THROUGH AND BEYOND COVID-19

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As the only four-year collegiate aviation education program in the State of North Carolina, ECSU offers a Bachelor of Science (B.S.) degree in Aviation Science. ECSU currently has a fleet of twelve airplanes for student flight training.
As our world struggled to understand this new COVID-19 pandemic, ECSU’s community came together in an unprecedented manner to support one another. Students, faculty, staff, and administrators moved into high gear as classes quickly transitioned to remote learning, PPE was ordered, buildings closed, and our world norm drastically shifted. Suddenly, we all had a new list of priorities. We each met our individual challenges privately but, collectively, we looked to ECSU’s leadership to show us a clear path for continuing our important work. Throughout the pandemic, we remained resilient! There were classes to teach, exams to administer, and research to undertake. Though we had to pivot and regroup at many levels, we supported one another and remained persistent throughout. And now, as ECSU prepares to reopen on-campus teaching and operations, we have realized our strength, commitment, and formed new bonds along the way.

In this edition of Beyond Research, we are proud to share stories that highlight our student and faculty research activities during this period of transition and determination. Dr. Kulwinder Kaur-Walker, Professor of Psychology, shares the work that she and her students are undertaking in coastal North Carolina communities with mental health research. On North Carolina’s Pine Island, Dean Kuldeep Rawat and Dr. Jinchun Yuan describe how drones are being used for conservation efforts on Currituck Sound. ECSU’s radio station, WRVS 89.9, celebrated the history of the Black Church by participating with PBS in a series of virtual activities and programming. This edition of Beyond Research contains many more stories about our research, our students, and our work in the community that showcases our diversity.

Finally, we have dedicated a section of the magazine to COVID-19 research undertaken by several ECSU faculty during the pandemic. In addition to receiving CARES Act Funding from the US Department of Education to provide financial assistance to students and support for University operations, our faculty and staff worked tirelessly to secure additional support from state and private sponsors. Our researchers have been on the forefront of the COVID-19 response. They have had a compelling presence in the communities of northeastern North Carolina through numerous community engagement efforts related to education and testing. Grant funding has enabled researchers to secure a mobile testing van that travels across the counties providing needed support to citizens.

We welcome you to celebrate with us our achievements and resilience. Our Viking Pride remains steadfast!

Annemarie Delgado
Annemarie Delgado, MPA, MA, CRA, CPRA
Director of Sponsored Programs
Elizabeth City State University’s research team, led by Drs. Kuldeep Rawat and Jinchun Yuan, is using drones to conduct aerial surveys of the Pine Island Audubon Sanctuary in Corolla, NC as part of the Currituck Banks National Estuarine Research Reserve restoration efforts.

The purpose of the project is to map the marsh and collect data to help inform marsh restoration work, ensuring Currituck Sound remains a stronghold for birds and a place where people in the region can enjoy outdoor recreation, hunting, and wildlife.

This partnership, funded by the N.C. Policy Collaboratory at UNC Chapel Hill, unites the unique assets of the university and the Audubon NC as it increases ECSU-led research collaboration to broaden and strengthen conservation research. Cat Bowler, the Coastal Resilience Program Manager at Audubon NC, noted that this pilot project creates new approaches to conservation planning. The marshes of Currituck Sound are expansive, making them a great habitat for wildlife, but making field surveys difficult. Drones can offer a new, efficient, and inexpensive way to perform this essential task.

This research partnership will provide baseline data and analyses in order to inform marsh restoration planning and design led by Audubon NC. This collaborative effort will test the effectiveness of drone technology for mapping and monitoring in the field of conservation, specifically, how well drones can chart the resilience of natural ecosystems and coastal communities along the East Coast.

The mapping of environmentally sensitive areas is essential for natural resource management. “While traditional field survey work can be utilized,” said Dr. Rawat, “advancement in drone technology in conservation work has made surveying more cost-effective.”

Dr. Yuan, a remote sensing scientist, is currently testing a 10-band multispectral sensor payload module on a quadcopter drone that the team is planning to use for aerial imagery.

By restoring the Currituck marshes and other habitats, ECSU’s efforts, in partnership with Audubon NC, is building the foundation for the long-term sustainability of, not only birds and other wildlife, but coastal communities as well. ECSU’s critical role in this project is a great example of how research at ECSU is assisting communities across northeastern North Carolina.
In the aftermath of hurricanes, recovery efforts primarily center on rebuilding the infrastructure of stricken communities. But often overlooked is how these natural disasters can impact the mental health of residents, particularly those who live in areas repeatedly hit by such weather events.

A faculty-student research team from Elizabeth City State University recently studied this topic as part of the U.S. Department of Homeland Security (DHS) Summer Research Team (SRT) Program for Minority Serving Institutions.

The SRT Program is designed to increase scientific leadership at Minority Serving Institutions in DHS research areas. The program provides faculty-student research teams the opportunity to conduct research at university-based DHS Centers of Excellence.

