Program Abstracts:

Modernity and Global Identities:

Candace G. Wiley

"Afrofuturist Reimaginings of the Igbo Landing Rebellion (1803)"

Igbo Landing is a site on St. Simons Island, Georgia where 73 captured Igbos (from modern day Nigeria) took control of a slaving vessel and reportedly walked to their deaths in the waters of Dunbar Creek, rather than endure slavery. Oral narratives contradict this claim by saying the Igbo were transformed or given powers to walk or fly back home to Igbo Land. Beginning from a stance that accepts the oral narratives as true and that does not glorify Black death, I'm using Afrofuturist poetry as a lens to write into this historical moment. In my writing, this group doesn't die. They were transformed into vultures, mermaids, mutants, etc.; they were given superhuman abilities; and they were transported to Klingon spaceships.

Lee Morrissey

"Forms of Modernity and Milton's late poems"

My paper will be based on my book MS, currently under consideration at a U press. In it, I address long-standing critical concerns about Milton's late poems--Paradise Lost, Paradise Regained, and Samson Agonistes--by showing that they narrate three different responses to modernity.

Walt Hunter

"Forms of Identity in Global Poetry Festivals"

The Storymoja Festival in Nairobi has played a historic role in Kenyan culture and politics since 2007. The festival, now in its tenth year, functions as a site for public debates over national identity and culture, placing poets, cultural ministers, and experts on constitutional law on the same panels. Using Storymoja as a case study, this paper will examine the international literary festival as a key global institution for mediating access to poetry, for defining what poetry is, and for adjudicating who counts as a poet.

Gabriel Hankins

"Envisioning Literary Correspondence and Culture at Global Scale"

Recent work in the digital humanities has given us tools to envision the global flows of culture in several ways, from the viral spread of texts to the networks of correspondence that enlivened the Enlightenment's "Republic of Letters." This talk will examine a few ways in which humanists have adapted visualization to examine the global spread of literary formations, focusing on literary correspondence networks and paths of textual transmission.

Susanna Ashton

"Fugitives in the Ledger"

A study of historical census data and conflicting notions of racial identity and global citizenship.

Design, Processing, and Characterization of Materials at Relevant Length Scales

Brian Powell

“Probing chemical/physical processes governing ion mobility and ligand exchange using radiotracers”

The use of radiotracers in laboratory experiments provides an additional means to probe underlying reaction mechanisms and kinetics which are frequently not available using standard analytical techniques. Additionally radiotracer experiments can frequently be performed at ultra-trace (<10 pM) concentrations. In this presentation examples of radiotracer work in the Clemson Environmental Radiochemistry Laboratories will be shown in the fields of 1) nanoparticle surface chemistry, 2) radioactive waste disposal, 3) metal-ligand binding analysis, and 4) plant uptake.

Kai He

“Accelerating materials innovations by advanced in-situ electron microscopy”

Advanced transmission electron microscopy has played an important role in fundamental understanding of materials’ structures and compositions at the atomic level, and recent advancement of in-situ methods further enables the direct observation of materials’ dynamic transformation and transient phenomena in real time. By applying various stimuli to the observing system, we can also acquire the response directly correlated to the operando conditions. Here, I will show our recent developments of in-situ electron microscopy and their implementations in magnetic, electronic and energy storage materials, and also discuss the perspectives in diverse scientific directions.

Kyle Brinkman

“Ceramics for Energy Conversion and Storage: Microstructure Matters”

The emergent properties arising from the interactions of phases including interfacial contributions (surfaces) and phase evolution at the mesoscale present new opportunities, as well as challenges, for materials performance and functionality. This presentation will highlight interfacial contributions to system level performance in two diverse fields: i) solid oxide fuel cells (SOFCs)/solid state Li-ion batteries and ii) ceramic waste forms for nuclear waste immobilization.

Leah Casabianca

"NMR Methods for Characterizing Nanoparticle Surface Interactions"

Nanotechnology is finding increasing use in our everyday lives. One of the main challenges in the field of nanotechnology is understanding the molecular-level structural details at the nanoparticle surface. Here we present our recent work in using Nuclear Magnetic Resonance (NMR) to study the structure of molecules that are adsorbed on the surface of nanoparticles.

Rachel Getman

"Understanding Materials Function and Design with Multiscale Modeling"

In computationally-driven design, molecular simulations are used to identify the properties of materials that dictate the desired functionality, as well as how to tune those properties to optimize functionality. In this presentation, we demonstrate how our group uses methods in quantum and classical physics to elucidate material properties. In addition to demonstrating our own work on the function and design of catalysts, i.e., materials that accelerate the rates of chemical equations without being consumed, themselves, we highlight collaborations that we've developed across campus, using computational methods to understand material structure, predict uptake, and tune magnetic properties. If you are looking for a modeler to help understand electronic- or molecular-scale features of a material, this presentation is for you.

