THE UNIVERSITY of TENNESSEE CHATTANOOGA

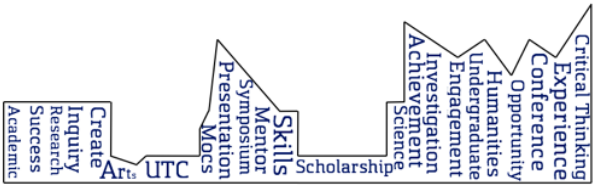
RESEARCH DIALOGUES 2016

FACULTY SHOWCASE EVENTS

UTC UNIVERSITY CENTER & LIBRARY

APRIL 14, 2016

12 P.M. – 7 P.M.



UTC Research Dialogues 2016

UTC Research Dialogues 2016

Faculty Showcase Schedule of Events

12 p.m. – 1:30 p.m.

Council of Scholars Research Panel Discussion

Listed on page 4

UC Chickamauga Room

2 p.m. – 5 p.m.

Research Elevator Speech Competition

Listed on pages 5-22

UC Raccoon Mountain Room

2 p.m. – 5 p.m.

Poster & Display Presentations

Listed on pages 23-49

UC Chattanooga Room

5 p.m. – 7 p.m.

Faculty Reception

Listed on page 50

Library 4th Floor

UTC Research Dialogues 2016

Council of Scholars Research Panel Discussion

University Center • Chickamauga Room

Why Do I Research?

Panelists will briefly discuss their approach to research and why they consider it essential to the university.

Dr. Talia Welsh
Moderator
Philosophy & Religion

Dr. Tim Gaudin
Biological & Environmental Sciences

Dr. David Levine
Physical Therapy

Dr. Lyn Miles
Sociology, Anthropology, & Geography

Dr. Lisa Burke-Smalley
Management

Mr. Earl Braggs
English

UTC Research Dialogues 2016

Faculty Elevator Speech Competition

2 p.m. – 5 p.m.

University Center • Raccoon Mountain Room

Schedule of Events

2:10 p.m. – 2:40 p.m.

Social Sciences Panel

Listed on pages 8-10

2:10 – Mr. Takeo Suzuki
2:15 – Mr. Jonathan Brocco
2:20 – Dr. Amanda Clark
2:25 – Dr. Jill Shelton
2:30 – Dr. Morgan Cooley
2:35 – Dr. Michelle Deardorff

2:45 – 3:25 p.m.

STEM Panel

Listed on pages 11-14

2:45 – Dr. Don Reising
2:50 – Dr. Jennifer Boyd
2:55 – Dr. Daniel Loveless
3:00 – Dr. Hope Klug
3:05 – Dr. Hinsdale Bernard
3:10 – Dr. Bryan Ennis
3:15 – Dr. Mbaki Onyango
3:20 – Dr. Loren Hayes

SCHEDULE OF EVENTS CONT.

3:35 – 4:40 p.m.

HEALTH PANEL

Listed on pages 15-21

3:35 – Dr. Kate Rocklein Kemplin
3:40 – Dr. Jamie Harvey
3:45 – Dr. Shirleen Chase
3:50 – Dr. Shewanee Howard-Baptiste
3:55 – Dr. David Giles
4:00 – Drs. Dana Moody & Jessica Etheredge
4:05 – Dr. Andrew Bailey
4:10 – Dr. Carrie Baker
4:15 – Dr. Mina Sartipi
4:20 – Dr. Sumith Gunasekera
4:25 – Dr. Henry Spratt
4:30 – Dr. Gary Wilkerson
4:35 – Dr. Elgin Andrews

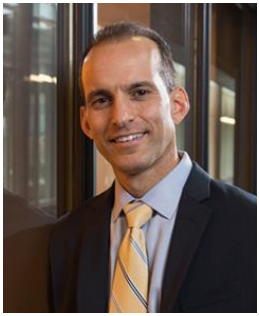
4:45 – 4:55 p.m.

ARTS & HUMANITIES PANEL

Listed on pages 21-22

4:45 – Dr. Talia Welsh
4:50 – Drs. Jennifer Beech & Matt Guy

MEET THE JUDGES



Dr. Richard Brown
UTC Vice Chancellor for Finance, Operations, & Information Technology

Ms. Robin Posey
Community Foundation of Greater Chattanooga Director of Programs

Mr. Kirk Englehardt
UTC Vice Chancellor for Marketing

Ms. Mary Kilbride
Community Volunteer Extraordinaire

Mr. David Steele
Chamber of Commerce VP of Policy and Education

Ms. Kristina Montague
JumpFund Managing Partner

Dr. Stacey Patterson
UT Research Foundation Associate Vice President

SOCIAL SCIENCES PANEL

Mr. Takeo Suzuki – *Does Global Education Matter to You?* According to Open Doors (2013), 886,052 international students studied at US colleges and universities, and 283,332 US students studied abroad for academic credit. Among them, 53% studied in Europe, 16% in Central and South America, and 12% in Asia. The number of international students studying in the US grew by 8% over the prior year and is now a record high. As a new executive director of international programs at UTC, my presentation will share how globalizing our campus will benefit UTC students' life and faculty research, and advance UTC to the next level through the proposed program and initiative.

