Better Together

CUSHR FALL MIXER

September 14, 2016

Academic Partnerships that Transform Healthcare

Clemson University
School of Health Research

Greenville Health System
GHS Clinical and Academic Departments
Academy of Leadership and Professional Development

Tod. N. Tappert, Vice Chair, VP of Learning and Culture/GHS
Sharon L. Wilson, Director, Conscious Leadership Development/GHS
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Marissa Shuffler, PhD, Assistant Professor/Psychology Dept./Clemson University
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Departmental Research Focus
Areas
• Conscious Leadership and Conscious Professionalism

FY 2016 Featured Research Accomplishment

• Longitudinal study of leadership development in partnership with Clemson University began in 2014

• Results stayed consistent from 2014 to 2016 that show a statistically significant positive relationship between declarative knowledge of conscious leadership principles and employee engagement, employee commitment and work unit performance

Key Research Challenge

• How do we know that declarative knowledge of conscious leadership/professionalism results in behavioral change?

• How do we know that the curriculum is effective?

FY 2017 Research Goal

• Continue longitudinal study

• Develop a behavioral measurement tool for conscious leadership/professionalism

• Assess the appropriate level of exposure to and the quality of the conscious leadership/professionalism curriculum
Departmental Research/Education Focus Areas

- Continue to provide a large arena of clinical education for residents, medical students, MEDEX, undergrads, and SRNA’s.
- Continue the growth of our clinical research, publication infrastructure.

FY 2016 Key Education / Research Accomplishment

**Research**: IRB approval for ERAS (Enhanced Recovery After Surgery) study. Retrospective study analyzing length of stay, total opioid consumption, and incidence of PONV (post op nausea and vomiting) in inguinal hernia patients before and after implementation of the ERAS initiative. Abstract presented at the Southeastern Surgical Conference.

**Key Education / Research Challenge**

**Research**: As a relatively recently acquired department, and essentially no research, data-acquisition, manuscript-writing staff, Anesthesiology faces systems/support challenges in study organization and publication.

**Education**: With the dramatic increase in learners rotating through our department, and the future ER resident rotations, we struggle to maintain our high level of productivity and efficiency. Furthermore, OR traffic has become a major area of concern for surgical site infection.

FY 2017 Education / Research Goal

**Research**: Expand departmental research support infrastructure. Maintain emphasis of research experience/interest in new-hire acquisitions.

**Education**: Incorporation of Emergency Medicine Airway Rotation while maintaining high quality educational experience for existing resident and student rotations.
Emergency Medicine

Ronald G. Pirrallo, MD, MHSA, Vice Chair of Academics
Professor, University of South Carolina School of Medicine-Greenville
Clinical Professor, Clemson University School of Health Research
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Departmental Research/Education
Focus Areas

• ED Operations
• Patient satisfaction
• Resident selection
• Medical student education
• Roadway safety
• Simulation in education
• Profession burnout
• Physician motivation
• Cardiopulmonary Resuscitation (CPR)
• Disaster preparedness

FY 2016 Key Education / Research Accomplishment


• 3 IRB approved projects
  EPIC electronic health record implementation: R Raman, M Bitner, M Ramsay
  Head CT ordering simulation: S Lowe, R Gimbel, Z Connor, RG Pirrallo
  Community ED efficiency: D Mcguff, M L Fredendall, M Land, David Buitelaar

• 11 Partnership projects in process

Key Education / Research Challenge

• New Department
• New role in match making
• Research Coordinator support

FY 2017 Education / Research Goal

• Inaugural Emergency Medicine Residency class
• CU Nurse Practitioner clinical training integration
• Measuring the BMW Car Control School Effect
• Build out simulation center programming
• Build out of Patient Center Studio
• Suicide\ Emergency Behavioral Health exploration
Family Medicine

Irfan M. Asif, MD
Vice Chair of Academics
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Departmental Research/Education Focus Areas

FY 2016 Education/Research Accomplishments

1. Institute for Healthcare Improvement (IHI) Triple Aim
   - M.A.P. Hypertension Project (Hanlin, Egan, Davis, Asif)

2. Leadership
   - Faculty Development Curriculum (Wiederman, Asif)
   - Certificate of Physician Leadership Program (Tappert, Changamire, Bowers, Wiederman)

3. Lifestyle Medicine
   - Lifestyle Medicine Integrated into Medical Student, Resident, and Sports Medicine Fellowship Education (Trilk, Masocol, Emerson, Kennedy, Buchanan, Leclair, Elkhinder, Asif)
   - The Impact of Lifestyle Measures on Cardiometabolic Disease in GHS Employees (Asif, Ewing, Reid, Schwecke, Hale, Wiederman)

Key Education/Research Challenge

Training medical students and residents in an environment that prepares them for primary care of the future

FY 2017 Education/Research Goal

1. Institute for Healthcare Improvement (IHI) Triple Aim
   - Access: No Show Rate (Changamire, Horner, Olatosi, Russ-Sellers, Asif)
   - Quality: Resident Access to CCI Quality Reports?
   - GME Expansion (Cull, Asif)

2. Leadership
   - Vertical Training Model with Physician Leaders (Cull, Thames, Jindal, Asif)

3. Lifestyle Medicine
   - Exercise is Medicine Referrals to Community Partners (Trilk, Masocol)
   - The Impact of Lifestyle Measures on Cardiometabolic Disease in GHS Employees (Asif, Ewing, Reid, Schwecke, Hale, Wiederman)
Departmental Research/Education
Focus Areas
- Pregnancy Outcomes
- Infertility
- Full scope of Learners

FY 2016 Key Education / Research Accomplishment

- NIH
  - Centering
  - Endometrial Receptivity
  - MFMU sub site
- Team Based Approach to Resident Research
- Long-acting Reversible Contraception (LARC)

Key Education / Research Challenge

- NIH funding
- Maximizing the Clinical Learning Environment (CLE)

FY 2017 Education / Research Goal

- Maternal-Fetal Medicine Fellowship
- Maintain high educational quality with more learners
- Expand LARC
**Department of Orthopaedic Surgery**

Kyle J. Jeray, MD, Vice Chair of Academics

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kjeray@ghs.org

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**Departmental Research/Education Focus Areas**

- Comparative Effectiveness (SC Center for Effectiveness Research in Orthopaedics)
- Clinical and Patient-Reported Outcomes
  - Biomechanics/Biomaterials
- Prospective Randomized Clinical Trials
  - Gait analysis

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**FY 2016 Key Education / Research Accomplishment**

- Publication of “A Trial of Wound Irrigation in the Initial Management of Open Fracture Wounds” in NEJM

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**Key Education / Research Challenge**

- Funding (specifically for small clinical studies)
- Geriatric fracture care (osteoporosis)
- Evaluation of patient centered outcomes in orthopaedics

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**FY 2017 Education / Research Goal**

- Having every resident publish 1-2 papers/book chapters during their 5 years of residency
- At least 35 publications a year
- Continued and new collaboration with Clemson University
Department of Pathology
Jenny Knight, MD, Vice Chair of Academics
jknight@ghs.org
Office – (864)455-7735

**Departmental Education Focus Areas**

- Introduction to pathology and the medical laboratory for MedEx students and undergraduate students...established relationships with Furman, Clemson, and Bob Jones
  - Undergraduate forensic pathology internships through Clemson
    - M1/M2 education in the classroom
    - M3/M4 pathology elective rotation

**Departmental Research Focus Areas**

- Student summer research program
- Interdepartmental projects

**FY 2016 Key Education / Research Accomplishments**

- M2 Biomedical Sciences Faculty of the Year – James Fulcher, MD
- M1 Biomedical Sciences Faculty of the Year – Kirk Baston, MD
- Golden Peach Award for Excellence in M2 teaching – Kirk Baston, MD
- 23 undergraduate students through summer research program
  - 3 accepted publications this year, 3 additional submitted manuscripts
  - Greater than 200 total students to date
- Currently working with 6 medical students and 1 resident (OB/GYN)
- 13 open IRBs, all multidisciplinary

**Key Education / Research Challenge**

- Balancing clinical responsibilities with time for quality education and research in a small department

**FY 2017 Education / Research Goal**

- Increase medical student participation in summer research program
  - Shift from undergraduate predominant model to a model with medical student led teams of undergraduate students
- Expand student experience in the M3/M4 elective rotation
Departmental Research/Education Focus Areas

- Autism and related disabilities
- Eosinophilic Esophagitis
- Diabetes
- Drug exposed newborns
- Obesity
- Early child development
- Child Population Health
- Interprofessional leadership training

FY 2016 Key Education / Research Accomplishment

- Established Center for Childhood Neurotherapeutics (Endowed Chair in translational research in autism and related disabilities)
- Embedded Clemson Faculty Fellows in Gastroenterology, Endocrinology and Community Pediatrics
- Embedded Clemson Post Doc Fellow – Eosinophilic Esophagitis and Diabetes
- Funding to establish and study school-based health centers

Key Education / Research Challenge

- Developing infrastructure to enable access to consultation and support for faculty (especially junior faculty) in research design, biostatistics and publishing

FY 2017 Education / Research Goal

**Education**

- Maintain high caliber of education in Pediatric Residency program and Developmental-Behavioral Pediatrics Fellowship
- Increase research expertise and scholarly activity of fellows and residents
- Effectively serve increasing numbers of health profession trainees in our clinical learning environment

**Research**

- Expand research activities of Center for Childhood Neurotherapeutics
- Expand research in Eosinophilic Esophagitis and Diabetes
- Establish effective research structure to support studies in varied areas of Child Population Health through the Bradshaw Institute for Community Child Health and Advocacy
Psychiatry

Benjamin T. Griffeth, Vice Chair of Academics

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Departmental Research/Education Focus Areas

• Mental Health in the Community
• Psychiatry’s interface with the Emergency Department
  • Zero Suicide Initiatives
  • Medication Adherence
  • SBIRT

Mental Health Integration in Primary Care

FY 2016 Key Education / Research Accomplishment

• GHS Department of Psychiatry awarded the Patient-Centered Outcomes Research Institute (PCORI) Eugene Washington PCORI Engagement Awards
• The inaugural Southeastern Symposium on Mental Health co-sponsored by GHS/community partners and driven by GHS/Clemson Research faculty
• Collaboration with Emergency Medicine in identifying the needs of the mentally ill presenting to emergency rooms around the Upstate
• Original research focusing on the Emergency Department resulting in several national conference presentations and publications in high impact peered review journals
• Establishing the annual Research Showcase (3rd year)
• Establishing Monthly Research Group
• Bi-annual Grand Round

Key Education / Research Challenge

• Small Department with limited to no administrative support due to our size
• Psychiatry clinically focus (not focus on theoretical/bench research)
• Not motivated by grants/personal monetary gain. Tenure, or academic rank
• Success measured by practical solutions to problems/outcomes

FY 2017 Education / Research Goal

• Further refine our work with the Emergency Department and the issues of providing mental health care for the community of Greenville in such a fashion as to remove that burden from the emergency rooms of the Upstate.
• Through our research and embedded scholar, cultivate a culture of curiosity and commitment to excellence in research.
• Developed leadership that will focus on patient-centered outcomes, research, practice and policy in mental health.
• Enhance the care of patients through joint ventures, partnerships, academic and research collaborations.
Department of Surgery
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Departmental Research/Education Focus Areas

• Bariatric Surgery
• Management of Critical Limb Ischemia
• Vascular Access Surgery for Hemodialysis
• Surgical Simulation
• Bioengineering Solutions to Surgical Problems

FY 2016 Key Education/Research Accomplishment

• Achieved academic/scholarship balance through targeted hiring/on-boarding
• Developed productivity tracking process that places value on academic activities

Key Education / Research Challenge

• Providing adequate research support to young faculty for “home-grown” prospective research projects

FY 2017 Education / Research Goal

• Develop a new faculty academic productivity tracking model
• Obtain resources to support research activities for our faculty
Clemson University
Departmental Spotlights:
Health Researcher Sampler
Department of Bioengineering

Martine LaBerge
Professor and Chair; CUBEInC Executive Director
864-656-5557; laberge@clemson.edu

Featured New Health Research Faculty

Brian Booth, Ph.D.
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Tumor initiation and progression
Natural anticancer molecules

Renee Cottle, Ph.D.
rcottle@clemson.edu
Genome editing; Gene therapy
Metabolic diseases and blood disorders

William Richardson, Ph.D.
wricha4@clemson.edu
Cell-Matrix remodeling
Computational models Mechanobiology
Melinda Harman, PhD
harman2@clemson.edu

• Engineering research and training program focused on optimizing medical device designs for reprocessing and reuse and promoting medical device sustainability.
  • Medical device design for remanufacturing and reuse
  • Verification and validation of reprocessing protocols
  • Novel methods and materials for biofilm disruption
  • Research in cleaning, sterilization and re-packaging
  • Sustainability in healthcare
  • Medical Device Recycling and Reprocessing Certificate Program
• Helps healthcare providers enhance patient care by controlling supply costs and maintaining safety and quality control.
• Under the supervision of the Food & Drug Administration, Clemson University and RE-MED are creating a unique research and training program.