Ramakrishna Podila

"Defects and Interfaces at the Nanoscale"

Our history is defined by the materials we use, starting with those used during the Stone Age up until the present age of nanoscience and nanotechnology. Although high quality and defect-free materials may be a pre-requisite to electronic devices, defects/interfaces in nanomaterials provide a simple and yet principal way to break crystal symmetry and thereby realize distinctive electrical, magnetic, thermal, and optical properties. In this regard, this talk will provide a brief overview of synthesis and spectroscopic tools for generating and characterizing defects/interfaces in nanomaterials in addition to their applications in energy, sensing, and imaging.

Steven Pellizzeri

"Microkinetic modeling of single-site catalysts for ethene hydrogenation to ethane"

Six first-row transition metal cations (Mn^{2+}, Fe^{2+}, Co^{2+}, Ni^{2+}, Cu^{2+}, Zn^{2+}) were evaluated using both computational and experimental methods as catalysts for the hydrogenation of ethene to ethane. Experimentally these metals were installed on the zirconium oxide nodes of the metal-organic framework NU-1000 using atomic layer deposition and isolated zirconium oxide nodes were used for the computational screening. Utilizing a five-step mechanism for ethene hydrogenation, a microkinetic model was solved to predict catalyst activity, surface coverage, apparent activation energy, and which steps and species had the largest effects on the catalytic rates. These computational results were found to be consistent with those determined experimentally.

Thompson Mefford

"Assembling, Pulling, and Twisting of Magnetic Nanoparticles as a Collaborative Tool"

Multifunctional magnetic nanoparticles can be manipulated utilizing unique properties to control colloidal dynamics in magnetic resonance imaging (MRI), rate of magnetophoretic mobility, efficiency of magnetically mediated energy delivery (MagMED), and detection limits in AC susceptibility. Parallel to these properties are applications in medical imaging, low cost nanomanufacturing, directed drug delivery, alternatives to antibiotics, and assays for diabetes. Central to this talk will be the importance of fostering collaborations across campus to accomplish complex projects.

Innovation Uses of Emerging Cyber Tools and Technologies in Research and Education

Alex Feltus

"Mining Petabytes of Genomics Data for New Knowledge"

The Feltus group is trying to find actionable gene modules (chunks of complexity) that control complex phenotypes to help the people of Earth. Current phenotype foci include root nodulation, tumor development, intellectual disability comorbidities, and extraterrestrial plant development. To do these studies we process petabytes of genomics "big data" which requires computer and software engineering across the data life cycle using salient advanced cyberinfrastructure systems including Internet2, NCBI, SciDAS, Palmetto, the Open Science Grid, XSEDE, Pegasus/NextFlow scientific workflow engineering and the Tripal gateway project. Recent approaches to tumor sorting and biomarker module discovery using these systems will be explored.

David White in collaboration with Tim Howard

"How Smart is Your Building?"

The Watt Family Innovation Center provides a unique opportunity to explore smart building technologies. Multiple systems that vary from HVAC and lighting to smart screen usage and occupancy can play a potential role in developing models to better understand how the building is used and help improve energy efficiencies. This research explores the development of multiple real-time databases both internal and external to the building (i.e., weather) using SAS data management tools integrated with the latest SAS Visual Analytics dashboard technologies.

Dotan Shvorin

"Advancements in Human Performance Using Bio-Sensors and Simulation Modeling and Advancements in Athletic Performance Using Bio-Sensors and Simulation Modeling"

A proof of concept research experiments were constructed to test if the integration of bio-sensing technology with advance analytical tools could provide advantageous insights to human performance.

Kuang-Ching (KC) Wang and Hudson Smith

"Bringing Cognitive Analytics to Your Research: The Watson-in-the-Watt Project"

The Watson in the Watt project, sponsored by IBM, has officially launched in Spring 2018. The project was conceived in view of the potential of cognitive analytics in a multitude of Clemson research areas and the shared frustration in bootstrapping such an effort. The project establishes a Watson-in-the-Watt team, consisting of a post-doctoral Research Associate and a group of Creative Inquiry students, to build a shared foundation of Watson knowledge and assist Clemson faculty to bootstrap their research in diverse domains. The talk will introduce the project, some early successes, and ways Clemson faculty can start working with the team.

