

VIRGINIA-NORTH CAROLINA

Louis Stokes Alliance
for Minority Participation



IMPACT REPORT
2007-2011



PARTNER INSTITUTIONS



Bennett College for Women

Elizabeth City State University

George Mason University

Johnson C. Smith University

Saint Augustine's College

University of Virginia

Virginia Commonwealth University

Virginia Polytechnic Institute and State University

About the Alliance	4
Greetings	5
Principal Investigators and Staff	6-7
Highlights	8-9
Lead Institution : University of Virginia	10-11
Bennett College for Women	12-13
Elizabeth City State University	14-15
George Mason University	16-17
Johnson C. Smith University	18-19
Saint Augustine's College	20-21
Virginia Commonwealth University	22-23
Virginia Polytechnic Institute and State University	24-25
Summer Research Program	26-27
Conferences, Symposia, Presentations	28-30
Graduate Schools, Employment	31
Economic Impact	32-35



VA-NC Alliance Summer Researchers pose in the Center for Chemistry of the Universe lab with Alliance staff, including Principal Investigator Dr. Marcus Martin.

Through the Louis Stokes Alliances for Minority Participation Program, the National Science Foundation promotes the formation of partnerships among leaders in academia, government, industry, and other organizations. There are currently over forty Alliances nationwide.

The Virginia-North Carolina LSAMP (Alliance) is led by the University of Virginia and includes the following partners: Bennett College for Women, Elizabeth City State University, George Mason University, Johnson C. Smith University, Saint Augustine's College, Virginia Commonwealth University, and Virginia Polytechnic Institute and State University. The Alliance's primary goal is to increase significantly the number of students earning STEM (science, technology, engineering, and mathematics) baccalaureate degrees.

Each of the eight institutions offers individually tailored recruitment, retention, and enhancement activities to support their students. These activities include annual symposia, tutoring, bridge programs, workshops, colloquia, faculty exchanges, common reading experiences, and summer research programs. They are designed to maximize utilization of available resources and produce the necessary synergy among participants in order to meet the Alliance's goal.

Activities also facilitate communication and interaction among Alliance members and across disciplines, thus fostering a sense of community within partners, strengthening the Alliance structure, and providing faculty and students opportunities to build productive academic and professional networks.



August 2011

Dear Friends:

The Virginia- North Carolina Louis Stokes Alliance for Minority Participation is an eight institution partnership consisting of Bennett College for Women, George Mason University, Elizabeth City State University, Saint Augustine's College, the University of Virginia, Virginia Commonwealth University, and Virginia Polytechnic Institute and State University. The University of Virginia has served as the lead institution for the Alliance since its inception in 2007 and continues its strong commitment as the partnership approaches the mid level phase.

The goal of the Alliance is to increase the quality and quantity of students from underrepresented populations who receive undergraduate degrees in science, technology, engineering and mathematics (STEM) disciplines. Institutions in the Alliance have been working hard to accomplish this goal, demonstrating the value of collaboration across institutional lines toward the advancement of knowledge and learning. The Alliance has been productive during Phase I, resulting in significant increases in the number of STEM degrees earned and overall enrollment of underrepresented minorities in STEM disciplines from year one to year four.

By providing dedicated resources and creating synergy among its partner institutions, the Virginia-North Carolina Alliance supports its students through a variety of initiatives, including: bridge programs for entering freshmen, direct student support activities, book stipends, mentoring, tutoring, annual research symposia, and an annual summer research program created specifically for Alliance students hosted by the University of Virginia.

This is important work, and the stakes are high. The United States is falling behind other nations in the number of men and women earning college degrees, especially those who receive training in the STEM fields. The Alliance is creating opportunities by helping students earn degrees in these fields while building strength for the nation.

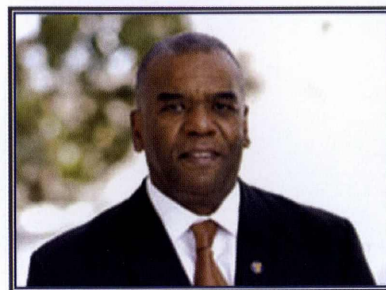
Throughout this report, you will get to know the partner institutions, their students, the impact they are making in STEM disciplines, and foresee the difference they will make in meeting critical regional, national and international needs of research, industry and education, making this a better world.

Best wishes,



Marcus L. Martin, MD
Vice President and Chief Officer for Diversity and Equity
Principal Investigator, Virginia-North Carolina Alliance

**Principal Investigator
Dr. Marcus L. Martin**



Dr. Marcus L. Martin serves as principal investigator for the Virginia-North Carolina LSAMP. He is Vice President and Chief Officer for Diversity and Equity and Professor of Emergency Medicine at the University of Virginia.

A native of Covington, Virginia, Dr. Martin earned bachelor's degrees in pulp and paper technology (1970) and chemical engineering (1971) from North Carolina State University, and was the first African American to play varsity football at the school. He was employed as a production engineer and researcher for Westvaco following graduation from NCSU. A member of the charter class of Eastern Virginia Medical School and the first African American graduate, he earned his medical degree in 1976.

Dr. Martin was commissioned by the U.S. Public Health Service, serving at the USPHS Hospital in Staten Island, New York. Later, he was a general medical officer at the Gallup Indian Medical Center in New Mexico. He completed emergency medicine residency training at the University of Cincinnati in 1981 and held a series of staff and administrative/teaching posts at Allegheny General Hospital in Pittsburgh between 1981 and 1996.

In 1996, Dr. Martin was appointed Professor and Chair of the Department of Emergency Medicine at the University of Virginia and became the first African American to head a clinical department at U.Va. His responsibilities included the adult and pediatric emergency departments, chest pain unit, express care, Pegasus air ambulance, Blue Ridge Poison Center, paramedic training program, emergency medicine residency program and several emergency medicine fellowship programs.

During his tenure in this role, Dr. Martin also served as the clinical director of the Summer Medical Dental Education Program, a summer program for underrepresented pre-med students. He established EMCERT (Emergency Medicine Center for Education, Research and Technology) as well as the Life Saving Techniques course for medical students using computerized human patient simulation. He also established the simulation center in the U.Va. School of Medicine and is member of a collaborative simulation research team with U.Va. Systems Engineering, School of Nursing, and School of Medicine faculty. Dr. Martin directs an annual interdisciplinary course in St. Kitts and Nevis on disaster preparedness.

Dr. Martin is past president of the Society for Academic Emergency Medicine and served on the board for 12 years, as well as past president of the Council of Emergency Medicine Residency Directors. Dr. Martin was appointed in 2007 by Governor Tim Kaine to serve on the Secure Commonwealth Panel and as Vice Chair of the Virginia Tech Tragedy Review Panel. In August 2011, he was appointed to the Board of Trustees of the Kenan Institute for Engineering, Technology & Science at NC State.

Dr. Martin's awards include the 1994 Emergency Medicine Residents' Joseph F. Waeckerle Founders Award, as well as the 2008 SAEM Diversity Interest Group Leadership Award, named the "Marcus L. Martin Leadership Award" in his honor.

VA-NC Alliance Management Team



Dr. Linda Columbus, Co-Principal Investigator
Assistant Professor, Department of Chemistry
University of Virginia



Ms. Carolyn Vallas, Co-Principal Investigator
Director, Center for Diversity in Engineering
University of Virginia



Ms. Kristin Morgan, Program Director
Office for Diversity & Equity
University of Virginia



Ms. Debra White
Business Manager & Grants Administrator
Office for Diversity & Equity
University of Virginia

Not pictured: Ms. Shirley M. Cauley, Administrative Research Assistant, Office for Diversity & Equity, University of Virginia



Left to right: Sheila Spence, Alok Berry, Gloria Payne, Mattie Marshall, Bernard White, Orestes Gooden, Kristin Morgan, Sunil Gupta, Rosalyn Hobson, Jody Thompson, Eric Williams, Cristina Moreira, and Principal Investigator Marcus Martin.

Bennett College for Women:

Dr. Cristina Moreira, Principal Investigator

George Mason University:

Dr. Alok Berry, Principal Investigator

Elizabeth City State University:

Dr. Ali Khan, Principal Investigator; Mr. Warren Poole, Program Director (not pictured)

Johnson C. Smith University:

Dr. Sunil Gupta, Principal Investigator; Ms. Mattie Marshall, Program Coordinator

Saint Augustine's College:

Dr. Mark Melton, Principal Investigator (not pictured)

University of Virginia:

Ms. Carolyn Vallas, Principal Investigator

Virginia Commonwealth University:

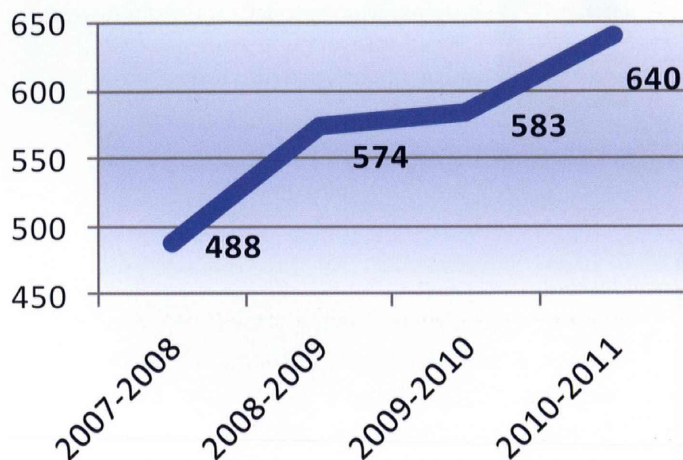
Dr. Rosalyn Hobson, Principal Investigator; Mr. Alfred Herrera, Program Coordinator (not pictured)

Virginia Polytechnic Institute and State University:

Dr. Karen Ely Sanders, Principal Investigator (not pictured); Dr. Jody Thompson, Associate Director, Multicultural Academic Opportunity Programs

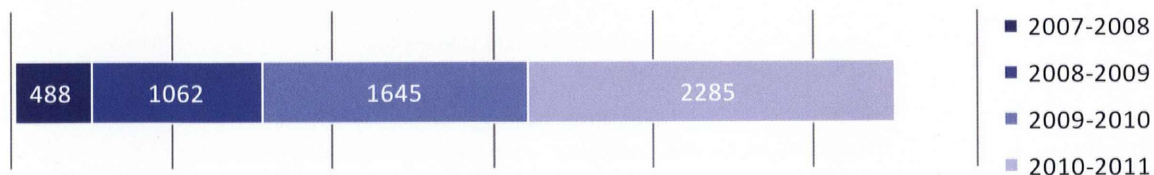
IMPACT:

NSF and the VA-NC Alliance... Making a Difference!