Naren Vyavahare, Ph.D. Director

• NIH Center of Biomedical Research Excellence
  • Novel cutting-edge research in tissue regeneration through cell-biomaterials interactions using distinctive biomaterials-based approaches.
• Targeted Projects:
  • Approaches to small molecule-based tissue engineering;
    Ann Foley, Ph.D. acfoley@clemson.edu
  • Targeted Nano-therapeutics for Neural Regeneration;
    Jeoung Soo Lee, Ph.D. ljspia@clemson.edu
  • Polymer Microarrays for Stem Cell Cardiac Differentiation;
    Ying Mei, Ph.D. mei@clemson.edu
  • Point of Care Regenerative Medicine: Rotator Cuff Engineering in the Operating Room;
    Jeremy Mercuri, Ph.D. jmercur@clemson.edu
  • Diabetes Resistant Vascular Graft Remodeling;
    Aggie Simionescu, Ph.D. Agneta@Clemson.edu
Electrical and Computer Engineering
Daniel Noneaker, PhD
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Featured Health Research Faculty

Adam Hoover, PhD
Ahoover@clemson.edu
Obesity, energy intake measurement, mHealth tools

K.C. Wang, PhD
Kwang@clemson.edu
Advancing computing and networking solutions for health IT, data analytics, mobile health

Richard Groff, PhD
Regroff@clemson.edu
Bio-printing systems and biomanufacturing

Pingshan Wang, PhD
Pwang@clemson.edu
Ultra-high sensitivity radio-frequency (RF) sensors for liquid biopsies

Goutam Koley, PhD
Gkoley@clemson.edu
Photoacoustic and photothermal detection of analytes

Hai Xiao, PhD
Haix@clemson.edu
Bio-sensing, optical bio-imaging, bio-instrumentation, single-cell analysis
RF Detectors
Pingshan Wang, pwang@Clemson.edu

- **RF Flow Cytometers**: detect and identify cells in body fluids
  - Disease diagnosis & prognosis: *label-free, high throughput and easy-to-use.*
- **RF LC detectors**: detect and identify DNAs and proteins in body fluids
  - Disease diagnosis & prognosis: *highly sensitive, universal and user friendly*
- **RF GC detectors**: detect and identify volatile organic chemicals (VOCs) of exhaled breath
  - Disease diagnosis: *easy-to-use*

A measurement setup

Bio-Photonics
Hai Xiao, haix@Clemson.edu

- **Biosensors**
  - Labor free detection of biological quantities
  - Single cell pH and temperature monitoring
  - Fiber optic sensors for distributed strain, temperature and pressure movement
- **Optical biomedical imaging and tomography**
  - Optical coherence tomography (OCT)
  - Photoacoustic imaging (PAT)
- **Biomechanics**
  - Additive manufacturing (3D printing) of smart bones and implants with embedded sensors
Wearable and implantable biosensors for physiological monitoring

Nanoscale Electronics and Research Laboratory (NESL)
Goutam Koley, gkoley@clemson.edu

Major research directions:

• Ion-sensitive Field Effect Transistors (ISFETs):
  Implantable ISFETs that are being developed at NESL have strong applications in sensing ion efflux (especially focused on K+ ions) from cells for prediction of epilepsy and heart attack. Arrays of ISFET sensors are also being developed for drug discovery applications, avoiding the issues with traditional methods such as patch clamp method. The sensors are made of graphene—a two dimensional material with ultra-high sensitivity to ionic surface adsorbates, where the ionic selectivity is provided by specific polymer coatings.

• Wearable sensors for volatile organic compound (VOC), particulates, and physiological parameters:
  The wearable sensors (as part of clothing or standalone devices) have applications in determining environmental safety for humans (special focus on infants) in terms of respiratory diseases, such as asthma. The sensing is being done using gallium nitride (GaN) based microelectromechanical devices.
  Polymer and flexible material based wearable/implantable sensors for physiological monitoring, i.e. blood pressure, temperature, and oxygen content are also being developed for continuous as well as pre/post surgical applications.
  Piezoelectric material based wearable energy harvesting devices capable of harvesting energy from body movement and body temperature are being developed to provide energy to the wearable sensor devices.
Materials Science and Engineering

Raj Bordia, Chair
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Featured Health Research Faculty

Raj Bordia
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Controlled porosity materials for tissue engineering and drug discovery

Olga Kuksenok
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Computational design of multicomponent, multifunctional biomimetic materials. Including responsive gels, and enzyme-polymers conjugates.

Fei Peng
FPENG@CLEMSON.EDU
Additive Manufacturing of Bio-Ceramics with Embedded Sensors

Ulf Schiller
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Computational Modeling, Flowing Matter, Soft Materials

Marek Urban
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Bio-active Polymeric Surfaces/Interfaces, Self-Repairing Materials
**Schiller Research Group**

**Simulation of vascular blood flow**
- Modeling patient specific geometries (e.g., 3D angiographic images)
- Segmentation and mapping to digital grid representation
- Lattice Boltzmann simulations of blood flow (HemeLB software)
- Variation of cardiac parameters (heart rate, blood pressure, ...)
- Extraction of velocity and wall shear stress
- Validation against Doppler echocardiography

**Kuksenok Research Group**

**Designing Thermostable Enzyme-Copolymer Conjugates**
Using computer simulations, we probe the behavior of the conjugated enzyme-copolymer complexes. The goal of the project is to design conjugated enzymes with highly increased thermostability. We are developing an integrated platform that includes both simulations and experimental studies (in collaboration with Prof. I. Luzinov (CU) and Prof. S. Minko (UGA)).

**Bordia Research Group**

**Hierarchical Anisotropic Porous Ceramics for Tissue Engineering**

Full control over the size, volume fraction and orientation of macro- and micro-scale porosity

**Peng Research Group**

**Joint Stress Characterization**

Use 3D printing system to fabricate patient-specific joint model with the highly sensitive, embedded strain sensors

**Urban Research Group**

**Bio-Active Polymeric Surface/Interfaces**
- Antimicrobial/Anticoagulant/Antifouling Properties
- Bacteriophages, Antibiotics

**Self Healing Polymeric implants**

Pearson et al., Biomacromolecules, 2013, 14 (5), pp 1257

Mathematical Sciences

Chris Cox, PhD
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Featured Health Research Faculty

Billy Bridges, PhD
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Design and analysis of surveys and experiments, applications of mixed models and causal analyses

Ling Ma, PhD
lingm@clemson.edu
Time-to-event data analysis, joint modeling of longitudinal and time-to-event data, statistical methods with application to reproductive and environmental epidemiology

Andrew Brown, PhD
ab7@clemson.edu
Bayesian statistics, neuroimaging data analysis, large-scale simultaneous inference, computer experiments, uncertainty quantification

Chris McMahan, PhD
mcmaha2@clemson.edu
Statistical computing, epidemiology/public health, and biomedical applications

Pat Gerard, PhD
pgerard@Clemson.edu
Director, Statistics and Mathematics Consulting Center. Statistics related to biomaterials, statistics for pharmaceutical applications

Julia Sharp, PhD
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Statistics and biostatistics applications
Psychology

Pat Raymark, PhD
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Featured Health Research Faculty

Thomas W. Britt, PhD
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Stress, Resilience, Treatment Seeking and Delivery

Marissa L. Shuffler, PhD
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Teamwork, Leadership, Organizational Effectiveness

James A. McCubbin, PhD
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Blood pressure, Coronary Heart Disease, Hypertension

Robert R. Sinclair, PhD
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Occupational Health, Positive Psychology, Stress

June J. Pilcher, PhD
j pilche@Clemson.edu
Stress, Fatigue, Sleep Deprivation, Exercise

Heidi M. Zinzow, PhD
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Trauma, Sexual Violence, Suicide, PTSD
Chair: David Eitle
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Featured Health Research Faculty

Catherine Mobley, PhD
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Community-based health care; health disparities; complementary/alternative medicine; environmental health; qualitative research methods, including in-depth interviews, focus groups, and content analysis

Ye Luo, PhD
yel@clemson.edu
Social determinants of health; aging and life course; sexual behavior and sexual health; health care in China; quantitative methods

Tamela Eitle, PhD
teitle@clemson.edu
Social determinants of health; race-based health disparities; quantitative methods; risky sexual behaviors

David Eitle, PhD
deitle@clemson.edu
Social and personal risk and protective factors predicting substance use/risky sexual behaviors; Social Contexts and substance use/risky sexual behaviors

Marissa Yingling, PhD, MSW
myingli@clemson.edu
Access to treatment among children with autism spectrum disorder; Early intensive behavioral intervention; Disparities in age of treatment onset and utilization
Faculty Scholars

As of press time, the following Clemson University Health Research Faculty serve as CUSHR Faculty Scholars. Although not inclusive of all Clemson Health Research Faculty, the list provides a sampler of potential collaborator opportunities.
College of Agriculture, Forestry and Life Sciences
Katherine Cason, PhD, RD, LD
Professor of Nutrition
Director of the Expanded Food and Nutrition Education Program (EFNEP)
Department of Food, Nutrition, and Packaging Sciences
864-723-4520
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Research Interests:
Food purchasing and preparation, food security among limited resource audiences, and examining the relationship between diet-related chronic diseases and dietary practices.

Katherine is transforming health care by training teachers to incorporate nutrition and physical activity education into classrooms. She, along with the Clemson University Expanded Food and Nutrition Education Program, has created an online training course that provides teachers with the strategies and tools to make wellness a part of classroom curriculum.

Susan Duckett, Ph.D.
Professor
Ernest L. Corley Jr. Trustees Endowed Chair
Department of Animal and Veterinary Science
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Research:
Explores how specific fatty acids alter lipogenesis and insulin resistance and how environmental toxins impact fetal growth and muscle development

As an Animal Scientist, Susan can provide expertise on the use of farm-animal models for human health research. Her current research efforts are examining: 1) how palmitoleic acid regulates lipogenesis and insulin resistance in obese sheep models, and 2) how dopamine agonists (ergovaline or ergot alkaloids) impact fetal growth and muscle development in gestating sheep. Palmitoleic (C16:1 cis-9) acid is proposed to function as a lipokine that regulates lipogenesis and glucose/insulin metabolism. They found that palmitoleic acid reduced lipogenesis and stimulated lipolysis when added to primary adipocytes. Using obese animal models, palmitoleic acid infusion reduced intramuscular lipogenesis and restored insulin sensitivity. This research established the basis for the proposed research and highlighted the uniqueness of this monounsaturated fatty acid, palmitoleic acid, to regulate glucose and lipid metabolism in vivo and restore insulin sensitivity in obese sheep. Ergot alkaloids are naturally occurring mycotoxins produced by endophytic fungi, Neotyphodium). Their main perennial forage, tall fescue (Festuca arundinaceum), contains ergot alkaloids. The ergoline ring structure of ergot alkaloids are structurally similar to dopamine and bind to D2 dopamine receptors eliciting a second messenger response similar to that of dopamine. She has shown that exposure to ergot alkaloids during gestation results in a lower birth weight (-36%) and reduced secondary muscle fiber formation. Currently, she has a USDA-NIFA grant, Impact of Fescue Toxicosis on Fetal Development and Postnatal Growth, to further evaluate the effects of ergot alkaloids on fetal growth and myomiRNAs involved in reduced secondary muscle fiber development.
Angela Fraser, Ph.D.
Associate Professor of Nutrition
Department of Food, Nutrition, and Packaging Sciences
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Research Interests:
Food, Foodborne Diseases, Food Service Environments, Food Service Operations, School Food Safety

Angela is aiming to research and prevent disease caused by human noroviruses. Human noroviruses sicken over 21 million Americans each year, making them the number 1 cause of acute gastroenteritis in the U.S. Human noroviruses, like most microbes that cause acute gastroenteritis, are nearly 100% preventable if one properly implements known preventive strategies. She is actively involved in several funded studies to design, deliver, and evaluate the effect of disease prevention interventions on reducing cases of acute gastroenteritis.