Shanna Hirsch

"Is There a Domino Effect in the Classroom? Functional Assessment-based Interventions for Students with Behavioral Concerns and Classroom Peers"

A majority of students with disabilities and behavioral challenges are taught in general education classrooms. Although these students may receive interventions resulting in positive behavioral changes, little is known about the collateral effects of implementing behavior intervention plans (BIP) on classroom peers with similar behavioral problems who are not receiving intervention. The purpose of this study was to investigate the effects of functional behavioral assessments (FBAs) and BIPs for students with challenging behavior as well as their peers. As a result of the intervention, target students demonstrated increased academic engagement. In addition, results suggest that the FBA-BIPs had moderate effects on engagement for some peers.

Weitian Wang

"Robot Learning from Demonstrations for Human-Robot Co-Assembly Tasks via Natural Language"

Collaborative robots are widely employed in strict and complex hybrid assembly tasks involved in intelligent manufacturing. Facilitating the robot to be easily programmed and the human-robot collaboration to be exactly performed is a necessary issue needing to be addressed. To this end, we develop a novel teaching-learning-collaboration (TLC) approach for the collaborative robot to learn and assist its human partner in natural working situations. Experimental results and analysis suggested that the human did not need to make many efforts to program the robot using this approach especially when the task was updated, and the robot could effectively and exactly collaborate with the human to accomplish the co-assembly task in natural working surroundings.

G Kumar Venayagamoorthy

"Situational Intelligence in Complex Systems"

This presentation focuses on big data science and engineering and a Clemson owned US patent technology. A new data-analytics method based on D-layered, N-dimensional cellular computational network will be presented for situational intelligence. The advances are in the development of a scalable computational method to deal with large data in real-time.

Food, Energy, and Water in a Changing World: Security and Scarcity

Andrew S. Mount

"Miata57 is a potent antifoulant of marine invertebrate biofouling"

Miata57 (patent pending) is a fouling deterrent molecule that has shown a promising ability to deter fouling marine invertebrate larvae from settling when it is covalently linked to a surface or included as part of a coating. It is a synthetic peptide that is based on the Chi-class of marine conopeptides, which are effectors of neuroendocrine transport in eukaryotic cells. Conopeptides derive from Cone snails, a highly successful marine gastropod predator species which has evolved these molecules to capture prey. The combination of proper molecular confirmation and surface geometry prevents invertebrate biofouling at a much lower molecular density than most biocides and copper which are currently included as additives in marine antifouling paints, thus Miata57 may prove to be an attractive environmental benign alternative to this market. (Funding provided by Clemson University Research Foundation)

Apparao Rao

"Powering our Planet in 2025"

Our increasing energy demands have spurred a rigorous search for renewable energy sources to reduce our dependence on fossil fuels. However, efficient use of renewable energy is possible only with advances in both energy generation and storage. Besides solar and wind energies, new methods based on the triboelectric effect are in vogue which harvest energy from a broad range of natural motions and activities, including walking. Today's batteries and capacitors, which are the main energy storage devices, cannot meet the world's demand for combined power and energy densities. To enhance the viability of such energy generation and storage technologies, the Clemson Nanomaterials Institute is developing a mix of scalable processes which will be presented.

Christophe Darnault

"Preferential Flow and Transport in Soil"

Flow and transport in porous media with applications in environment and energy are complex phenomena that encompass a wide range of disciplines, including physics, chemistry, biology, earth sciences, hydrology, soil and water engineering, and reservoir engineering. Understanding flow and contaminants transport processes in porous media is critical for the mitigation of their impacts, the development of effective remediation procedures, the exploitation and management of subsurface resources --aquifer systems and petroleum reservoirs, and the protection of the environment and public health. We have demonstrated the critical role that preferential flow (macropore flow and fingered flow); transient in water content and velocity; transient in solution chemistry, gas-water interfaces; solid interfaces; system heterogeneities; plants and microbes; and their interactions and feedback have in the flow, transport, and retention of contaminants in the vadose zone. The results of our research will contribute to the development and validation of flow, fate, and transport models of contaminants from pore scale to watershed scale for management and protection of groundwater resources, petroleum reservoirs, public health, ecosystem sustainability, risk assessment, and life-cycle analysis.

Lasha Zhang

"Price Forecasts for Soybeans Produced in South Carolina from 2018-2025"

This paper focus on predicting prices for soybeans produced in South Carolina with two methods: vector autoregression (VAR) and autoregressive integrated moving average (ARIMA). I will choose the best model to report, according to test criteria, as well as the consistency between forecasted price data and actual observations of soybean prices.

