RESEARCH CLUSTER DESCRIPTIONS & DIRECTORS

BIG DATA & ANALYTICS OVERVIEW

Big data in health care can mean a lot of things to different individuals. However, there is one common element – data complexity. This is due, in part, to the fact that health care data can come from numerous sources including electronic health records, medical imaging, payor records, pharmaceutical research, patient and disease registries, and government claims, to name a few. Because it derives from many sources, it is highly variable in structure and nature, and therefore, requires special analytical techniques. Although challenging, technological improvements in computing and analytics allow one to systematically utilize big data to help inform health decisions.

The Big Data and Analytics Research Cluster was formed to bring together experts in support of the university's mission in health care research. The overall goal is to utilize big data from different health data sources to support informed decisions for teaching, research and delivery of health care. To realize this goal, the cluster will develop university-wide data analytics capabilities by utilizing big data technologies. The cluster plans to develop data collection, storage and analysis capabilities in support of health care research. By harnessing these tools, the cluster will increase the awareness of the value of big data to internal and external stakeholders.

For more information about the Big Data & Analytics Research Cluster, visit: https://rede.ecu.edu/clusters/big-data-analytics/.

BIG DATA & ANALYTICS DIRECTORS

William (Bill) Irish | irishw17@ecu.edu
Surgery, Brody School of Medicine

Irish is a professor and vice chair for research in the Department of Surgery. His major research interests consist of identification of important prognostic factors of disease and clinical outcomes and developing statistical models and assessing their clinical utility. Of interest is evaluating factors that can affect outcomes in individuals who live in rural areas. Rural residents have less exposure to health care specialties and may not seek necessary medical care. All these factors can result in disparate outcomes among rural versus urban residents. Irish's goal is to design, implement and evaluate an academic/community coordinated health system strategy to improve health outcomes in the rural community.

Yajiong (Lucky) Xue | xuey@ecu.edu
Management Information Systems, College of Business

Xue is a professor of management information systems in the College of Business. She is the co-director of the Center for Healthcare Management Systems. Her research interests include information technology (IT) and neuroscience, healthcare informatics, IT governance, IT strategy, enterprise systems, IT security, IT outsourcing, IT compliance, IT adoption, and knowledge management. She is the author of 56 papers that have appeared in peer-reviewed academic journals. Among those publications, 13 papers were published in the top four journals in the information systems discipline. Xue has taught a wide variety of graduate and undergraduate courses, including enterprise infrastructure, telecommunications and network, security management, MIS projects, business computer applications, introduction to MIS among others.

BIOMATERIALS OVERVIEW

The Biomaterials Research Cluster focuses on the broad field of next generation biomaterials, including applications in biomechanics, biosensors, nanotechnology, medical imaging, drug delivery, radiation, and tissue engineering. These applications span the study of natural and created materials, including the combination of both in biomimetic materials. The cluster facilitates research development that supports and integrates ECU faculty and their research endeavors, while collaborating with regional and national strategic partners. The cluster encourages collaborations between clinicians in medicine, dentistry and allied health with basic scientists in engineering, physics, chemistry and the biological sciences. The Biomaterials Research Cluster engages in proactive, catalytic and capacity-building activities – including core facility development – to position cluster scholars to grow extramurally funded research programs and to train the next generation of biomaterials researchers.

Previous cluster activities include two lightning talk sessions that highlighted biomaterials research across campus. Currently, the cluster is finalizing its strategic plan and hopes to launch research development initiatives – such as seed grants and grant advisory panels – in the coming months.

Learn more about the Biomaterials Research Cluster online at https://rede.ecu.edu/clusters/biomaterials/ or by contacting co-directors Stephanie George (georges@ecu.edu) and Saulo Geraldeli (geraldelis19@ecu.edu).

BIOMATERIALS DIRECTORS

Saulo Geraldeli | geraldelis19@ecu.edu
General Dentistry, School of Dental Medicine

Geraldeli is the division director of biomedical materials in the School of Dental Medicine. Geraldeli earned his doctorate in dentistry with a focus in dental materials from the University of Sao Paulo, Brazil. His research interests relate to the understanding of current dental biomaterials performance in both laboratories and clinical environments. His laboratory is equipped to synthesize and test bioactive nanoparticles for the delivery of nano-precursors and ions aiming remineralization of demineralized dental tissues.