Vivian Haley-Zitlin, Ph.D., R.D.N., L.D.
Associate Professor of Nutrition
Department of Food, Nutrition, and Packaging Sciences
864-656-7716
vivianh@clemson.edu

Research Interests:
Type 2 diabetes, cardiovascular disease, obesity and metabolic syndrome and includes the inter-relatedness of these diseases

Vivian’s research works toward transforming the care and management of chronic disease with a focus on diabetes, CVD and obesity. She has been involved with research teams delivering diabetes education and care for several years. She is also assessing the impacts of the New National School Lunch Program Guidelines on childhood obesity.

Elliot D. Jesch, Ph.D.
Assistant Professor of Nutrition
Department of Food, Nutrition and Packaging Sciences
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Research Interests:
Examining the interaction of nutrition and exercise, effects of healthy lifestyle interventions on fitness and body composition

Elliot is working to transform healthcare by incorporating and evaluating the effectiveness of nutrition and physical activity interventions on cancer survivors through Greenville Health System’s Center for Integrative Oncology and Survivorship.
Dil Thavarajah, Ph.D.
Assistant Professor
Department of Agricultural and Environmental Sciences
dtharvar@Clemson.edu

Research Interests:
Micronutrient Malnutrition, Obesity, Gut Health, Prebiotic Carbohydrates, Food Systems, Selenium, Sustainable Agriculture

Dil is a passionate scientist seeking to understand the link between global food system and human health. As a result, she has established research programs on bio-fortification of pulse crops with micronutrients (minerals, carotenoids, and folates), and prebiotic carbohydrates to combat malnutrition, and obesity related non-communicable diseases. Recently, her research group has established animal models to determine what effects lentil prebiotic carbohydrates have on gastrointestinal health. Also, she has a greater desire to implement healthy food systems using home and community gardens, especially for low-income communities in South Carolina. The last five years of Dil’s research program data focused on pulses and vegetables, have been included in the USDA and FAO nutrient databases. In addition, her research papers, industry reports, and other communications have helped to position lentil as a sustainable whole food solution to micronutrient malnutrition. Dil’s group has assisted HarvestPlus and ICARDA to develop food solutions to reduce global micronutrient deficiencies.
College of Architecture, Arts and Humanities
David Allison, FAIA, FACHA  
Alumni Distinguished Professor of Architecture  
Director, Graduate Studies in Architecture and Health  
School of Architecture  
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adavid@clemson.edu  

Research Interests:  

David’s research and scholarship focuses on relationships between health and the built environment at many scales from communities to healthcare settings. His work in healthcare facilities is concerned with balancing how they can be designed to improve operational efficiency and effectiveness, improve health and health outcomes, improve patient, family and staff satisfaction and how they can accommodate changing needs over time. He initiated Clemson’s award winning collaborative Patient Room Prototype design initiative. He is working to transform health care by educating future design professionals who focus on the design of healthcare facilities and translating research into usable design knowledge for health environments. He is concerned with meeting the needs of patients, family, and staff and improving the quality care while minimizing operational costs, space, and resources in an ever-changing healthcare landscape.

Anjali Joseph, Ph.D., EDAC  
Endowed Chair in Architecture + Health Design and Research  
School of Architecture  
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Research Interests:  
Built Environment, Architecture, Health Facilities, Design, Population Health, Patient Safety, Health Care Quality  

Anjali’s research focuses on understanding the relationship between the built environment and health outcomes. She is interested in multidisciplinary approaches to improving patient safety in healthcare. Another area of focus is the role of the built environment in promoting population health. She collaborates extensively and builds relationships with healthcare organizations, architecture firms, and non-profit organizations.
Kelly C. Smith, Ph.D.
Associate Professor of Philosophy
Departments of Philosophy, Religion, Biological Sciences
864-650-1093
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Research Interests:
bioethics, ethics education and assessment, the relationship between religious faith and scientific reasoning, and theoretical issues in biology

Kelly’s diverse past research has included studies on the concept of genetic disease, the ethical implications of biotechnology and analyses of the evolution-creationism debate. His current work is focused on developing novel approaches to ethics education, studying the effects of mindfulness training on health care professionals, and investigating cognitive biases in ethical reasoning that affect the quality of services provided in a health care system.

Jillian Weise, Ph.D.
Associate Professor
Department of English
jweise@clemson.edu

Research Interests:
Affect, Bioethics, Biohacking, Biopolitics, Creative Writing, Cyborg, Disability Studies, Feminist Theory, Hybridity, Medical Ethics, Narrative Theory, Poetry, Prosthetics

The New York Times published Jillian’s essay, "Going Cyborg" in which she identifies as a cyborg. The name "cyborg" functions as description, rebellion and provocation. Cyborg accurately describes her computerized knee while pushing back against common signifiers for disability. Most cyborgs belong to science fiction, feminist theory or bio-politics. While theorists like Donna Haraway use the cyborg metaphor to argue for a politics beyond naturalism and essentialism, the use of cyborg-as-metaphor restricts cyborg identity. The theoretical imperative of scholars like Haraway, Fukuyama and Kaku is meant to be inclusive. Yet in culture and literature, the cyborg remains excluded from the realm of the human. By claiming the identity, she is trying to make room for common cyborgs.
College of Business
Scott Barkowski, Ph.D.
Assistant Professor of Economics
Department of Economics
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Research Interests:
Labor Economics, Health Economics, Applied Econometrics

Scott is working with a private medical group to transform health care by working to understand the effect of cost information on referral choices by primary care physicians.

Lawrence Fredendall, Ph.D.
Director, Institute of the Advancement of Health Care
Professor of Management
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Research Interests:
scheduling, interdepartmental coordination, implementing quality improvement, and using technology to improve quality and process flow in clinical and non-clinical departments

Larry was awarded an IAHC Seed Grant to work with Greenville Health System to develop information technology-assisted methods to improve patient flow in perioperative services. The technology he is researching will allow hands-free documentation of events during patient flow and promote coordination between different units of the hospital. This research is related to an NSF-funded project conducted in conjunction with Kevin Taaffe and Joel Greenstein in the Department of Industrial Engineering.
Christopher D. Hopkins, Ph.D.
Associate Professor
Department of Marketing
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Research Interests:
Print Ad Messaging, Smoking, Drinking and Driving, Texting and Driving, Teenage Promiscuity and the Transmission of Sexually Transmitted Diseases, Type II Diabetes
Christopher’s research is designed primarily to assess and determine the effectiveness of differing message content formats designed to augment public behavior; specifically, he is identifying print ad content that results in having a significant effect on reducing consumer’s intent to engage in such risking behaviors including smoking, drinking and driving, texting and driving, teenage promiscuity and the transmission of sexually transmitted diseases and Type II diabetes.

James A. McCubbin, Ph.D.
Professor of Psychology and Public Health Sciences
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Research Interests:
Blood Pressure, Coronary Heart Disease, Hypertension, Psychology, Stress, Emotions
Jim has been studying subtle changes in the central nervous system (CNS) that accompany the gradual rise in blood pressure in persons at risk for development of hypertension and coronary heart disease. Most recently, his work has shown that persons with elevated blood pressure have emotional dampening, a reduced recognition of emotional meaning in facial expressions and in text narratives. His research on the CNS origins of hypertension provides a better understanding of brain function in persons at risk for hypertension and may lead to improved therapeutic strategies to prevent hypertension and other diseases linked to our physiological, behavioral, emotional and cognitive responses to stress.

Kristin L. Scott, Ph.D.
Associate Professor of Management
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Research Interests:
Organizational Behavior, Mindfulness Training, Group Dynamics, Employee Rewards, Workplace, Workplace Exclusion
Kristin is working to improve well-being and turnover in critical care. To achieve this, she is conducting mindfulness training on critical care nurses.
College of Engineering, Computing and Applied Sciences
Emil Alexov, Ph.D.  
Professor of Biophysics and Bioinformatics  
Department of Physics and Astronomy  
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Research Interests:  
DelPhi, Genetics, DNA Sequencing, Electrostatics, Biophysics, Bioinformatics

Emil is working to advance personalized medicine and the molecular mechanisms of human disease in order to more effectively prevent diseases before they even happen. He and his research team look for how DNA variants and other factors affect diseases.

Mark Blenner, Ph.D.  
Assistant Professor of Chemical and Biomolecular Engineering  
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Research Interests:  
Protein Engineering, Metabolic Engineering, Biopharmaceuticals, Antibodies, Microbiome, Genomics

Improving Biologic Therapeutics: Biologic therapeutics requires high specificity, low off-target frequencies, and high stability. These properties are encoded into the sequence and structure of a protein; however, they have not understood these systems in enough detail to a priori design such therapeutics. To address this short-coming, the screening of mutants is required. His lab is pioneering methods that will enable highly efficient selection of novel properties, including targeting specificity. He is also developing novel antibody selection methods that utilize unusual post-translational modifications.

Improving Enzymes for Field Applications: Mark’s enzyme engineering work is aimed at making the use of enzymes more robust so that they can be deployed in field settings. His overall goal is to make enzymes less sensitive to environmental changes without sacrificing activity. This is accomplished through both rational and directed evolution methods. Applied to health, these more robust enzymes could serve field-deployable sensors or be used in harsh environments.

Rajendra Bordia, Ph.D.  
Chair and Professor  
Materials Science and Engineering Department  
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Research Interests:  
Porous Ceramics, Porous Metals, Hydroxyapatite, Water-Resistant Coatings, Anti-Bacterial, Anti-Fouling Coatings

Raj’s research interests are in the areas of processing and microstructure control in ceramics and metals. Two areas of current focus are relevant to biomedical technologies. The first one is on porous ceramics and metals for implantable devices and the other is on ceramic coatings for specific biological functionality.
Brian C. Dean, Ph.D.
Associate Professor
School of Computing
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Research Interests:
Computational Neuroscience, Bioinformatics, Genome-wide Association Studies, Data Mining, Machine Learning, Medical Imaging, Biological Modeling

Brian is currently involved in several projects that could have significant positive impact on health care; they are briefly summarized below:

• Novel algorithms for genome-wide association studies. He has recently developed sophisticated methods for localizing faults (e.g., “bugs”) in computer software. Exploiting the analogy between software and the human genome, he is now using these methods to perform genome-wide association studies, in which context a “bug” is a mutation that causes a malfunction in genomic execution.

• Developing automated tools for understanding epilepsy. In a long-term collaboration with neurologists at MUSC, he has developed a web-based platform, called EEGnet, for collection and analysis of expert opinion on diagnosing Epilepsy. To date, dozens of neurologists have used this platform to help us analyze data from hundreds of subjects. Goals of the project include: understanding human inter-rater reliability issues and construction of automated machine learning models for diagnosis of Epilepsy from EEG data.

• Network analysis of the human brain. In collaboration with researchers at MUSC, he has designed novel algorithmic methods for analyzing high-resolution network models of the human brain, derived from MRI data. Through analysis of both structural and functional brain networks, he hopes to understand connectivity patterns indicative of Autism, and how these relate to developmental changes in the brain.

John David DesJardins, Ph.D.
Robert B. and Susan B. Hambright Leadership Associate
Professor of Bioengineering
Director of the Laboratory of Orthopaedic Design and Engineering
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Research Interests:
Joint Replacement, Orthopaedic Implants, Cartilage Tribology, Biomaterials, Rehabilitation

John is working with orthopaedic surgeons at Greenville Health System to improve limb salvage through infection-preventing surface modifications of orthopedic fracture fixation implants. These orthopedic implants retard bacterial infection without inhibiting bone healing.
Sandra Eksioglu, Ph.D.
Associate Professor of Industrial Engineering
Department of Industrial Engineering
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Research Interests:
Operations Research, Supply Chain Optimization, Inventory Management

Sandra is working to transform the way the health care industry manages perishable products, such as pharmaceuticals, vaccines and blood that have limited shelf life. Currently, she is working with a student to develop a model that can be used by health care providers to identify vaccine vial size and reorder point with the goal of ensuring successful immunization of patients while minimizing purchasing, inventory, and wastage costs.