Mik Carbajales-Dale

"An overview of energy-economy-environment systems analysis"

The Energy-Economy-Environment (E3) System Analysis group's research focuses on building tools to reduce the environmental impacts of technology systems and to understand the structural transformation necessary to navigate a peaceful transition to prosperous and sustainable future. Specifically, we model energy and material resource requirements at three distinct levels: (1) the device/facility level, using engineering-based, bottom-up life cycle assessment and techno-economic modeling tools; (2) the industry/local level, using multi-layer, network-analytic techniques; and (3) the regional/national/global scale, using geographic information systems (GIS) and environmentally-extended input-output models.

R. Andrew Hurley

"Automated Microfarms: Sustainable Jobs for All"

My research group has developed a functional prototype to automate the cultivation of difficult to grow, high margin exotic foods. The system leverages food and agricultural waste to grow nutritious food and enables anyone with 125 sq. ft. to significantly supplement their income. We are seeking faculty collaborators who have experience in plant extractions, machine learning, robotics, organic chemistry, and logistics/supply chain backgrounds to improve the prototype and create a global marketplace with a distribution model to enable farmers to produce their own consumer products.

Roberto Risso

"Bread, oil and wine: teaching Italian food culture without too much fraud"

My ten minutes short paper will be a critical account of my experience in creating a new Italian three hundred level class about Italian and Mediterranean food culture. Moving from history, art and literature and focusing on popular culture, my efforts are on giving Clemson students a clear idea of how and why food is so relevant in Italy and how it helped shape our young and problematic Nation. But here issues arise fast and numerous: is it still possible in 2018 to talk about Mediterranean diet and Italian food when ingredients are heavily modified and they come from very far away? My paper will give answers to those questions and suggests that Italy is reacting fast and strong to those threats by going back in centuries and re-introducing ingredients, foods and materials that were long gone and forgotten.

Sachin Rustgi

"Breeding crops for improved productivity and nutritional quality using molecular tools"

My presentation will focus on the research activities in my program, which range from increasing productivity of crops like cotton by selecting for an annual over a perennial type or by tweaking

meiotic genes and sorghum/peach by reducing pressure of insect and fungal pests to the development of nutritionally enhanced nonimmunogenic genotypes of wheat, peanuts and soybean.

Sruthi Narayanan

"Sustainability, Profitability and Climate Adaptability of Crop Production Systems"

Our crop-ecophysiological research program focuses on improving crop productivity through economically viable and environmentally sustainable agronomic practices. Climate variability necessitates development of resilient, regionally adapted production systems and our group strives to achieve this by applying concepts from Physiology, Biochemistry, Lipidomics, and Genomics. Crop-ecophysiological responses from rhizosphere to global scale is studied using on-farm, greenhouse, growth chamber, and laboratory and modeling experiments. Our group's main focus is categorized under two themes; Crop response and adaptation to climate change and improving field crop production through sustainable agronomic practices.

Sudeep Popat

"Anaerobic biotechnologies for wastewater treatment and their central role in addressing the food-energy-water nexus"

In this presentation, I will describe three important anaerobic biotechnologies that we work on in my lab at Clemson that could play a central role in addressing the food-energy-water nexus. First, I will discuss how adding fats, oils and grease (FOG), a category of food waste, could enhance anaerobic digestion of wastewater sludge, as long as the microbial communities are managed to avoid inhibition from excess FOG loading. Second, I will provide an example of how anaerobic membrane bioreactors (AnMBRs) could possibly replace the activated sludge process for secondary treatment of domestic wastewater, resulting in methane production, as well as providing an effluent that is suitable to recover nitrogen and phosphorus from, for fertilizer use. Finally, I will describe how microbial fuel cells (MFCs) could be used for treatment of high-strength wastewater to produce valuable chemicals such as peroxide and caustic.

Kathleen Thum

"The Illusion and Substance of Oil"

Using crude oil and recycled motor oil as an ink and paint to create representations of petroleum refining landscapes, my artwork aims to disrupt and interfere with our expectations of how one experiences oil in our western world. Crude oil is usually contained and controlled by the industry. In using crude oil as a medium to create artwork, I heighten the viewer's awareness of the disconnection between ones relationship with the material; oil is both a familiar, integral part of contemporary existence, yet remains a mysterious and unknown substance. In this presentation, I will show images of my crude oil and recycled motor oil artworks, along with other artworks created as a way to process my own increasing anxiety about climate change.

Power and Privilege: Grappling with Interlocking Systems of Oppression

Luke J. Rapa

"Are We Still Talking About This? (Yes): Exploring and Addressing Issues of Inequity in the Field of Education

Inequities in education—be they related to access, opportunity, achievement, or attainment—have been long-standing and intractable within the United States. Indeed, such inequities persist across ethnic-racial, social class, and gender lines, among others (e.g., immigration status). This presentation will highlight recent work (2-3 manuscripts), work underway (2 projects), and work envisioned (2 projects) that aims to explore and address issues of inequity in the field of education. Highlighted research entails a combination of primary data and secondary data analysis, demonstrating a range of innovative approaches being utilized to understand disparities and promote more equitable education outcomes for our citizenry.