Jason Yao | yaoj@ecu.edu
Engineering, College of Engineering and Technology

Yao is the associated dean for academic affairs in the College of Engineering and Technology. He founded and directs the Biosensors Laboratory. The lab places an emphasis on research including biomedical sensors and devices that can be utilized for healthcare applications in non-hospital settings. Over the 15 years since he joined ECU, Yao has successfully established collaboration with ECU's health sciences campus, including the College of Nursing, College of Allied Health Sciences, and the Brody School of Medicine. Yao received his doctorate from Kansas State University. He is a senior member of the Institute Electrical and Electronics Engineers (IEEE), where he has held various leadership roles.

HEALTH BEHAVIOR OVERVIEW

The Health Behavior Research Cluster takes a lifespan approach to improving mental and physical health by focusing on the science of health behavior from a socioecological standpoint, from childhood to adulthood, with an emphasis on critical concerns arising in eastern North Carolina communities.

To date, the cluster has facilitated the development of two interprofessional research teams that are working in the areas of child and adolescent health. One team is examining the influence of prenatal exercise on infant health and the second team is developing a mobile application for smartphone use with adolescents to reduce substance misuse. Community partners, such as the vice president of programs with the Boys & Girls Clubs of the Coastal Plain, are instrumental in these research teams.

For more information about the Health Behavior Research Cluster, visit: https://rede.ecu.edu/clusters/health-behavior/.

HEALTH BEHAVIOR DIRECTORS

Lisa Campbell | campbelll@ecu.edu

Psychology, Thomas Harriot College of Arts and Sciences

Lisa Campbell is a licensed clinical psychologist and clinical researcher. Her research focuses on ethnic disparities in pain conditions and cancer outcomes, as well as developing culturally sensitive psychosocial and behavioral interventions to enhance post-treatment quality of life in African American prostate cancer survivors. Campbell's research is funded by the National Cancer Institute and the Department of Defense Prostate Cancer Research Program. She earned her doctorate from the University of Florida and has been published in peer-refereed journals including *Pain Medicine*, the *Journal of Pain and Palliative Care Pharmacotherapy*, and the *Journal of Pain & Symptom Management: Including Palliative Care*.

Angela Lamson | lamsona@ecu.edu

Human Development and Family Science, College of Health and Human Performance

Lamson is a licensed marriage and family therapist. She is one of the co-creators of the ECU's Medical Family Therapy (MedFT) doctoral program. Lamson's funding and publications have been devoted to integrated care and biopsychosocial health of armed service members, veterans and their families, as well as attention to trauma and illness with underserved and minoritized couples and families. She has been funded by the Department of Defense and secured more than $4 million in funding toward integrated care intervention and service initiatives. She has authored two textbooks and published in peer-refereed journals including, "Military Medicine," "Journal of Immigrant and Minority Health," "Journal of Traumatic Stress," and "Journal of Marital and Family Therapy."

NATURAL RESOURCES & THE ENVIRONMENT OVERVIEW

The Natural Resources and the Environment Research Cluster focuses on discovering new ways to support and optimize sustainable use of natural resources and the environment, with an initial focus on water quality, water quantity, and sustainable energy.

To meet its goals, the cluster supports core faculty members in a variety of ways. These include provision of seed grants to initiate ideas for developing large proposals, access to proposal reviewers, access to travel funds, access to incubator sessions to develop proposals, and access to multi-disciplinary faculty to collaborate on big proposals.

This past year, the cluster awarded four seed grants to faculty with the range of topics reflecting the breadth of the cluster's interests, including hydrokinetic energy development, evaluation of nano-filters to improve water quality, oyster restoration and water quality, and evaluating pro-conservation behaviors in eastern North Carolina. The cluster is also interested in fostering collaborations with other ECU clusters, as well as public/private groups and organizations whose interests align with the cluster's focus areas. For example, the cluster is collaborating with Sylvan Heights Bird Park in addressing species preservation and research, as well as habitat and land use trends.

For more information about the Natural Resources and the Environment Research Cluster, visit: https://rede.ecu.edu/clusters/natural-resources-environment/.

NATURAL RESOURCES & THE ENVIRONMENT DIRECTOR

Alex Manda | mandaa@ecu.edu
Geological Sciences, Thomas Harriot College of Arts and Sciences

Manda is an associate professor in the Thomas Harriot College of Arts and Sciences. Manda is interested in exploring water resources (groundwater and surface water) issues (e.g., saltwater intrusion) and the drivers that influence water resources (natural and anthropogenic). He has used a combination of field-based and computer modeling techniques to tackle various research problems in the inner and outer banks regions of eastern North Carolina. He is also interested in improving undergraduate student education in the geosciences and citizen science. Manda was awarded a Fulbright Scholarship in 2019 to study water quality in Zambia.