Joel Greenstein, Ph.D., CPE
Associate Professor of Industrial Engineering
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Research Interests:
Industrial Engineering, Human Factors, User-Centered Design, Computers, Mobile Technology

As part of an NSF grant, Joel is working with Larry Fredendall and Kevin Taaffe to improve patient flow in perioperative services at Greenville Health System by developing information technology to ease the process of documentation and facilitate coordination between various units at the hospital. He is also working on a project with Rae Cho for the GHS Management Engineering and Project Management Office to develop customized Lean Six Sigma instructional materials. In 2009-2010, he worked with the GHS Pharmacy on a project to map the processes and identify the potential errors involved in oral anti-coagulation therapy. He has also conducted research on the following health care applications:

Design of effective web-based public reports of healthcare quality for consumer use
Design of interfaces to engage patients in the process of providing informed consent
Design of a cognitive aid to present information on reversible causes of pulseless in-hospital cardiac arrest (with Matt McEvoy, Department of Anesthesiology, Vanderbilt University Hospital)
Melinda K. Harman, Ph.D.  
Assistant Professor  
Department of Bioengineering  
harman2@clemson.edu

The RE-MED lab, directed by Melinda, is located at the Clemson University Biomedical Engineering Innovation Campus (CUBEInC) in Greenville, South Carolina. The mission of RE-MED is to improve the safety and effectiveness of medical device technology, focusing on systematic assessments that foster biomedical innovation. RE-MED helps to extend Clemson’s healthcare impact by strengthening translational research activities and by engaging clinical professionals and industrial partners at this recognized biotechnology hub in the Upstate. Melinda’s research aims to evaluate medical device technology in various stages of development and under end-use diagnostic and treatment conditions. She seeks to transform healthcare treatments by challenging the existing paradigm that the properties of medical devices remain constant after long-term exposure to the human physiological environment. Her most enduring scientific achievements have been attained by establishing post-marketing surveillance of implanted medical devices and implementing experimental protocols to explore failure mechanisms, material properties and biocompatibility. The research outputs inform the development of pre-clinical bench tests that are capable of differentiating the performance of medical devices under clinically relevant conditions. This approach compliments strategic areas of regulatory science, as identified by the US Food and Drug Administration, to: 1) modernize biocompatibility/biological risk evaluation of device materials; 2) advance methods to predict clinical performance of medical devices; and 3) refine computer models and simulations to enhance the effectiveness of clinical studies.

Larry Hodges, Ph.D.  
Professor of Human-Centered Computing  
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Research Interests:  
Health Care Informatics, Computer, Virtual Reality, 3D, User Interface, Interactive Training, Computing

For more than two years, Larry’s team has been developing a game for post-stroke upper limb rehabilitation. At this point, they have completed an initial study with the Center for Rehabilitation Research in Neurological Conditions at the Medical University of South Carolina (MUSC) that showed significant improvements in patients with respect to upper limb functional ability and reduced compensatory movements when playing their game for one hour a day for five days in a clinic environment. The system is designed to be usable for the approximately 75 percent of patients with upper limb impairment who cannot practice basic reaching tasks (that they need to do to recover) due to the severity of their impairment and has been shown to increase repetitions to over 150/hour with no fatigue, pain or adverse effects. MUSC has agreed to fund a second study which will evaluate the game for in-home therapy. There are over 500,000 new stroke survivors in the U.S. each year who could benefit from this game.
Adam Hoover, Ph.D.
Associate Professor of Electrical and Computer Engineering
Department Electrical and Computer Engineering
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Research Interests:
Engineering, Computing, Computer, Electrical Engineering, Tracking, Embedded Systems, Obesity, Energy Intake, Automation, Sports Medicine, Bite Counter, Bite Technologies

Adam is working in mHealth, the practice of medicine and public health supported by mobile devices. His specific expertise is in tools that support the measurement of energy intake. New tools are needed for studies in obesity and related co-morbidities such as diabetes and for treatment of obesity and eating disorders. His tools help participants increase compliance with taking measurements, decrease underestimation bias, and provide a low-cost and low-burden alternative to traditional methods.

Amin Khademi, Ph.D.
Assistant Professor
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Research Interests:
Operations Research, Decision Processes, Dynamic Programming, Medical Decision Making

Amin works to develop models to aid decision and policy-makers in developing treatment and medical allocation strategies. His research helps decision-makers take multiple trade-offs and factors into account while also helping prioritize patients’ access to treatment. His research is even able to look into the future by helping decision-makers predict the impact of difference policies for health care challenges, such as HIV. Amin’s research supports and enables key decision-makers in health care to make informed, systematic decisions about impactful and complex health challenges.

Goutam Koley, Ph.D.
Professor
Department of Electrical and Computer Engineering
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Research Interests:
Smart Health, Telemedicine, Drug Discovery, Food Safety, Physiological Monitoring through Wearable Sensors

A major focus of Goutam’s research is at the interface of Nanotechnology and Bio-sensing, especially involving both implantable and wearable bio-sensors for measurement of internal and external physiological parameters. The measurement of these parameters are extremely important for various emerging health care needs especially in the areas of smart health, drug discovery and personalized medicine.
Eileen T. Kraemer, Ph.D.  
C. Tycho Howle Director  
School of Computing  
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Research Interests:  
User Interfaces, Tools, Visualization, Bioinformatics

Eileen’s research focuses on the intersection of humans and technology, with two major thrusts: human aspects of software development (CS education and software engineering) and human aspects of bioinformatics (design of tools and user interfaces for bioinformatics). The work on human aspects of bioinformatics has focused on the effective design of user interfaces and tools for bioinformatics, with applications to EuPathDB, a web-based database covering the eukaryotic pathogens in the genera Cryptosporidium, Giardia, Leishmania, Neospora, Plasmodium, Toxoplasma, Trichomonas and Trypanosoma.

Olga Kuksenok, Ph.D.  
Associate Professor  
Department of Materials Science and Engineering  
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Research Interests:  
Hydrogels, Biomimetic Materials, Hydrogels for Drug Delivery, Gel Composites, Volume Phase Transitions in Gels

Hydrogels are used in a variety of health-related applications, from gel-based drug delivery to hydrogels used to promote wound healing. Olga is interested in fundamental aspects of gel’s dynamics and their behavior as relevant to various aspects transforming health care.

Ethan Kung, Ph.D.  
Assistant Professor of Mechanical Engineering  
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Research Interests:  
Cardiovascular System, In-vitro Experimentation, Surgery, Medical Device Testing, Heart Disease, Computational Modeling, CFD, Physiology

Ethan’s research is transforming the way we investigate the cardiovascular system via the use of engineering methods. Through close clinical collaborations, his translational research integrates experimental and computational engineering tools to help advance cardiovascular medical devices, diagnostics and clinical procedures. Computational physiology models are used to predict systemic mechanisms affecting cardiovascular performance, 3D computational models enable the investigation of surgical procedures, and realistic experimental setups mimicking in-vivo conditions provide physical environments for direct testing of devices and procedures.
David Morgan Kwartowitz, Ph.D.
Professor of Bioengineering
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Research Interests:
Robotics, Image-Guided Surgery, Medical Imaging, Image Analysis

David is working with many clinical and research partners to transform health care in several ways. He is working with a team to develop novel techniques for the performance of image-guided surgery in the pediatric cath lab and to reduce the impact of fluoroscopy use on children born with congenital defects. He is also partnering with fellow researchers to work towards an in situ assessment of rotator cuff disease and progression based on non-invasive ultrasound and mechanical measurements that can be taken by a physical therapist at the bedside or out in the field. Additionally, he is exploring the use of high-performance networks for the real-time analysis and processing of images generated during laparoscopic surgery for better outcomes and navigation.

Martine LaBerge, Ph.D.
Professor and Chair
Department of Materials Science and Engineering
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Research Interests:
Bioengineering, Knee Implants, Joint Replacement, Tribology, Endovascular Stents, Orthopedics, Implant

Martine has numerous publications and is an inventor of several patents related to the design of orthopedic and vascular implants. Through her administrative positions, she has developed the Clemson Biomedical Engineering Innovation Campus (CUBEInC), devoted to the development of high-impact medical technology and treatments, as well as the South Carolina Translational Medical Technology Program (SCMedTransTech), a collaboration among the major universities and hospitals in the state aimed at developing clinically relevant medical technology.
The act of providing healthcare has impacts on the environment, resource use, energy, and air and water quality. A sustainable healthcare system not only improves patient outcomes at affordable costs, but should also minimize its impact on society and the environment. Amy has developed a research program in sustainable (i.e. environmental, economic, social) engineering of bioproducts and healthcare systems. Her research ranges from design of systems based on industrial ecology and byproduct synergies, life cycle and sustainability assessments of biopolymers and biofuels, and design and analysis of sustainable solutions for healthcare. Amy investigates the sustainability impacts of delivering healthcare and aims to identify ways to improve sustainability. Her work has quantified greenhouse gas emissions for hospitals, energy consumption (and savings) for hospitals, improved indoor air quality, waste reduction and a host of other projects that relate sustainability to healthcare delivery.

**Jeoung Soo Lee, Ph.D.**

**Assistant Professor**

**Department of Industrial Engineering**

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ljspia@clemson.edu

**Research Interests:**

Bioengineering, Drug Delivery, Gene Therapy, Targeting, Nanoparticles, Biomaterials, Colon, Crohn’s Disease, Colitis, Cancer, Spinal Cord Injury, Traumatic Brain Injury, Regenerative Medicine, Tissue Engineering

Jeoung Soo’s research focuses on the development of drug and gene delivery systems to alleviate pathological conditions and promote functional tissue regeneration through biomaterial-based synthesis, formulation, and delivery of therapeutic compounds. Her research focuses on the understanding of drug and gene delivery in biological systems and developing new therapeutics and biomaterials for the diagnosis and treatment of many diseases. She is currently working on developing drugs for targeted delivery to the colon to treat various colonic diseases such as Crohn’s disease, ulcerative colitis, and colorectal cancer. She is also investigating delivery strategies using polymeric nanoparticles to stimulate central nervous system regeneration after trauma or degenerative disease and to treat cancers such as drug-resistant breast cancer and brain and spinal tumor. Currently, she is collaborating with Michael Lynn (neurosurgeon), Robert Brown (head and neck surgeon), and Wendy R. Cornett (endocrine surgeon) in Greenville Health System.
Rodrigo Martinez-Duarte, Ph.D.
Assistant Professor of Mechanical Engineering
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rodrigm@clemson.edu

Research Interests:
Bioengineering, Biofabrication, Biomaterials, Pathogens, Infectious Disease, Biomedical Systems

Rodrigo’s lab, the Multiscale Manufacturing Laboratory, is currently conducting research involving detection of the cause of infection, bio-enabled nanomanufacturing, and advanced manufacturing of carbonaceous materials. The goal of his research is to provide innovative, practical applications of manufacturing technologies in healthcare systems.

Jiro Nagatomi, Ph.D.
Associate Professor of Bioengineering
Director of the Cell Mechanics and Mechanobiology Laboratory
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Research Interests:
Regenerative Medicine, Urology, Surgical Materials

Jiro is working with his research group on the regeneration of bladder tissue and the development of surgical tissue adhesive.
David Neyens, Ph.D. MPH
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Research Interests:
Industrial Engineering, Human Factors, Safety, Quality Improvement, Lean, Six Sigma, Statistics

David is completing several projects with quality management at GHS. These projects have research components and also quality improvement projects geared towards achieving GHS quality benchmarks. As a scholar within the Institute for the Advancement of Health Care (IAHC), he is expanding the relationship between IAHC with the Department of Industrial Engineering at Clemson and the Quality Management Department at GHS. In addition to working on research and quality improvement projects, David has developed and is managing the Quality and Patient Safety Internship Program at GHS for undergraduate and graduate students.

Fei Peng, Ph.D.
Assistant Professor
Department of Materials Science and Engineering
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Research Interests:
Smart Embedded Strain Sensors for Joint Replacement, Additive Manufacturing of Smart Bio-components Sensor Materials for Diagnosis and Health Monitoring Bioactive and Biocompatible Thin Film and Coatings, Sintering and Grain Growth High-Temperature Kinetics and Microstructure High-Temperature Ceramics

Fei is currently affiliated with SC-TRIMH. Fei’s current research projects focus upon the development of smart miniature biosensors to monitor tissue and device function in vivo. The goal is to systematically establish the customizable and quantifiable surgery protocols to prevent or minimize osteolysis progression, based on the highly sensitive, embedded strain sensors, patient-specific biomechanical modeling, and cadaver/animal validation. Fei has extensive collaborations with the members at SC-TRIMH on a number of research topics. He currently collaborates with Drs. John Tokish at GHS and Hai Xiao at Clemson, conducting research on joint replacement surgeries. Fei is working together with Dr. Jeryl Jones at Clemson on in vivo testing of implant materials with high-performance embedded sensors. He also jointly works with Dr. Monica Cayouette at MUSC on dental implant researches, and with Drs. Hai Yao and Guigen Zhang at Clemson on musculoskeletal simulation and modeling.
Vladimir Reukov, Ph.D.
Research Assistant Professor
Department of Bioengineering
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Research Interests:
Biomaterials, mHealth, Telemedicine, Oxidative Stress, Antioxidants, Atomic Force Microscopy, Near Infrared Imaging, Home Exercise Program

Vladimir is working closely with GHS Blue Ridge Orthopaedics on developing soft-tissue therapy for the management of musculoskeletal disorders like plantar fasciitis. He also leads four undergraduate student Creative Inquiry teams working on mobile health technologies and telemedicine, NIR imaging for patients with diabetes, developing Organic LEDs for biomedical applications, and designating large-scale educational model of Atomic Force Microscopy. Vladimir also serves as Chief Technology Officer of VRM Labs, Inc., a start-up company he co-founded in 2013, to pursue commercialization of the technology for production of antioxidants from animal sources for protection of lipids from rancidification.