During a 10-week appointment, Elizabeth City State Professor of Psychology, Dr. Kulwinder Kaur-Walker, and students Jaida Ellis and Genesis McClain collaborated with researchers at Old Dominion University (ODU), a university partner of the Coastal Resilience Center (CRC). The CRC, a DHS Center of Excellence at the University of North Carolina, Chapel Hill, conducts research to enhance the resilience of the nation’s people, infrastructure, economies, and the natural environment to the impacts of coastal hazards, such as floods and hurricanes. Dr. Wie Yusuf, a professor of public service at ODU, served as the team’s mentor.

Dr. Kaur-Walker and her students focused their study on North Carolina’s Bertie and Jones counties, both coastal...
areas often affected by hurricanes. The team visited county offices, events and churches, and recruited 231 residents to participate in a survey that covered topics such as mental and physical health, traumatic events, and alcohol and substance abuse. The team also conducted individual interviews and held focus groups with civic leaders and mental health professionals to gather input on the availability of mental health services.

The team’s survey results pointed to a prevalence of mental health issues among residents, including alcohol and substance abuse and symptoms of anxiety and depression. Residents also reported a variety of hurdles in accessing mental health services, such as transportation, cost and a stigma around such care.

“There are resilient communities not leaving their place even when repeatedly affected by devastating hurricanes,” Dr. Kaur-Walker said. “Emotionally, people are so attached to their origins that they are mentally prepared to deal with challenges or rebuilding their lives over and over. Of course, mental health issues cloud the progress of such a resilient community. Substance abuse issues, along with other mental health problems like anxiety, depression and post-traumatic stress disorder, are on the rise.”

The team recommended offering training for stakeholders on mental health and substance abuse issues so that they can educate and assist residents on accessing the appropriate services.

At the conclusion of their appointment, Dr. Kaur-Walker’s team presented their research findings at the annual COE Summit at George Mason University in Fairfax, Virginia. The event offered a chance to network with researchers from other DHS Centers of Excellence around the country.

For Ms. Ellis, the SRT Program proved to be a pivotal point in her education and solidified her desire to pursue a career in environmental psychology. Through the program, she learned more about research procedures and gained experience in data analysis software such as SPSS and Qualtrics.

“Before participating in the program, I honestly was not sure what area of psychology I wanted to specialize in,” Ms. Ellis said, noting that the field’s main subdisciplines include clinical/counseling, cognitive and developmental. “All of these subdisciplines are extremely important in terms of personal and group development, but they never spoke to me. By participating in this experience, I feel like it has helped me in continuing with my interest in environmental psychology.”

Dr. Kaur-Walker was recently awarded funding to continue research on the mental health impacts of hurricanes on residents in coastal North Carolina, and she is planning a publication on her team’s SRT Program project in coordination with researchers at ODU.

She highly recommends the SRT Program to other faculty and students at Minority Serving Institutions.

“ar SRT Program has provided me with an opportunity to conduct research with confidence and full support and has led me to explore an area in my primary field that is related to the DHS mission,” she said.

From left, Jaida Ellis, Kulwinder Kaur-Walker, Ph.D., and Genesis McClain explored the impact of hurricanes on residents’ mental health in coastal North Carolina as part of the U.S. Department of Homeland Security’s Summer Research Team Program for Minority Serving Institutions.

The DHS SRT Program is funded by DHS and administered through the U.S. Department of Energy (DOE)’s Oak Ridge Institute for Science and Education (ORISE). ORISE is managed for DOE by Oak Ridge Associated Universities.
The Black Church:

**THIS IS OUR STORY, THIS IS OUR SONG**

WRVS 89.9 radio station was selected amongst a host of other public radio stations across the country to participate in a unique grant opportunity in association with Public Broadcasting Service (PBS), WETA-TV, and the Corporation for Public Broadcasting (CPB). The $6,940 grant award provided an opportunity for WRVS to expand its audience reach, grow relationships with new and existing community partners, and create more opportunities for long-lasting engagement throughout northeastern North Carolina and southeastern Virginia. The Black Church Grant Project included the implementation of a well-structured promotional campaign in association with the documentary series “The Black Church: This Is Our Story, This Is Our Song.” Additionally, the station created on-air, online, and virtual activities and programming designed to celebrate the history of the Black church in northeastern North Carolina and to strengthen

Ms. Melba Smith
engagement between WRVS and the greater community, especially churches and other faith-based organizations.

