendine
Director, Regional Center
University of North Carolina-Pembroke
Pembroke, NC
teresa.oxendine@uncp.edu

Project: *Advanced Science Scholars Program (ASSP)*

The Advanced Science Scholars Program (ASSP) is a joint venture between UNC Pembroke and the Public Schools of Robeson County to serve 225 minority mathematics and science, middle and high school students to unify the concepts of science and build a bridge for students to crossover into higher education and advanced science studies by offering creative and engaging ways to involve hands-on activities. ASSP is a year-round 21st century learning environment with a two-prong component approach: The first component, the Summer Science Scholars Symposium, is an annual entry point for 45 middle school students providing a two-week science day camp, introducing students to science curriculum typically not available in middle grades. The second component is the Advance Science Academy (ASA), a year-round program for 30 high school students. Through ASA students are involved in monthly hands-on Saturday Academies, which are workshops broadening their understanding of science and its content and improving their experience in scientific techniques.

Wake Forest University

Director: Ronny Bell, Ph.D.

Professor

Wake Forest University

Winston-Salem, NC

rbell@wfubmc.edu

Project: *Cherokee MedCaT Academy Medical Career and Technology: Enriched Student Experiences in Health Careers*

MedCaT is a partnership between the Eastern Band of the Cherokee Indians (EBCI), Wake Forest University (WFU), and the Center for Excellence in Research, Teaching, and Learning (CERTL), the Northwest Area Health Education Center (NW AHEC) of WFU Health Sciences (WFUHS), and the Center for Native Health, Inc to educate North Carolina American Indian students about careers in health sciences, while giving their teachers new tools to motivate and excite them about science and math. Since program inception, more than 50 Western North Carolina high school students and 10 high school teachers have gone to the Wake Forest University campus in Winston-Salem. The goals of the program are to: provide students with culturally-based science programs in a university setting, using Problem-Based Learning (PBL) methodology; familiarize students with career opportunities in health care and biotechnology; and prepare students for science enrichment activities through follow-up sessions during the school year.

MedCaT offers three sustainability features that ensures that its impact is deep and has a prolonged trajectory: 1) the development of student cohorts who receive support, and are able to support each other, throughout the school year; 2) the inclusion of respected teachers in PBL exercises, who serve as mentors and facilitators during the academy and who connect more deeply with their students through interactive pedagogy; 3) follow-up activities during the school year that reinforce student confidence, re-energize cohorts, and mentor students as they approach the college application process. Outcomes measured include: student knowledge acquisition and application; student participant feedback on the program's successes and needs for improvement; and teacher feedback on professional development training.

West Marion Elementary School

Director: Renata Sabine Crawley

Teacher

West Marion Elementary School

Marion, NC

renata.crawley@mcdowell.k12.nc.us

Project: *G.O.A.L. - Get Outside And Learn*

Get Outside and Learn is a program that allows K-6 students to conduct science experiments, explorations and investigations through environmental and physical science. West Marion Elementary School is located in the Appalachian foothills and surrounded by an ecological environment that offers unique paths to learning. Students have limited direct experience with the outdoors. The program strives to reverse this trend by introducing students to their natural habitat. Using nature as our primary classroom, the program is designed to help children view themselves as scientists exploring the interdependence and interconnectedness of all living things and the impact humans have on their environment.

GOAL enhances students' knowledge of core science materials and helps them develop an understanding of scientific concepts through their own experiences. The program helps students develop critical thinking skills through inquiry-based lessons in afterschool clubs and field trips. The program focuses on students who express an interest in science especially those who are underrepresented in advanced science and mathematics classes. These include AIG, students with disabilities, girls, and English as a Second Language students. For students who previously participated in this program, their E.O.G. science scores increased from 50 percent to 80 percent passing rate, empowered them to take higher level science and mathematics classes, and exposed them to careers in these sciences.

