ELIZABETH CITY STATE UNIVERSITY

REU Site: Arctic and Antarctic Project with Research Experience for Teachers Component

Center of Excellence in Remote Sensing Education and Research
Summer 2015 Research Abstracts :: 2015-2016 Program Highlights

2015 GEX - JUNEAU ICEFIELD RESEARCH PROGRAM

The CReSIS-GEX project provides students with genuine research experiences,augmented by mentoring and sustained engagement with the polar community. This has been shown to be a highly effective strategy for STEM retention in general and CReSIS in particular. Past REUs who have engaged in a field experience number among the ranks of those PhD students who garner prestigious national fellowships. This field experience provides a diverse group of REU students with the opportunity to complete a glacier expedition. During the Juneau Icefield Research Program (JIRP) participants traverse from Juneau, Alaska to Atlin, British Columbia. This travel is followed by their individual projects, guided by faculty mentors. Representatives from the CReSIS Glacial Exploration Project (GEX) project participated in the 2015 JIRP. They were: Arianna Varuolo-Clark (Lyndon State University) and James Headen (Elizabeth City State University) and participated in the project: *Juneau Icefield Mass Balance of Taku and Lemon Creek Glaciers*.

Arianna Varuolo-Clark

James Headen

RESEARCH EXPERIENCES FOR UNDERGRADUATES SYMPOSIUM (REUS)

This conference featured keynote talks, presentations by students from Research Experiences for Undergraduates (REU) programs in all disciplines, sessions for REU students, faculty, and administrators, and opportunities to present to representatives from the National Science Foundation (NSF).

Elizabeth City State University (ECSU) was represented by Maeah J. Walthall who took part in the Summer of 2015 REU at ECSU. Her research was titled "Autochamber Measurements of Net Ecosystem (CO_2) Exchange at a Subarctic Mire in Northern Sweden. Her mentor, an ECSU graduate, was Mr. Ryan Lawrence, a graduate student at the University of New Hampshire. Ms. Walthall's poster can be found at: http://nia.ecsu.edu/reuomps2015/teams/arctic/Slide1.jpg.

Dr. Linda Hayden, principal investigator for the NSF rctic and Antarctic REU grant, also attended the symposium.

Dr. Nicole Bennett, Program Director, Division of Undergraduate Education, gave a talk titled "The NSF REU Program: Establishing a Lifetime of Discovery." She spoke on how undergraduate researchers form the foundation for building a coherent body of knowledge. She told the audience "Your next steps should be to take ownership of your vision as a scientist. Push the science forward."

From Left to Right: Dr. Linda Hayden, Dominique Seles, Dr. Julie Brigham-Grette, Maeah Walthall, Ryan Lawrence

2015 SACNAS NATIONAL CONFERENCE

The Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) was held in Washington, DC on October 29-31, 2015. The conference was aimed at inspiring and training those individuals pursuing an education or a career in the STEM fields. Dr. Linda Hayden, Director of the Center of Excellence in Remote Sensing Education and Research (CERSER) at Elizabeth City State University, along with ECSU graduate student Andrew Brumfield attended the conference.

Also in attendance were Maeah Walthall from George Mason University, Charlie Nelson from Kentucky State University, and Jennah Seaver from Haskell Indian Nations University.

Nigel Pugh - ECSU
Mentors: Dr. Renee Bryce, Ryan Michaels
Exploration of Mobile Testing Through Automatic Test Case Generation

As technology continues to progress and become a more integral part of everyday life, the need for efficient and reliable testing services likewise continues to grow. This is especially true in mobile testing, where there is both incredible device diversity and a low barrier for entry into the realm of application creation. Most current mobile research has focused on either addressing concern over applications functioning over a wide range of devices, or proof of concept test generation on no more than a handful of applications, and typically cannot be generalized to a wider application pool. This summer we have focused on addressing that second issue, by developing a tool for test case generation of android applications regardless of android version and emulator type. Additionally, the team explored the breadth of the software testing process, from application discovery, test case generation, replaying of test cases against bugged versions of the application, and finally exploring questions of test case analysis, specifically looking at (GUI) element coverage.