On February 16 and 17, 2021 the riveting documentary series “The Black Church: This Is Our Story, This Is Our Song” debuted on PBS stations nationwide. The intimate four-hour series from executive producer, host, and writer Henry Louis Gates, Jr., traces the 400-year-old story of the Black church in America all the way down to its bedrock role as the site of African American survival and endurance, grace and resilience, thriving and testifying, freedom and independence, solidarity and speaking truth to power. The story reveals how Black people have worshipped, and through their spiritual journeys, improvised ways to bring their faith traditions from Africa to the New World, translating them into a form of Christianity that was a redemptive force for a nation having endured enslavement across the Middle Passage. The institution of the Black church would become the epicenter of the freedom struggle that revolutionized the United States across slavery and abolition, Reconstruction, Jim Crow and the Great Migration, and the civil rights movement.

In support of this dynamic film, WRVS utilized its funding support to host several programs/activities including a virtual Pastors Information Session of fifty church leaders representing gender and denominational diversity throughout North Carolina and Virginia. Participants were given a detailed overview of the events and activities planned in association with the documentary series and were provided a host of resources and information for their ministries. The station also hosted The Black Church Social Media Challenge where participants were invited to enter a drawing to win a complimentary one-year Zoom Pro subscription for the church of their choice. Eleven ministries were awarded subscriptions which are now being used to support virtual meetings, study groups, services, and general communication during the pandemic. For “The Black Church: Hometown Reflections,” panelists Pastor Beverly Mercer, Dr. Johnny L. Houston, and Mrs. Felicia Cooper Reid presented insightful discussion on the importance and impact of the Black church in northeastern North Carolina. This one-hour live event was featured on Facebook, hosted by Sheila Lee of WRVS, and moderated by Dr. Melissa Stuckey, a member of the ECSU history faculty and co-chair for ECSU’s Black History Month Committee. The final program, “The Black Church: A Look Ahead,” also hosted by Sheila Lee, featured an exclusive interview with the film’s producer and director, Stacey L. Holman as she shared a glimpse of the making of the film.

WRVS received tremendous feedback for its efforts to engage the community in unique and meaningful ways. “We are so grateful for The Black Church and WRVS-FM for reminding the faith-based community of the importance in persevering in difficult times and showing us how far we have come. This transformational thinking helped to reignite our faith and encouraged us to embrace our roots. Many times, we forget about those that have paved the way and cultivated our story and our song,” said supporter, Pastor Timothy Stallings Jr.

WRVS 89.9 is committed to serving as an exceptional media resource and educational tool for its listening audience, aspiring students, and beloved station supporters. The station is invested in the community through service and educational endeavors, and by serving as a reliable source of information and a platform for discussion. “The Black Church: Hometown Reflections’ and “The Black Church: A Look Ahead” can still be viewed online on WRVS’s Facebook page. The PBS documentary series “The Black Church: This Is Our Story, This Is Our Song” is also available online at www.pbs.org/show/black-church.
BREAKTHROUGHS IN GLUCOSE TESTING

Dr. Bijandra Kumar
Dr. Bijandra Kumar's research is breaking boundaries in the field of glucose sensing. His current findings have been published in an international peer reviewed journal "Material Today Communication, Volume 27, June 2021, 102261." In this work, the authors discovered that reduced Ag based nanocatalysts can work at extremely low record operational potential with high sensitivity for glucose detection (Figure 1).

Diabetes mellitus is currently a major health problem and continuous glucose monitoring systems are contributing to the effectiveness of its management. Common glucose measuring tools, such as blood glucose meters, rely on measuring glucose levels from a sample of blood to determine the glucose levels of a patient. It has been shown that type 1 and 2 diabetic patients spend 7% and 9% less time respectively outside of their glycemic target when using continuous glucose monitoring systems compared to similar patients using self-monitoring systems. Information about blood glucose levels is of extreme importance to these patients, so obtaining this information as regularly as possible would be very beneficial. The transition to glucose sensors will allow these patients to get live feedback about their blood glucose levels rather than the snapshot provided by the technology currently used. The applications of glucose sensors also span into non-clinical fields such as fuel cell and self-powered devices.

The discovery of novel non-enzymatic means of glucose sensing is in high demand due to the increasingly strict standards regarding their accuracy. Non-enzymatic sensors provide several advantages over their enzyme counterparts, including being operational in varying pH levels, temperatures, presence of detergents and being significantly easier to be sterilized for in vivo usages such as implants. Among non-enzymatic catalysts, Ag is one of the most suitable elements for glucose sensing application due to its low cost and excellent antibacterial characteristics. However, a glucose oxidation reaction occurs at significantly high potential, and most of the Ag-based glucose sensors are operated above the working potential of 0.5V (vs. Ag/AgCl) in a widely used alkaline solution environment. Here it should be noted that other molecules in the analyte, such as ascorbic acid (AA), can be easily oxidized at higher potential and originate false glucose detection signals. Therefore, numerous efforts have been made to solve this issue without any significant reduction in working potential. Here, research conducted at Dr. Kumar's lab at ECSU, uncovered that reduced Ag (R-Ag) based nonenzymatic glucose sensor oxidized glucose at potential as low as -0.1V (vs. Ag/AgCl), exhibited significantly high sensitivity (150μA/0.1mM/cm-2) at 0.1V working potential, the lowest for Ag-based glucose sensors, and long term stability with minimum loss in sensitivity.