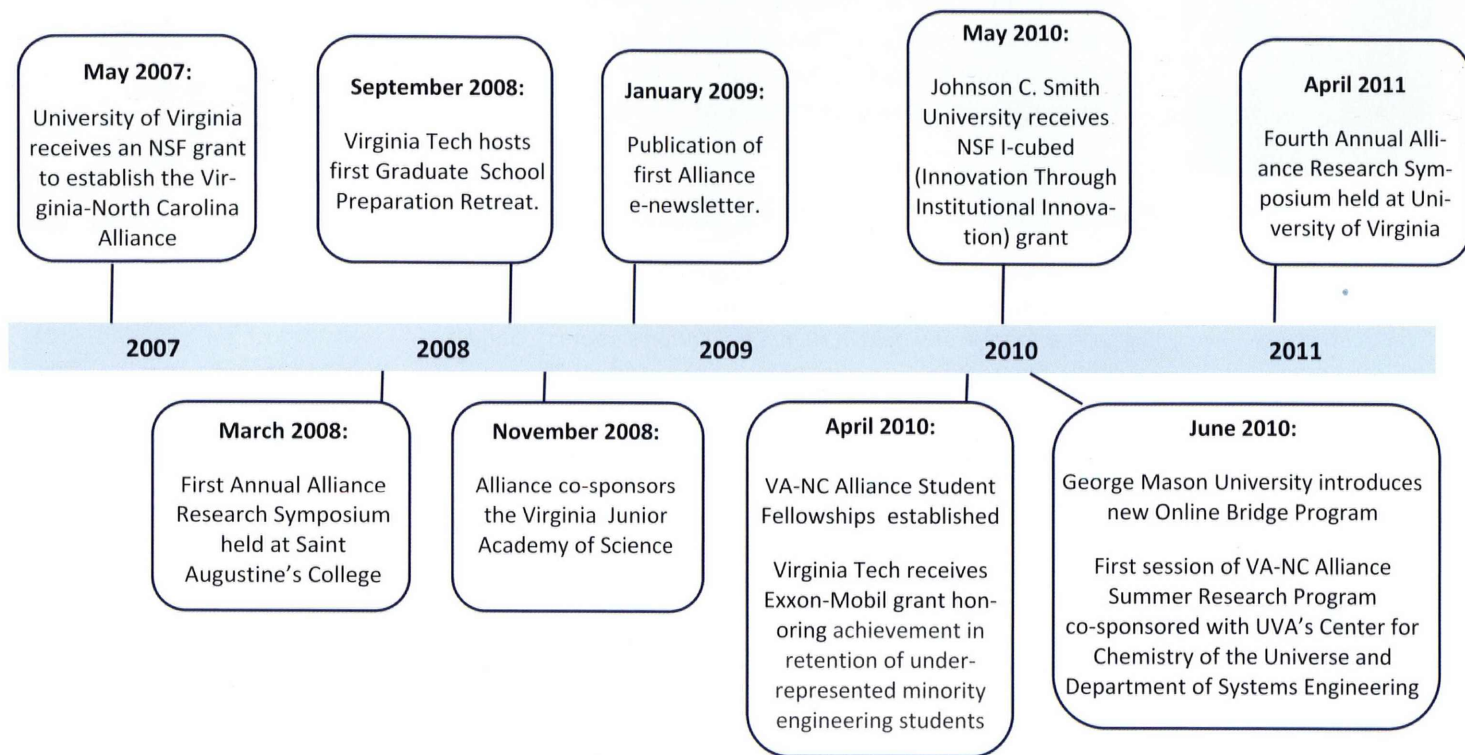
**31% Increase in STEM Degrees
Earned by Minority Students
at Virginia-North Carolina Alliance
Institutions, YR01-YR04**

Cumulative STEM Degrees Earned by Minority Students at Virginia-North Carolina Alliance Institutions, YR01-YR04



Enrollment:

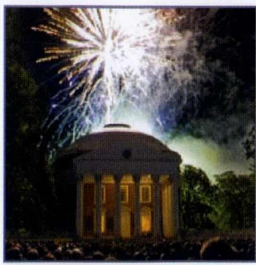
Enrollment of underrepresented minority students has increased in the Alliance, from 3,469 students in year one to 4,244 in year four, representing an increase of 22%, with particular success in mathematics compared to national trends in higher education.



What Students are Saying about the Alliance...

Results from a satisfaction survey showed that at least 65% or more of Alliance students were satisfied with socialization into their discipline, feelings of belonging, and the ability to conduct independent research in their discipline. Ninety percent of students have discussed the Alliance with friends, and encouraged them to participate. Particularly effective aspects of the program include:

- Assistance and peer advice for the graduate school application process
- A great way for students to get experience at nationally recognized research facilities
- Helping students remain competitive and academically focused by making available tutors, book stipends, and financial assistance with housing and other expenses
- The chance to experience collaborative research in multiple disciplines



The University of Virginia is a public research institution founded by Thomas Jefferson in 1819 and located in Charlottesville, Virginia. The university sustains the ideal of developing, through education, leaders who are well-prepared to help shape the future of the nation.

Leading the Nation in Minority Graduation Rates

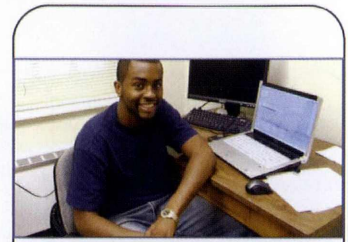
The University of Virginia continues to achieve the highest graduation rate (87% in 2010) for African-American students of any state-chartered institution in the nation for the sixteenth consecutive year, according to *The Journal of Blacks in Higher Education's* report*. Equally impressive are its four-year graduation rate for Hispanic students (86%) and for Native American students (100%).**

The University uses multiple approaches to enhance the minority undergraduate experience, such as:

- "Project View", an outstanding retention tool that partners the university with businesses to expose students to engineering workplaces and the range of available jobs.
- UVA-to-TNCC Summer Laboratory Research in conjunction with Thomas Nelson Community College
- an intensive six-week Bridge program
- scholarships, tutoring, mentoring, and textbook stipends
- Host institution for the VA-NC Alliance Annual Summer Research Program

*source: *Journal of Blacks in Higher Education*, January 15, 2011

**source: University of Virginia Office of Institutional Assessment & Studies



Featured Program

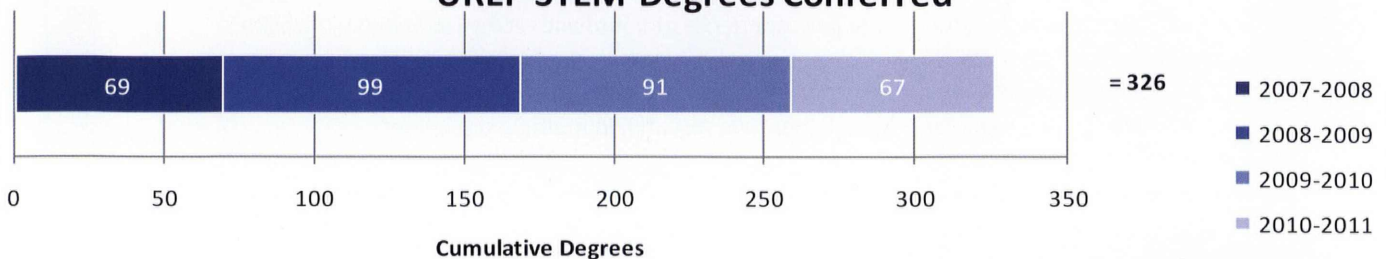
The topic for U.Va.'s Center for Diversity in Engineering's 2011 Research Experience for Undergraduates was Systems-level Design Experience in Nanodevices and Nanomaterials Technology.

Focused on a cross-disciplinary model that included design experience and the use of a research team model, the program gave undergraduate students an opportunity to work closely with faculty and graduate students.

Program participants also took a two-credit seminar course examining the societal and ethical implications of nanotechnology research.

Summer REU students receive a stipend and live in on-campus housing at the University of Virginia's historic campus in Charlottesville.

University of Virginia UREP STEM Degrees Conferred





HIWOT WOLDESEMAYAT

A biology major who graduated from the University of Virginia in 2010, Hiwot Attended a post-baccalaureate Research and Education Program at another Alliance partner institution, Virginia Tech after graduation. Hiwot is currently working on her graduate degree in microbiology at San Francisco State University.



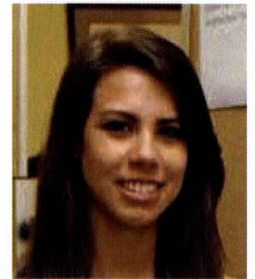
ANDREW BENNETT-JACKSON

A member of the class of 2012 majoring in chemistry, Andrew was a director of the University's volunteer tutoring program and worked in the lab of chemistry professor and MacArthur Fellow, Dr. Brooks Pate. Andrew attended the Alliance's first Summer Research Program, where he presented *A Fourier Transform Microwave Spectrometer with Double Resonance Capabilities*.



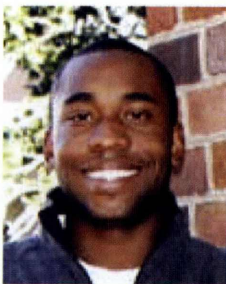
JULIANA CANO-MEJIA

Juliana, an engineering undergraduate of the University of Virginia, presented research at the 2010 Virginia Junior Academy of Science and in 2011 at the VA-NC Alliance Annual Symposium. Juliana is also a write for *Spectra*, the recently introduced journal of engineering and science research at the University. Juliana's article, *A Review of the Pathogenesis of Necrotizing Fasciitis by Group A Streptococci* appeared in the spring 2011 issue. She is also a member of the NExT (nano and emerging technologies club) at the University.