William J. Richardson, Ph.D.
Assistant Professor
Department of Bioengineering
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Research Interests:
Biomechanics, Mechanobiology, Systems Biology, Fibrosis, Matrix Remodeling, Wound Healing, Computational Models, Precision Medicine

Mechanical loads are key regulators of tissue function in many disease conditions, including fibrosis - a growth and remodeling process characterized by excessive extracellular matrix accumulation. Controlling fibrotic remodeling offers broad and significant therapeutic opportunities for pathologies such as heart failure, musculoskeletal wound healing, pulmonary fibrosis, and others; however, this control will require understanding a complex system of cell and matrix processes including proliferation, differentiation, orientation, migration, matrix deposition, matrix degradation, and matrix reorganization, all of which can be highly mechanosensitive. Will’s lab is pursuing several projects that integrate computational and experimental models to better understand fibrotic mechanobiology and engineer novel technologies for controlling tissue fibrosis.
Sara Lu Riggs, Ph.D.
Assistant Professor of Industrial Engineering
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Research Interests:
Human Factors, Ergonomics, Display Design, Attention Management

Sara’s research looks to address data overload at various levels and units around the hospital. She is working to develop an efficient and effective way for one person to monitor the vitals of all patients in areas within a unit or level within the hospital.

Jorge I. Rodríguez-Dévora, Ph.D.
Research Assistant Professor
Department of Bioengineering
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Research Interests:
Cancer, Biofabrication, Dispensing Technologies, Microfluidics and Perfusion Systems, Medical Product Design

Jorge has worked to transform health care through the development of novel medical devices in collaboration with clinicians at the Greenville Health System. He has worked with undergraduate students at the senior and freshman level for the development of novel medical devices and technologies in collaboration with GHS. He is also developing a program to develop medical-assisted devices for the disabled in partnership with GHS.

Ilya Safro, Ph.D.
Assistant Professor
School of Computing
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Research Interests:
Networks, Network Science, Modeling, Graph Theory, Data Mining, Algorithms, Scientific Computing, Modeling, High-Performance Computing, Computing

Ilya is interested in applying mathematical methods for predictive modeling of complex systems, including bio-systems, large groups of people, communities, infections, and diseases. His recent projects in collaboration with national labs include optimal models and fast computational methods for response to epidemics and infection spread. Ilya is collaborating with GHS on machine learning and data mining projects. Some of his projects in drug design industry included machine learning methods for bio-medical data analysis and text analysis of bio-medical literature.
Ulf D. Schiller, Ph.D.

Assistant Professor
Department of Materials Science and Engineering
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Research Interests:
Computational Biomedicine, Modeling and Simulation, Hematology and hemodynamics, Blood-flow in Brain Arteries, Modeling of Stented Arteries, Transport in Bone Tissue, Modeling of Bone Implants

Computational biomedicine is a burgeoning area of multidisciplinary research concerned with computer-based modeling and simulation of physiological systems. It aims at advancing clinical practice through computational science applied to human health. The continuing growth of supercomputing facilities along with the development of efficient computational capabilities is expected to transform health science and clinical practice by supporting predictive, preventive, personalized and participatory medicine. Ulf’s research focuses on modeling and simulation of physiological fluids such as blood or interstitial fluid. Flow is essential for the transport of nutrients and drugs, and flow dynamics is connected to cell mechanics and signaling in the surrounding tissue. Ulf’s research group addresses two major systems of interest. In the cardiovascular system, the dynamics of blood flow in brain arteries is known to be a major factor affecting the risk of aneurysm formation and rupture, a primary cause of adult disability. He uses patient specific models of cerebral arteries to simulate the flow properties and extract quantitative indicators (e.g., wall shear stress) that can support clinical diagnosis and decision-making. In the musculoskeletal system, flow of interstitial fluid is vital to maintain the organ function of bones. Ulf studies how external loads induce fluid motion that transports nutrients and waste products through porous bone tissue and artificial replacements. The aim is to understand the influence of the porous geometry on the flow, which can be used to optimize scaffold structures used in tissue engineering and to improve drug delivery to the tissue.

Kevin Taaffe, Ph.D.

Associate Professor
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Research Interests:

Kevin was awarded an IAHC Seed Grant to work with Greenville Health System to develop information technology-assisted methods to improve patient flow in perioperative services. The technology he is researching will allow hands-free documentation of events during patient flow and promote coordination between different units of the hospital. This research is related to an NSF-funded project conducted in conjunction with Larry Fredendall in the Management Department and Joel Greenstein in the Department of Industrial Engineering.
According to the World Health Organization, in 2012 there were about 450,000 new cases of multidrug-resistant tuberculosis reported in 92 countries. Staph infections caused by staphylococcus bacteria can turn deadly if the bacteria invade deeper into the body, thereby entering the bloodstream, joints, bones, lungs or heart. Unfortunately, an alarming number of otherwise healthy people develop life-threatening staph infections that often lead to death.

While hospitals are being penalized for improper sterilization procedures and the overuse of antibiotics, the real question is whether enough research is being conducted to eliminate these problems at its inception, before large doses of drugs are administered in an attempt to save human lives. Marek's plans are to develop materials that will coat surgical tools, catheters or implants, any devices, and kill bacteria on contact. Unfortunately, the general perception is that infections are not associated with specific diseases and very often occur under most unpredictable conditions. He proposes to develop robust surfaces and interfaces that will be activated upon sensing an infection. Since these approaches require multi-investigator teams, through this collaboration, he will be able to integrate various talents across the state and form inter-institutional partnerships and tackle these critical issues.

**Research Interests:**

Antimicrobial Surfaces, Self-healing Materials, Stimuli-responsive Materials, Applications of Thereof

Narendra Vyavahare, Ph.D.

Hunter Endowed Chair
Professor
Department of Bioengineering
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Naren has a broad background in cardiovascular disease pathology, biomaterials, and animal models for cardiovascular applications, with specific training and expertise in cardiovascular implants and targeted therapies. He has made major contributions to heart valve implants and one of the treatments that he researched to prevent calcification of heart valves is now clinically used. He also has made contributions to understanding the mechanisms of vascular calcification, and showed that matrix metalloproteinases are involved in elastin specific vascular calcification and elastin degradation in aortic aneurysms. His current research includes finding site-specific therapies to stabilize vascular structures so as to prevent or reverse calcification and aortic aneurysms. Naren has developed novel nanoparticles that can target drugs to disease sites in cardiovascular and pulmonary tissues.
Kuang-Ching Wang, Ph.D.
Associate Professor
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Research Interests:
Computing, Networking, Data, Security, Analytics

Kuang-Ching’s research is centered on advanced cyber-infrastructure, including software-defined infrastructure, cloud computing, and data-intensive computing. His research aims at realizing a future computing paradigm that is highly customized, seamlessly automated, and effectively connects people to insights in different application contexts. In health care, his focus is on creation of the technology foundations that will allow rich varieties of data (clinical, social, environmental, demographical) to be flexibly collected, disseminated, computed, and presented to aid individuals, societies, and policy bodies to make decisions that promote better health. Kuang-Ching’s recent NSF projects, from GENI to CloudLab to US Ignite; collectively are creating a national computing infrastructure that enables highly programmable applications from the Internet edge (personal devices, Internet of Things, smart cities and buildings) to the core (cloud data centers and data repositories). Kuang-Ching’s research will transform the health care practice, connecting patients to doctors, rich knowledge, and medical services via advanced and secure compute, network, and data infrastructure.

Hai Xiao, Ph.D.
Samuel Lewis Bell Distinguished Professor of Electrical and Computer Engineering
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Research Interests:
Bio-sensing, Bio-instrument, Biomedical Imaging, Single-cell Analysis

Hai’s healthcare-related research mainly focuses on bio-sensing and optical bio-imaging. His work on miniaturized sensors and advanced instrumentation has resulted in various tools for effective diagnosis and treatment of various diseases. Examples include the most recent ultra-small fiber probes for single-cell analysis in a niche environment, the common-path needlescope OCT probes, all-in-fiber microfluidics and optofluidics for in situ analyzing biosamples, and sensor-embedded smart implants. In addition, Hai is actively collaborating with researchers and clinicians to translate the fundamental research in bio-sensing and bio-imaging into clinics.
Hai Yao, Ph.D.

Professor of Bioengineering
Interim Director, Clemson-MUSC Bioengineering Program
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Research Interests:
Mechanobiology, Orthopaedics, Tissue Regeneration, Molecular Transport, Biomechanics

Hai’s Tissue Biomechanics Laboratory brings together the principles of biomechanics and biology and approaches research at multiscale levels, from the whole body to single cells, to provide new perspectives on skeletal tissue degeneration and regeneration processes. Much of his research focuses on Temporomandibular joint disorders (TMJD), which currently impact 35 million people in the United States yet remain poorly understood. In order to address TMJDs with early diagnoses and management methods, research into the pathophysiology of TMJ disc degeneration is needed. Hai is working to develop a novel measuring system that can lead to the ability to identify bio-indicators of TMJ disorders, allowing for early clinical diagnosis of these disorders. His group is also working to establish a multi-institutional TMJ research network.

Tong Ye, Ph.D.

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Research Interests:
Cardiology, Endoscopy, Arthritis, Pathology

Collaborating with clinicians and biologists, Tong and his lab are working on imaging problems that are raised from diagnostics and treatment of cardiovascular and musculoskeletal disorders.
College of Behavioral, Social and Health Sciences
Thomas W. Britt, Ph.D.
Professor of Psychology
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Research Interests:
Psychology, Stress, Resilience, Treatment Seeking, Treatment Delivery, Mental Health

Thomas received a three-year grant from the Department of Defense in 2010 to examine the determinants of mental health treatment seeking among military personnel, and to develop training that would change the unit climate associated with the receipt of needed treatment. A well-documented finding among the U.S. population is that many individuals with mental illness fail to seek treatment that could improve their quality of life and productivity. Thomas' research examines the barriers and facilitators of individuals seeking needed mental health treatment, and the development of interventions to promote the timely receipt of treatment seeking. His research highlights the importance of changing the mechanisms for delivering effective mental health treatments in order to reach large numbers of individuals in need.

Liwei Chen, M.D., Ph.D.
Assistant Professor of Public Health Sciences
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Research Interests:
Maternal and Children’s Health, Obesity, Hypertension, Diabetes, Cardiovascular Diseases, Nutrition

Liwei is specifically interested in research in the following areas: diet and nutrition in relation to chronic diseases, dietary approaches as a means to prevent and manage chronic diseases, optimal strategies for improving maternal and children’s health, systematic reviews and meta-analysis for evidence-based medicine, comparative Effectiveness Research (CER), and Electronic Health Information/Electronic Medical Records (EHI/EMR).

Stephanie Davis, Ph.D.
Associate Professor of Nursing
Graduate Coordinator of Nursing
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Research Interests:
Quality of Life with Breast Cancer, Body Image, Sexuality, Social Support, Women’s Health

Stephanie works to transform health care by improving the quality of life for breast cancer patients and survivors. Her research works to understand breast cancer’s impact on its victims on a holistic level. She considers the different factors of the complex disease, including body image, social networks, and sexuality.
Nicole Davis, Ph.D., AGPCNP-BC, GNP-BC

Assistant Professor
Nursing
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Research Interests:
Aging, Elderly, Incontinence, Telehealth, Technology, Family Caregiver Support

Nicole’s research is transforming healthcare by developing innovative ways to reach chronically ill, care-dependent elders, with a particular focus on caregiver support for the management of urinary incontinence. Urinary incontinence is a highly prevalent and burdensome condition affecting frail elders and their family caregivers. Unfortunately, many of these caregivers lack the necessary information to appropriately care for their loved ones’ chronic illnesses and feel ill-prepared to carry out their duties. As the US population rapidly ages and healthcare continues to shift towards the home environment, the burdens and needs of community-dwelling elders and their caregivers will increase exponentially. Nicole’s research focuses on exploring non-traditional, innovative methods to improve caregiver and care-recipient access to evidence-based interventions that improve their quality of life and optimize outcomes. Her doctoral research, which was funded by the John A. Hartford Foundation’s National Hartford Centers of Gerontological Nursing Excellence Award Program, focused on the development and pilot testing of an innovative, evidence-based, multicomponent behavioral intervention to support older adults with urinary incontinence and their informal caregivers, delivered via mobile technology.