Career Awards for Science and Mathematics Teachers Biographies

BWF has awarded nearly \$2 million for 10 Career Awards for Science and Mathematics Teachers since the program's inception in 2010. The award provides \$175,000 over five years to support the careers of North Carolina teachers who make significant contributions to enhancing student knowledge in science or mathematics. The award seeks to advance the field of teaching by identifying and developing a cadre of well-prepared K-12 teachers in science and mathematics. Candidates must be currently licensed North Carolina public school science or mathematics teachers who teach in grades K-12. The current deadline for applications is September 18, 2012. For complete information, visit www.bwfund.org. The following are Career Award for Science and Mathematics Teacher recipients:

Wendy Bartlett

Parkland Magnet High School
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Wendy Bartlett has been an educator in the Winston-Salem/Forsyth County School System for 13 years. She has spent the majority of this time teaching mathematics at Parkland Magnet High School with a respite from the classroom in 2003 to help the school implement the International Baccalaureate Diploma Program. In 2006, Bartlett returned to the classroom fulltime and has enjoyed implementing Learning Focused strategies and the IB educational philosophy in her classroom. She is a National Board Certified Teacher and the 2008 recipient of the Marcellus Waddill Excellence in Teaching award from Wake Forest University. Bartlett also works with the education department at Wake Forest University in their Master's Teaching Fellows program.

Teaching mathematics through the use of technology is Bartlett's true passion; and she enjoys creating engaging lessons using technology to help her students recognize how mathematics relates to them and their future. Funds from the Burroughs Wellcome Fund, allows her to purchase more technology for the mathematics classrooms at Parkland and to provide valuable staff development for herself and her colleagues to implement technology practices seamlessly into their mathematics instruction. Bartlett plans to create useful and meaningful resources for teachers in Forsyth County as the new Common Core Standards are rolled out in the 2012–2013 school year.

Michael Bowman, Ed.D.

North Buncombe High School
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Michael Bowman is a science teacher and science department chair at North Buncombe High School. He attended Augustana College, a small private college in Illinois, and was fortunate enough to take geology classes from Dr. Anderson and calculus classes from Dr. Marrow. Both taught him how to learn, connect ideas/topics across content areas, and to respect/love science and mathematics.

After graduating from Augustana, he studied geophysics at Purdue University, earning a masters of science degree. This was followed by several years of working within, then consulting for the oil industry. In these roles he embraced the inter-connectedness of science and math in the context of real world problems, which had a profound impact on how he teaches.

While in the oil industry he was drawn to teaching and investigated alternate paths to teacher certification. He received his master of education degree from University of Houston. Dr. Bowman received his doctorate degree in educational leadership from Western Carolina University in 2007.

Dr. Bowman's honors include; national board certification (and renewal), the 2007 Presidential Award for Excellence in Mathematics and Science Teaching, and the 2011 Burroughs Wellcome Career Award for Science and Mathematics Teachers.

Gregory Fisher

Mt. Tabor High School

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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 BS in Mathematics. Fisher 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.

Fisher is actively involved with the Winston-Salem Jaycees and fosters community service opportunities for his students. He also assists with the cross-country teams. Fisher provides 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. Fisher 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. Fisher plans to increase the community outreach programs and the resources for the district with the Burroughs Wellcome Fund grant.

William Hendrickson

North Pitt High School
Pitt County Schools
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William E. Hendrickson is a science teacher at North Pitt High School in Pitt County Schools. He began his career as a science teacher in the Edgecombe County Schools system in 1994 at Tarboro High School and most recently taught within the Warren County School District. Hendrickson graduated from East Carolina University in 1994 with a BS in Biology. In 2000, he received a M.Ed. in Science Education from North Carolina State University as well as National Board Certification in Adolescent and Young Adult Science.

Hendrickson has a host of experiences working with students in science competitions at the state, regional, and local levels. Most recently, he founded and supervised a team of students in the North Carolina Junior Engineering and Technology Society competitions in 2008 and served as a faculty advisor for the Youth Technology Corps in 2009.

Hendrickson is a member of the North Carolina Science Teachers Association, American Association of Physics Teachers, National Science Teachers Association, American Chemical Society, and has served as an evaluator for ETS Praxis Exam in Chemistry. He has received numerous awards, among them Hendrickson was elected Teacher of the Year for Warren New Tech HS (2009-2010), Teacher of the Year for Warren County Schools (2009-2010), and Nobel Educator of Distinction (2009).

Heather Kaiser

Walker-Spivey Elementary School of Math and Natural Science
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Heather Kaiser holds a BS in Elementary Education and Educational Ministry from Houghton College. She 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 (now known as Walker-Spivey Elementary School of Math and Natural Science) 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. She currently serves as the science lab teacher at Walker-Spivey Elementary School of Math and Natural Science. In this role, she has been instrumental in developing a community garden as well as gaining certification as a “green school”. Students benefit daily from the resources she has secured through grants from various organizations.

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 recently begun creating “webinars” to assist teachers with the implementation of technology and replication of her teaching models.