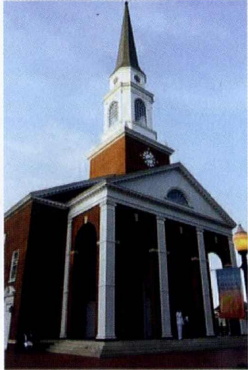


MATTHEW MANLEY

Matthew, Class of 2012, is a computer engineering major and two-time recipient of NSF scholarships. Matthew is a member of the IEEE (Institute of Electrical and Electronics Engineers), and his undergraduate research project is creating software to automatically process Internet routing information to identify the number of stub Autonomous Systems (network administrative organizations) that changed their Internet Service Provider over the course of the last few years. This data will be used in a statistical analysis in Professor Malathi Veeraraghavan's research project on the next-generation Internet.



Bennett College is a small, private, historically Black liberal arts college for women founded in 1873 and located in Greensboro, North Carolina. The College offers women an education conducive to excellence in scholarly pursuits; preparation for leadership roles in the workplace, society, and the world; and life-long learning in a technologically advanced, complex global society.



Bennett College for Women takes great pride in its heavy emphasis on sending students to summer research programs, conferences, and symposia for maximum exposure to various academic environments. Bennett Alliance Principal Investigator, Dr. Cristina Moreira, says:

“We believe that participation in summer research opportunities is one of the most meaningful aspects of being a successful Alliance scholar; conducting such research is a prerequisite, not an option”.

Recent destinations for Bennett students include:

- Science 2010 Transformations, University of Pittsburgh
- 2010 North Carolina OPT-ED Program, Greensboro, North Carolina
- 2010 Annual Biomedical Research Conference for Minority Students, Charlotte, NC
- Undergraduate Research Celebration, Library of Congress, Washington, D.C.
- Bioscience Undergraduate Research Program, University of Utah
- Organization of Tropical Studies Ecological Research Station, La Selva, Costa Rica
- Collaboration around Research Education Program (CARE), Duke University
- Ninth Annual New England Undergraduate Symposium, Harvard University
- ENAR Fostering Diversity in Biostatistics workshop, Miami, Florida

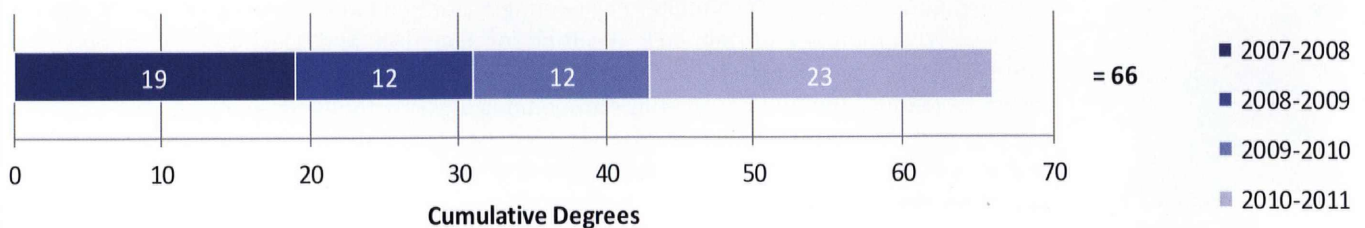
Program Facts

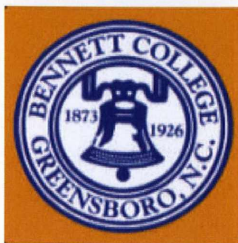


Sisters in Science

Sisters in Science, an initiative of Bennett’s VA-NC Louis Stokes Alliance for Minority Participation program, was created when Bennett scholars voiced their desire to mentor high school students from the Early Middle College at Bennett. The program recently received a grant from the Clapp Charitable & Education Trust, for the purchase of laboratory equipment and supplies, after being featured in a local North Carolina newspaper.

Bennett UREP STEM Degrees Conferred





KATRINA DIX

Katrina, a chemistry major from California, graduated from Bennett College in 2010. She was featured in "Who's Who Among American College Students" and made the Honors and Dean's list during her years at Bennett. Katrina was part of the Chemistry Club and is part of the Alpha Kappa Alpha Sorority and the Beta Kappa Xi Scientific Honor Society. She is currently working for a laboratory company in Los Angeles.



TALER JEFFERSON

Taler graduated in 2010 and is currently pursuing a Master's Degree in biology at Hampton University. While at Bennett, Taler participated in the Making a Difference in Nursing program at Duke University, where she gained hands-on experience in the nursing career and worked with a research project in neuroscience. She also participated in the Pharmacy Technician Training Initiative (PTTI) at North Carolina A&T. In addition to academics, Taler dedicated her time at Bennett to community service and mentoring other students. She also served as a Black College Fund intern/ambassador, raising funds for eleven historically black colleges and institutions.

EBONIE MCNEIL

Ebonie McNeil was an LSAMP scholar until her senior year when she received a scholarship from the U.S. Dept. of Defense. A math/computer science major at Bennett College, Ebonie worked for AmeriCorps (Office of Black Child Development Institute of Greensboro) to support herself during college and also found time to tutor math for the LSAMP program and at the Vance Chavis Library through the Spirit of Excellence Tutorial Program. She was also a volunteer at Washington Elementary school in Greensboro. Ebonie currently works as a computer scientist for the U.S. Army Space and Missile Defense Command.



LANISHA BROWN

Lanisha Brown, a biology major, conducted research during the summer following her sophomore year in the Research Experience for Undergraduates (REU) program at the Organization of Tropical Studies in Costa Rica. Lanisha attended the 2009 Annual Biomedical Research Conference for Minority Students on Phoenix, Arizona. She presented her research, *Damage and Mortality of Leaflets of Nephrolepis brownii ferns (Lomariopsidaceae)* at both the 2009 State of North Carolina Undergraduate Research and Creativity Symposium (SNURCS) and the 2010 VA-NC Alliance Symposium. Lanisha also conducted a workshop presenting principles of chemistry to middle school girls at Bennett's 2009 *Girls Making It In Science Day*.



Elizabeth City State University, a constituent institution of the University of North Carolina founded in 1891, offers baccalaureate, graduate, and professional programs for a diverse student body. Located in Elizabeth City, North Carolina, the institution's rich heritage provides a firm foundation for its educational endeavors, as well as its role in serving the needs and aspirations of individuals and society.

Research Week at Elizabeth City State University is an annual program that features aeronautics and space-related science and technology research presentations by faculty and students to the university and community through week-long seminars, poster sessions, guest speakers, and a research fair.

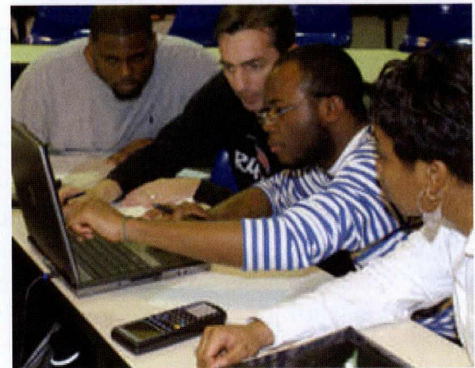
Research Week creates an environment in which scientists and researchers from state and federal agencies and industry discuss areas for research collaboration with ECSU faculty and students. Major research institutions exhibit at the research fair and provide information about internships and graduate programs.

Research Week is also an outreach program to the local community and K-12 schools. Hundreds of local students will come to ECSU to view poster sessions and presentations.

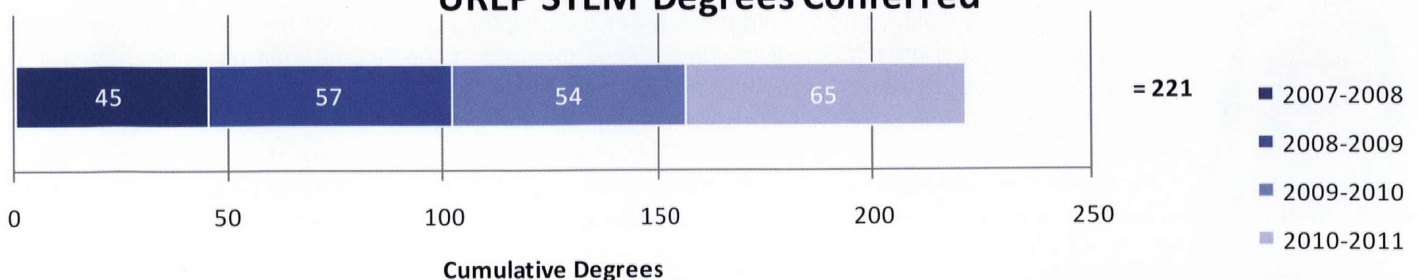
The major goal of Research Week is to expose and encourage under-represented minority students' interest and involvement in science and space-related research.

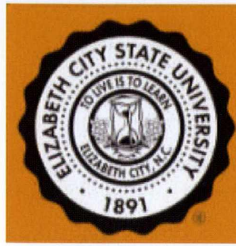
Dr. Harry S. Bass, Dean of ECSU's School of Mathematics, Science, and Technology, welcomed participants to this seventh annual event, themed *A Commitment to Excellence in Research and Education*.

"Our goal is not only to showcase existing research and education projects, but also to provide stimulus for future collaborations, internships, curriculum enhancements, research, discovery and economic development," Bass said.



Elizabeth City State University UREP STEM Degrees Conferred





KAIEM FRINK

Kaiem completed both his bachelor's degree (computer science) and his master's (applied mathematics with a minor in GIS) at ECSU. He was selected for Carnegie Mellon University's "Information Systems in the Community" internship. Among other research projects, Kaiem assisted with NASA grant proposals for the Purdue Terrestrial Observatory at the Rosen Center for Advanced Computing. His current research interest includes combining traditional Remote Sensing methods with Environmental emphasis techniques on *Identifying Melt Events in the West Antarctic Ice Sheet to Determine the Correlation between Sea Surface Temperatures and Brightness Temperatures*.



JAMIKA BALTROP

Jamika received her bachelor's degree in computer science with a minor in GIS and remote sensing and is continuing her studies in the Bridge to the Doctorate program at Howard University in Washington, D.C. Jamika received a CI-TEAM (Cyber-Infrastructure) scholarship and conducted undergraduate research under Dr. Malcolm LeCompte in the Antarctic Temperature Mapping Team. She is the lead author of the 2011 paper, *Impact of Distributed Denial of Service Attacks*.