Mr. Jonathan Brocco, M.Ed. – *The Future of UTC:* How can we shape the future of our city and University now? Easy! Engage the future, our Chattanooga children. College Knowledge, Now! is a post-secondary awareness initiative that educates elementary students about future options. Not only do students come to UTC to learn what they can do, but also the steps it takes to make their dreams reality. In alignment with Chattanooga 2.0, UTC's Strategic Plan, and the Drive to 55 movement, CK, Now! helps prepare our youth for the road ahead. Our work is quantitatively evaluated by teachers and school counselors, and qualitatively evaluated by the children themselves.

Dr. Amanda Clark – *Self-Esteem and Attention to Idealized Relationship Portrayals on Facebook* - Relational social comparison involves comparing one's own relationship to others. Facebook posts often represents the most positive characteristics of relationships; presenting an idealized view of normal relationships. We employed eye-tracking technology to determine if people with low self-esteem evaluate their relationships more negatively after exposure to idealized relationship portrayals on Facebook. Our results indicate that those with low self-esteem negatively evaluate their relationship after viewing idealized relationships and that they spent more time viewing that idealized content. This suggests that self-esteem affects what one posts to Facebook but also how one engages in day-to-day life after viewing Facebook content.

Dr. Jill Shelton – *Improving Prospective Memory in Healthy Older Adults and Very Mild Alzheimer's Disease Patients* - Remembering to complete one's goals (referred to as prospective memory) plays a critical role in everyday life, and prospective memory errors can lead to serious consequences. Prospective memory deficits are particularly prevalent in Alzheimer's disease patients. It is, therefore, important to develop effective strategies to enhance this ability. Our research demonstrated that a simple behavioral strategy was effective in minimizing prospective memory errors in both healthy older adults and patients in the early stages of Alzheimer's disease.

Dr. Morgan Cooley - *Foster Parent Experiences: Stories of Complexity within the Child Welfare System* - Foster caregivers are faced with multiple demands when it comes to providing care for foster children. The purpose of this study was to examine current and former foster parents and their experiences within the child welfare system in order to better understand what their unique experience has been. Three overarching themes were identified: concerns about the complexity of the child welfare system, personal narratives that highlight the complexity in the system, and means of navigating complex experiences within the child welfare system. Implications for foster parent training, support, and intervention will be presented.

Dr. Michelle D. Deardorff - *Pregnancy Discrimination and the American Worker* - The percentage of women in the American labor force exceeds 57%, and many are pregnant while working. However, few analyses have explored how law mediates conflict between workplace expectations and the realities of pregnancy. This presentation explores how the federal courts have addressed the two primary federal statutory protections found in the Pregnancy Discrimination Act and the Americans with Disabilities Act. While pregnancy discrimination has been litigated under both, these laws establish different forms of equality. Drawing from their unique database of 1,112 cases, Deardorff and Dahl discuss how courts have addressed pregnancy through these two different approaches to equality.

STEM PANEL

Dr. Daniel Loveless– *Engineering for Outer Space in the Classroom*- Space science is unique due to the broad appeal and involvement of amateurs and experts alike in a global technological community. New advancements in science and engineering, including novel electronic materials and scaling methodologies have facilitated the advancement of small satellite systems. Small satellites not only provide a mechanism for low-cost space exploration, but also enable further discovery of science and technology in education. UTChattSat (UTC's Satellite Research Group) utilizes such systems to enable students to conduct research on emerging technological problems related to the space sciences and to encourage continued study and practice in engineering, math, and science fields.

Dr. Jennifer Boyd - *An energetic approach to understanding plants in a changing climate* - Plants play critically important roles in both the biosphere and the earth system as a whole. Like all living things, plants have a fundamental need for energy to survive, grow, and reproduce. But the ability of plants to influence global climate based on their energy needs and their ability to acquire energy via photosynthesis makes them (and other photosynthetic organisms) biologically unique. My research takes an ecophysiological approach to improve understanding of how plants will be impacted by and impactful to global change by focusing on the responses of plant energetic properties to future climate forecasts.

Dr. Loren Hayes - *Reproductive inequality: Why bother living in a group?* - Evolutionary theory predicts that animals live in groups when the benefits of group-living exceed the costs. However, the benefits and costs of group-living are not the same for all members of a social group. Not surprisingly, reproductive inequality (i.e., differences in reproductive success) among same-sexed members of animal social groups is common. I explore the environmental and social factors contributing to reproductive inequality in the common degu (Octodon degus), a social rodent endemic to Chile. Funding: National Science Foundation

Dr. Hope Klug - *Filial cannibalism: why did dad do that?* Understanding the evolution of social behavior is a major focus in the field of evolutionary biology. In particular, understanding parental behavior is key to understanding the evolution of sociality, as parental care is likely one of the most primitive forms of social behavior. Parental care co-evolves with a range of behaviors, and understanding co-evolutionary dynamics is essential to understand the evolution of care. One intriguing behavior that parental care co-evolves with is filial cannibalism, the consumption of one's offspring. From an evolutionary perspective filial cannibalism is perplexing. In this talk, I will discuss how filial cannibalism can potentially be adaptive.