The leading author of the manuscript, Mr. Johvan O. Hill-Dick, is thankful for the support of students and faculty, including Alexis Harmon, Kishor K. Sadasivuni, Mehran Elahi, Adetayo Adedeji, Hani E. Elsayed-Ali, Gymama Slaughter, Kapil Kumar, and Mohammad Asadi, collaborating from numerous institutes globally.

Wanda L. Cooper is the Regional Center Director in the Small Business Technology Development Center. She started at ECSU in October of 2020 as a Business Resiliency Counselor and was promoted to Regional Center Director for Elizabeth City and the Outer Banks in February of 2021. She holds a doctorate degree in Educational Leadership from Liberty University, a master’s in Public Administration from Troy State University and a bachelor’s in business from St. Leo University.

In her role as Regional Director, she manages the small business services for 12 counties that includes: Pasquotank, Dare, Currituck, Hertford, Bertie, Chowan, Perquimans, Washington, and Gates counties.

The SBTDC operates in formal partnership with the U.S. Small Business Administration, Defense Logistics Agency and others, making it a unique and valued asset in the economic development infrastructure of North Carolina. Business, government, and university leaders recognize the SBTDC’s value and impact to support small, mid-sized and large businesses. Dr. Cooper and her team are aggressively working to provide business counseling, COVID-19 relief funding and training opportunities to support and promote the economic vitality of small businesses.

The 2021 Small Business Initiatives include:

- Open 10 new businesses
- Generating $8 million dollars in capital impact into the local economy by assisting clients with covid19 related disaster funding such as the Paycheck Protection Program, the Economic Impact Disaster Loan, SBA Bridge Loans, and SBA Debt Reduction Programs
- Create and retain 200 jobs to support the local economy
- Provide free training workshops and hands-on training that increases client's proficiency in management, economic vitality, business growth and digital marketing strategies.
- Create a student internship program in collaboration ECSU, that would provide hands-on small business support to local businesses. This program will be dually beneficial to the student and the business.
- Provide International Business Development opportunities for local businesses to expand in overseas markets.
- Provide Federal Contract Training to assist local businesses in successfully applying for Federal Contracting Opportunities.

“We are committed to provide a robust, aggressive approach to work with our community partners and ESCU to promote small business and economic vitality in North Carolina.”
Since the US Department of Education issued its first ‘Dear Colleague’ Letter in 2011, Elizabeth City State University, like many other institutions, has sought to be responsive to not just the federal mandates related to addressing issues of sexual and domestic violence as well as the equitable treatment of all members of the Elizabeth City State University community. In its current form, the Office of Title IX is aligned with the Division of Student Affairs and provides resources, educational programming and response services when critical issues arise.

As a means of expanding its reach and taking innovative approaches towards providing these resources and programming to the campus, the Office, under the leadership of Ms. Lucretia Banks, sought after a competitive grant offered by the Governor’s Crime Commission. In this proposal, Ms. Banks sought to leverage community resources and enhance collaborations with other institutions in the City of Elizabeth City, Mid-Atlantic Christian University, and College of the Albemarle. Although, not initially accepted at the start, the committee who considered the grant submissions was impressed with the ingenuity and the perspective that was offered in ECSU’s proposal and afforded the Office to be funded in the cycle in the amount of $126,829.

The net impact of this grant provided funding for two part-time employees to be added to the department. Their impact has been seen as the department now has a vibrant social media presence and students have been provided several opportunities to be engaged and educated on Title IX issues during the 2020-2021 academic year. Some of these opportunities include, creating a Safe Haven for students to seek support and anonymously report sexual violence violations. The department intentionally programmed in February for Teen Dating Violence Awareness Month; March-where students sign the “No More Pledge and partnered with Recreation and Wellness to host a Virtual/On-Campus 5k to raise awareness for No More Sexual Violence. In April, the department sponsored Sexual Assault Awareness Month and provided programming to students related to consent and sexual assault as well as partnering with Student Health Services and Student Counseling Services by hosting a Wellness Fair for students.

The additional staffing to increase programming opportunities is quite exciting. The grant has also allowed ECSU to launch the RAVE Guardian Mobile Safety App. This mobile app will allow students, faculty, staff, and guests to report tips to University Police. Tips may also be reported anonymously. The mobile app will allow users to have a virtual escort of their choice when needed as they walk on campus alone. RAVE Guardian is not only for safety, but it is an all-purpose campus app that provides contact information and resources of campus offices and agencies community and nationwide.

The department has also leveraged the grant to secure a 24-hour hotline (844) SFE-COMM (844-733-2666) for the ECSU campus community, in addition to MACU and COA students in seeking assistance as it relates to sexual violence. Finally, the department has provided safety kits to students that included information on sexual violence and other resources provided from other community agencies such as the Albemarle Hopeline.