SHAVONDA EVANS

Shavonda received her bachelor's degree in biology and went on to work at Abbott Laboratories. She presented her research, *Effect of TRAIL on Estrogen Receptor Negative Breast Cancer Cell Lines HTB-129*, at the 2009 Virginia Tech Undergraduate Research and Prospective Graduate Student Conference, and *miRNA 128 induces cell death in Glioblastoma multiforme cell lines* at the 2010 student poster competition of the American Association of Cancer Research.



TIWANA WALTON

Tiwana received her bachelor's degree in mathematics from ECSU and is currently a graduate student at Old Dominion University. She also works in the Aeronautics Systems Analysis Branch (aviation safety) of the NASA Langley Graduate Co-op. Her current research is on the portfolio assessment of aviation safety technologies, using statistics, probability, systems analysis methods and computer programs to predict whether NASA's technologies will reduce the number of airplane accidents in the future.



George Mason University, founded in 1972 and located in the heart of Northern Virginia's technology corridor near Washington, D.C., is an innovative, entrepreneurial institution with national distinction in a range of academic fields. With strong undergraduate and graduate degree programs in engineering, information technology, biotechnology and health care, Mason prepares its alumni to succeed in the workforce and meet the needs of the region and the world.

George Mason University combines technology with tradition to introduce its Online Bridge Program.

At the June 2011 conference of the American Society for Engineering Education (ASEE), GMU's Alliance PI Dr. Bernard White, with colleagues Eileen Mazzone and Vicki Dominick presented *An Online Alternative to the On-Campus Summer Bridge Program*.

GMU has developed this innovative curriculum to address issues of funding, flexibility, and increased access not always available in traditional on-campus bridge programs. GMU inaugurated the concept with its 2010 LSAMP Summer Transition Bridge Online Course, and shared details of the implementation during the presentation of this paper at the ASEE conference.

The Online Bridge Program was created by testing universal design criteria, pedagogical principles, feasibility and time-management analysis.

Using Blackboard technology for program delivery, the online version of Bridge features greater use of multimedia and increased accessibility, engagement, and collaboration among new students, who developed a peer network prior to arriving at their physical campus.

Plans for improving the summer 2011 version of GMU's Online Bridge Program include incorporating more powerful technology and emphasizing problem solving and critical thinking skills in relation to STEM majors.

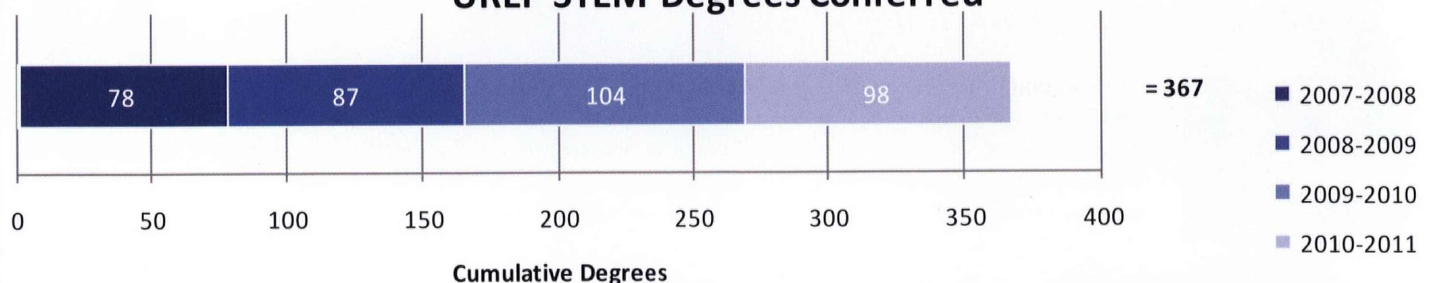
Program Facts

Volgenau School of Information Technology and Engineering

For the past 25 years, The Volgenau School of Information Technology and Engineering has been Virginia's premier destination for graduate studies in information technology (IT)-based engineering. Centrally located in Fairfax, Virginia, the school is seated in the center of Northern Virginia's IT corridor with over 2,000 other IT-based companies within the metropolitan area around the nation's capital in Washington. As a partner with the Northern Virginia IT industry, Volgenau produces research and quality graduate educations that have garnered national attention.



George Mason University UREP STEM Degrees Conferred





BASSAM DOURASSI

Bassam graduated in spring 2011 with a bachelor's in Electrical Engineering. During his stay at George Mason, he was on the Dean's List every semester. Bassam attended the Systems Information and Engineering track of the 2010 VA-NC Alliance Summer Research Program, and presented *Communication Interface for a Prostate Cancer Simulator* at the 2011 Alliance symposium. Bassam currently works for Intel, in Oregon, as a quality and reliability engineer.



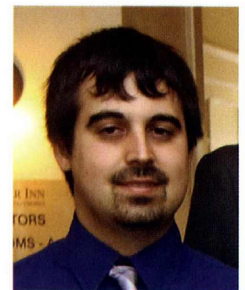
AVIS FOSTER

Avis completed her BS in Applied Mathematics with a minor in visual technology, graduating in spring 2011. She was on the Dean's List for six semesters while at George Mason University. Avis was selected by a group of faculty researchers in the Mathematics department to work on an NSF funded research project and presented her results both at George Mason and at national conferences. Avis is attending the University of Alabama for her graduate studies.



TAREK LAHLOU

Tarek finished his BS in Electrical Engineering in spring 2011. In 2009, he began working on a project entitled *Radio Transmitter Localization for Health Care Applications in Rural Guatemala*, and published a paper with his advisor. At the Alliance's 2011 symposium, Tarek also presented *RHEED Image Analysis on Epitaxial Niobium Thin Films*. Tarek is pursuing a Ph.D. in Electrical Engineering at Massachusetts Institute of Technology (MIT) and has been awarded the MIT School of Engineering Lemelson Fellowship.



MARIANA CRUZ

Mariana completed her bachelor's degree in Civil and Infrastructure Engineering in spring 2011. She tutored for the engineering school, completed research overseas, appeared on the Dean's List five times and received the GMU Alumni Association Outstanding Senior Award. Mariana was also president of GMU's chapter of the Society of Hispanic Professional Engineers (SHPE). She will attend the University of Delaware this fall for graduate work in structural engineering.





Johnson C. Smith University is a private liberal arts university located in Charlotte, North Carolina. Founded in 1867, the university enrolls approximately 1,500 students each year, maintaining proud HBCU traditions and a future aimed at diversity.

Johnson C. Smith to host upcoming STEM conference, “Enhancing Our Global Impact through STEM Innovation” September 29-October 1, 2011

JCSU is well underway in planning for this fall’s 3-day conference, which will feature workshops on *Designing Researching Communities, Expanding the Global Workforce, Fostering Collaborations/Partnerships* , and *Retooling for the Global Market* . A “Sharing Best Practices” Information Fair will run the duration of the conference.

The conference opens with an evening “STEM Soiree” and concludes with a visit to the North Carolina Research Campus, a public-private venture that houses over a million square-foot of state -of-the-art lab and office space for universities and private businesses.

Confirmed speakers are drawn from a wide array of private sector companies, research institutions, and STEM departments at fellow universities. They include the Virginia Space Grant Consortium, Boston Scientific, the American Chemical Society, Caterpillar, UNC Charlotte, the U.S. Environmental Protection Agency, Wake Forest Baptist Medical Center, and others.

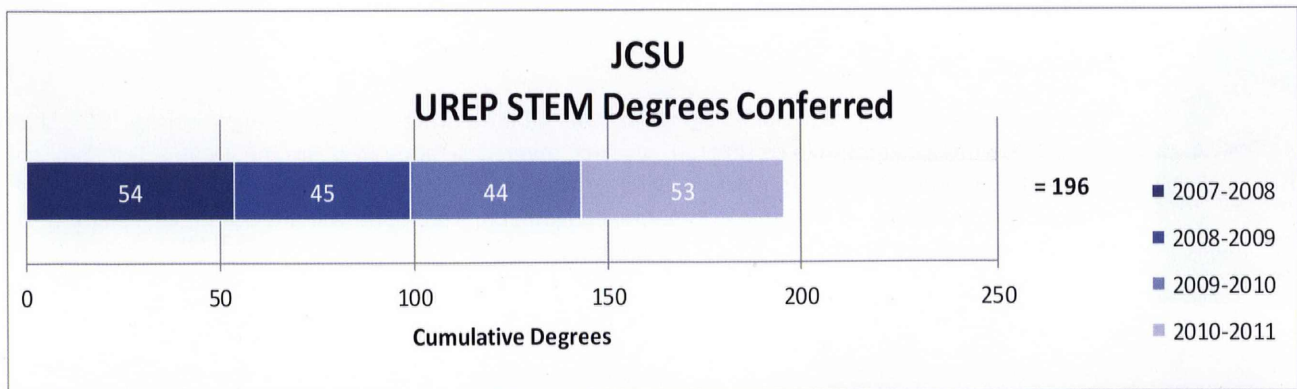
Program Facts

JCSU Summer Science Learning Academy



The LSAMP Summer Science Learning Academy assists first-semester freshmen in making a successful transition from high school to college. The program provides an academic curriculum, access to student support services, and an environment in which students can acclimate to campus and develop effective academic strategies.

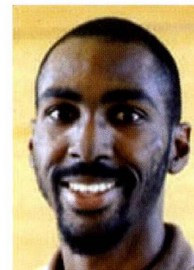
Academically gifted students with a strong interest in science, technology, engineering, or mathematics are selected. Participants receive a stipend, tuition, fees, room, insurance, and board. The program is offered through a collaboration with the University of Virginia to increase the number of minority students earning degrees in a STEM discipline.





COREY JENKINS, Jr.

Corey graduated magna cum laude with a Bachelors of Science in Information Systems Engineering. Currently, Corey is interning at Pacific Northwest National Laboratory in Richland, Washington, working in the Software Engineering and Architecture's group. He will be attending Rochester Institute of Technology this fall to complete a Master's in Software Engineering.



JUSTIN BUTLER

Justin graduated cum Laude from Johnson C. Smith University in 2011 with a bachelor's in science. A member of the university's Alliance program from 2009 through 2011, Justin also mentored LSAMP students. He is currently attending the University of Antigua College of Medicine.