Dr. Hinsdale Bernard - *The Impact of a Three-dimensional Periodic Table of the Elements on the Science Achievement of 8th Grade Students: A Pilot Study* - In this pilot study, a three-dimensional periodic table of the elements (3DPT) was introduced to a treatment group of eighth-grade students for approximately ten weeks. Their TCAP science scores were compared to those of a comparison group that was taught science in a traditional manner. The results indicated that the treatment group scored significantly higher on TCAP Science than the comparison group. Results showed a socioeconomic level difference, with students in the non-economically disadvantaged group scoring significantly higher than their economically disadvantaged counterparts. The qualitative component reflected a positive attitude by teachers and students toward the use of the model.

Dr. Donald Reising - *Radio Frequency Fingerprinting* - Radio Frequency (RF) fingerprints are based upon the concept of human biometrics in which an individual's identity can be established based upon sufficiently distinct and native attributes present within a given physical trait (i.e., human fingerprints). Similar to human fingerprinting, RF fingerprinting exploits sufficiently distinct and native attributes that are unintentionally imparted to the waveform by a given device's RF components during transmission. It has been shown that these innate attributes are adequately unique to enable specific identification of wireless devices.

Dr. Mbakisya Onyango – *Improving Rigid Pavement Smoothness Using PolyLEVEL* - Concrete pavement slab drop-off is among the major problems that are encountered in concrete pavements after years of service, leading to poor load transfer between concrete slabs and poses a safety hazard to motorists. The traditional methods to rectify this problem require long operational and lane closure times. In recent years, a different concrete slab lifting technique has been developed. PolyLEVEL and a similar product URETEK are compounds that use high-density polyurethane, two part expanding foam, to raise settled concrete slabs. This study evaluates the performance of PolyLEVEL material to lift (level) concrete slabs.

Dr. Bryan Ennis – *What is the Shape of a Particle?* It is well known that particle shape affects flow characteristics of granular materials, as well as a variety of other solids processing issues such as compaction, rheology, filtration and other two-phase flow problems. The impact of shape crosses many diverse and commercially important applications, including pharmaceuticals, civil engineering, metallurgy, health, and food processing. Two applications studied here include the dry solids flow of lunar regolith simulants (e.g. JSC-1, NU-LHT-2M, OB-1), and the flow properties of wet concrete, including final compressive strength. A multi-dimensional generalized, engineering method to quantitatively characterize particle shapes has been developed, applicable to both single particle orientation and multi-particle assemblies.

HEALTH PANEL

Dr. Kate Rocklein Kemplin– *Green Berets & Nurses* - In this dangerous, violent world, Special Forces (SF; "green berets") treat critically wounded warriors and oppressed civilians with third-world resources, often without capabilities to evacuate patients to higher echelons of care. SF clinicians recruited academic nursing to develop practice guidelines to improve survivability, as nursing was the science crucially needed. The purpose of this presentation is to share the innovative utilization of nursing science to influence military medics' practice. Translating nursing models to improve survivability provided entree to milieus previously closed to nurses and women; in resource-devoid situations of unlikely evacuation, nursing science became the difference between life and death.

Dr. Sumith Gunasekera - *Generalized Inference for the Youden Index for Two-Parameter Exponentially Distributed Pooled Samples* - The aim of this talk is to show the effect of pooling on distinguishing between healthy and diseased. Toward this, we develop the generalized variable procedures based on Generalized Variable Method (GVM). This goal is accomplished by developing generalized variable procedures for the Youden Index (J) based on the pooled biomarkers that are exponentially distributed. These are juxtaposed using estimators, biases, confidence intervals, p-values, powers and sizes of the test, and coverage probabilities with a wide-ranging simulation study featuring a selection of various scenarios and with real-world data collected form either Erlanger or Siskin Hospitals.

Dr. Mina Sartipi - *Beyond mStroke: Smart Healthcare Powered by Internet of Things/Persons and Real-Time Big Data Analytics* - This talk will start with our ongoing research project mStroke funded by NIH. We will present the research progress on the design, development, and implementation of apps and wearables for several physical activities to achieve a real-time rehabilitation assessment and behavior monitoring of stroke patients. Then, we will give our vision and insight about the exploration of Internet of Things/Persons and real-time big data analytics for smart healthcare, which can be provided to the elderly and patients at home or in the healthcare facilities such as nursing homes, rehabilitation centers, or hospitals. Furthermore, the proposed philosophy can also benefit sports medicine.

Dr. Jamie F. Harvey - *The various distance covered among high school football officials during a high school football game* - Collecting descriptive data from the various officiating positions during a high school football game was the research purpose. Four faculty from the Health and Human Performance department ventured on the fields every Friday evening for the Fall 2015 season. The officials were drawn to the concept immediately and were enthusiastic during each event. The data is presently being evaluated for the results of the research outlined with the limitations we experienced.