Lori Dickes, Ph.D.

Program Coordinator, MPA Program
Assistant Director, S.C. Water Resources Center
Assistant Professor, Strom Thurmond Institute
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Research Interests:
Public Policy, Economic Incentives, Socioeconomics, Economic and Community Development, Health Policy

Lori’s research strives to understand economic incentives and costs related to public health initiatives in areas like immunization, food security analysis, and social and health issues like obesity. She is also working in collaboration with a joint Greenville Health System and Clemson research team to study neonatal abstinence. She is also currently involved in a pilot study to understand the impact of social and cultural messaging on weight management programs.
Cheryl Dye, Ph.D.
Professor of Public Health Sciences
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Research Interests:
Public Health, Aging, Older Adults, Health Coaches, Health Promotion, Alzheimer’s, Dementia, Caregivers, Family, Community, Lifestyle, Engagement, Quality of Life, Population Health

Cheryl is working with the Institute for Success in Aging at Greenville Health System to research the effect that exposures to environmental stimuli such as music and images may have on cognitive ability, engagement, and dementia-related disordered behavior among patients with Alzheimer’s Disease and Related Disorders (ADRD). The research is not only focused on enhancing the quality of life for those diagnosed with ADRD but their caregivers as well. She is also developing health coaching models for older adults with GHS providers.

Ron Gimbel, Ph.D.
Chair and Associate Professor
Department of Public Health Sciences
864-656-1969
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Research Interests:
Health Informatics, Mobile Health, Clinical Decision-Making, Patient Safety, Quality of Care, Evidence-Based Medicine, Clinical and Translational Science

Ron is transforming health care through mobile health technology. He is actively engaged in research aimed at enhancing active living of chronic diabetes patients. He is also striving to use clinical decision support technology to aid physicians in clinical decision-making around medical imaging to reduce radiation exposure and improve the ordering of advanced medical imaging.

Sarah Griffin, Ph.D.
Associate Professor of Public Health Sciences
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Research Interests:
Childhood Obesity Prevention, School Health, Health Disparities, Community-based Intervention Effectiveness, Population Health, Obesity

Sarah is working to assess the effectiveness of primary prevention or health management. Two of her current projects are community-based prevention efforts in predominately rural South Carolina.
William Haller, Ph.D.
Associate Professor of Sociology
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Research Interests:
Disparities, Race, Ethnicity, Immigration, Assimilation, Culture, Demography, Public Health, Population Health

William’s current research focuses on public health issues pertaining to the Spanish-speaking immigrant population. He is currently conducting research on outreach efforts to extend health care coverage and services to Upstate South Carolina’s growing Hispanic communities. His health research interests are particularly to improve the cross-cultural communication issues central to patient adherence to early stage type 2 diabetes treatment.

Brent Hawkins, Ph.D., L.R.T./C.T.R.S.
Assistant Professor of Recreational Therapy
Department of Parks, Recreation, and Tourism Management
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Research Interests:
Therapy, Rehabilitation, Outcomes, Military, Veterans, Recreation, Sport, Disability, Injury, Reintegration, Health Promotion, Health, Mixed Methods

Brent’s research investigates the rehabilitative and transitional needs of civilians and military veterans who have disabling conditions. His research informs the development of rehabilitative interventions and programs designed to restore and promote functioning and health. For example, he has completed a series of studies investigating the barriers and facilitators of community reintegration for military veterans with physical and psychological injuries. These studies have been used by governmentally funded (e.g., Veterans Affairs) and non-profit agencies (e.g., R4 Alliance organizations) to develop or improve their rehabilitative and transitional services. His research also evaluates the effectiveness of rehabilitative interventions and programs. He has completed many outcome-based studies including, but not limited to, a cost-effectiveness analysis of therapies provided in in-patient spinal cord injury rehabilitation, effects of a recreation-based camp on family functioning for veterans and their families, effects of a yoga therapy intervention on individuals with Parkinson’s Disease, and the effects of equine-assisted therapy on children with Autism Spectrum Disorder. These studies have helped to inform the use of these therapies and programs on distinct target populations. His research impacts the agency in which the studies were conducted as well as contributes to the empirical literature that informs other evidence-based programs.
Karyn Jones, Ph.D.
Associate Professor of Communication Studies
Director, Graduate Health Communication Certificate
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Research Interests:
Health Communication, Disability Studies, Media Effects

Karyn is transforming health care by examining the ways in which we communicate about health and wellness. Her most recent projects include qualitative research on perceived roles, responsibilities, communication, and social support among families of children with multiple disabilities and quantitative research on public communication about health.

Robin Kowalski, Ph.D.
Professor of Psychology
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Research Interests:
Psychology, Bullying, Cyberbullying, Sibling, Courage, Sports Psychology, Organ Donation, Cervical Cancer, Cancer Screening, Women’s Health, Mental Health

Robin is on the forefront of research investigating bullying and cyberbullying. Her research focuses on factors leading to bullying, aversive interpersonal behaviors such as teasing and complaining, and bullying prevention and intervention efforts. She also conducts research in the area of sports psychology and has previously studied organ donation and cervical cancer screening.

Ye Luo, Ph.D.
Associate Professor
Department of Sociology and Anthropology
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Research Interests:
Social Determinants of Health, Aging, Life Course

Ye’s research examines how life transitions in old age, such as retirement, grandparenting, living arrangements, and life events (e.g., elder abuse) affect the well-being of older adults. She then strives to understand how social services and social support at the individual, family, community and societal levels modify these relationships.
Rachel Mayo, Ph.D.
Professor of Public Health Sciences
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Research Interests:
Women’s Health, Cancer Prevention and Control, Health Disparities, Latino Health, Minority Health, International Health, Cultural Competence in Health Care, Population Health

One example of how Rachel is striving to transform health care is through a focus evaluation of Neonatal Abstinence Syndrome. She has served as the Clemson primary investigator for a collaborative project with Greenville Health System studying the cost, safety and efficacy of a palliative approach to treating narcotic dependent newborns.

Eric Muth, Ph.D.
Professor of Psychology
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Research Interests:
Psychology, Obesity, Weight Loss, Sports Medicine, Bite Counter, Bite Technologies, Eating, Motion Sickness, Stress

Eric’s current research focuses on weight loss interventions and the treatment of obesity. Along with Adam Hoover in the Department of Electrical and Computer Engineering, he developed the Bite Counter, a wrist-worn device that tracks when the wearer has taken a bite of food.

Stephanie M. Pangborn, Ph.D.
Assistant Professor
Department of Communication
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Research Interests:
Aging, Hospice, Dementia, Community, Resiliency, Creativity

Guided by a rich appreciation of the artful, storied ways we experience life and relationships, Stephanie’s work highlights the communicative capacities waiting to be realized by the unwavering pursuit of possibility. Her specific focus on creative approaches to living well amidst the inherent challenges imposed by life-altering diagnoses has enabled her to join with individuals, families, and health professionals in the creative pursuit of cultivating caring communities. Through her work, she continually strives to challenge deficit perspectives of illness and difference, fiercely imagining and working to construct realities that enable individuals and relationships to thrive, even amidst life’s inherent uncertainty, fragility, and vulnerability.
Veronica G. Parker, Ph.D.
Professor of Nursing
Director, Center for Health Disparities
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Research Interests:
Obesity, Health Risk Assessments, Mood and Anxiety Disorders, Diabetes, Community,
Community-Based Intervention Effectiveness, African-American Health

Veronica is the Principal Investigator in the LIFE project, developed by the Outreach Core of the EXPORT Center. The project is a collaboration between Clemson University, Voorhees College, and South Carolina churches, community members, and organizations. It is a nutrition and physical activity intervention initiative that focuses on African American women in rural areas of SC.

June J. Pilcher, Ph.D.
Alumni Distinguished Professor of Psychology
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Research Interests:
Psychology, Stress, Fatigue, Sleep, Sleep Deprivation, Sleep Habits, Shiftwork, Exercise

June is interested in a broad range of research topics related to stress and fatigue. She has published a number of sleep deprivation studies simulating night-shift work to study how working at night affects performance and well-being. She also studies the effects of good and poor sleep habits on performance, health and well-being. June is interested in establishing a research collaboration to examine sleep habits and sleep loss in health care settings. She is interested in examining sleep in health care givers as well as the patients. Her newest research venture includes using FitDesks (stationary bikes with a desktop) to help people be active while completing necessary work. June is starting a collaborative venture using the FitDesks with the USC School of Medicine in Greenville and would be interested in research collaborative efforts in other health care settings at GHS. Imagine, for example, FitDesks in every waiting room in addition to the standard seating. Would people enjoy using the FitDesks while they wait? June’s expertise can help inform hospitals and provide a unique perspective in better understanding how sleep and activity affects our daily functioning, a crucial aspect of hospital operations.

Ellen Granberg, Ph.D.
Associate Provost of Faculty Affairs
Associate Professor of Sociology
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Research Interests:
Sociology, Obesity, Weight Loss, Mental Health, Discrimination, Social Status, Aging, Older Adults

Ellen has experience researching social and emotional factors that influence weight loss maintenance success. She has studied participation in weight loss organizations and is interested in expanding her focus to include clinical populations. She is also interested in research that could result in patient education or intervention programs designed to improve weight loss maintenance success.
Rosanne H. Pruitt, Ph.D.
Professor of Nursing
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Research Interests:
Community Health Nursing, Family Nurse Practitioner, Health Policy

Rosanne is transforming health care through her research and collaboration with Clemson University’s Sullivan Center and the Best Chance Network. The Best Chance Network aims to reduce mortality from breast and cervical cancer among medically underserved women in South Carolina.

Marieke Van Puymbroeck, Ph.D., CTRS, FDRT
Associate Professor of Parks, Recreation and Tourism Management
Recreational Therapy Coordinator
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Research Interests:
Disabilities, Neurological Impairments, Complementary and Alternative Medicine, Intervention Research, Rehabilitation

Marieke’s research focuses on yoga as a therapeutic intervention for individuals with chronic disease and disability, including individuals with chronic stroke, breast cancer survivors, and older adults with a fear of falling. She is currently working on a project with partners at the Roger C. Peace Rehabilitation Hospital focusing on yoga for people with Parkinson’s disease.

Windsor Westbrook Sherrill, Ph.D.
Professor of Public Health Sciences
Associate Vice President for Health Research, Clemson University
Chief Science Officer, Greenville Health System
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Research Interests:
Health Services Evaluation, Medical Education, Health Disparities, Health Administration, Finance and Policy, Survey Research, Health Policy, Population Health

Windsor is transforming health care by facilitating research collaborations between Clemson’s health research faculty and health care professionals through her joint administrative roles at Clemson University and Greenville Health System. She also currently serves as an investigator on several collaborative health research projects between Clemson and GHS: establishment of an accountable communities population health management initiative (Duke Endowment); evaluation of the uninsured in SC (BCBS Foundation of SC); establishing a patient engagement research studio; and evaluation of the MAIN palliative approach for treatment of newborns with neonatal abstinence syndrome (funded by SC DHHS).
Dorothy L. Schmalz, Ph.D.

Associate Professor
Department of Parks, Recreation, and Tourism Management
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Research Interests:
Leisure Behavior, Obesity, Health Prevention, Quality of Life and Wellbeing, Stereotype and Stigma, Physical Activity, Eating Behavior

As a Ph.D. in leisure behavior, Dorothy’s research offers a unique and little pursued perspective within the health fields. Though often reduced to “free time” in common lexicon, leisure encompasses much more among leisure scholars. Countless proposed definitions can be summarized into leisure as “unobligated time, away from work, personal maintenance, evaluation and judgment, during which freely chosen and intrinsically motivated activities, both active and passive; social and solitary, are pursued for enjoyment and relaxation toward achieving a state of mind that supports rejuvenation, and contributes to overall quality of life, health, and wellbeing. 1” It is widely accepted that we currently live in a society in which stress and anxiety are contributing to increased frequency of insomnia, unhealthy eating and exercise, obesity, depression, and reduced overall quality of life. Attitudes toward, and participation in leisure has the potential to change the current direction of these chronic personal and social debilities. By collaborating with faculty and practitioners in the health fields, her research provides a valuable perspective that uses enjoyment and self-determination as a vehicle for health. To date, Dorothy’s agenda has focused on people with obesity, and identifying the stigmas they face that prohibit behavior change. As a CUSHR Faculty Scholar, she welcomes opportunities to apply the leisure perspective to existing and future research efforts toward the goal of identifying successful health prevention and treatment.