Omar Owens - WSSU
Tori Wilbon - ECSU
Mentors: Dr. Geoffrey Fox, (Graduate Mentor) Jerome Mitchell
Exploring Learning Algorithms for Layer Identification

The focus of this project is to explore learning algorithms for automatically detecting layer boundaries from images collected from the Polar Regions, specifically Antarctica images. . Layer boundaries are incorporated into climate models for forecasting a rise in sea level but are difficult to extract from noisy images. Currently, glaciologists manually identify layer boundaries, which is time-consuming and requires sparse hand selection. An active contours model will be explored for detecting layer boundaries. An active contours model (snake) is used in computer vision for object tracking, shape recognition, segmentation, and edge detection. The snake algorithm is an energy optimization spline guided by an outside constraint force and influenced by image forces, which would pull it toward layer boundaries.

RESEARCH EXPERIENCE FOR TEACHERS

Research Experience for Teachers (RET) provides opportunities for pre-service STEM teachers to participate in the AaA-REU program. This component is housed at ECSU and KU. RET interns are assigned to specifically-designed research teams led by members of the CReSIS Education staff. RET team members are undergraduate students with a major in STEM Education.

Jennah Seaver – HINU
Analyzing the Efficacy of the Addition of a Survival Unit into the Science Program "Ice, Ice, Baby" to promote environmental awareness on behalf of the Center for Remote Sensing of Ice Sheets

Ice, Ice, Baby is a science program developed by the education team of the Center for Remote Sensing of Ice Sheets (CReSIS). The inquiry-based, hands-on activities built into the program are designed to help students understand the dynamics of polar ice sheets in sea level rise on a basic level. Ice, Ice, Baby lessons not only give educators an opportunity to expand the environmental awareness of their students, but they serve as platforms for the teaching of scientific principles to fulfill the national and Kansas state standards. The "survival unit" of Ice, Ice, Baby is an effective component of the program because, rather than limiting lessons to the physical terrain, it instead focuses lessons on the people involved in it, a relatable topic which may stimulate interest and creativity among youth; potentially increasing productivity. Lessons involve why explorers must develop awareness of and solutions for hazards such as ice thickness, frigid temperatures, food scarcity, and lack of shelter. The lessons associated with these topics are designed to be inquiry-based, hands-on, and to meet the national and state standards for school districts.

Jessica Hathaway - ECSU
Mentors: Dr. Gamaliel "Dan" Cherry and Katrina Young
NASA Langley Research Center Student Volunteer Research Summer Experience

This summer, I was a student volunteer at NASA Langley Research Center (LaRC) (Hampton, VA) in the Office of Education. As part of my volunteer experience, I had the opportunity to work with Katrina Young and Dr. Gamaliel "Dan" Cherry. The two main projects that I participated on were NASA LaRC's Day of Education and YOUth Day. I also had training on how to conduct hands-on science, technology, engineering, and mathematics (STEM) activities with K–12 educators and students using NASA's Rockets to Race Cars program. As an education major, this experience opens a door to show activities that can be used in and out of the classroom.

Kamberlin King - MVSU
Charlie Nelson - ECSU
Ayanna Overton – NCAT
Mentor: Michael Jefferson, Jr.

Validation of the Antarctic Snow Accumulation and Ice Discharge Basal Stress Boundary in the South Eastern Region of the Ross Ice Shelf, Antarctica

The largest ice shelf in Antarctic, Ross Ice Shelf, was investigated over the years of (1970-2015). Near the basal stress boundary between the ice shelf and the West Antarctic ice sheet, ice velocity ranges from a few meters per year to several hundred meters per year in ice streams. Ice velocity increases as the ice moves seaward, reaching more than 1 km yr-1 in the central portions of the ice front. Most of the drainage from West Antarctica into the Ross Ice Shelf flows down two major ice streams, each of which discharges more than 20 km3 of ice each year.

Along with velocity changes, the warmest water below parts of the Ross Ice Shelf resides in the lowest portion of the water column because of its high salinity. Vertical mixing caused by tidal stirring can thus induce ablation by lifting the warm water into contact with the ice shelf. This process can cause melting over a period of time and eventually cause breakup of ice shelf.