Tiffany D. Creegan Miller, PhD.

"Kojb'ixan pa qach'ab'äl!: Kaqchikel Maya Children's Songs as Socio-Political Forms of Resistance in Pan-Maya Activism in Guatemala"

As part of contemporary Pan-Maya activism in Guatemala, many Maya authors and intellectuals have emphasized the importance of educational initiatives focusing on indigenous languages. Kaqchikel speakers combating what linguist David Crystal has described as "language death" recognize that attempts to preserve their language largely depend on the children—Kaqchikel youth must value and learn the language so that they can teach it to future generations. In this context, numerous songs circulate orally and via print and digital media to teach Maya children about their indigenous languages and cultures; from my fieldwork since 2010, I have identified three songs that Kaqchikel parents and instructors have used to teach children numbers, greetings, and verbs in the imperative form: "Chila' pa nujuyu'," "Jun ti sanïk" and "Xseqär nana'." During this presentation, I will argue that these songs are cultural forms of political mobilization for Pan-Maya activism, specifically in terms of their push for language revitalization.

Faiza Jamil

"Exploring Developmental Changes in Teacher Expectations and Associations with Children's Mathematics Achievement"

The current study uses a large nationally representative dataset and a new method for computing teacher expectations to better understand the developmental effect of mathematics teacher expectations on future student achievement. The study utilizes autoregressive cross-lagged models with five time points between kindergarten and eighth grade, and multi-group modeling to examine group differences in teacher expectancy effects on achievement based on gender and ethnicity. Results indicate that teacher expectations from one time point to the next are not significantly associated with each other, but their influence on future student achievement grows over time. Teacher expectancy effects in math are stronger for Caucasian and minority girls, and minority boys than they are for Caucasian boys. Implications for teaching are discussed.

Qualitative Research and Methodological Diversity

Robin Phelps-Ward

"Using Participatory Action Research and Photo Methods to Explore Graduate Students of Color Experiences"

The Action Research Collective, which is a collaborative team of participatory action researchers at Clemson University, explore the experiences and needs of graduate students of color using photo enhanced methods. Drawing on the theoretical frameworks of CPAR and campus racial climate we use photographs to elicit and facilitate discussions with participants to consider ways to increase support for graduate students of color. Our research study aimed to collect the photographs shared by the participants to elicit their narratives around obstacles/needs, support, and success as a graduate student at Clemson University. Our poster and presentation discuss the findings produced by our 10-30 participants that will inform future research and policy decisions in graduate education.

Ashley L. Isreal

"Qualitative research using photo-elicitation to examine decision-making processes among Black master's students"

Drawing on the methodology frameworks of constructivist grounded theory and photo-elicitation, I use photographs to elicit and facilitate discussions with participants to discover the decision-making process of their graduate school pursuit. My research study aimed to collect the photographs shared by the participants to elicit their narratives around factors that triggered them to pursue graduate school. The findings produced by eight participants will inform future research and policy decisions in graduate education.

Oriana R. Aragon

"Dimorphous Expressions of Emotion"

Sometimes human expressions of emotion are dimorphous, that is, two expressions represent and communicate one category of emotion, e.g., during "tears of joy," both smiles and tears represent and communicate happiness. My lab investigates, the prevalence of these expressions, what they communicate, and how they affect product communications. We focus on experimental paradigms, through surveys, behavioral observations of individuals expressing emotions in lab settings, and electroencephalogram (EEG) methodologies. Our results thus far indicate that dimorphous expressions clearly communicate one-dimensional emotion states and unique motivational orientations, both of which affect observers' appraisals and reactions toward expressers.

Ecology and Conservation

Saara Dewalt

"Carbon Footprint of Hurricane Maria on Caribbean Islands"

Hurricane Maria (HM) caused substantial damage to tropical dry and wet tropical forests in the Caribbean, particularly on the islands of Dominica, Guadeloupe, and Puerto Rico in 2017. I present estimates of above-ground carbon stocks in these forests before HM based on forest surveys conducted before the hurricane and species-specific wood density. I present plans to assess the loss of carbon in living woody biomass following HM by resurveying the forests and determining damage to individually marked and identified trees. I will determine the carbon footprint of the hurricane on these three islands and will test two hypotheses: 1) damage is less prevalent where winds were not as strong (Guadeloupe and Puerto Rico) and 2) levels of damage, if present, are greater for species with more restricted ranges.