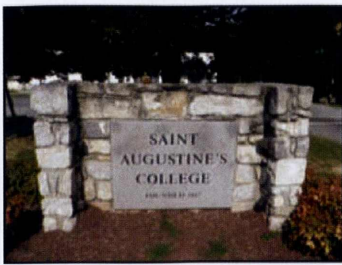
KIERA MATTHEWS

A 2011 rising sophomore, Kiera is majoring in biology at Johnson C. Smith University. She attended the 2011 chemistry track session of the VA-NC Alliance Summer Research Program at the University of Virginia and presented her team's research after travelling with the group to the Robert C. Byrd Green bank Telescope at the National Radio Astronomy Observatory's facility in West Virginia.



ANTHONY SPEAS

Anthony Speas is a 2011 graduate of Johnson C. Smith University, and attended the 2010 session of the VA-NC Alliance Summer Research Program. Anthony and fellow members of his research team presented their poster, *Identification of Molecules through Experimental and Computational Spectroscopy*, at the 2011 Alliance symposium (at which they won first place) and also at the concurrent research competition conducted during the inauguration of U.Va.'s new president, Teresa Sullivan.



St. Augustine's College is a four-year institution preparing students for leadership roles in a complex, diverse, and rapidly changing world. It was founded in 1867 and is located in Raleigh, North Carolina. The school's mission is to sustain a learning community in which students can prepare academically, socially and spiritually for leadership in a complex, diverse and rapidly changing world.

Peer Tutoring Has Advantages for Both Sides of the Equation

"The one-to-one ratio most often practiced in peer tutoring situations allows the pace and level of instruction to adjust to the tutee's individual learning needs, which is particularly beneficial to college freshmen as they make the oftentimes difficult social adjustments and academic transition to college life.

Through the tutorial relationship, the tutee has the opportunity to become a more active and participatory learner, and can experience greater self-confidence and lower academic anxiety...

...the tutee is often more comfortable revealing his or her learning needs or academic deficiencies to the tutor than the classroom instructor...

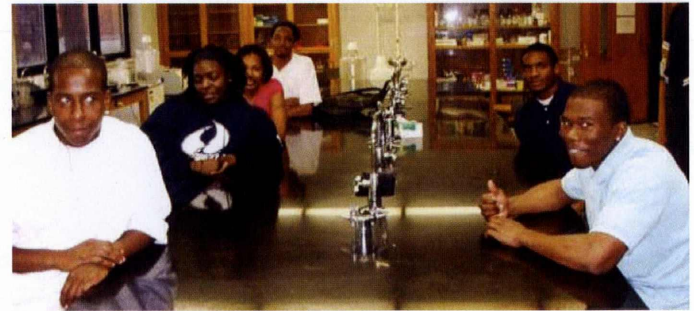
Competent peer tutors are a vital part of the university's teaching/learning team. They act as ambassadors for the institution, serve as outstanding role models to less confident peers, and help their fellow students strengthen their self-esteem, motivation, cognitive, and meta-cognitive skills".

Source: Roberta Schotka, Northeastern University, Manager, Peer Tutoring/ Language Instruction Support, Snell Library Media Center

Saint Augustine's College Leverages the Power of Peer Tutoring

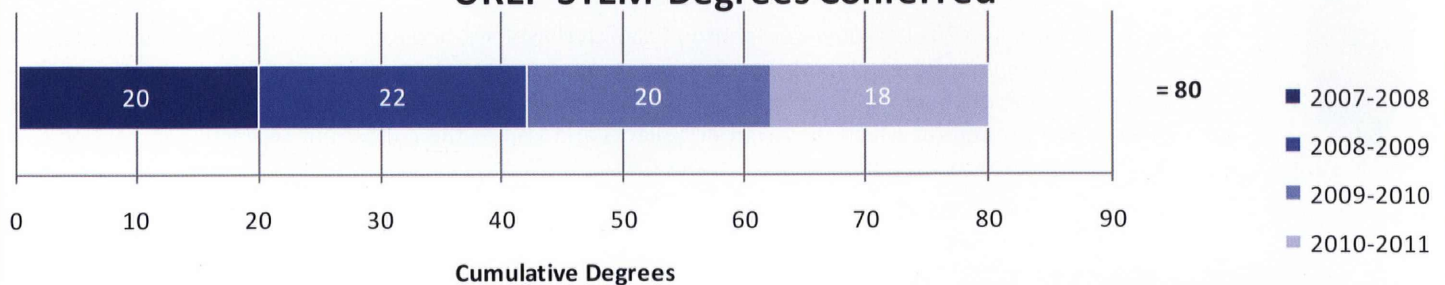
Scholars in the LSAMP program at Saint Augustine's College have always been able to rely on the school's strong tradition of peer teaching assistants and mentoring. Selected from the Departments of Biological and Physical Sciences, Mathematics, and Computer Sciences, peer tutors provide academic support in general chemistry, principles of biology, algebra, trigonometry, and calculus. Peer assistants are required to attend the lecture sessions of these classes and hold weekly office hours.

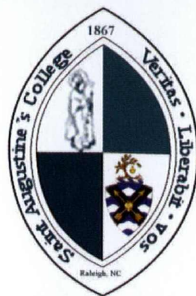
Peer tutoring is a proven, evidence-based method for both tutors and tutees to obtain experience and skills in the academic and work environments.



Above, peer tutors in their laboratory at Saint Augustine's College.

Saint Augustine's College UREP STEM Degrees Conferred





SANJAY RAMDON

A 2011 Saint Augustine's graduate and engineering and mathematics major, Sanjay was a member of the first VA-NC Alliance Summer Research program (chemistry track). He is currently pursuing his Ph.D. in Mechanical Engineering at Ohio State University, researching the degradation of Li-ion batteries using nanotechnology. While at Saint Augustine's, Sanjay received a full Presidential Scholarship, and tutored in mathematics and biology.



RAEDEEN RUSSELL

After graduating in 2010 from Saint Augustine's with a biology degree, Raedeem went on to Georgia State University, where she is currently working on her master's degree in microbiology. While at Saint Augustine's, Raedeem attended the University of North Carolina Chapel Hill's Health Careers Access Science Enrichment Program, and the Medical Education Development Program. In addition, Raedeem conducted research at Stony Brook University's Center for Infectious Disease Department of Molecular Genetics.

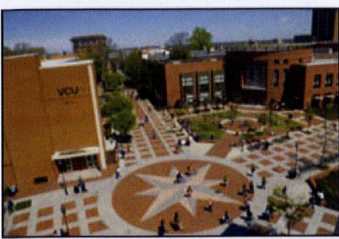
LATOYA McDONALD

A 2010 graduate in engineering and mathematics, LaToya is now in her second year of a Ph.D. program in mechanical engineering at Clemson University. While an undergraduate at Saint Augustine's, she participated in the Minorities Accessing Research Careers Training Program funded by NIH, conducted summer research at the University of South Carolina on cryo preservation of deer mice oocytes, and at the University of Wisconsin, where she assisted in developing and testing properties of cancellous bone surrogates.



OYITA UDIANA

After graduating in 2010 from Saint Augustine's (BS in engineering and mathematics), Oyita began graduate school at Ohio State University, where he is also currently a teaching assistant, in mathematics. In 2009, he presented his research *Functionalization and Chaining of FeCo Magnetic Nanoparticles for Applications in Regenerative Medicine* at Carnegie Mellon University; in 2010, Oyita and other Saint Augustine's College colleagues presented *The Impact of Learning Outcomes in the Basic Communications Course on Student Self-Assessment* at the Atlantic Assessment Conference, sponsored by Meredith College in collaboration with North Carolina State University.



Situated in the heart of Richmond, the state capital, Virginia Commonwealth University is one of the nation's top research universities and enrolls more than 32,000 students on two campuses.

VCU Furthers Ties to Community and Industry Partners through RAPME Program

Virginia Commonwealth University is a proud partner in the unique RAPME (Richmond Area Program for Minorities in Engineering) Program, a collaboration of academic and industry partners working towards a goal of achieving greater diversity in science and engineering.

Along with Virginia State University, the Richmond public school system, and 10 corporate sponsors, VCU and RAPME have developed the Summer Engineering Institute (SIE), scholarship programs, and other outreach efforts. RAPME also conducts an annual conference and student orientation programs.

VCU is the host institution for part of the multi-phase Summer Engineering Institute; the VCU component exposes students to design for electrical and computer engineers by applying the design process with a sound academic basis integrated with theoretical knowledge in order to bring useful systems to reality. A "Green Engineering Competition" was the featured project in 2011.

RAPME furthers VCU's relationships with professional organizations such as the National Society of Black Engineers, the Society of Women Engineers, and industry partners, including Verizon, DuPont, and Honeywell.

As a local nonprofit organization, RAPME exemplifies how VCU extends its reach into the community and enhances NSF's footprint into partnerships with other universities, public schools, academic societies, and industry. VCU and RAPE have collaborated since RAPME's inception in 1978.

VCU Competes Internationally!

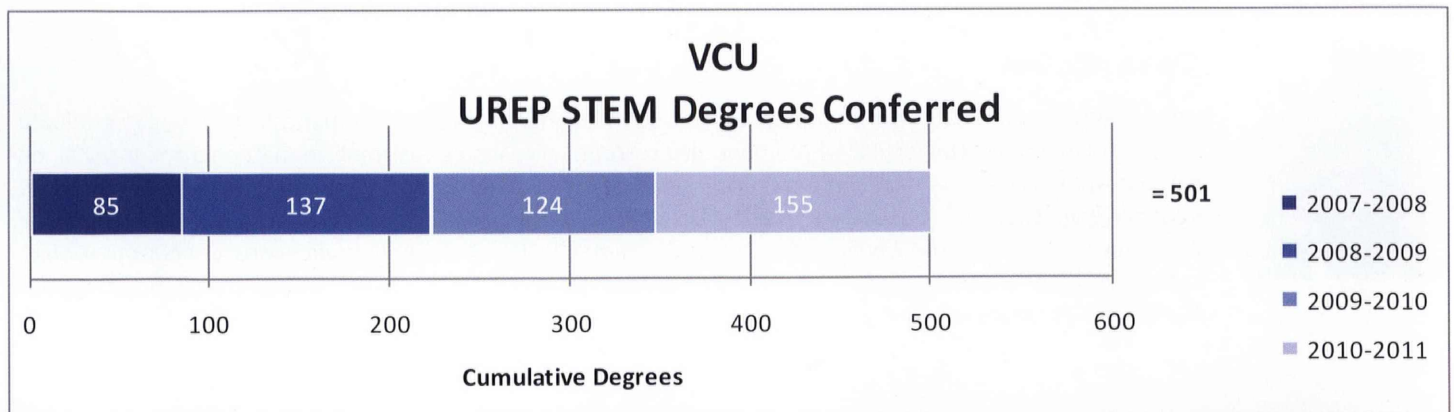


iGEM @ MIT

VCU student Afton Trent was awarded a spot on the 2009 VCU iGEM team. The prestigious annual iGEM (International Genetically Engineered Machine) Project is the nation's premier undergraduate synthetic biology competition.