As a division, we are truly appreciative of the opportunity provided by the support of the Governor’s Crime Commission and we are hopeful that such great work that has been accomplished has now positioned the department to receive expanded support to be built upon the foundation that has be laid during this year.
Immature Oxide Semiconductor with Great Potential

Dr. Victor Adedeji

One of the current National Science Foundation (NSF) funded research programs at ECSU is the Excellence in Research (EiR) project for growth of thin layers of novel oxides semiconductor with wide range of applications, beta-gallium oxide ($\beta$-Ga$_2$O$_3$). The usefulness of this “immature” oxide semiconductor stems from the fact that it is transparent and what scientists and engineers in the field call the energy bandgap. $\beta$-Ga$_2$O$_3$ has ultra-wide energy bandgap (about 5 times the energy gap of “grandpa” Silicon). Because of the material’s ultra-wide energy bandgap, microelectronic devices (diodes and transistors) fabricated with it would be able to handle very high power and survive in harsh environments. High power and harsh environment microelectronic devices are needed in all electric military aircrafts and spaceships, and more electric automobile systems. These devices will also survive in elevated temperatures and corrosive environments.

THE RESEARCH EFFORT AT ECSU INCLUDES:

Upgrading the magnetron sputtering system at ECSU to be able to grow a good quality $\beta$-Ga$_2$O$_3$ layer. The system was upgraded in the Fall 2020. Currently, a first set of samples have been grown and sent to collaborators at the Air Force Research Lab and Old...
Dominion University (ODU) for further processing and to determine their properties. Spring and summer 2021 will be devoted to fine-tuning the growth process for pure samples of $\beta$-Ga$_2$O$_3$ and samples with intentional impurities. Finding acceptable solutions to some of the outstanding materials issues will be the overarching goal of our research effort. In particular, we will focus on novel impurity control to manage contact problems for different devices based on this material.

**RESEARCH TRAINING**

- Undergraduate students at ECSU are involved in this research, learning how to grow the material with the magnetron sputtering system and determining the surface morphology, optical and electrical properties of the material with instruments that are available on ECSU’s campus.

**OUTREACH TO NEIGHBORING HIGH SCHOOLS**

- Summer outreach activities to high schools in Elizabeth City/Pasquotank county and neighboring counties are in the plan. This first outreach effort will be done virtually with about 15 students (primarily high school sophomores and juniors). The students will be introduced to interdisciplinary material science and engineering fields.

  Major facilities and instruments available for materials science and engineering research work at ECSU include: (a) UHV Magnetron Sputtering system with 3-guns and 3 power supplies (2 Radio frequency and 1 Direct Current power sources); (b) Scanning Electron Microscope with Energy Dispersive Spectroscopy for surface morphological studies and atomic compositional analysis; and (c) Photolithography system including a mask aligner spin coater and contact profiler. [ ]
As a result of legislation enacted by the General Assembly of North Carolina back in 2015, North Carolina Medicaid and Health Choice programs were required to change their operations from current fee for service format to managed care. Consequently the North Carolina Department of Health and Human Services began preparation to go live with transition that was originally scheduled for February 1st, 2020. However, funding issues and additional constraints imposed by the novel coronavirus pandemic halted transition efforts in November 2019. Following new legislation in July 2020, NC Medicaid transformation is now projected to go live on July 1, 2021 for standard plans and one year later for plans that support behavioral and intellectual or developmental disability health.

Appreciation of uncertainties and other unintended consequences that come with change, the Elizabeth City State University Medicaid Transition Evaluation for Eastern North Carolina [ECSU MEDITEEN] program, under the direction of Dr. Anthony Emekalam, was developed to assist and guide area residents through the transition process. The goal of the ECSU MEDITEEN program is to measure impacts of utilizing Medicaid reform and a value-based care environment to facilitate health improvement for financially disadvantaged North Carolinians on African American Medicaid recipients within the 21 counties in the ECSU service region. Specifically, the program will support system change efforts to collect and disseminate data and information that helps stakeholders understand how Medicaid reform and value-based care are impacting health outcomes for members of this community.

This goal will be achieved through a hierarchy of information collection network that connect program administrators in the Department of Health and Human Studies at ECSU to African American (AA) Medicaid recipients in each county through indigenous students serving as Rural Health Ambassadors (RHAs). The strategy holds the best promise for reaching most individuals due to its cultural appropriateness of including individuals that are likely to be known by community members in the information gathering process. The overall approach is comprehensive and will be implemented through partnerships with grassroots organizations, including church communities and local chapters of the National Association for the Advancement of Colored People (NAACP).