Barbara Campbell

"Wildfires and drought/flood cycles impacts on aquatic microbes"

Water quality is likely to change with changing environmental stresses, such as drought/flooding cycles as well as inputs of wildfire byproducts such as polycyclic aromatic hydrocarbons. We assessed the impact of both the Pinnacle wildfire and Columbia SC flooding/urbanization on the microbial communities associated with creeks and rivers. We will present data demonstrating the association of these events with changes in the microbial communities in these habitats and discuss the types of microbes associated with these occurrences.

Beth Ross

"Spatially-varying environmental effects on species of North American waterfowl"

While environmental conditions may affect species differently throughout their range, we often assume basic linear relationships that hold constant over space. Rather, species likely exhibit non-linear relationships to their environment that differ spatially as well as among related species. I discuss how we can examine cross-scale and cross-species relationships to the environment across the breeding range of several species of North American waterfowl.

Brandon Peoples

"Reconciling theories of invasion ecology using functional traits"

Species invasions are a key component of the global biodiversity crisis. Numerous theories seek to describe the causes of species invasions, and many are contradictory. Some theories posit that invasion success is inherent to organisms (i.e. functional traits), while others suggest only human factors determine invasions. Considering indirect effects of traits can unite these theories into a causal, functional framework for better prediction of invasion dynamics.

Carmen Blubaugh

"Predator invasion disrupts link between biodiversity and herbivore suppression"

Herbivore suppression may be strongest when predator communities are species rich (high richness) with similar abundances among those species (high evenness), however environmental drivers of predator community evenness are not known. Working on over 50 mixed-vegetable farms across three US states, we used structural equation models to examine relationships between two potential ecological predictors of predator community evenness: invasive predators and structurally complex habitat, and finally evaluated their cascading effects on agricultural pests.

Kyle Barrett

"Wildlife conservation and management in an era of rapid local and global change"

Global environments are changing rapidly as a result of shifting climates and land use patterns, and the distribution, abundance, and behavior of a wide range of plants and animals are influenced by such changes. In the Barrett Lab we use a variety of tools (e.g., spatial modeling, experimental manipulations, and behavioral studies) to better understand how vertebrate species are responding to global change. During this symposium I will talk specifically about our efforts to address wildlife conservation in the face of global change at scales both large (resiliency of priority conservation areas to climate change in the Northeast U.S.A.) and small (owl distribution and movement in forested and developed areas near Clemson, SC). These projects all are designed to provide data to inform on-the-ground decision makers such as wildlife managers, foresters, urban planners, and landscape architects.

Michael Childress

"Building for Resilience in Coral Reef Restoration"

Coral reefs are one of the most important and most threatened ecosystems on the planet. Rapid loss of corals at local and global scales requires immediate attention if we are to maintain important ecosystem services for millions of people. Our research focuses on developing strategies for where to transplant corals for maximum benefit on reefs of the Florida Keys National Marine Sanctuary. Boulder corals on reefs with low algae and high reef fish abundance have the highest resilience to coral bleaching and hurricane disturbance.

Patrick Jodice

"Conservation and Ecology of Atlantic and Caribbean Seabirds"

Seabirds are important indicators of marine ecosystems and integrate conservation threats across multiple ecological and jurisdictional boundaries. Our lab is engaged in various seabird research efforts in the Atlantic, Caribbean, and Gulf of Mexico. We will review results from individual tracking projects, large-scale survey efforts, and colony-based studies focused on seabirds in these marine ecosystems.

Rob Baldwin

"Biodiversity in a Changing World"

Biodiversity loss has reached crisis levels and a robust, systematic response is required to avoid a human future filled with impoverished ecosystems. Allocation of conservation resources so that

the most important places, organisms, and systems are protected in the correct time frame – given changing environmental conditions – is a complex socio-ecological problem. We approach this through stakeholder-driven, computing and data intensive, repeatable exercises to make near-optimized maps. Our latest example was executed for the 15 state region making up the Central and Southern Appalachians, funded by the US Fish and Wildlife Service as part of their Landscape Conservation Cooperative (LCC) program.

External Partnerships: Communities, Healthcare, Industry, and Federal Laboratories

Brian A. Powell

"Lessons learned from almost two decades of working with Department of Energy national laboratories"

I have spent time as an intern, postdoc, staff member, and most recently jointly appointed faculty member Department of Energy laboratories (SRNL, LLNL, and LBNL). In this presentation, I'll highlight some experiences with an emphasis on understand the national laboratories role and provided examples of how I have found and maintained long term collaborations with scientists from the national laboratories. Research highlights describing results from several DOE user facilities will also be included.