Student teams are given a "kit" of biological parts at the beginning of the summer, from which to compete by building biological systems and operate them in living cells.

iGEM is revolutionizing the biotechnology industry as academic teams from around the world compete; many schools have developed "iGEM boot camps" and intramural iGEM competitions in advance of each year's annual event.





AFTON TRENT

A member of the VCU Class of 2012, Afton is currently a Safety, Health and Environmental Engineering intern at Meadwestvaco. A chemical and life sciences engineering major, she was also selected for VCU's 2009 iGEM team (see feature at left). Afton joined the iGEM team to gain experience by exploring synthetic biology and other aspects of chemical engineering.



POANNA BENNAM

VCU student Poanna Benham is majoring in clinical laboratory science coming to the university after graduating summa cum laude in high school. She decided to major in biology after becoming involved in the university's Alliance program.

ARRIYAM SOFIA FESSHAYE

Currently a sophomore biology major, Arriyam came to Virginia Commonwealth University from high school with an advanced diploma carrying a mathematics and science academy seal. She plans to follow her father's profession and become a pharmacist.



RACHEIDA LEWIS

Racheida Lewis is currently a junior at VCU, studying engineering. In the summer of 2010, while participating in the first VA-NC Alliance Summer Research Program's Systems and Information Engineering track, she conducted research on a prostate exam simulator. Subsequently, Racheida worked as an Application Engineering Intern with General Electric.



A leading research institution, Virginia Tech offers 215 undergraduate and graduate degree programs to more than 30,000 students. The university fulfills its land-grant mission of transforming knowledge to practice through technological leadership and by fueling economic growth and job creation locally, regionally, and across Virginia.

Virginia Tech and the VA-NC Alliance demystify the graduate school application process

Each year, Virginia Polytechnic Institute and State University assists prospective graduate school applicants as they navigate the graduate school process. The annual Graduate School Preparation Retreat (GSPR), is co-hosted by the Virginia Tech Ronald McNair Scholars Program and the Virginia Tech Graduate School.

The 2010 retreat was attended by students from multiple alliances, including Virginia-North Carolina, North Carolina A&T, and Hampton University. Guest speakers offer tips on the application process.

GSPR Retreats extend over a period of three days and offer workshops on multiple facets of the graduate school application process, including: selecting a graduate program, writing a personal statement and CV, GRE preparation, completing the graduate school application, and exploring funding opportunities.

By the end of each retreat, students have drafted their personal statement and completed in full at least one application. Participants are also extended an application fee waiver for graduate school applications to Virginia Tech.

A formal meal is held to conclude the retreat, during which students can practice their networking skills and mingle with faculty, administrators, and current graduate students.

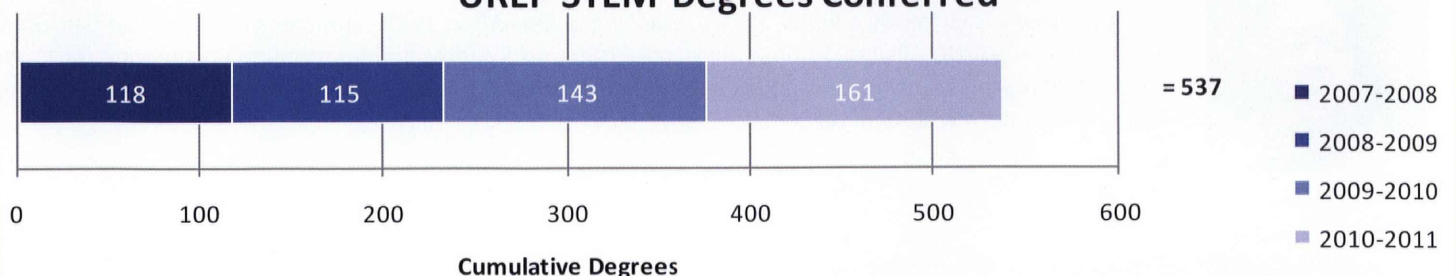


Above, students work on their graduate school applications during a session of the Virginia Tech retreat.

Retreat applicants also learn about opportunities at NSF's Bridge to the Doctorate grant program, an extension of the Louis Stokes Alliance for Minority Participation which provides fellowships to students at selected universities.



Virginia Polytechnic Institute & State University UREP STEM Degrees Conferred





BRITTANY RALPH

A senior majoring in biological sciences and psychology, Brittany participates in the Virginia Tech American Medical Women's Association, the Ronald McNair Post-baccalaureate program, and is the founding president of the African American Sisterhood. Brittany is also a member of the student conduct committee, part of the Virginia Tech Honor System. She has been a summer intern with the Multicultural Academic Opportunities Program, and would like to be a biomedical researcher.



REISHA PARHAM

Reisha is an honors student at Virginia Tech, and was an Initiative for Maximizing Student Diversity (IMSD) Undergraduate Scholar. Reisha participates in the American Institute of Chemical Engineers and the National Society of Black Engineers. She has made conference presentations at the Annual Biomedical Research Conference for Minority Students, the Virginia Tech Undergraduate Research Conference, and the Multicultural Academic Opportunities Program Summer Research Internship Symposium.

IRISCILLA AYALLA

A biochemistry major and 2011 cum laude graduate of Virginia Tech, Iriscilla won first place for her research poster at the 2010 Alliance Symposium. She attended the 2011 Annual Biomedical Research Conference for Minority Students in Charlotte, North Carolina. Iriscilla has been accepted to the Ph.D. program in at the University of Texas in San Antonio.



MARISSA RICE

Marissa has been a part of the VT AMP family since her freshman year. This past school year, she was the program assistant with VT AMP and conducted research with Dr. Lisa Belden in Biology. Marissa was also a McNair Scholar, and an undergraduate teaching assistant with the Biology department. In March 2011, Marissa won second place in the oral competition at the Minorities in Agriculture, Natural Resources, and Related Science (MANRRS) National Conference. She also won first place in the talent competition at MANRRS! In August 2011, Marissa will begin working on her Ph.D. in Zoology at Oklahoma State University.





July 28, 2010 - College students visiting for a special summer research program at the University of Virginia got up close and personal with the world's largest steerable telescope in Green Bank, W.Va. last week. The undergrads also are conducting original experiments cross-linked with chemistry and engineering in the eight-week program, which concludes July 30.

"We learned to operate an actual telescope and were given individual research problems to complete", student Arianna Seabrooks said.

Over the summer, Seabrooks and 11 other minority students in the Virginia-North Carolina Alliance have conducted hands-on research as part of the program, devoted to boosting the number of underrepresented-minority students in science, technology, engineering, and math fields, the so-called STEM disciplines.

The VA-NC Alliance, formed by U.Va. in 2007 and funded by the National Science Foundation, partners with seven colleges and universities in the two states to provide enrichment activities to students who are pursuing STEM degrees, with the goal of recruiting and retaining more students in these disciplines. The VA-NC Alliance is part of the NSF umbrella program, the Louis Stokes Alliance for Minority Participation, which sponsors multi-institution programs all over the country.

Chemistry professor Brooks Pate of the College of Arts & Sciences, who won a MacArthur Foundation "genius" grant in 2001, led one of two research tracks for the students. Gregory Gerling, assistant professor of systems and information engineering, headed the other curriculum in engineering.

A rising junior in chemical engineering at Virginia Tech, Seabrooks said the chemistry program gave her valuable research experience she did not have before, including "the opportunity to work with a variety of different equipment, such as spectrometers and radio telescopes", like the kinds at Green Bank Observatory.

The observatory is home to the Robert C. Byrd Green Bank Telescope, the largest fully steerable dish in the world, as well as several other telescopes, said Tony Remijan, an astronomer with the National Radio Astronomy Observatory in Charlottesville, who accompanied the students to Green Bank. The telescope is 450 feet high, and the size of the main dish is more than two acres across, which is the same as two football fields sitting next to each other, Remijan said.

The summer program, offered for the first time this year, has provided an opportunity for students from smaller institutions with fewer resources to participate in a major research institution, according to Dr. Marcus Martin, interim vice president and chief officer for diversity and equity.

"We wanted the program to give students the opportunity to build confidence, lasting relationships and a positive experience in research," Martin said.

For Bassam Dourassi, an electrical and computer-engineering senior at George Mason University, "being here this summer has confirmed to me that as a systems engineer, I will still have a variety of disciplines to work in."

Dourassi has been working with Gerling in developing a simulator for detecting prostate cancer, involving research, design and testing an intermediate interface between a laptop computer and the simulator.

"It was crucial that the communication... assure a fast response so that the doctor, nurse, or any practitioner be able to get feedback in real time to make their decision as efficiently as they can," Dourassi said. He also had to change the software program being used, for better compatibility and security, he said.

"We got to do what real physical chemists do," said Sanjay Ramdon, a senior electrical engineering student at St. Augustine's College in Raleigh, N.C. He worked with Pate's research team, which built a spectrometer and programmed it to operate on its own, in order to participate in ongoing research that is being conducted in U.Va.'s Center for Chemistry of the Universe.

Ramdon said the most important skill he has learned is "how to do research, from looking into past research on the topic, to actually building an instrument that does the job, then using that instrument to obtain data that we need and then to analyze that data."

"We got to know about different professors working in the field and got invaluable exposure to careers in the field."

In addition, the students learned about lab safety, ethics in science, approaches to scientific writing and referencing, and intellectual property considerations.

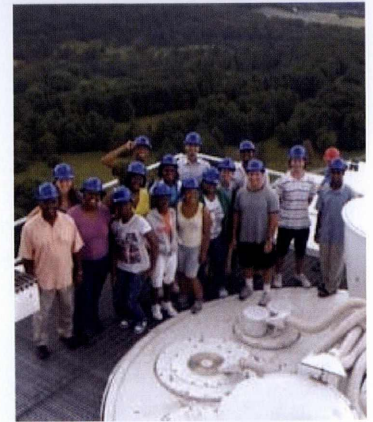
Alliance students also attended several lectures organized for other student groups - in the U.Va. Medical School's summer research internship program and the summer medical and dental education program.