Lu Shi, Ph.D.

Assistant Professor of Public Health Sciences
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Research Interests:
Population Health Simulation, Mindfulness-Based Intervention, Behavioral Economics

Lu is currently working to transform care through mindfulness-based therapies.
Marissa Shuffler, Ph.D.
Assistant Professor of Psychology
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Research Interests:
Psychology, Teamwork, Leadership, Organizational Effectiveness, Team Training

Marissa’s research on what makes leaders and teams effective has important implications for the medical field where effective leadership and teamwork directly impact the quality of health care delivery and patient care. She is currently working with GHS to explore issues of conscious leadership and its impact on the climate and culture of health care organizations, and to assess the factors that impact successful interprofessional health care collaboration. Further, she is working with colleagues in emergency management to address the needs of multiteam systems operating to care for patients as they transition from first responder care to hospital care. Marissa has actively worked to translate best practices, recommendations and guidelines for team and leadership development from current training and research programs in aviation, medicine and the military. She has published these guidelines and associated research in over 30 peer-reviewed journal publications/book chapters and given over 70 presentations to academic and professional audiences around the world.

Robert Sinclair, Ph.D.
Professor of Psychology
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Research Interests:
Psychology, Industrial/Organizational, Occupational Health, Nursing, Positive Psychology, Stress, Work, Workplace, Retention

Bob’s health care research focuses on how nurses’ work experiences influence their physical health and psychological well-being. Since 2008, he has led a research team called the Oregon Nurse Retention Project, a research team involving researchers from Clemson University, Portland State University, the Oregon Nurses Association, George Mason University, and Indiana University-Purdue University at Indianapolis. The overall purpose of this research program is to better understand how nurses’ work experiences influence their occupational health and their desires to remain in the nursing profession. His recent work in this area addresses a wide range of topics including workplace conflict, financial stress, death anxiety, burnout, family-supportive workplaces, work schedules, stress management, and organizational climate. One innovative aspect of his research concerns his team’s focus on positive workplace experiences and resilience. While much research in this area has focused on the negative and stressful aspects of nursing, Bob’s team has been investigating the personal qualities of nurses and the positive aspects of nursing work that help promote nurses’ positive health outcomes. This research identifies factors that help maximize nurses’ work engagement, organizational commitment, and psychological well-being.
Mary Beth Wilson Steck, Ph.D., FNP, BC  
Assistant Professor of Nursing  
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Research Interests:  
Public Health, Health Services, Medical Sociology, Epidemiology, Substance Abuse, Disability Services, Health Policy, Bioethics, Population Health  

Mary Beth is working to develop awareness of the Genetic Information Nondiscrimination Act of 2008 (GINA) among health care professionals. She is currently measuring awareness of genetic discrimination and GINA in advanced practice nurses. Her future research includes researching candidate genes for development of seizures in adolescents with autism spectrum disorder.

Shirley M. Timmons, Ph.D., R.N., C.N.E.  
Associate Professor of Nursing  
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Research Interests:  
Health Disparities, African-American Health, Faith-Based Health Programs, Population and Community Health  

Shirley works in collaboration with GHS clinical researchers in the Center for Integrative Oncology and Survivorship Cancer Institute to help low-income breast cancer survivors through stress reduction therapy. She is also working with an embedded scholar to develop and evaluate self-management for health in chronic conditions. She is currently principal investigator of a funded research project to develop a dynamic population model of hypertension and stroke-related interventions using micro-simulation.

Margaret Ann Wetsel, Ph.D., CNS  
Associate Professor of Nursing  
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Research Interests:  
Nutrition, Limited Nutrition, Poverty, ADD, Food Stamps  

Margaret is the Principal Investigator in research with the Supplemental Nutrition Assistance (SNAP) Outreach Community-University Partnership Program.
Jasmine A. Townsend, Ph.D., C.T.R.S.
Assistant Professor
Recreational Therapy
Department of Parks, Recreation, and Tourism Management
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Research Interests:
Family Well-being, Family Leisure Involvement, Military Families, Community Reintegration, Family Reintegration

The U.S. is seeing an increase in the number of military service members returning from deployments with life changing psychological and physical injuries. Current healthcare services are struggling to meet the needs of military service members. Standard treatments for the signature injuries (PTSD and TBI) from our current wars primarily focus on pharmaceutical and psycho-therapies. Many service members are turning to alternative and complementary approaches to their treatments. One complementary treatment approach, recreational therapy, has been used for decades to help individuals with disabilities recover from injuries, as well as learn to be active participants in their lives, regardless of their functioning levels. In the last 5-10 years, there has been an explosion of recreation-based programs that serve military service members and their families. Very few of these programs are evidence-based or conduct any sort of program or outcome evaluation. Jasmine’s research is aimed at helping to determine the outcomes associated with participation in these programs, with the intention of determining best practices for providing recreation-based treatment services to injured military service members.

Melinda Weathers, Ph.D.
Assistant Professor of Communication Studies
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Research Interests:
Health, Communication, Digital Abuse, Dating Relationships, Interpersonal violence, Women’s Health

Digital dating abuse is a problem of increasing magnitude in the United States. The Centers for Disease Control and Prevention (2011) define digital abuse as “any type of harassment or bullying by a significant other that occurs through e-mail, chat rooms, instant messaging, websites [including social networking sites and blogs], or text messaging.” Research suggests that one in four young people report being victims of this type of abuse (Family Violence Prevention Fund, 2009).

Consistent with other forms of abuse (e.g., physical, sexual, or psychological abuse), digital dating abuse can also have harmful effects on victims’ health. A recent study indicates that there is an association between digital abuse and mental health in particular (Gatti, 2009). Consequences may include increased stress, emotional distress, depressive symptoms, suicidal ideation or suicide attempts, frequent serious or chronic illness, decreased relational satisfaction, and lower levels of perceive power (Dutton & Painter, 1993; Marshall, 1996; O’Leary, 1999).

Despite the tremendous amount of research on abuse over the past two decades, studies of digital abuse in samples of abused women are few. Little integrative work has been done with this population; much of the research that does exist in populations of abused women has been descriptive in nature. Melinda’s research begins to address some of the issues in digitally abusive relationships. She is currently working on projects to assess women’s coping strategies in response to digital abuse in romantic relationships, and projects examining the effects of health campaign messages that target digitally abused women.
Katherine Weisensee, Ph.D.
Associate Professor of Anthropology
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Research Interests:
Morphology, Skeletal Biology, Forensics, Human Remains, Morphometrics, Osteology, Anatomy

Katherine is working with a collaborative research team to investigate innovative methods for estimating the postmortem interval in human skeletal remains recovered from a forensic context through the examination of the decomposition process in bone under varying environmental conditions. She is also investigating craniofacial fluctuating asymmetry as a marker of developmental stress using geometric morphometric methods.

John Whitcomb, Ph.D., R.N., C.C.R.N., F.C.C.M.
Associate Professor of Nursing
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Research Interests:
Critical Care, Resuscitative Outcomes Post Cardiac Arrest, Delirium, Ethics, Leadership, Military Nursing, End of Life

John’s program of research consists of adult critical care in areas or resuscitative outcomes post cardiac arrest, delirium, and neuro assessment. Over the years, based on the outcomes of research conducted, his research has translated to policy and procedure changes within large academic healthcare settings. One example, based on findings from a cardiac arrest studies, protocols and approach to care during emergencies were changed that improved access and outcomes. Currently, John is preparing a retrospective study at GHS looking at the outcomes of therapeutic hypothermia post cardiac arrest. He has participated in many studies at GHS.

Heidi M. Zinzow, Ph.D.
Associate Professor of Psychology
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Research Interests:
Trauma, Sexual Violence, Suicide, Posttraumatic Stress Disorder, Depression, Military Personnel, Service Use, Intervention Research

Heidi is conducting health-related research in the following areas: 1) implementing and evaluating a comprehensive campus suicide prevention program; 2) facilitating mental health treatment-seeking in military personnel; 3) identifying risk factors for trauma-related mental and physical health outcomes; and 4) evaluating and improving clinical interventions for trauma-exposed populations. Her work will inform methods to reduce barriers to care, as well as tailor healthcare to maximize efficacy with at-risk populations.
College of Science
Jeffrey Anker, Ph.D.
Associate Professor
Chemistry and Bioengineering Department
janker@clemson.edu

Research Interests:
Medical Imaging Radiography, Biofilm Detection, Spectroscopy, Chemical Sensors, Biomechanical Sensors, Smart Medical Implants, Orthopedic Devices

Jeffrey is developing novel sensors and imaging techniques to monitor fracture healing in order to determine when it is safe to bear weight, and to detect and monitor infections adjacent to orthopedic plates. He also has expertise in magnetic nanoparticle synthesis and imaging, Raman spectroscopy, plasmonic nanoparticles, X-ray imaging and X-ray excited optical luminescence.

Dev P. Arya, Ph.D.
Professor of Chemistry
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Research Interests:
Antibacterial Drugs, Anticancer Drugs, Ribosome Binding Drugs, Transcription Factor Inhibition, miRNA Targeted Drugs

For the past 16 years, Dev’s laboratory has conducted synthesis, physical and structural studies of natural and designed drug candidates that are capable of binding to nucleic acids and proteins. These studies are important to both fundamental understanding of macromolecule recognition and to drug development. Based on the information gained from fundamental studies of molecular recognition and supramolecular chemistry, new drug analogues have been synthesized to exhibit altered binding properties with desired biological effects. Ongoing projects have combined areas of synthetic organic chemistry, physical organic chemistry, biochemistry, pharmacology, and molecular and cell biology. The interdisciplinary nature of these projects has allowed leads in antimicrobial, anticancer and HIV targeted therapies, as described in his patents and publications.

Lisa Bain, Ph.D.
Professor
Biological Sciences and the Environmental Toxicology Graduate Program
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Research Interests:
Arsenic, Metals, Toxicology, Xenobiotics, Stem Cells, Neurons, Muscle Cells, Cellular Differentiation, Fish As Model Species

Lisa’s research aims to better the understanding of why arsenic-exposed populations are at increased risk of defects in muscle and neuronal development, such as low birth weight, altered locomotion and reduced neuronal function. She hopes that this will aid in making rational decisions about specific time periods in pregnancy to avoid or reduce exposure to products potentially contaminated with arsenic. Finally, she will be to understand whether the effects of an early life exposure to arsenic are permanent, or if recovery later in life can occur.
Weiguo Cao, Ph.D.
Professor of Biochemistry
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Research Interests:
DNA Repair, Nitrosative Stress, Enzymes, Genetics

DNA is constantly assaulted by stresses that damage its building blocks. Damage to DNA can cause mutations resulting in various diseases. Weiguo is working to further the understanding of DNA repair and its ability to evolve to repair different types of DNA damage. DNA mutation and repair and DNA methylation status are related to cancer, mental retardation and other diseases.

Susan Chapman, Ph.D.
Associate Professor of Biological Sciences
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Research Interests:
Cell Biology, Developmental Biology, Embryology, Genetics, Genomics, Morphogenesis, Organogenesis, Patterning.
Congenital Diseases studied including Hearing and Deafness, Spinal Dysmorphogenesis, X-linked Autism Spectrum Disorders.

Susan’s lab is working to prevent birth defects by studying mechanisms of development in early embryos, including zebrafish, chicken and mouse. She has worked to better understand the developmental defects in newborns through the study of conductive hearing loss (FGF signaling) and caudal spine dysmorphogenesis (Araucana rumpless phenotype). She is currently using zebrafish as a novel model organism to perform high throughput screening to efficiently identify drug hits that can then be quickly moved to mouse studies and phase I clinical trials.

Elena Dimitrova, Ph.D.
Associate Professor of Mathematical Sciences
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Research Interests:
Systems Biology, Reverse-engineering, Discrete Models of Biochemical Networks, Computational Algebra, Polynomial Maps over Finite Fields

Elena is working on a multidisciplinary research team that is studying how to delineate the shared and unique features of the response to tissue damage by ischemia/reperfusion injury in disparate tissues in mouse models and human patient samples.
Feng Ding, Ph.D.
Assistant Professor of Biophysics
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Research Interests:
Molecular Modeling, Structural Bioinformatics, Protein Misfolding Diseases, Amyloid Diseases, Type-II Diabetes, Drug Design, Nanomedicine

Feng’s research and scholarship focuses on understanding the disease mechanisms at the molecular level. The mechanistic insights obtained by combining molecular modeling with experimental validation and characterization will help design therapeutic strategies in a cost-effective manner. The research effort to understand physicochemical determinations of interactions between nanoparticles and biomolecules will help advance applications of nanomedicine in health care, including therapeutics, diagnostic, drug delivery and imaging.