With changes occurring over many years a validation is needed for the Antarctic Snow Accumulation and Ice Discharge (ASAID) basal stress boundary created in 2003. After the 2002 Larsen B Ice Shelf disintegration, nearby glaciers in the Antarctic Peninsula accelerated up to eight times their original speed over the next 18 months. Similar losses of ice tongues in Greenland have caused speed-ups of two to three times the flow rates in just one year. Rapid changes occurring in regions surrounding Antarctica are causing concern in the polar science community to research changes occurring in coastal zones over time. During the research, the team completed study on the Ross Ice Shelf located on the south western coast of the Antarctic. The study included a validation of the ABSB vs. the natural basal stress boundary (NBSB) along the Ross Ice Shelf. The ASAID BSB was created in 2003 by a team of researchers headed by National Aeronautics and Space Administration Goddard Space Flight Center (NASA GSFC), with an aim of studying coastal deviations as it pertains to the mass balance of the entire continent. The point data file was aimed at creating a replica of the natural BSB. Select cloud free Landsat satellite imagery from satellites 1 through 7 was used to detect changes occurring over the span of 19 years. The last major interest in the study included documenting the deviations or incorrect placements of the ABSB vs. NBSB. ENVI 4.7 as well as ENVI 5.0 image manipulation software was used in the geo-rectifying and the geo-referencing process. Changes that occurred were documented in the form of a data table with the change that occurred along with the latitude and longitude geographic coordinates.

Maeah Walthall - GMU
Xavier Parker-Smith - NCAT
Mentor: Dr. Tim Kidd

Autochamber Measurements of Net Ecosystem (CO2) Exchange at a Subarctic Mire in Northern Sweden

Permafrost stores 50% of the global soil organic carbon. Increasing climate temperatures in the arctic region have given rise to permafrost thaw, exposing once stable organic carbon to decomposition, and potentially altering the global carbon budget. In this study, we present a secondary data analysis of high frequency net ecosystem (CO2) exchange measurements made using a quantum cascade laser spectrometer connected to a nine member autochamber system positioned in the three dominant vegetation communities at Stordalen Mire in Northern Sweden (68° 21'N, 18° 49'E). Over DOY 121 - 260 during the year 2013, the magnitude of net ecosystem (CO2) exchanged followed the moisture gradient with increasing CO2 uptake from the dry Palsa site (- 0.3 ± 1.6 mg C m-2 h-1), to the wet intermediate melt feature with Sphagnum spp. (- 22.1 ± 0.9 mg C m-2 h-1), to the fully wet Eriophorum spp. site (- 49.9 ± 4.2 mg C m-2 h-1), with highest uptake occurring in the fully thawed Eriophorum/ Sphagnum (Ch. 9) collar (- 87.2 ± 6.0 mg C m-2 h-1) (overall mean ±1 SE, n = 1267, 2334, 1211, 772). All mean fluxes were statistically different from each other (p < 0.0001). At all sites, PAR was the best environmental predictor of NEE. Although increased warming has resulted in permafrost thaw, any possible loss of old carbon in the form of CO2 from thawing or thawed sites was more than offset by a greater net uptake of CO2 occurring in the wetter sites.

NASA LANGLEY SIGMA SERIES

On Tuesday, January 13th, Dr. Linda Hayden, PI of the Center of Excellence in Remote Sensing Education and Research (CERSER) led several representatives from Elizabeth City State University to the NASA Langley Sigma Series, a Forum on Science and Technology. This event was held at the Virginia Air & Space Center's Pearl Young Theater and featured Mr. Brian K. Stewart a Senior Researcher in NASA Langley's Research Directorate. The title of his presentation was: "Taking the Long View: How ISAAC Prepares LaRC for the Future."

Those attending with Dr. Hayden included: Dr. Cheryl Lewis, Andrew Brumfield, and Hagan Hodgkins.

Steffi Walthall - SCAD
Ricky Dixon, Raveen McKenzie, Jamal Stevenson - MVSU

Mentor: Jeff Wood

A Corresponding Study of Water Quality Evaluation of the Pasquotank Watershed in Northeastern North Carolina

The Pasquotank River Watershed covers over 450 square miles and is located in the Coastal Plain of northeastern North Carolina. It flows from the Great Dismal Swamp at the Virginia/North Carolina border into the Albemarle Sound. The watershed is part of the Albemarle-Pamlico Estuarine System, the second largest system in the United States after the Chesapeake Bay Estuary and provides a transition between spawning grounds and the waters of the Albemarle Sound. Forested swamp wetlands border much of the waterways. Increased agricultural and urban development has greatly affected water quality during recent years.