Dr. Henry G. Spratt Jr. – *UTC's Clinical Infectious Disease Control Group: Research focused on assisting regional health care givers reduce the potential for the spread of infectious disease* - Beginning in July 2010, David Levine of UTC's Physical Therapy (PT) department and I began a research collaboration focused on development of data-based microbiological studies that could help health care officials reduce the incidence of nosocomial (health care acquired) infections in clinics. Two other research projects followed, leading to the formation of UTC's Clinical Infectious Disease Control (CIDC) group. Our group has expanded to include five other faculty and 15 students in three departments. To date, the CIDC has provided recommendations to nearly 30 regional clinics and one hospital that should help reduce the incidence of these infections.

Dr. Gary Wilkerson - *Smartphone Application for Sport Injury Prevention* - Recent technological advances have dramatically increased the potential for data acquisition from mobile electronic devices, which some consider the biggest development in medical research since the introduction of the randomized clinical trial in 1946. Smartphones can now acquire data that previously required immobile laboratory equipment and highly skilled personnel. Integration of electronic data derived from survey responses and simple tests of neuromechanical abilities can identify subtle deficiencies in an athlete's ability to process and respond to sensory input, which can be used to guide implementation of individualized risk reduction interventions that may prevent recurrent musculoskeletal injuries and disability.

Dr. Shewanee Howard-Baptiste - *Dance Away Disease* - Heart disease is the leading cause of death for African Americans in the United States and is inversely associated with physical activity. Engaging in more than 150 minutes of moderate physical activity or an hour of vigorous physical activity every week will reduce risk of coronary heart disease by about 30%. Individuals who engage in regular physical activity have increased cardiovascular fitness and improved mood. One way to increase physical activity amongst African American and Latino adolescent females is to develop an intervention that focuses more on gross body movement (dance) instead of using words that may question their ability level.

Dr. Andrew W. Bailey - *OutdoorRx: A healthy solution for America's best outdoor town* - Chattanooga, Outside Magazine's "Best Town Ever," is renowned for its natural beauty and is a favorite venue for international outdoor events. Unfortunately, our outdoorsy reputation is not reflected in our health statistics. Our region is listed among the top five in the country for obesity, physical inactivity, ADHD, and prescription drug use. Imagine if we could prevent this loss of health, life, and millions in annual health care costs with a readily available, free prescription that was fun to take and had no side effects. It's already happening, and no location shows more promise for OutdooRX than the scenic city.

Dr. David Giles - *Bacterial Membrane Sabotage: The Potential for Polyunsaturated Fatty Acids to Fight Disease* - The human health benefits of polyunsaturated fatty acids (PUFAs) are well documented, ranging from protection against cardiovascular disease, inflammation, depression, aging and arthritis. As important constituents of cell membranes, PUFAs influence membrane permeability and lipid homeostasis, thus affecting cellular signaling and gene expression. My laboratory has been examining the effects of PUFAs on virulence traits of Gram-negative pathogens. Our promising results demonstrate that PUFAs manipulate bacterial behavior, an application that could have far-reaching consequences for control and prevention of disease. By testing membrane permeability, antimicrobial effectiveness, biofilm formation and motility, our data highlights potential usefulness of PUFAs against pathogenic bacteria.

Drs. Dana Moody & Jessica Etheredge - *Strategies for Promoting Health and Well-Being in Interior Environments Utilizing Universal Design and Aging in Place* - This program will define the design concepts of Universal Design and Aging-In-Place and describe how they can be used as strategies for promoting health and well-being in interior environments. Demographic trends, the development of the specialized field of Certified Aging In Place Specialist, and growth in the senior housing industry will be addressed. A survey of accessibility and safety features of the home interior will be presented and participants will engage in an activity evaluating the compliance of various spaces with the principles of Universal Design and Aging In Place.

Dr. Carrie Baker - *The Importance of Injury Risk Screening* - There is evidence to support specific injury risk screening methods for defined populations. For any given measurement, the association between pre-participation status and subsequent injury occurrence can be numerically represented by a risk ratio or odds ratio. Furthermore, predictive variables can be combined to create multi-factor models that increase the accuracy of an injury risk estimate. Evidence-based injury prevention is still in its infancy, but some well-validated methods are available to guide efforts to identify athletes with elevated injury risk.

Dr. Shirleen D. Chase - *Melanoma Survivorship* - For more than a decade, research related to melanoma has focused mainly on prevention, early detection, and treatment. Although ongoing follow-up is critical for cancer survivors, there are currently no accepted guidelines defining post-treatment care for individuals diagnosed with melanoma. A major component of follow-up for melanoma survivors includes monitoring for recurrence and/or new malignancies with regular comprehensive skin exams, nodal assessment, along with symptom and psychological evaluation, treatment, and referral. Currently, the responsibility for follow-up with melanoma survivors is fractured; falling inconsistently on a variety of health care providers. Utilizing an interpretive description method, melanoma survivors within various communities throughout Tennessee share their individual and collective stories about living "as" and living "with" melanoma.

Dr. Elgin B. Andrews - *Feeding the heart and soul* - The YMCA served more than 36,000 nutritious meals to families in over 50 sites throughout Chattanooga, which included more than 8,000 at-risk children. Many of these families live in food deserts where fruits and vegetables are scarce and physical activity is minimized by safety concerns. University of Tennessee Chattanooga students in the department of health and human performance (HHP) have been integral in promoting and maintaining the Mobile Fit program. The program is looking to expand by reaching out to more minority neighborhoods that have historically experienced health disparities in relation to chronic diseases. In partnership with HHP, Mobile Fit will add a physical activity component to be delivered in conjunction with the meals. From this partnership, students will be able to conduct research in the local community while making a difference.