To this end, Dr. Anthony Emekalam and program administrators will recruit and train students from the Department...
of Health and Human Studies from each of the 21 counties to serve as RHAs for their respective counties. This will be followed by implementation of open forums on Medicaid reform in all counties that are included in the program. The purpose of the forums will be coordinated through local faith-based communities and local chapters of the NAACP is to provide additional explanation on Value-based care and Medicaid reform, explain the purpose of ECSU MEDITEEN, including the roles of RHAs and the importance of engaging AA Medicaid recipients in the process.

RHAs will collect information that measure impacts of Medicaid managed care on individual lifestyles and behaviors that modify chronic disease outcomes. Physical activity, dieting, smoking and adult vaccination data will, therefore, be collected from program participants. Unfortunately, due to novel coronavirus pandemic, some efforts of the ECSU MEDITEEN program have been directed toward implementation of an ancillary component to counter unexpected impacts of COVID-19 among this patient group. This is accomplished by providing virtual/remote support that encourages routine engagement in behaviors that mitigate the spread of COVID-19 and emphasizes the need of keeping diabetes and cardiovascular disease under control during the COVID-19 emergency.

Focus on Medicaid Transition has resumed with scheduled community outreach forums being planned and implemented across the 21 counties in the service region of the Elizabeth City State University.

The ECSU MEDITEEN program is supported by a generous grant of $167,275 from the Kate B Reynolds Charitable Trust with Dr. Anthony U. Emekalam serving as the program’s Principal Investigator.

Evidence from research show that there are multiple reasons why students are unable to persist in STEM education. Factors such as being a woman, an underrepresented minority, a first-generation student and having a low-income background have been identified as key contributors. Additionally, higher prevalence has been also associated with a weaker academic background and poor motivation and confidence in one’s capacity to comprehend STEM courses. Furthermore, institutional factors including poor academic advising, poor career counseling, and inadequate networks of academic support services have all been mentioned in STEM literature as notable contributors to STEM attrition.

IDEA @ ECSU posits that intentional accommodation is a practical method of addressing these important concerns. IDEA uncovers a logical pathway for supporting real education needs of all students including those whose designation are practically undefinable such as underrepresented minorities, low-income, female and first-generation students. It also provides a process that questions and assists in rewriting the educational assumptions that have traditionally marginalized some student populations and hindered optimal academic performance. It argues that an academic curriculum that is intentional in its design of providing reasonable accommodation to all students will be effective in reducing attrition from STEM and, ultimately, improves retention and graduation rates of students enrolled in STEM programs.

The study seeks to understand the feasibility and effectiveness of addressing individual-level extenuating education burdens that are formally unrecognized and traditionally unaccommodated within conventional academic curricula as a means of reducing STEM attrition and improving educational outcomes. It is motivated by preliminary findings of a small-scale study by Dr. Anthony Emekalam suggesting that inadequate accommodations for students bearing extenuating education burdens - such as student athletes - is a possible contributor of attrition from STEM programs.

IDEA @ ECSU is exploring the Intentionally Delivered Effective Accommodation (IDEA) - infused academic curriculum: an instructional guideline requiring instructors to intentionally identify and adequately consider extenuating education burdens.

THE COMMUNITY

Exploring Innovative STEM Instruction

Dr. Anthony Emekalam

It is a well-documented fact that a majority of students who identify as STEM majors in their first year of college ultimately graduate with degrees in non-STEM programs. This phenomenon is referred to as ‘STEM attrition’ is sadly one of many key reasons why, collectively, American colleges and universities are currently graduating fewer than adequate number of students in STEM disciplines. While this pattern of switching from STEM to non-STEM majors is true across all racial groups, the number is much higher for African Americans and under-represented minorities which may also account for the current poor diversity in the national STEM workforce.
The coronavirus disease became a public health emergency, the global need for concerted efforts to counter its devastating consequences at all fronts became the number one priority of many individuals and organizations. The Through and Beyond COVID-19 (TABC) program was developed as a comprehensive community outreach program designed intentionally to reduce disparate impacts of the novel coronavirus disease (COVID-19) on African Americans through pragmatic health promotion efforts in African American communities.

The program was conceived by evidence showing that whereas blacks/African Americans make up just 13.4% of the population of the United States, approximately 30% of individuals with a confirmed COVID-19 diagnosis, whose race or ethnicity are known, and 33% of individuals hospitalized with lab-confirmed COVID-19 cases are African Americans. Although the dynamics of this association has not been completely delineated, statistical trends and patterns substantiate arguments alleging that these disparate health outcomes are driven by notably high prevalence rates of diabetes, high blood pressure and other adverse health issues that are proven physical comorbidities of COVID-19. For instance, AAs are more likely than whites to be diagnosed with obesity, cardiovascular disease, or diabetes. They also smoke at rates that are significantly higher than whites (21% vs 17%) and are more likely than whites to have poor social determinants of health such as living in crowded conditions and working in essential services that cannot be performed remotely, and have poor/inconsistent access to quality health care.