The 2015 Research Experience for Undergraduates Pasquotank River Watershed Team completed various tests along the tributaries and the river itself, adding to the previously gathered data from 2011, 2013, and 2014. The test points were derived during the 2011 Summer Watershed Team research project with four points added during the 2014 summer project. Results were compared with previous readings for analysis. Streams tested were the Newbegun Creek, Knobbs Creek, Areneuse Creek, Mill Dam Creek, and Sawyers Creek. These streams, along with the river, cover a large area of the watershed and provide a wide variety of shore development from swampland and farmland to industrial development.

In-house tests on this year's samples continued to include pH, salinity, total dissolved solids, and conductivity. Air/water temperature, dissolved oxygen, wind speed/direction, and turbidity/clarity measurements were taken in the field. The results from these readings were placed into an online database where they are correlated to the location of the sample using Google Maps®.

Analysis tools were developed in order to compare the data from all years for any variations or similarities. Excel spreadsheets were developed to look more closely at individual points and tests for each point. Past projects have used a general analysis of the entire stream to determine water quality. Steps were also made to research the development of an online graphing tool for analyzing the data at individual points over several years. Test results collected were added to a database developed during the 2014-2015 academic year at Elizabeth City State University. This database was connected to a data visualization page utilizing Google Maps®.

American Geophysical Union Fall Meeting

On December 14-18, 2015, representatives from various Historically Black Colleges and Universities attended the 2015 American Geophysical Union (AGU) Fall Meeting in San Francisco. The AGU Fall Meeting is the largest conference in the geophysical sciences with earth and space scientist, students, teachers, and others in attendance. Presenting students below were also joined by Ms. Steffi Walthall and Mr. Kaiem Frink.

Presenters included:

Maeah Walthall, George Mason University
"Automatic chamber measurements of Net Ecosystem (CO2) Exchange at a Subarctic Mire in Northern Sweden"

Charlie Nelson, Kentucky State University
"Validation of the Antarctic Snow Accumulation and Ice Discharge Basal Stress Boundary in the South Eastern Region of the Ross Ice Shelf, Antarctica"

Derek Morris, Jr, Elizabeth City State University
"Implementation of an interactive database interface utilizing HTML, PHP, JavaScript, and MySQL in support of water quality assessments in the Northeastern North Carolina Pasquotank Watershed"

Jamal Stevenson, Mississippi Valley State University
"A Corresponding Study of Water Quality Evaluation of the Pasquotank Watershed in Northeastern North Carolina"

Derek Morris - ECSU

Mentors: Dr. Gamaliel "Dan" Cherry

NASA Langley Research Center Student Volunteer Research Summer Experience

This summer I was a student volunteer at National Aeronautics and Space Administration (NASA Langley) in the Studio Production. In this internship, I had the opportunity to work with Dr. Gamaliel "Dan" Cherry Glenn and Katrina Young. The projects I took part in were equipment's and schematic, and YOUth Day. This involved installing and wiring new equipment racks in a new building, providing communication for workers and guests through electronic communication, and working with students to complete the Drag Race to Mars Engineering Design Challenge where students used the drag of the atmosphere to slow down a capsule landing on Mars.

Maya Smith, Anthony Scott – WSSU

Mentor: Dr. Geoffrey Fox, (Graduate Mentor) Supun Kamburugamuve

Analyzing Stock Data using Multi-dimensional Scaling

We describe the application of a statistical technique kenned as Multidimensional Scaling to analyze & model a stock market. To analyze such astronomically immense volume and high-dimensional scientific data, many high performance dimension reduction and clustering algorithms have been developed. Among kenned algorithms, we utilize Multidimensional Scaling (MDS) to reduce the dimension of pristine data and Pairwise Clustering, and to relegate the data.

Multidimensional Scaling is a means of visualizing the level of similarity of individual cases of a dataset. It refers to a set of related ordination techniques used in information visualization, in particular to display the information contained in a distance matrix. Furthermore, a stock market is the market in which portions of publicly held companies are issued and traded either through exchanges or over-the-counter markets. Withal kenned as the equity market, the stock market is one of the most vital components of a free-market economy, as it provides companies with access to capital in exchange for giving investors a slice of ownership in the company. The stock market makes it possible to grow diminutive initial sums of currency into immensely colossal ones, and to become affluent without taking the jeopardy of starting a business or making the sacrifices that often accompany a high-paying vocation.