With this award, Kaiser is developing “Stimulating Science Simulations” that will engage students in learning about careers in Science, Technology, Engineering, and Mathematics through inquiry-based investigations embedded within role-play. It is her ultimate goal to share these units with other teachers via the Internet; making them easy to replicate in any classroom and on any budget.

Stuart Miles

Evergreen Charter School

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Stuart Miles is the seventh and eighth grade science teacher at Evergreen Community Charter School in Asheville. A graduate of the College of Charleston, Stuart began his career as a Teach for America corps member teaching eighth grade science in Helena, AR. For the last four years he has been teaching at Evergreen, where he serves as a middle school team leader, coaches basketball, and is a member of the Board of Directors. In 2010, he completed his Masters Degree in Science Education from Montana State University. He was honored as the 2010-2011 North Carolina Charter School Teacher of the Year.

Miles' classroom is a place where students create and learn with authentic audiences and purposes; he sets high standards and is committed to the success of all students. He has created place-based curricula focused on the land and culture of southern Appalachia, and is endeavoring to develop a K-8 water quality curriculum for teachers across the state with the support of the Career Award.

Amanda Northrup

Riverbend Elementary School

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Amanda Northrup has been a teacher at Riverbend Elementary School for eight years. She has spent the last six years as a fifth grade teacher. Her students enjoy an engaging learning environment that strengthens their confidence, competence, and enjoyment of mathematics. Her students regularly report a new-found love of learning.

Northrup's teaching extends beyond her students to her colleagues, as well. She is a mentor for college students, beginning teachers, and school colleagues. Through her work with Partners for Mathematics Learning, Northrup is known for leading dynamic mathematics professional development sessions for elementary teachers and administrators across North Carolina. She has also developed and presented a four-day training module for kindergarten through fifth grade teachers called Building Mathematical Thinkers.

Northrup serves as Program Chair for the North Carolina Council of Teachers of Mathematics, organizing speakers for an annual conference attended by more than 2,000 teaching professionals. She is also the North Carolina winner of the 2010 Presidential Award for Excellence in Mathematics Teaching.

Northrup has a B.A., summa cum laude, in education from the University of North Carolina at Greensboro and an M.A.Ed. from Western Carolina University. She is certified in elementary education and is a National Board Certified Middle Childhood Generalist.

Tamica Stubbs

Phillip O. Berry High School
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Tamica A. Stubbs was educated in urban Philadelphia, PA. Bequeathed from a single parent home and low socioeconomic status, she defied the social and academic circumstances of her childhood. After graduating from a magnet program at Franklin Learning Center High School, Stubbs attended Clarion University of Pennsylvania obtaining Bachelor and Master degrees in Science Education. She then became a Charlotte transplant where she began a teaching career as a general science educator at Wilson Middle School.

In 2001, Stubbs joined the Waddell High School Team and became an avid participant in a myriad of professional development opportunities, a skilled grant writer, and a pioneer of new programs for students to extend their experiences beyond the high school biology courses that she teaches. Stubbs utilizes hands-on, minds-on and modular approaches to facilitate learning in the classroom and is a huge proponent of serving and educating the traditionally underserved populations within the science arena. Stubbs has secured hundreds of thousands of dollars in funding through various grant opportunities to benefit her students. She believes and is driven by the stance that all her students should exit the classroom with not only a knowledge base in biology but a subset of skills that readies them for biotechnology based careers. Stubbs shares creative and progressive styles of teaching to inspire students to become successful. In 2011, Stubbs transferred to Phillip O. Berry High School.

Claudia Walker

Murphey Traditional Academy

Guilford County Schools

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Claudia Walker is a fifth grade elementary mathematics teacher at Murphey Traditional Academy in Guilford County. She has been in the classroom since 1992 and is a National Board Certified teacher. She received a BA from Rutgers and has a MA in Curriculum and Technology from the University of Phoenix. Walker's dedication to her students and her profession has earned recognition from her colleagues, students, and community, most notably receiving Teacher of the Year at her school in 2008. She is passionate about using technology in the classroom in order to engage students.

Walker has an aptitude for following data and using formative assessments to drive whole group instruction, assessments, centers, and small-group instruction. She promotes student interaction, discussion, hands-on, and cooperative learning at all times. Through these interactions, her students learn how to listen to others, form their own math language to bring understanding at a higher level, and advance their ability to communicate effectively. Walker strives to provide her students with a classroom environment of cooperation and collaboration in order to prepare them for their future in our ever-changing, technological world.