Arts & Humanities Panel

Talia Welsh - *Fat, Drunk, Smokers: An existential examination of the good health imperative* - From weighing children at school to higher insurance premiums for smokers, one's health habits have never received so much scrutiny. Instead of viewing poor health as solely a matter of bad luck or bad genes to be attended to by medical professionals, increasingly the individual is considered the master of her fate. She should alter her diet, increase her activity, and learn how to manage stress without using alcohol or drugs. Fat, Drunk, Smokers considers what such a focus means for the way in which we live in our bodies, see our futures, and understand our choices.

Drs. Jennifer Beech & Matt Guy - *Rick Grimes, Eastman, and White Power: Resisting the Suture from a Critical Fan Perspective* - Critical race theorists posit that whiteness as a racial category is the invisible norm and, as such, only gains recognition when placed in opposition to some abstract or supposedly abject other race or when viewed from the perspective of whites behaving in ways supposedly unbecoming or unexpected of whites. Yet, in the post-apocalyptic world of The Walking Dead, we might expect that strict non-dominant/dominant normative structures will break down along with other societal norms. But do they in the fictional representation of The Walking Dead--where the protagonist is a white cop with whom viewers are repeatedly asked to identify? When or how does race matter in this post-apocalyptic representation? As viewers of this ongoing serial drama, we turn to critical whiteness studies, as well as to cinematic suture theory, for our analysis. We are particularly interested in whiteness as portrayed by protagonist Rick Grimes and the character Eastman as figures of white power when contrasted with other potential leaders of color, such as Michonne and Morgan. We would argue that without a fuller examination of whiteness and white power as a both reflected and produced in television, we run the risk of further normalizing it and, consequently, reproducing oppressive racial hierarchies.

UTC Research Dialogues 2016

Faculty Poster & Display Presentations

2 p.m. – 5 p.m.

University Center • Chattanooga Room

Administrative Units

Natalie Bennett - *Striving to Improve Chat Reference Service* - I have been working to improve our library's chat service with systematic assessment of our chat transcripts and software. We have also implemented a new chat platform that allows us to transfer chats to multiple service points throughout the building so that our patrons can get answers from the right place. In the Spring, 2015 we fielded over 1000 chat questions, proving just how important the service has become to our patrons. My poster will describe this process of assessment and communicating the assessment results effectively with the librarians who work that service.

Chapel Cowden & Manuel F. Santiago - *Interdisciplinary Explorations: Promoting Critical Thinking via Problem-Based Learning in an Advanced Biochemistry Class* - This paper explores an interdisciplinary collaboration between a librarian and a chemist seeking to improve student research and critical thinking skills through the utilization of problem-based learning. A module exploring the interdisciplinary nature of science was implemented for an advanced Biochemistry class and delivered in a library setting. Initial findings of this pilot project suggest that the implementation of a carefully constructed, problem-based curriculum has the potential to improve research skills and multidisciplinary thinking as well as engender a more holistic view of chemical research. **Coauthor on the project: Manuel F. Santiago*

College of Arts and Sciences

Art

Katie Hargrave - *Audio Postcard* - Students in Art 1020: Visual Studies II created Audio Postcards, allowing them to learn audio recording and editing while exploring the communities surrounding UTC. This project is supported by a ThinkAchieve grant.

Andrew O'Brien - *Hardscape - Understanding the Materiality of Photographs* - The photographic print has been called a "mirror with a memory" and it is clear that the status of that "mirror" can have a profound effect on the way a photograph is understood. At this moment, technological advances have dramatically improved printing processes, yet digital circulation and the web simultaneously threaten the very existence of the physical photographic print. This project aims to investigate the complicated status of the contemporary image-object. The subject matter of this photographic project is the material artifacts of landscaping and urban land use. Everyday objects and settings are explored as I reflect on the actions that shape our physical environment, while also exploring the potential for their representation as tangible photographic prints.

Aggie Toppins - *Experiential Learning & Collaborative Curating with Bob Cicero from Globe Poster* - We collaborated with The Open Press to bring legendary letterpress printer Bob Cicero of The Globe Poster Company to Chattanooga from Baltimore, Maryland. Cicero gave a public lecture and did printing workshops with our students during his visit. Students enrolled in the Apothecary Gallery course also worked with Cicero to curate an exhibition of historical letterpress posters.

Chemistry & Physics

Dr. Tatiana Allen - *Using EBSD to characterize deformation under scratches in Inconel 690 heat exchange tube* - A heat exchanger was being re-tubed with Inconel 690 alloy tubing. It was noted that the tubes had been scratched by the tube sheet supports during the installation. The scratches on the outer diameter surface were of various depths up to 11 microns. However, it was important to determine not just the scratch depth, but also the depth of the deformation introduced underneath the scratches. Electron backscatter diffraction (EBSD) was used to study crystallographic orientation maps in the regions underneath the scratches. We were able to estimate the extent of propagation of deformation introduced by the scratch that was measured as much as 100 microns. This information is important for understanding the corrosion susceptibility of the material.