On July 20th, Alliance students swapped programs for a day. The chemistry and astronomy students switched labs with the systems engineering students so each group had the opportunity to explain their research to the other, Martin said.

He said the professors involved have been pleased with the students' performance and some of the students definitely wanted to return to U.Va.

The VA-NC Alliance comprises eight colleges and universities: in North Carolina, Bennett College for Women in Greensboro, Elizabeth City State University, Johnson C. Smith University in Charlotte, and St. Augustine's College in Raleigh; in Virginia, U.Va., George Mason, Virginia Commonwealth and Virginia Tech.

On the final day of the program, July 30, the students will present their research to friends, family members and their colleagues at the National Radio Astronomy Observatory, followed by a closing reception.



Students in the VA-NC Alliance visited the Green Bank Telescope in W. Va. The telescope is 450 feet high and more than 2 football fields in diameter.

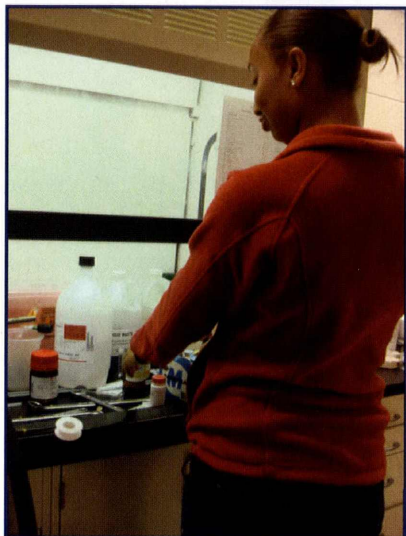
(Photo: Robin Pulliam)

Contact:

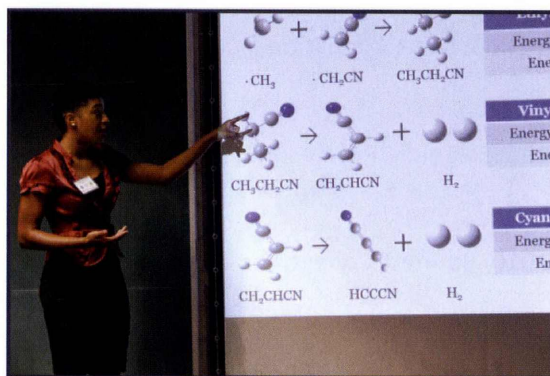
*Anne E. Bromley
Senior Writer, Editor
(434) 924-6861
anneb@virginia.edu*

Virginia-North Carolina Alliance Summer Research Program

Two research tracks:
Center for Chemistry of the Universe
Systems & Information Engineering



Intensive eight-week experience
with faculty in nationally
recognized programs.



2010 session: June 6th-July 31st
2011 session: June 5th-July 30th

2011 Research Presentations:

- Using the Kinect Technology to Monitor Body Movement in the Workplace*
Desire Bounds, George Mason University
- Virtual Reality Testing of Public Preparedness for a Radiological Emergency*
Alexandra Leandre, Bennett College for Women
- The Effectiveness of Information Relayed During Oklahoma Severe Weather Events*
Amy Daniels, Concordia College
- Broadband Nitrile Reaction Screening*
Hanifah Hendricks, University of Virginia; Kiera Matthews, Johnson C. Smith University
- Creating a 40-60 GHz Broad-band Microwave Spectrometer*
Calvin Nellum, Norfolk State University; Michael Pheng and Pedro Rodriguez, Virginia Tech
- Chemistry of Nitriles in Hot Cores*
Megan Hill, Virginia Tech; Niklaus Dollhopf, University of Virginia

Annual Alliance Symposia



The Virginia-North Carolina Alliance holds annual research symposia each spring semester. Partner schools rotate as the host institution. Each symposium features oral and poster research competitions, keynote speakers, panel discussions, representatives from graduate schools, and the opportunity to tour facilities at the host school.

Partner institutions often combine forces with existing conferences or competitions scheduled for their locations, in order to achieve economies in logistics and scale, and leverage resources.

These symposia are frequently the first opportunity for many students to present their research in front of judges and peers, offering an opportunity for feedback and critique before submitting their work at other academic and professional venues.

March 2008, Saint Augustine's College:

A Partnership to Develop the Next Generation of Leaders in Teaching and Research

April 2009, Virginia Polytechnic Institute & State University:

Undergraduate Research and Prospective Graduate Student Conference

April 2010, Bennett College for Women:

Embracing Academic Diversity through Effective Research and Collaboration

April 2011, University of Virginia:

Fourth Annual Alliance Symposium & Presidential Inaugural Research Competition & Academic Symposium

Johnson C. Smith University (Charlotte, North Carolina) is scheduled to host the Alliance's 2012 symposium.

Dr. Art Hicks, NSF Program Director, with Ms. Sheila Spence at the 2008 Alliance Symposium hosted by Saint Augustine's College.



**Oral & Poster Research Competition Winners
2011 Alliance Annual Symposium
University of Virginia
Charlottesville, Virginia**

First Place, Poster:

Identification of Molecules through Experimental and Computational Spectroscopy

Jasmine Mays & Anthony Speas (Johnson C. Smith University)
Arianna Seabrooks-Matthews (Virginia Polytechnic Institute & State University)
Jasmine Drake (University of Virginia)

Second Place, Poster:

**Utilizing Micro-Computed Tomography (μ -CT) Scan Data to Create Finite Elements of
Lower Limb Bones**

Jamie Wright (University of Virginia)

Third Place, Poster (tie):

**Inhibition of E2 Viral Protein to DC-SIGN of Dendritic Cell Can Lead to Advancement in
Drug Therapeutics**

Michaila Latore (Virginia Polytechnic Institute & State University)

Platelet-Rich Plasma Isolation for Targeted Bone Tissue Engineering

Juliana Cano-Mejia (University of Virginia)

First Place, Oral:

The Effect of Ouabain on Sodium Potassium ATPase α 1 in the Heart

Merischia Griffin (Johnson C. Smith University)

Second Place, Oral:

Fabrication of Nanofibrous Blend Polymer Scaffold for Wound Healing

Alan Molina (University of Virginia)

Third Place, Oral:

Numerical Evaluation of Mode-II Delamination in Layered Fiber Reinforced Composites

Mariana Cruz (George Mason University)



Alliance Scholars Present Research Across the Nation

VA-NC Alliance scholars have presented at conferences and symposia across multiple disciplines, including:

2008

American Geophysical Union Conference (*San Francisco, CA*)
IEEE International Geoscience & Remote Sensing Symposium (*Boston, MA*)
Symposium on Computing at Minority Institutions (*Virginia Beach, VA*)

2009

Collaboration Around Research in Education (*Duke University, Durham, NC*)
North Carolina OPT-ED (Alliance to Create Opportunity through Education) Conference (*Greensboro, NC*)
Conference on Undergraduate Research in Mathematics IPenn State University, College Township, PA)
National Collegiate Honors Council (*Washington, DC*)
HBCU-UP National Research Conference (*Washington, DC*)

2010

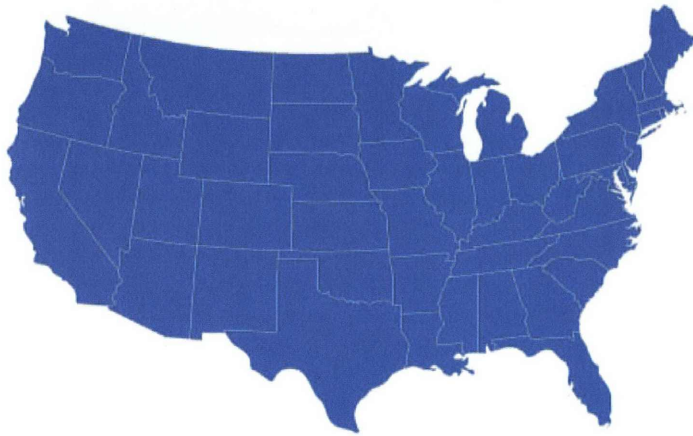
SACNAS (Society for Advancement of Chicanos & Native Americans in Science) National Conference (*San Jose, CA*)
National Council of Teachers of Mathematics (*Greensboro, NC*)
American Association for Cancer Research (*Washington, DC*)
Nebraska Conference for Undergraduate Women in Mathematics (*Lincoln, NE*)

2011

Annual Biomedical Research Conference for Minority Students (*Charlotte, NC*)
American Institute for Aeronautics & Astronautics Regional I-MA Conference (*Charlottesville, VA*)
Virginia Society for Microbiology Annual Meeting (*Lynchburg, VA*)
International Engineering Research Conference (*Reno, NV*)
Mathematical Association of America, Southeastern Section, Annual Meeting (*University of Alabama*)
National Conference on Undergraduate Research (*Ithaca, NY*)
Ecological Society of America Annual Meeting (*Austin, TX*)
University of Baltimore County Chemistry & Biochemistry Undergraduate Research Conference (*Baltimore, MD*)
Virginia Tech Undergraduate Research Symposium (*Blacksburg, VA*)
Minorities in Agriculture, Natural Resources & Related Sciences Annual Meeting (*Kansas City, MO*)
State of North Carolina Undergraduate Research & Creativity Symposium (*Charlotte, NC*)
Revolutionary Aerospace System Concepts Academic Linkages Competition (*Merritt, FL*)

Where Are They Now?

**VA-NC Alliance scholars have been accepted at graduate schools
all across the country, including:**



Carnegie Mellon University
Clemson University
Drexel University
East Carolina State University
Elizabeth City State University
Florida A&M University
Georgia State University
George Washington University
Hampton University
Howard University
Ohio State University
Oklahoma State University
Old Dominion University
Massachusetts Institute of Technology
North Carolina A&T
Purdue University
Rochester Institute of Technology
San Francisco State University
University of Alabama
University of Delaware
University of Kansas
University of Oklahoma
University of Texas, San Antonio
University of Virginia
Virginia Polytechnic Institute & State University

**...and the Alliance's first graduating cohort is just beginning
to enter the public and private workforce, at employers such as:**

U.S. Army Space and Missile Defense Command
Abbott Laboratories
Intel Corporation
and public school systems in various states

Virginia Governor Bob McDonnell Signs “Top Jobs of the 21st Century” Higher Education Legislation (January 18, 2011)

This landmark legislation creates a roadmap for an additional 100,000 undergraduate degrees, following the recommendations made by Governor McDonnell’s Higher Education Commission on Reform, Innovation and Investment at its December 2010 meeting.