The Burroughs Wellcome Fund grant has provided funds for Walker to help train teachers at her school on high quality global mathematic concepts. Most recently, she was instrumental in successfully leading her school to participate in a Singapore Math Pilot, a partnership between the Fund, DPI, and State Board of Education. She has most recently been selected to serve as a member of the National Academy of Sciences Teacher Advisory Council.

Jennifer Williams

Brevard High School

Transylvania County Schools

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Jennifer Williams began her teaching career in Transylvania County after graduating from North Carolina State University as a member of the first class of the North Carolina Teaching Fellows Program. She has taught science and mathematics in Transylvania County for 12 years and is currently teaching chemistry and physics at Brevard High School.

Four years ago, Williams partnered with Mary Arnaudin, Transylvania County's 4H agent, to create and direct the "It's About T.I.M.E. to do Real Science" program funded by the Burroughs Wellcome Fund Student Science Enrichment Program. During the summer/afterschool program, T.I.M.E. students engage in authentic environmental research into their own questions as they work with local scientists and teachers. Williams has also mentored two student teams as they competed in the science fair, advancing to the international level.

Williams states that her passion for engaging students in scientific research stemmed from her graduate work at UNC Wilmington. "I was fascinated by asking my own questions, searching the literature, talking to experts in the field, and designing and conducting my own experiments. I realized that I wanted my students to experience this fascination with doing REAL science." With help from the Career Award, Williams has developed a science research course during the school day at Brevard High School that began in 2011.

Singapore Math Pilot Program

The Singapore math 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.

Singapore math 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.

The Burroughs Wellcome Fund Singapore Math Pilot Program targets elementary public schools that have a desire or have made efforts to develop strategies to implement Singapore math in their school or school district. The focus of SMP is on elementary teachers and students beginning at the kindergarten level and advancing through to fifth grade. The following elementary schools are implementing the SMP:

- Bladen County School District (Elizabeth Primary School and East Arcadia School)
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Principal: Richard Coley, rmcoley@bladen.k12.nc.us
Cheryl White Smith, cwsmith@bladen.k12.nc.us
- Eastfield Global Magnet School (McDowell County)
Coach: Michelle Baker, michelle.baker@mcdowell.k12.nc.us
Principal: Susan Edwards Pool, susan.pool@mcdowell.k12.nc.us
- Gallberry Farm Elementary School (Cumberland County)
Coach: Joni Wiggins, joniwiggins@ccs.k12.nc.us
Principal: Dawn Collins, dcollins@ccs.k12.nc.us
- Murphey Traditional Academy (Guilford County)
Coach: Claudia Isabel Walker, walkerc2@gcsnc.com
Principal: Rich Thomaer, thomaer@gcsnc.com
- North Wilkesboro Elementary School (Wilkes County)
Coach: Kim Bell, bellk@wilkes.k12.nc.us
Principal: Sharon Shoupe, shoupes@wilkes.k12.nc.us

UNC FastTrack Scholar Profiles

BWF has partnered with the University of North Carolina system to increase the number of certified science and mathematics teachers produced for North Carolina's primary and secondary classrooms. Four campuses are serving as pilots for FastTrack—University of North Carolina at Chapel Hill, University of North Carolina at Asheville, North Carolina Central University, and North Carolina State University. BWF FastTrack Scholars receive scholarships during their junior and senior years, mentoring, supplemental salary support in transitioning to the classroom as new teachers, and experiences with global models of excellence in teaching. Individuals interested in FastTrack must contact the FastTrack representative on each of the four campuses. For general details, contact Dr. Alisa Chapman at UNC General Administration at chapman@northcarolina.edu. The following are FastTrack scholars:

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Other Science Education Initiatives of BWF

As part of Burroughs Wellcome Fund's expanding commitment to science education, we are partnering with various organizations by providing grants and staff support to further the development of an infrastructure to improve science, mathematics, and technology education across North Carolina. The following is a listing of some of the educational initiatives created with BWF grants.