The TABC program focuses on intensification of efforts that improve and expand validated practices for reducing community viral spread and proper management of modifiable comorbid conditions. In the absence of targeted efforts, it is certain that COVID-19 outcomes in rural underserved African American populations will continue to worsen. The TABC program, therefore, uses content-appropriate and culturally adapted education and motivational supports to promote evidence-based practices that alleviate the rate of undesirable impacts of COVID-19 and other diseases through prevention and proper management of comorbid conditions that worsen disease outcomes.

It is implemented through partnerships with community grassroots organizations to ensure adequate reach of program targets and provide the cultural context that will facilitate successful implementation.

The program is currently promoting the COVID-19 vaccine and vaccination throughout the 21 counties within the service region of the Elizabeth City State University using social media, radio, and town hall-type community programs.

The Elizabeth City State University TABC program was implemented with a $131,840.00 funding support from the North Carolina Healthcare foundation and Dr. Anthony U. Emekalam is the program’s Principal Investigator.

The overwhelming success of the TABC program is proof that initiatives that target rural dwelling African Americans must be implemented through collaborative partnerships with community grassroots organizations and their leaders. Partnerships and collaborations formed as key implementation strategy of the program will endure and serve as foundation for future community outreach endeavors that target African American residents in these 21 counties.
RESILIENCE: ECSU’S RESPONSE TO COVID-19

ECSU’S SARS-COVID2 MITIGATION AND VARIANT RESEARCH EFFORTS

Dr. Hirendranath Banerjee
In the summer of 2020, ECSU Provost and Vice Chancellor of Academic Affairs, Dr. Farrah Ward was awarded a $1.2 million grant to establish a COVID mitigation project and pandemic response lab from UNC general administration to provide free COVID-19 testing for the general population of northeastern North Carolina. Under the leadership of Dr. Kuldeep Rawat, Dean of MST and active guidance from Dr. Hirendranath Banerjee, Professor of Natural Sciences, a state of the art COVID detection lab was established on the second floor of the STEM Complex on campus. Associate professor and Chair of Department of Health Sciences, Dr. Anthony Emekelem and research operations manager, Ms. Sheryl Bradford, alongside undergraduate and graduate students and Dean Rawat, went into 21 counties in North Carolina to provide free COVID-19 testing. After samples were collected, three graduate students in Dr. Banerjee’s lab, Kayla Johnston, Chelsey Aurelus, and Joseph Hedley used their molecular biology training to isolate the viral RNA and conduct RT-PCR on the samples for detection of the virus. At the end of the project, approximately 850 samples were collected.

ECSU has established a pandemic response laboratory fully stocked to meet future challenges. The success of this lab was featured in both the Daily Advance and the Virginian-Pilot newspapers.

Further, a grant in the amount of $75,000 was awarded to Dr. Banerjee, Principal Investigator, Dean Rawat and Dr. Dipendra Sengupta, Professor of Mathematics, to study and identify variant strains in the region using Bioinformatics techniques. A secondary specific aim of this project is to collect samples from vaccinated and unvaccinated individuals in order to gain insight into the vaccine’s efficacy. The original strain of COVID-SARS 2 virus was first discovered in Wuhan, China and currently several other mutants of the original strain known as Variants were first detected in the UK, South Africa and Brazil. The data analysis for this project will be done via Chaos Game Theory alongside with Dr. Sengupta in the Math and Computer Science Department. These combined efforts have been hailed as among the ‘most high profile science efforts in the hundreds of years school history by local newspapers.’
Postdoctoral Research

Dr. Praveen Malali & Dr. Baleeswaraiah Muchharla

Under the direction of Dr. Bijandra Kumar, Assistant Professor of Technology, Postdoctoral researchers are currently working with Dr. Kumar on a number of research projects in ECSU’s Materials Research Laboratory. Dr. Malali received his Ph.D. in Mechanical Engineering from Old Dominion University. His research interests are the areas of electrochemical energy conversion, renewable energy and engineering education. Dr. Muchharla received his Ph.D. in Applied Physics from Southern Illinois University. His research interests are in novel nanomaterials to be utilized as catalysts for hydrogen evolution reaction (HER) and carbon dioxide reduction.
Dr. Linda Hayden leads the Workforce Development component of the National Science Foundation (NSF) Science Gateways Community Institute (SGCI). As such, ECSU develops High Performance Computing Skills in students using Coding Institutes, workshops and Hackathons. The goal is to help students learn to collaboratively code in an extreme manner over a short period of time.

In conjunction with Practice and Experience in Advanced Research Computing (PEARC) and the Supercomputing conferences, SGCI, Omnibond, Intel and Texas Academic Computing Center (TACC) engage up-and-coming programmers in tomorrow’s High Performance Computing (HPC) and Gateway challenges. Undergraduate and graduate students compete on projects established by Science Gateways Community Institute partners and HPC community members. The Hackathons aim to harness the resources, skills, and knowledge found in the HPC community in an effort to provide applied exposure for the student participants. These issues can range from programmatic, to societal, to scientific subject areas.