* *Coauthors on the project: W.L. Roes and M. Mat. Engr.*

Dr. Josh Hamblen - *Cosmic Ray Detection with Embedded Computing Device* - We propose to have upper division Physics students assemble a cosmic ray detector and use this instrument to investigate a variety of empirical questions. The detection of cosmic rays offers students a complex problem against which to apply the analytical methods they have been learning in the classroom. Over the course of several decades, the cost of experimental setups has decreased in price from tens of millions to a few hundred dollars for a small, portable device.

** Coauthor on project: Dr. David Welch*

Dr. Han Park - *Study of the photoacoustic effect in SF6 at high concentrations and at trace detects in N2* - Photoacoustic spectroscopy was used to test the photoacoustic properties of sulfur hexafluoride, an optically thick and potent greenhouse gas. Detection of trace amounts of the gas was also implemented. The conditions in which the gas was tested, gas cell length, temperature, concentration, and power of the laser, were varied in order to determine their effect on the photoacoustic signal, and an ideal condition to detect trace gas amounts. A detection limit of 2.86 ppb was determined for SF6.

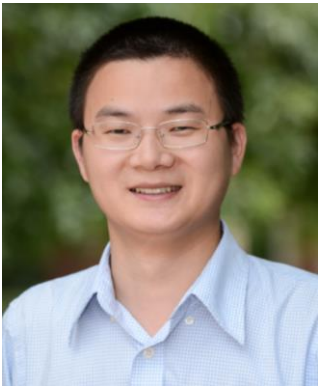
**Coauthor on the project: Witt Murphy*

Dr. Gretchen Potts - *Elemental analysis of Shiitake mushrooms from Mississippi small business farms* - Samples of edible Shiitake mushrooms were provided by the Mississippi Small Farms and Agribusiness Center (MSFAC), which is run as an outreach program of Alcorn State University. The mushrooms were grown on sweetgum logs, which were harvested from trees grown near creeks. Questionable log choice and possible log contamination led to an interest in the elemental analysis of the mushrooms. The Shiitake mushrooms were harvested, dried at 70°C, ground to a powder, and digested using a variation of US Environmental Protection Agency (EPA) 200.3 Method. The results of the analysis and a statistical comparison to our previous published research will be presented.
* *Coauthor: Jay N. Patel*

History

Dr. Susan Eckelmann – "*Even Though I'm Not Old Enough:" Youth & Political Activism* - Between 1963 and 1968, the War on Vietnam increasingly became a lens through which young people understood and debated issues of race, gender, and class. Thousands of children and teenagers across the U.S. and abroad wrote to public figures like Lyndon B. Johnson. Letter writing helped make teenage citizenship visible and young could engage with the adult world on their own terms as youth "ambassadors" or "advisors." Child and teenage correspondence functioned as political acts as well as technologies of political representation and cultural production as part of the everyday "business" of childhood.

Mathematics



Dr. Xuhua Liu - *Some Inequalities for Matrix Exponentials* - In this poster, the speaker will present some trace inequalities (Golden-Thompson inequality, Araki-Lieb-Thirring inequality, Bernstein inequality, and others) for matrix exponentials, their generalizations in terms of majorization or log-majorization, and their extension to Lie groups in terms of Kostant's preorder.

Dr. Roger Nichols - *Inverse Uniqueness for Rank-One Perturbations Via the Krein Spectral Shift Function* - We consider inverse uniqueness results for two problems: (i) rank-one perturbations of a self-adjoint operator with a coupling constant, and (ii) self-adjoint extensions of a symmetric operator A with deficiency indices (1,1). In problem (i), it is shown that Krein's spectral shift function characterizes the coupling constant uniquely. In problem (ii), von Neumann's theory of self-adjoint extensions characterizes all self-adjoint extensions of A in terms of a single real parameter t. We show that Krein's spectral shift function for a fixed reference extension and any other extension corresponding to t uniquely characterizes the parameter t.

Dr. Jin Wang - *Computing fluid-structure interaction by a partitioned approach* - We present a new partitioned approach to compute fluid-structure interaction (FSI) by extending the original direct-forcing technique and integrating it with the immersed boundary method. The fluid and structural equations are calculated separately via their respective disciplinary algorithms, and their solution data only communicate at the fluid-structure interface. This computational framework is capable of handling FSI problems with sophisticated structures described by detailed constitutive laws.

Music

Dr. Jonathan McNair - *Breath in a Ram's Horn: Daniel Asia, composer, in residence* - The noted American composer Daniel Asia was in residence at UTC, Nov. 1-3, 2015. During this time, Mr. Asia worked with students, gave a public lecture on Aesthetics, coached performers who presented his music, and was present for two public concerts of selected works from his catalog. This residency came about through a collaboration involving the Ruth S. Holmberg Professor of American Music (Dr. Jonathan McNair), the Chair of Excellence in Judaic Studies (Dr. Irven Resnick), the Departments of Philosophy, Theater, Music, and Art, and the Honors College. There was a concerted effort to reach out to the community at large, and the Jewish community in particular, and there was a good response from these efforts.