Christy Brown

"Analysis of Pathways to Calculus Readiness for SC Engineering Students: Preliminary Results from the SC: SUPPORTED NSF INCLUDES Project"

The overarching goal of the SC: SUPPORTED project is to reduce attrition rates of South Carolina students in engineering degree programs due to insufficient preparation for success in Calculus. National data indicate that students placing into Calculus at the start of their degree program persist in obtaining an engineering degree at twice the rate of students whose initial math placement is below Calculus, a cohort consisting of a disproportionately large number of underrepresented minority and low-income students. In an effort to identify common pathways to differing levels of Calculus readiness, the 4 ABET-accredited institutions in South Carolina pooled information on the background and initial math placement of their engineering students. A preliminary analysis of this data identified characteristics of South Carolina high schools that are statistically significant predictors of the level of Calculus readiness of their students, with the goal of supplying institutional recommendations for stakeholders.

Dev P. Arya

"Novel targets for Antibacterial Therapy"

Since 1980s, no new classes of antibiotics have been brought to the clinic. With increasing prevalence of multi-drug resistant pathogens in the human population, new approaches are sought to address this problem. In this presentation, I will discuss how the antibacterial drug market is uniquely different from other markets, and how collaborative science is the key for success in this venture. I will also share some of our own data in the quest for finding new targets and drugs.

Dotan Shvorin

"Strategic Development of a Research Experience Enrichment Program (REEP)"

Can the Clemson University Creative Inquiry program be adapted to the Greenville Health System (GHS) health care environment to advance GHS scholarship and workforce development?

John Morgenstern

"The University Press as a Center for Collaboration"

Clemson University Press has expanded in recent years, publishing approximately twenty-five books and journal issues per annum. Through strategic partnerships with learned societies and organizations, departments, and institutes, the Press aspires to publish as many as twenty open-access journals per year. All of our publications are produced using the most rigorous standards of peer review and are broadly discoverable online and in library catalogs. The Press seeks enthusiastic collaborators positioned to assist us in building our publishing program to represent all fields of scholarly excellence at Clemson University. This brief presentation would provide an overview of our publishing program and invite further collaboration with colleagues across campus.

Ken Marcus

"Lessons learned in 30-plus years of industry and national laboratory collaborations"

By definition, collaborations of all sorts must be synergistic in nature. The needs and desires of the academic and industrial/federal entities are very different, yet complementary. Over the last 30-plus years, my group has had many successes, and a few failures, in cooperative research projects. I will provide perspectives of nurturing and sustaining meaningful collaborations that benefit faculty and their students.

Matthew Macauley

"The poor African country where 14-year-olds learn calculus (and how to bring them to Clemson)"

In one of the poorest countries in Africa, every high school freshman takes calculus -- the same class taken by thousands of Clemson students each year. Students from this country interested in math and physics then spend the remainder of their high school years taking college-level classes. Those that go onto the (only) University are incredibly prepared for graduate school, but due to both the financial burden and the lack of a research culture in this country, the road usually ends there. At this talk, I will tell you all about what I've learned about this amazing country from several years of teaching grad students at the African Institute for Mathematical Sciences, as well as some bold plans I have to involve Clemson, some funding agencies, and possibly a few curious and inspired attendees of this talk.

Renee Cottle, PhD.

“CRISPR-Cas-Mediated Gene Editing of Metabolic Liver Disease”

Homozygous familial hypercholesterolemia (HoFH) is characterized by dyslipidemia caused by loss of function mutations in the LDL receptor (LDLR) gene resulting in severe cardiovascular disease as early as childhood. Although the only curative therapy for severe HoFH, orthotopic liver transplantation is not a standard therapy for HoFH because of related complications. Clustered regularly interspaced short palindromic repeats (CRISPR) and associated Cas nucleases has unleashed new possibilities for HoFH and other inherited metabolic liver disorders. Our research addresses critical technical barriers for advancing a novel cell-based gene therapy for HoFH by: 1) optimizing gene editing tools with improved efficiency and specificity in hepatocytes, 2) developing safe methods for delivering gene editing components into hepatocytes and other therapeutically relevant cells, 3) characterizing the effects of gene editing on cell functionality, and 4) developing strategies for repopulating the liver. We will present exciting research from our lab, which is on the frontier of cell-based gene therapies and precision medicine.

W. Howard Brown

“Combining Socially Responsible Outreach and Progressive Research”

Increasingly, access to research funding depends on the capacity for internal/external collaborations and on access to community partners and reliable subjects. At the Youth Learning Institute, our programs serve individuals across the life span. Since all our endeavors are 100% self-supporting, we have had to develop sustainable community relationships. With the addition two years ago of the Office of Research and Organizational Development, we now have the potential to provide faculty with research support and access to our long-standing community partnerships.