Grassroots Science Museum Collaborative

- Purpose is to enhance hands-on science learning across North Carolina through programs and activities offered by more than 25 member science museums
- First such museum collaborative in U.S.
- Supported by the Beijing Youth Science Creation Competition in China

N.C. Institute for Education Policymakers

- Purpose is to build the capacity and the relationships of policymakers including legislators, State Board of Education Members, and media who cover education in areas related to school improvement
- International Exchange Program developed in 1999

N.C. Science Mathematics and Technology Education Center

- Established in 2002 to systematically improve performance in science, mathematics, and technology pre K-12 education for all children in North Carolina
- Established Teacher Link Program to connect scientist to teachers
- Coordinating Leadership in Science Education Reform Institutes with NSRC

Project SEED

- Partnership with Hamner Institutes for Health Sciences
- Purpose is to support a statewide program to encourage talented, disadvantaged North Carolina high school students to pursue terminal graduate and professional degrees in chemistry or related science disciplines through a scientific research internship experience

NC School of Science and Math Discovery Center

- Purpose is to utilize multimedia technologies to interconnect schools across the state to train teachers and share tools and curricula for institutional reform and improvement in science and mathematics education
- Seven cyber campuses in low wealth counties (Formerly Education Future Center)

Other BWF Grant Programs

Biomedical Sciences

Career Awards for Medical Scientists

Five-year awards for physician scientists provide \$700,000 to bridge advanced postdoctoral/fellowship training and the early years of faculty service. This award addresses the on-going problem of increasing the number of physician scientists and will help facilitate the transition to a career in research. Proposals must be in the area of basic biomedical, disease-oriented, translational, or molecular, genetic, or pharmacological epidemiology research.

Collaborative Research Travel Grants

Provide up to \$15,000 in support for researchers from degree-granting institutions to travel to a laboratory to acquire a new research technique or to facilitate a collaboration. Consideration is given to applicants who hold a Ph.D. or are studying for a Ph.D. in mathematics, physics, chemistry, computer science, statistics, or engineering who are interested in investigating research opportunities in the biological sciences or to biologists interested in working with physical scientists, mathematicians, engineers, chemists, statisticians, or computer scientists to incorporate their ideas and approaches to answering biological questions.

Infectious Diseases

Investigators in the Pathogenesis of Infectious Disease

Five-year awards provide \$500,000 for opportunities for accomplished investigators at the assistant professor level to study infectious disease pathogenesis, with a focus on the intersection of human and microbial biology. The program is intended to shed light on the overarching issues of how human hosts handle infectious challenge. The awards are intended to give recipients the freedom and flexibility to pursue new avenues of inquiry and higher-risk research projects that hold potential for advancing significantly the biochemical, pharmacological, immunological, and molecular biological understanding of how infectious agents and the human body interact.

Interfaces in Science

Career Awards at the Scientific Interface

Five-year awards provide \$500,000 to bridge advanced postdoctoral training and the first three years of faculty service. These awards are intended to foster the early career development of researchers with backgrounds in the physical/mathematical/computational sciences whose work addresses biological questions. BWF has moved to a self-nomination format for this award only.

Population and Laboratory Based Sciences

Institutional Program Unifying Population and Laboratory Based Sciences

Five-year awards provide \$2.5 million to unite population-level and laboratory-based biological sciences. The award supports the training of researchers working between existing research concentrations in population approaches to health and in basic biological sciences. The goal is to establish interdisciplinary training programs by partnering researchers working in disparate environments and intellectual frameworks.

Reproductive Science

Preterm Birth Initiative

Awards will bring together a diverse interdisciplinary group with expertise in genetics/genomics, immunology, microbiology, and proteomics along with the more traditional areas of parturition research such as maternal fetal medicine, obstetrics, and pediatrics to address the scientific issues related to preterm birth. The formation of new connections between reproductive scientists and investigators who are involved in other areas will give preterm birth research a fresh look. Full research grants will provide up to \$600,000 over a four-year period.

Science Education

Promoting Innovation in Science and Mathematics: The PRISM Award

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.

Career Awards for Science and Mathematics Teachers

Five-year awards provide \$175,000 to eligible science or mathematics teachers in the North Carolina public primary and secondary schools. The purpose of this award is to recognize teachers who have demonstrated solid knowledge of science or mathematics content and have outstanding performance records in educating children. The award is a partnership between the North Carolina State Board of Education and BWF.

Student Science Enrichment Program

Three-year awards provide up to \$180,000 to North Carolina nonprofit organizations, including public/private schools, universities, colleges, and museums. This program supports creative inquiry-based science enrichment activities that occur outside the typical school day for K-12 students. The program's goals are to nurture students' enthusiasm about science, expose them to the excitement of scientific discovery, and interest them in pursuing careers in research or a variety of other careers in science.

For further information on grant programs including deadlines and eligibility guidelines, please visit www.bwfund.org or email us at info@bwfund.org.

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