Political Science & Public Service

Dr. Marcus D. Mauldin – *Rational/Technocratic Explanations of Expected Local Economic Development Performance Outcomes* - Using a rational/technocratic framework, this research examines local government use of economic development performance agreements. The article assesses factors that influence municipal governments' use of performance agreements with businesses that receive economic development subsidies. Findings suggest that governments which employ subsidy controls such as cost-benefit analysis and performance measures, and that measure incentive effectiveness are more likely to enter performance agreements with businesses that receive subsidies.

Psychology

Dr. Svetlana Chesser - *Sexual Dimorphism in Cortisol Response to the Same Sex Exposure* - We examined relationships between environmental gender composition and HPA axis reactivity subjecting 11 males and 14 females to the computerized memory tasks alone, in the same and in the mixed sex conditions without participants being aware of the true experimental manipulations. Saliva samples were collected in the beginning, 15-20 min into, and at the end of each session. Repeated measures ANOVA revealed significant interaction between cortisol, experimental conditions and the sex of the participants with a large effect size of sex on cortisol response in the same sex condition. Intriguingly, female`s cortisol level rose and then declined and male`s did just opposite in the presence of same sex counterparts.

** Coauthor on project: Dr. Jill Talley Shelton*

Social, Cultural, & Justice Studies

Dr. Zibin Guo - *Standing like a tree and Moving like Water; the effects of Tai Chi Chuan and Its metaphors to individuals who live with chronic mental illness* - Tai Chi Chuan (Taijiquan), one of the most popular mind & body fitness forms in the world, embodies the thoughts and methods of traditional philosophies, healing and martial arts. The results from this study suggest that innovatively developed Tai Chi programs that integrates simple Tai Chi movement with the use of culturally constructed metaphors have successful impact in crisis stabilization clients operating as a resource in mental health crisis management. * *Coauthor on project: Chris Pell*

Southeast Center for Education in the Arts

Ms. Laurie Melnik - *The Art of Diagnosis: Strengthening Social Determinants of Health through Visual Art and Applied Drama Methodologies*- This multidisciplinary interprofessional program seeks to engage physicians-in-training through a series of visual art and applied drama methodologies that strengthen experiential awareness of multi-causal factors influencing patients' interpersonal communication. The program aims to strengthen entry level physicians' self-awareness and intentionality when entering diverse situations where patient interaction occurs. In partnership with allied health professionals, cultural educators and coaches, and master educators within the medical field, physicians-in-training will hone visual and aural diagnosis skills through real world exercises that involve negotiating difference, demystifying preconceived notions and cultural implications, and unpacking verbal and non-verbal cues.

College of Engineering and Computer Science

Civil & Chemical Engineering

Dr. Louie Elliott - *A parametric study of the mechanical properties of 3D printed parts for design optimization* - The importance of 3D printing and additive manufacturing (AM) has been well established. A student research project is proposed to material test 3D printed parts with a parametric assessment of material properties to determine optimal print configurations. Some long term goals of this research program are to educate a new class of engineers, develop a long-term, sustainable undergraduate research program at UTC, leverage these results for larger funding opportunities, and advance additive manufacturing in Chattanooga.

Dr. Bryan J. Ennis - *On Characterizing Particle Shape* - It is well known that particle shape affects flow characteristics of granular materials, as well as a variety of other solids processing issues such as compaction, rheology, filtration and other two-phase flow problems. The impact of shape crosses many diverse and commercially important applications, including pharmaceuticals, civil engineering, metallurgy, health, and food processing. A multi-dimensional generalized, engineering method to quantitatively characterize particle shapes has been developed, applicable to both single particle orientation and multi-particle assemblies. The characterization approach here is also demonstrated for the impact of rock aggregate shape on concrete slump rheology and dry compressive strength.

**Coauthors on the project: Drs. A. Brent Rollins, Matthew Pruitt (UTC), Douglas Rickman (NASA), and Brandon Ennis (E&G Associates)*

Dr. Bradley J. Harris - *The Structure and Function of Photosynthetic Protein Complexes: An Experimental and Computational Study* - Gaining insight into proteins and their interactions is crucial to our understanding of the biological world, and could provide technological advancement in alternative energy, drug discovery, and a wealth of other areas. Here, we are interested in studying photosystem I (PSI), a membrane integral protein involved in the photosynthetic cycle of plants and microorganisms that has been the subject of research for biorenewable energy conversion applications. We will also discuss current progress in studying the coupling of PSI with hydrogenase enzyme, which results in a unique complex capable of light-driven hydrogen production.

**Coauthors on the project: Drs. Xiaolin Cheng and Paul D. Frymier*

Dr. Mbakisya Onyango - *Evaluation of Pavement Marking Retroreflectivity Levels on Tennessee Highways* - This information if adhered to, leads to improved road safety. Pavement markings are characterized by their ability to retroreflect to the driver the light coming from the headlamps of the vehicle. Safety depends on efficiency and performance of the markings' retroreflectivity. This study used the LTL-X hand held retroreflectometer to measure the pavement marking retroreflectivity on sixty (60) randomly selected sites in the state of Tennessee for a period of two years. The analysis was performed at statewide and regional levels. Further analysis was performed to evaluate the influence of traffic intensity and elevation to marking deterioration rates. The study found no conclusive pattern for pavement marking deterioration rates based on traffic intensity and elevations. The deterioration rates obtained for thermoplastic markings yielded a very low correlation to measured values. Paint markings correlations were acceptable.