The vigor of this approach is in its ease of implementation, effective visualization and dynamic nature. Data was gathered and analyzed from Wharton Research Data Services to determine if there was a pattern through correlations. We give a brief exordium to Multidimensional Scaling, and verbalize the postulations & quandaries in stock market modeling. The approach developed is modified to study the time-evolving nature of the markets.

Laurissa Marcotte - KU

Characterizing the Effects of Carbon Fiber Composite Materials on the Performance of Remote Sensing Antennas

Carbon fiber composite materials have many useful structural applications on modern aircraft. The Center for Remote Sensing of Ice Sheets (CReSIS) utilizes carbon fiber composite materials on various aircraft, which fly over ice sheets in Greenland and Antarctica to collect climatological data. The data is collected by radar systems on the aircraft. This study proposes to characterize the effects of carbon fiber composite materials on the performance of CReSIS's remote sensing antennas.

Abbey Whislers - KU

A Graphical User Interface and Database Management System for Documenting Glacial Landmarks

The purpose of this landmarks project is to enable users to mark glacial features they find in the echogram and save their coordinates and description to the database directly from the Data Picker, which is a custom graphical user interface created by CReSIS to allow users to explore CReSIS' echogram images in an image browser window. At present, if users wished to record any landmarks observed in the echogram they would make a note in a shared spreadsheet. The landmark tool will be faster and more precise than this method because it saves the exact GPS time and two way travel time of the landmark to the database automatically.

The first part of this project is to update the Python/Django scripts into the CReSIS Open Polar Server so that they can store the landmark data users will input in a PostgreSQL table, and the second part of the project is to write the MatLab code to construct a graphical user interface that can accept user input and call the Python/Django scripts. Guidance from my mentor, John Paden, along with some instruction from the CReSIS GitHub page and the Django and MatLab help pages will be my most important resources in this project.

NORTH CAROLINA GIS CONFERENCE

ECSU student Jefferson Ridgeway attended the North Carolina GIS Conference: Mobile and Global in Raleigh, NC on Thursday, February 26, 2015. He presented the Update of the CERSER TeraScan Cataloguing System and TeraScan Image Processing Scripts. His oral presentation was followed by a question and answer session from the audience. On Friday, February 27, 2015, he received a monetary award for being one of the undergraduate presenters at this conference in Raleigh.

EMERGING RESEARCHERS NATIONAL CONFERENCE

The Emerging Researchers National (ERN) Conference in Science, Technology, Engineering and Mathematics (STEM) took place in Washington, DC on February 19-21, 2015. The conference was hosted by the American Association for the Advancement of Science (AAAS), Education and Human Resources Programs (EHR) and the National Science Foundation (NSF) Division of Human Resource Development (HRD), within the EHR. The conference was aimed at college and university undergraduate and graduate students who participate in programs funded by the NSF HRD Unit, including underrepresented minorities and persons with disabilities.

The objectives of the conference were to help students to enhance their science communication skills and to better understand how to prepare for science careers. Towards this end, the general format for the conference included:

- Student poster and oral presentations.
- Other conference activities include workshops focused on:
- Strategies for applying for and succeeding in graduate programs and finding funding for graduate school;
- Career preparation workshops focused on employment searches and retention; and
- Understanding STEM careers in a global context and identifying international research and education opportunities for undergraduate and graduate students and faculty.

Students attending included: Jamal Stevenson, Kalyx McDonald (MVSU), Tayla Fizell, Deanna Mallard (MVSU RET), Maya Smith, Omar Owens (WSSU), Kaliq Satchell, Tori Wilbon, and Nigel Pugh, (ECSU).
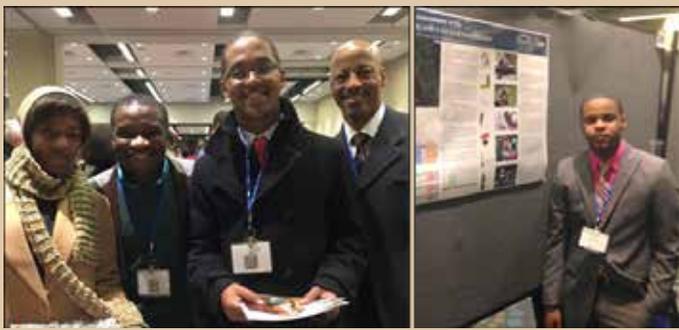
Jefferson Ridgeway IV - ECSU
Mentor: Dr. Guowei Yang
Regression Testing Selection for Android Applications