Higher education’s return on investment is second to none, and Virginia is no exception: the Weldon Cooper Center’s study for the Virginia Business Higher Education Council shows that *every one dollar currently invested in Virginia’s public higher ed system yields 13 dollars in increased economic output.*

A key priority of the University of Virginia includes increased enrollment in STEM fields.



Governor McDonnell remarked, “... The ‘Top Jobs’ legislation will enable our institutions to meet the goal of issuing an additional 100,000 degrees over the next 15 years, making Virginia one of the most highly educated states in the nation.

In fact, based on this legislation, for example, the University of Virginia Board of Visitors already is poised to add nearly 1,000 new spaces for in-state students on the University’s grounds, and that’s great news.

Our legislation also places a greater emphasis on the high demand science, technology, engineering and math subjects through the formation of a public-private partnership that will engage the business and professional community in leveraging best practices for K-12 and higher education.”

Key points of the legislation include:

- **Providing a roadmap for achieving an additional 100,000 undergraduate degrees for Virginians over the next 15 years by (1) increasing enrollment of Virginia students, (2) improving graduation and retention rates, and (3) assisting students with college credit to complete degrees through public and private higher education institutions in Virginia.**
- **Focusing additional degree attainment in high-demand, high-income fields (e.g., STEM, healthcare) that are keys to top jobs in 21st Century economy.**
- **Providing for creation of a not-for-profit STEM public-private partnership to fully engage the business and professional communities in the strategic direction and promotion of STEM initiatives. Incentivizes public-private collaboration on STEM-related and other commercially viable research.**

Demonstrating statewide public and private support for the STEM pipeline:

Schools and businesses leverage forces for STEM education through the **NC STEM COMMUNITY COLLABORATIVE** and the **NORTH CAROLINA SCIENCE, MATHEMATICS & TECHNOLOGY EDUCATION CENTER**

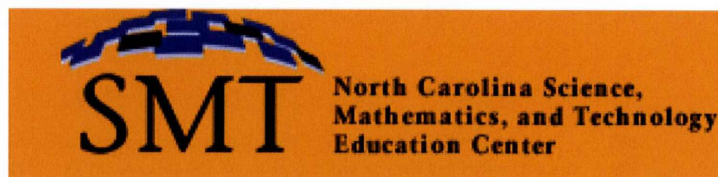
NC STEM activities include:

- **Community Visioning Pilots:** Targeting “STEM Communities” around the state, NC STEM partners support a replicable visioning process to inform communities mapping economic needs to their education pipeline.
- **Advocacy:** With passage of the “Joining Our Business & Schools (JOBS)” bill, the Collaborative works in alignment with and under the advisory of a broad study commission to recommend policy and investment decisions.
- **Network:** North Carolina communities build on their strengths, are informed by STEM resources, and actively collaborate with each other and the state to address our 21st century challenges.
- **Knowledge Capture:** Documenting STEM educational programs, research, and innovation within North Carolina to drive sustainable practices supporting communities’ STEM needs.
- **Catalyst.** Supporting investments from inside and outside North Carolina into a truly 21st century approach.



**COMMUNITY
COLLABORATIVE**

The North Carolina STEM Community Collaborative, incubated by MCNC (Microelectronics Center of North Carolina, a catalyst for technology-based economic development throughout the state) and supplemented by grants, builds the capacity of local communities to create and institute innovative and sustainable educational programs characterized by individualization, quality and scalability.

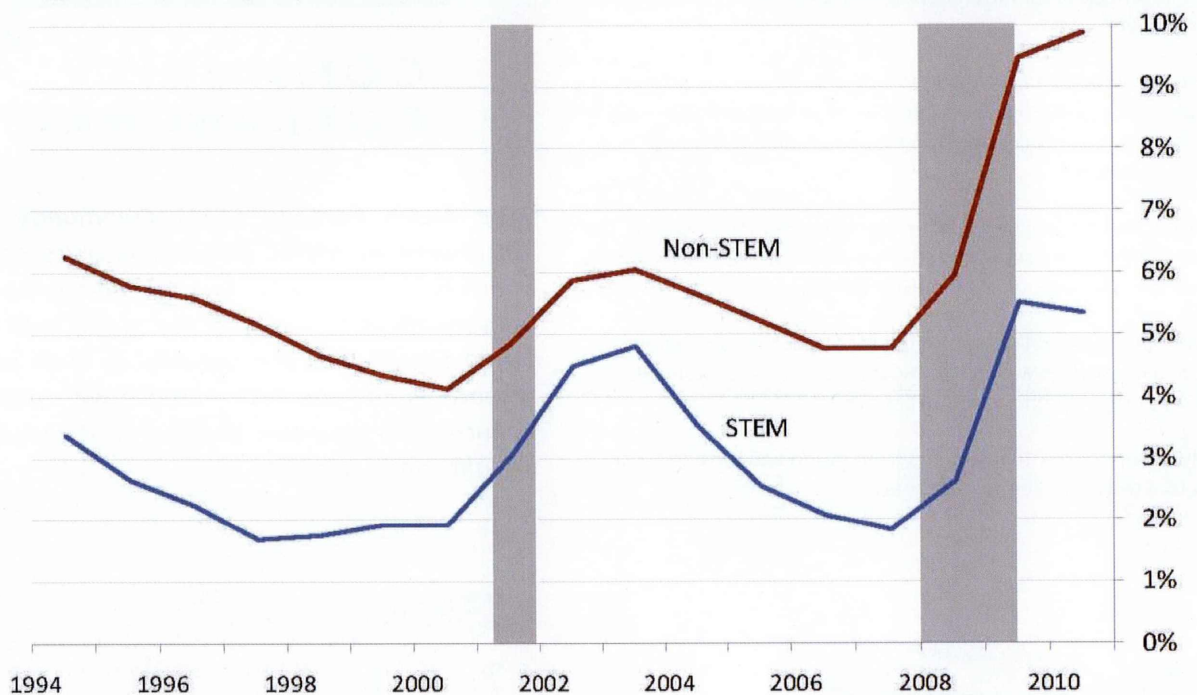


The North Carolina Science, Mathematics, and Technology Education Center promotes and supports innovation in science, mathematics, and technology learning in the state's elementary and secondary schools by serving as a catalyst for innovation and change in education; advocating for research-based instructional programs in schools; providing tools, learning methods, and technical help to educators; and recruiting community and business leaders to encourage and promote advanced SMT learning at all ages.

STEM Jobs and STEM Degrees

- A STEM degree is the typical path to a STEM job, as more than two-thirds of the 4.7 million STEM workers with a college degree has an undergraduate STEM degree.
- In addition to higher earnings, workers in STEM occupations on average experience lower unemployment rates than workers in other fields.

Figure 3. Unemployment Rates in STEM and Non-STEM Occupations, 1994-2010



Source: ESA calculations using Current Population Survey public-use microdata.

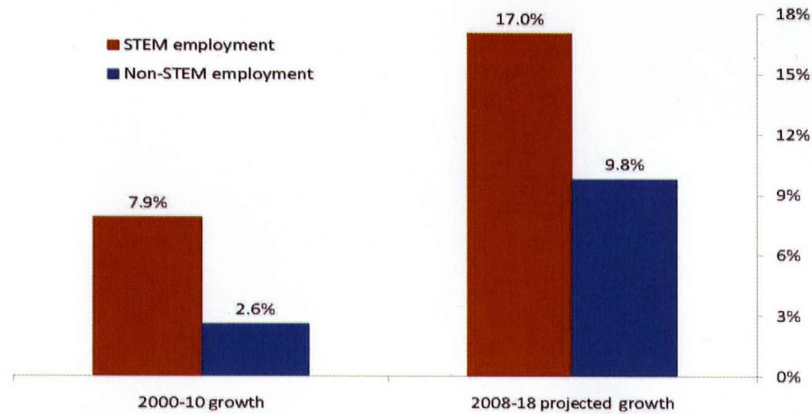
Note: The estimates are for the civilian labor force age 16 and over. Shading indicates recession.

“The greatest advancements in our society from medicine to mechanics have come from the minds of those interested in or studied in the areas of STEM. Although still relatively small in number, the STEM workforce has an outsized impact on a nation’s competitiveness, economic growth, and overall standard of living... STEM jobs are the jobs of the future. They are essential for developing our technological innovation and global competitiveness.”

STEM: Good Jobs Now and for the Future

According to a July 2011 issue brief by the U.S. Department of Commerce, Economics and Statistics Administration:

Figure 1. Recent and Projected Growth in STEM and Non-STEM Employment



Source: ESA calculations using Current Population Survey public-use microdata and estimates from the Employment Projections Program of the Bureau of Labor Statistics.

- In 2010, there were 7.6 million STEM workers in the United States, representing about 1 in 18 workers.
- STEM employment grew rapidly from 2000 to 2010, increasing 7.9 percent.
- Growth in STEM jobs was three times as fast as growth in non-STEM jobs.

- Those with graduate degrees in a STEM job earned more than \$40 per hour, nearly \$4.50 more per hour on average than those with non-STEM jobs.
- STEM workers command higher wages, earning 26 percent more than their non-STEM counterparts.
- STEM degree holders enjoy higher earnings, regardless of whether they work in STEM or non-STEM occupations.

Table 1. Average Hourly Earnings of Full-Time Private Wage and Salary Workers in STEM Occupations by Educational Attainment, 2010

	Average hourly earnings		Difference	
	STEM	Non-STEM	Dollars	Percent
High school diploma or less	\$24.82	\$15.55	\$9.27	59.6%
Some college or associate degree	\$26.63	\$19.02	\$7.61	40.0%
Bachelor's degree only	\$35.81	\$28.27	\$7.54	26.7%
Graduate degree	\$40.69	\$36.22	\$4.47	12.3%

Source: ESA calculations using Current Population Survey public-use microdata and estimates from the Employment Projections Program of the Bureau of Labor Statistics.



www.virginia.edu/amp