What Scientists can learn from Other Disciplines?

Ellen Breazel

“Statistics and Math Consulting Center”

This presentation will highlight the work of the Statistics and Mathematical Sciences Consulting Center (SMCC). Through the Department of Mathematical Sciences, the SMCC serves researchers from Clemson University, community organizations, commerce, industry, and government by offering data analysis, statistical guidance and interpretation, problem solving, scientific computing, and mathematical modeling. SMCC provides an interdisciplinary environment for collaboration and consultation. The mission of SMCC is to improve the quality of scientific analysis in support of Clemson's research efforts across a broad range of disciplines.

Marissa L. Shuffler

"When a Good Team is Not Good Enough: Applying the Science of Multiteam Systems in Saving Lives and Sending Astronauts to Mars"

While teams are often considered a building block of organizations and industries such as the military, aviation, scientific advancement, technology development, and healthcare, the grand challenges of today often mean that a single team is not enough. Instead, teams must often work interdependently with other teams to achieve complex goals—using a team of teams structure referred to in organization science as "multiteam systems." This presentation will highlight the Clemson DIGITAL Lab's current interdisciplinary research collaborations with both Greenville Health System as well as NASA, describing qualitative and quantitative field and lab research efforts. These research efforts provide initial results emphasizing that understanding multiteam systems as a distinct and unique entity is pivotal in reducing human error and more effectively tackling complex problems such as responding to environmental disasters, developing healthcare treatment breakthroughs, and even sending a crew of astronauts into deep space.

Matthew Macauley

"Mathematical biology show and tell"

Over the last 15 years, mathematical biology has been transformed by researchers using novel tools from discrete math and computational algebra to tackle old and new problems. This will be a talk given by a mathematician but for life scientists. I will somehow tell you what this is all about in 10 minutes, and then you can tell me if any of this seems interesting or useful. I will also shamelessly plug a new book on the topic.

Kelly Smith

"SoCIA: A Model for the integration of Humanities and Science"

In 2016, a new organization held its inaugural meeting here at Clemson. Social and Conceptual Issues in Astrobiology is a new academic society which seeks to develop the academic infrastructure that will allow humanities scholars to interact more fully with their scientific colleagues in addressing the many important "broader issues" surrounding the search for life on other planets. Clearly, this poses a series of interesting challenges, but so far we have met with much success – our membership has tripled since the Clemson meeting, we just completed a very successful second conference at the University of Nevada and numerous interdisciplinary projects have already resulted from the collaborations thus spawned.

Emerging Security Landscape: Challenges and Promises

Hongxin Hu

"Security in Emerging Computing and Networking Systems"

Security always plays a critical role in emerging computing and networking systems. In this talk, I will discuss security challenges in some emerging domains, including Artificial Intelligence (AI), Internet of Things (IoT), and Software-Defined Infrastructure (SDI). I will also present our recent research efforts in those domains.

Richard Brooks

"On-line Vulnerabilities: Issues related to crime and civil rights"

On-line communications are currently, in general, unprotected. This is exploited by both criminals and oppressive regimes. This talk discusses new ways to protect on-line communications, some of which are related to concepts originating in the criminal underworld. We also discuss the new security model provided by the blockchain; how criminals are subverting this tool; and a possible approach to countering on-line money laundering.

Yingjie Lao, G. Kumar Venayagamoorthy

"Device-Specific Signature Generation Technique for Smart Grid Device"

Smart grids are characterized by both opportunities and challenges to the cybersecurity of the power industry. Smart grid device vendors must prioritize security before their devices become hugely popular, leaving millions of people at risk from various forms of attacks. Specifically, any breach on the smart grids or the demand response management (DRM) systems in smart grids have the potential to corrosively erode consumer and provider confidence, economic stability, and even national security. This talk presents our work on exploiting the security of smart grid devices from the hardware perspective. In particular, we developed a novel device-specific signature generation approach by bringing the concept of physical unclonable function (PUF) into smart grid devices. A design for the smart grid PUF (SG-PUF) that uses fractional turn ratio transformer as identifier signature is presented, which is capable of generating signatures that are sufficiently unique to be used as secret keys in communication or cryptographic operations.

Yongqiang Wang

"Security in Timekeeping"

The focus of this project is to provide novel and holistic approaches to enable time security for systems that employ the two most commonly used time synchronization mechanisms, i.e., GPS based and NTP based synchronization. The project seeks to provide a security solution as a national service for all civil GPS time users. It will also develop and prototype a redundancy based security solution to NTP synchronization with minimal extra communication overhead.