Android is a widely used mobile platform for which many applications are developed. During the development process, many modifications are made resulting in potential changes in old behaviors and the introduction of new behaviors. Therefore, ensuring the reliability of applications is highly desirable. However, traditional regression testing techniques cannot be directly applied to the Android domain due to its differing architecture. To better understand how to develop and improve upon regression testing techniques, we first conducted a bug study focusing on bugs related to change. Then, we performed a change impact analysis on selected applications to understand the potential effect changes in the Android library and in the Activity component could have on the rest of the application. We believe that this study will help developing new or improving upon existing regression testing techniques specific to the Android domain.

Tatyana Mattews - ECSU
Mentors: XiaoFeng Wang, Ph.D., (Graduate Mentor) Kan Yuan
Investigating the Security Risks and Vulnerabilities of an Android System

Android System is a mobile open-source operating system (OS), developed by Google, utilized by a large community of users from around the globe. Due to its free and vast ecosystem, users with good intentions as well as criminals have taken advantage of the OS, unfortunately, implementing malicious attacks on many of Android's vulnerable applications. Because of security risks and exposures facing Android OS, the primary concern has been exploring methods that enable Android to remain open-source and sustain a high level of security. As a result, this research investigates the recent vulnerabilities and security risks of Android System, in addition, utilizes one of vulnerabilities explored (CVE-2014-3500) to design and conduct an attack via application on Android mobile device. Essentially, this study will produce familiarity with how Android System security is approached and operated to keep the operating system secure for its users.

NATIONAL BLACK ENGINEER OF THE YEAR AWARDS

Students from Elizabeth City State University recently attended The National Black Engineer of the Year Awards (BEYA) Science, Technology, Engineering, and Mathematics (STEM) Global

Competitiveness Conference which took place in Washington, D.C., February 5-7, 2015. Students attended the career fair and met employers, took advantage of onsite resources designed to enhance job searches and academic careers, and received tools for a successful STEM career.

IEEE Geoscience & Remote Sensing Symposium

On July 26-31, 2015 Dr. Linda Hayden, Principal Investigator of the Center of Excellence for Remote Sensing Education and Research (CERSER) at Elizabeth City State University attended the 2015 IEEE Geoscience and Remote Sensing Symposium (IGARSS) in Milan, Italy.

This year's symposium theme was: "Remote Sensing: Understanding the Earth for a Safer World" and provided a remote sensing forum for obtaining up-to-date information about the latest developments, exchanging ideas, identifying future trends, and making networking with the international geoscience and remote sensing community. The 2015 technical program included themes such as data analysis methods, atmosphere, cryosphere, oceans, land, missions/sensors calibration, data management, and education.

Andrew Brumfield - Elizabeth City State University
Update of the CERSER TeraScan Cataloguing System and the TeraScan Image Processing Scripts Remote Sensing and Ground Penetrating Radar Survey

Raveen McKenzie - Mississippi Valley State University
A Comparative Study to the 2011/2013 Water Quality Assessments in the Pasquotank Watershed in Northeastern North Carolina with a Sea Level Rise Component

Ryan Lawrence - University of New Hampshire
Ground Penetrating Radar Survey of Edenton Green for Early Structural Remains

2014-2015 REU Closing Program

The 2014-2015 Research Experience for Undergraduates Academic Year program came to a close on April 16th & 21st, 2015 at Dixon-Patterson Hall.