Zhicheng Dou, Ph.D.
Assistant Professor of Biological Sciences
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Research Interests:
Infectious Disease, Parasitology, Lysosome, Protease, Cell Biology, Toxoplasmosis, Toxoplasma gondii

Toxoplasma gondii is one of the most successful parasites on the earth, infecting nearly one-third of the global human population. The infection can cause severe diseases affecting the eyes, brain, and heart of the people with a weakened immune system, such as AIDS patients and pregnant women. As an obligate intracellular parasite, the Toxoplasma parasite has to ingest nutrients from host cells to support its intracellular replication. Zhicheng has recently revealed that the Toxoplasma parasite ingests host cytosolic proteins and digests them in its digestive organelle. His work will expand the understanding of nutrient acquisition and utilization in Toxoplasma parasites and identify potential therapeutic targets to prevent and toxoplasmosis.

David M. Feliciano, Ph.D.
Assistant Professor of Biological Sciences
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Research Interests:
Cerebrocortical Development, Neural Stem Cells, Intercellular Transport of InRNA and miRNA, Embryonic Development, Neurobiology

David is striving to understand how neural stem cells coordinate brain growth. Factors effecting brain growth have the potential to be leveraged in the development of therapeutic interventions for neurological disorders. His research is transforming health care by examining brain growth and other neurological processes that will help us further understand the etiology of neurological disorders, such as the epilepsy and autism spectrum disorders.
Nanomaterials, materials with sizes or features ranging from 1 to 100 nm in one or more dimensions, are the core of an emerging technological revolution. The main advantages of these materials are unique thermal, mechanical, electronic, and biological properties not found in conventional materials. Combining these properties with their remarkable recognition capabilities has resulted in analytical systems with significantly improved performance and novel applications across physics, chemistry, biology, and engineering. Although a number of nanomaterials have been used in conjunction with traditional separation techniques, the small volumes and low analysis time offered by microfluidic devices represent an open field for innovation with unique opportunities in terms of research and training. Owing to these opportunities, his group is interested in the development, characterization, and application of novel analytical strategies combining nanomaterials, electrochemistry, and microfluidics; in particular those that could provide significant advantages for biomedical research.

Cheryl’s research focus is on the role of glycolysis in growth and infection in Entamoeba histolytica. This eukaryotic pathogen is the causative agent of ameobic dysentery and infects 500 million people annually resulting in an estimated 50 million cases of invasive disease and approximately 100,000 deaths.

Research Interests:
Pathogens, Infectious Disease

James Culvin Morris, Ph.D.
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Research Interests:
Infectious Disease, Parasitology, Pathogens, Glucose Metabolism, Hexokinase, Protozoan Parasites, Trypanosoma, Plasmodium
Meredith Morris, Ph.D.
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Research Interests:
Molecular Parasitology, Peroxisomes, Glycosomes, Drug Development

Meredith’s work will elucidate basic cellular processes that are essential to parasite survival and can be exploited in therapeutic regimens.

Ramakrishna Podila, Ph.D.
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Research Interests:
Biophysics, Nanoparticles, Cancer Screening, Drug Delivery, In-vitro Experimentation, Safety

Rama is transforming healthcare with the development of smartphone-based nano-biosensors, which facilitate rapid diagnosis without long waiting times. For instance, his recent demonstration of a palsmonic tuberculosis sensor can detect a single bacterium within an hour compared to the traditional waiting time of days. This significantly reduces the in-patient time and allows for immediate treatment. His lab is also developing new multiphoton probes based on ZnO nanoparticles for cancer imaging. These ZnO nanoprobes use three-photon long wavelength absorption and infrared emission to provide high-resolution imaging with higher penetration depths non-invasively. Lastly, his lab is also identifying fundamental mechanisms of nanotoxicity to alleviate adverse physiological response and make personalized nanomedicine a reality.

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Research Interests:
Biophysics, Nanoparticles, Cancer Screening, Drug Delivery, In-vitro Experimentation, Safety

The advancement of nanotechnology applications in many fields such as health care, energy, and transportation relies on the resolution of the potential toxicity of ENMs to living organisms and the environment. For instance, there are more than 40 nanopharmaceuticals in routine clinical use and many more nano-products for cancer treatment are in the pipeline for approval. Despite concerted research efforts in nanotoxicity, there is still a wide gap in the understanding of ENM interactions with living organisms. His research focus at Clemson is elucidating the fundamental interactions between nanomaterials and biomolecules. This research will ultimately help the bench-to-bedside transition of nanomedicine.
Hugo Sanabria, Ph.D.
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Research Interests:
Protein Misfolding Diseases, Synaptic Plasticity, Protein Structure, Protein Dynamics, Single-molecule Fluorescence Spectroscopy

Hugo’s scholarship and research at the molecular level gives insight into the mechanism of biomolecular interactions and regulation of synaptic proteins. His novel imaging methodologies help visualize and understand how synaptic transmission occurs through receptors and signaling proteins. His research helps to alleviate the excruciating cost of treatment and prevention of neurological disorders. It is known that the more than 1,000 neurological disorders, directly connected to synaptic transmission, are the lead cause of hospitalizations and lost of productivity in USA. They surpass other diseases including heart disease and cancer. In the U.S. alone, there are more than 50 million Americans with neurological diseases with a projected treatment cost of $500 billion dollars. Therefore, advances in the understanding of the nervous system, and more precisely of synaptic biology, could elucidate treatments of neurological diseases.

Michael Sehorn, Ph.D.
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Research Interests:
Protein Biochemistry, Structure Function Relations, DNA Repair, Genome Stability

Michael is striving to understand how to maintain genome stability. His research focus is on homologous recombination and DNA double-strand break repair in eukaryotes, a process critical to maintaining genome stability. The Rad51 recombinase is central to the repair of DNA double-strand breaks through its homologous DNA pairing and strand exchange activities. Accessory proteins regulate Rad51-mediated repair of DNA double-strand breaks. Michael uses a combination of biochemical, biophysical and genetic approaches to delineate the mechanism of Rad51 directed repair of DNA double-strand breaks in the yeast Saccharomyces cerevisiae, eukaryotic pathogen Entamoeba histolytica and humans.
Julia L. Sharp, Ph.D.
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Research Interests:
(Bio)Statistics, Experimental and Study Design, Quality Improvement, Quality Assessment

Julia collaborates with many researchers in the health sciences at Clemson University and Greenville Health System (GHS). She has developed relationships with medical professionals in Anesthesiology at GHS on the statistical analyses of quality outcomes and multi-modal pain management studies. Additionally, she is involved in broadening the relationship between faculty and students in the Clemson University Mathematical Sciences Statistics & Mathematics Consulting Center and researchers at GHS.

Kerry S. Smith, Ph.D.
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Research Interests:
Pathogens, Infectious Disease, Fungal Pathogenesis, Metabolism, Protein Structure-Function, Enzymes, Enzymology

Kerry is striving to transform the way Cryptococcus neogformans, the most frequent cause of fungal meningitis, is understood and treated. He is working to understand the role of acetate production and evolution in C. neoformans in metabolism and infection.

Lesly Temesvari, Ph.D.
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Research Interests:
Infectious Disease, Parasitology, Cell Biology, Amoebic Dysentery, Entamoeba histolytica

Lesly is striving to understand the molecular and cellular mechanisms regulating virulence in the human protozoan parasite, Entamoeba histolytica. E. histolytica is a food- and water-borne intestinal parasite responsible for amoebic dystentry and amoebic liver abscess, and is prevalent in underdeveloped countries lacking proper sanitation practices. Infection caused by this parasite is especially common in communities that do not have access to clean water. Lesly’s research focuses on the stress response in the parasite and parasite-host interactions.
The aim of Endre’s medical physics research program is to investigate and develop advanced radiosurgery techniques and to further the understanding of how radiation interacts with biological matter. Stereotactic radiosurgery (SRS) is a form of external beam radiation that combines multiple finely collimated radiation beams and stereotaxy (3D target localization). The multiple radiation beams intersect to deliver a single, precise, high dose of radiation to a precisely defined location, while minimizing radiation exposure to surrounding tissues. Current exiting SRS technologies are based on three types of radiation sources: particle beam accelerators, electron acceleration generated photon beams, and Co-60 radioisotope based gamma beam systems. In realizing the ultimate goal of maximizing dose concentration within the treated volume and minimizing radiation to surrounding normal tissue, his aim is to investigate different treatment head designs, beam configurations, and irradiation procedures, both experimentally and using modeling techniques. Studies have shown that chemical and biological processes resulting from radiation interactions affect biological tissue in significant ways. The accumulated dose of radiation in cells can be calculated with Monte Carlo simulation software that was initially developed for particle physics applications at CERN. With the use of the modeling package called GEANT4, his group models the energy and spatial distribution of the primary radiation and secondary cascade processes. In collaboration between the Department of Physics and Astronomy and the Department of Bioengineering at Clemson University, Endre compares this data to experimental results and correlate cellular effects with the received dose.

Yanzhang (Charlie) Wei, Ph.D.
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Research Interests:
Cancer, Immunotherapy, Gene Therapy, Cell Biology

Charlie is developing novel therapies for cancer through the engagement of the immune system with the modern molecular and cellular biology approaches.
In recent years, a significant increase in gallbladder surgeries has been observed. This has become a very common abdominal disease, with an estimated prevalence of 10-15% in the adult population. Especially among young adults (< 20 years), the increase of gallbladder problems has been dramatic. Most gallbladder diseases are linked to the formation of cholesterol precipitates in the form of gallstones or biliary sludge. A number of both genetic as well as environmental factors have been attributed to the development of gallbladder disease. Recent studies have revealed that the functioning of a trans-membrane transporter (MDR3) plays a key role in the development of gallstones. This membrane pump in hepatocytes is responsible for the excretion of phospholipids into the bile. Together with bile salts these phospholipids keep cholesterol in solution and thus avoid the formation of cholesterol deposits. In some gallbladder patients, the gene for MDR3 is mutated, which results in less phospholipids being excreted. In addition, steroid hormones appear to be playing a role in the formation of gallstones. Pregnant women, and women using synthetic hormone therapies are more prone to development of gallstones. Peter hypothesizes that hormone-like compounds, in the form of synthetic hormones or environmental pollutants, play a role in the increase of gallbladder disease. Higher levels of hormone mimicking compounds in food items may explain the observed correlation between gallbladder disease and poor dietary habits in young adults. Peter is studying whether patients who undergo gallbladder surgery have a higher level of hormone-like compounds in their bile, and if this correlates with lower levels of phospholipids and bile salts. The results of this study will further the knowledge of the underlying mechanisms that are causing the observed increases in gallbladder diseases.

**Research Interests:**

Toxicology, Gastroenterology, Hepatology, Epidemiology, Enzymology, Biotransformation, Detoxification Pathways

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**Modi Wetzler, Ph.D.**

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**Research Interests:**

Creatine Transporter Deficiency, Rett Syndrome, Peptide Hormones, Endoscope Sterilization, MRI Contrast Agents, Radiopharmaceuticals

Intellectual disability has historically been “brushed under the rug” socially and has received far less rigorous scientific attention than other disorders. Medically speaking, the treatment of intellectual disability has focused on managing symptoms instead of remediating the cause. In the case of creatine transporter deficiency, South Carolina holds a strong advantage with Dr. Charles Schwartz at the GGC having identified the responsible mutation and leading research on this disease for fifteen years. Analogs of creatine that can cross the blood-brain barrier despite a non-functional creatine transporter protein could overcome the underlying cause of this intellectual disability disorder. This approach has been demonstrated as feasible in mice with a single therapeutic candidate that has not been improved upon in the past fifty years. The potential for this collaboration between Modi, a chemist making novel analogs of creatine to cross the blood-brain barrier; Dr. Chapman, a developmental biologist capable of evaluating these analogs in cells and zebrafish; and Dr. Schwartz, who can develop test systems from cells of patients with the actual mutation to improve health care for these patients, was originally recognized and funded by the Self Research Foundation. Recently, an extension of this collaboration was funded by the National Institutes of Health, with additional collaborators: Drs. Brian Dominy (Chemistry) and Kevin Champaigne (GGC).