Students participate in three days of hacking while being mentored by the best programmers in the field. The Hackathon is designed to challenge the future generation of HPC and science gateway professionals. Student teams compete on gateway projects, learn how to use important tools and methods, and win awesome prizes. The Hackathon is an excellent opportunity for students to have an enjoyable, engaging experience while also participating in coding challenges within the HPC and Science Gateway communities.

Program mentors are provided by Omnibond and SGCI. The mentors range from professors to programmers, to systems administrators, or even professionals in the HPC industry. During the Hackathons, mentors lead students in the design and development of a response to a question over the course of the event. This includes a set of deliverables (GitHub repository, with any associated code and a PDF of the team presentation) and a final presentation.

Walter Asbell, Computer Science major said the experience has left impacts that help shape my academic focus and future career. I went in the not knowing what to expect and it provided me with a structure that gave me a career focus and access to invaluable networking across the country.”

These Hackathon efforts are led by Mr. Je’aime Powell who received both his B.S and Masters degrees from ECSU (currently with TACC) and Dr. Linda Bailey Hayden, who leads the ECSU SGCI project. They look forward to continuing the development of the next generation of High Performance Computing professionals.

Dr. Linda Hayden
National Science Foundation Awards $1.2 Million for Science Teacher Training Program

Dr. Timothy Goodale

Elizabeth City State University has received a $1.2 million grant to train science teachers. The grant is awarded by the National Science Foundation’s Robert Noyce Teacher Scholarship Program. ECSU Associate Professor and the grant’s principal investigator, Dr. Timothy Goodale, says that the grant will fund a program that produces highly qualified secondary science teachers that are better equipped to teach challenging topics such as climate change and evolution.

The project will recruit approximately 36 prospective students over five years that will partake in a unique 14-month accelerated pathway to earn a master’s degree in biological sciences and at the same time train to become certified teachers in science classrooms in high-need schools. The project is entitled “Preparing Teachers to Address Challenging Scientific and Environmental Topics through Research, Dialogue, and Experiential Learning”, Dr. Goodale along with Co-PI’s Drs. Hirendranath Banerjee and Eyualem Abebe of Biological Sciences is working with area public schools such as the Elizabeth City-Pasquotank Public Schools, Perquimans County Schools, and the Northeast Academy for Aerospace and Advanced Technology.

This program will also “extend the body of knowledge on current science teacher preparation,” states Dr. Goodale. Many current science educators graduate and enter a classroom with a low levels of confidence in their aptitude and comfort in teaching controversial and complex topics. This can have a profound impact on their K-12 students and the potential pipeline of future STEM workforce. Research suggests that when a teacher lacks confidence in a topic like evolution, they are more likely to spend less time on the topic and utilize lessons that don’t require hands-on activities or high levels of critical thinking. This in turn, can leave a K-12 student under-prepared to succeed in introductory level Biology in various university settings and can potentially create gaps in STEM degree pursuits.

Dr. Goodale says the project will use “unique approaches” to attract qualified and diverse students to pursue a career as a science educator. Students will be supported with up to a $20,000.00 scholarship to cover cost of attendance during their respective study. The Noyce Program will provide research-based training and support initiatives for students during their studies and during their first two years of teaching. The project will also identify, prepare and compensate mentor teachers from the partner schools to work with ECSU students who will serve as role models for best practices.

To support the future science teachers the Noyce Program will initiate reforms such cross departmental “co-teaching,” Noyce Scholars will also participate in ongoing scientific research, complete course work and defend a thesis topic to earn a Master’s Degree in Biology. The Noyce students will also take part in “Professional Learning Opportunities” throughout their involvement and participate in training focused on environmental and scientific awareness and literacy and support their efforts to improve their teaching effectiveness and remain in area classrooms beyond their two-year requirement.

ECSU has a rich history in teacher preparation for diverse and rural populations, all while promoting innovative STEM education. This initiative has the potential to significantly increase the number of teachers and STEM graduates to fill the void of effective science educators across the state of North Carolina.

Dr. Timothy Goodale
ECSU Students Receive Charter for International Aviation Fraternity

ECSU EM students becoming certified to be fit testers for respirators. Here you see students putting together equipment and then demonstrating their skills. OSHA requires occupational wearing of respirators be fit tested to the same make and model the wearer has. With PPE shortages it was noted that it was hard for organizations to test each time they got a different supply of N95 masks. The students stepped up to learn how to fit test to help others ensure safety.

2019-20 AWARDS RECEIVED

OVER $15 MILLION

10% Foundations/Private Organizations
$1,504,119

8% State and Local
$1,229,123

9% Other Federal Agencies/Subawards
$1,399,509

16% National Science Foundation
$2,450,222

57% Department of Education
$8,536,914

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