Documentation of SeaSpace Ground Station Systems at Elizabeth City State University
Mentor: Andrew Brumfield: Jefferson Ridgeway, Tori Wilbon, Nigel Pugh

Enhancing Parent Involvement in North Carolina - Common Core State Standards for K-2 Mathematics
Mentor: Dr. Darnell Johnson: Alicia Reynolds, Jessica Hathaway, Rashida Williams, William Kahan

Remote Sensing Archaeological Sites through Unmanned Aerial Vehicle Imaging
Mentors: Mr. Edward Swindell, Dr. Malcom LeCompte
Tatyana Matthews, Khaliq Satchell, Cornelious Holness

Implementation of an interactive database interface utilizing HTML, PHP, JavaScript, and MySQL in support of water quality assessments in the Northeastern North Carolina Pasquotank Watershed
Mentor: Mr. Jeff Wood: Derek Morris Jr., Kathryne Burton, Antonio Guion, Hagan Hodgkins

Austin Feathers - KU
Conformal Dual-Band HF Radar Antenna System Design for Implementation on a Small UAS

High-frequency synthetic aperture radar (HF SAR) soundings from an aerial platform provide an effective method for sensing ice sheet basal topography. However, large manned aircraft are expensive to operate, and introduce risk to the crew, and pilot error in sounding measurements. Small unmanned aerial systems provide safe and inexpensive platforms for this radar equipment, necessitating the development of electrically small wide-band HF/VHF antenna systems that may be implemented conformally to the structure of the aircraft, as to avoid affecting the platform's aerodynamic properties. Metalization of the non-conductive aircraft surface was used to produce the antenna elements, which will be switched electrically for dual-band operation.

Joint Meeting Women in Engineering and IEEE-Geoscience & Remote Sensing Society

On April 8, 2016, the NC State Women in Engineering and the Elizabeth City State University Geoscience and Remote Sensing Society will hold a joint meeting on the campus of NC State. The guest speaker will be Dr. Melba Crawford, Associate Dean of Engineering for Research at Purdue University. Her talk is titled "Hyperspectral Remotely Sensed Data: Opportunities and Challenges." Dr. Crawford is the recent past president of the Geoscience & Remote Sensing Society (GRSS). Dr. Linda Hayden serves on the GRSS Subcomittee on Women in Engineering. The agenda starts off with a tour of the Center of Geospatial Analysis followed by the reception and lecture.

REU students with Dr. Julie Palais, NSF Glaciology Program Director, at the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) 2015 National Conference held in Washington, DC.

IEEE-GRSS Fall Distinguished Lecture Series

Dr. Gamaliel "Dan" Cherry
NASA Educator Professional Development, Deputy

NASA Opportunities, A Catalyst for Change

The Distinguished Lecture guest speaker, Dr. Gamaliel "Dan" Cherry, presented opportunities for internships, scholarships, and fellowships within NASA. Dr. Cherry currently serves as the NASA Educator Professional Development Line of Business Deputy. He received his doctorate degree in Instructional Design & Technology from Old Dominion University and has worked with NASA for ten years in the area of Education and Human Resources. He advised the students to visit NASA's One Stop Shopping Initiative Recruiting NASA Interns, Fellows, Scholars, the system for the recruitment, application, selection and career development of undergraduate and graduate students primarily in science, technology, engineering and mathematics disciplines.

2010-2015 Participating Institutions

Minority Serving Institutions (MSI)

Elizabeth City State University (ECSU)	Jackson State University (JSU)	St. Augustine's College (SAC)
Fayetteville State University (FSU)	Mississippi Valley State University (MVSU)	Virginia Union University (VUU)
Hampton University (HU)	Norfolk State University (NSU)	Winston-Salem State University (WSSU)
Haskell Indian Nations University (HINU)	Spelman College (SC)	North Carolina A&T (NCAT)

Non-Minority Serving Institutions (Non-MSI)

Colorado School of Mines (CSM)	Macalester College (MC)	University of Alaska Fairbanks (UAF)
Cornell University (CU)	Pennsylvania State University (PSU)	University of California, Los Angeles (UCLA)
Dartmouth College (DC)	Rice University (RU)	University of Kansas (KU)
George Mason University (GMU)	Rochester Institute of Technology (RIT)	University of Maryland (UM)
Gettysburg College (GC)	Savannah College of Art and Design (SCAD)	University of Pennsylvania (UP)
Kansas State University (KSU)	Texas A&M University (TAMU)	University of Utah (UU)
Kentucky State University (KSU)	Towson University (TU)	University of Vermont (UVM)
Longwood University (LU)	Unity College (UC)	University of Washington (UW)