**Coauthor on project: Dr. Deo Chimba (Tennessee State University)*

Dr. A. Brent Rollins - *Designing Resilient Bridges: Probabilistic Life Cylce Modeling of Current Practice* - Current levels of spending by state and federal departments of transportation do not adequately address sustainability of our nation's critical transportation infrastructure. The primary source of bridge failure is corrosion of concrete reinforcing steel. Current concrete bridge construction practices are examined in all fifty states and corrosion modeling applied, revealing a predicted design life that is inadequate for the resilience of the nation's transportation infrastructure. The gap between current bridge construction practice and needed design life is examined. Several solutions to the problem are discussed, with comparative life cycle cost assessments performed. The project utilizes Life 365, a probabilistic corrosion modeling product consisting of a combined effort between the American Concrete Institute (ACI), National Institute of Standards and Technology (NIST), and industry representatives.

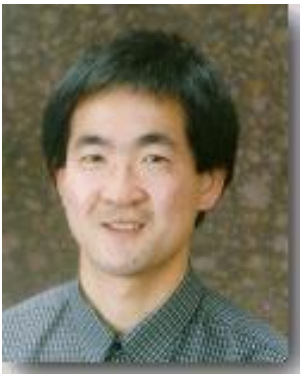
Dr. Cecelia Wigal - *UTC Design for Independence* - The mission of the UTC Design for Independence (DfI) project is for UTC ENGR 1850 Freshman Engineering students to team with Signal Centers' Assistive Technology (AT) Center and similar organizations to develop or improve existing adaptive and assistive technology to benefit the lives of toddlers, preschoolers, school age children, and adults with disabilities. The DfI project co-PIs (Drs. Wigal and Elliott) work with Signal Centers, Open Arms Care, Catoosa County Special Olympics and others in the community to identify projects that help children and adults be independent with their learning, work, and play. During the fall 2015 semester the student teams completed nine projects: two that support the disabled art community served by HART Gallery, one that supports the gardening experience for clients of Open Arms Care, and six that support children at various schools who are served by Signal Centers. These projects impacted 54 UTC students and an unlimited number of possible clients.

**Coauthor on the project: Dr. Louie Elliott*

Dr. Kidambi Sreenivas- *Blade resolved simulations of wind farms* – The results presented here are the outcome of the research into wind turbine flow fields that have been carried out over the past few years at UTC. They range from high fidelity blade resolved simulations to lower fidelity models. The results were generated using Tenasi, a 3D, unstructured, unsteady, Navier-Stokes flow solver developed at UTC. Results presented include comparisons to experimental data for single and tandem turbine flow fields in addition to representative wind farm simulations. **Coauthors on the project: Drs. Anshul Mittal, Walied Hassan, Lafe Taylor, and Levi Hereth*

Dr. Robert S. Webster - *Computational Simulations of a 3-Stage Axial Compressor* - The machine that is the subject of the results summarized in this presentation has been used for numerous experimental studies over a number of years. It is representative of the aft stages of the core compressor of a gas-turbine engine. Both Reynolds number and Mach number are consistent with those seen by such a machine, and the flow is entirely subsonic. The experimental studies, conducted at Purdue University, have been focused primarily on vane clocking and tip-clearance effects on compressor performance, as well as stall margin. This presentation is entirely computational and makes use of the extensive experimental database associated with this machine in order to validate the numerical results. The plan moving forward is to conduct further fundamental aerodynamic research in a collaborative experimental/computational setting.

**Coauthor on the project: Dr. Kidambi Sreenivas*



Dr. Yu Liang - *Virtual TaiJi System* - An Innovative Modality for Rehabilitation - This work intends to develop a fast prototype of Virtual TaiJi System (VTJS). By integrating a traditional form of healing arts with a series of cutting-edge computer technologies including 4D sensor technology, big-data-enabled data analytics, signal processing and analysis, static and dynamic analysis, pattern recognition, computer-enabled virtual reality, interaction of mind-and-body exercise, psychological theory, and physical therapy, this system would generate a controllable and consistent four-dimensional environment making Taiji movements suitable to patients who suffer from mobility disability due to diseases or injuries as an accessible rehab/fitness modality. **Coauthors on the project: Drs. Zibin Guo, Dalei Wu, Nancy Fell, and Amanda Clark*

Dr. Yu Liang- *A Hadoop-enabled Multiscale Reliability Analysis about Aging Bridges* - This work is dedicated to construct a multi-scale structural health monitoring system over Hadoop Ecosystem (MS-SHMM-Hadoop) to monitor and evaluate the serviceability of large-scale civil structures. By taking the advantages of fault-tolerant distributed file system called Hadoop Distributed File System (HDFS) and high-performance parallel data processing engine called MapReduce, Hadoop Ecosystem equips MS-SHMM-Hadoop with the highly scalable and robust tools such as R-Connector, HBase, Flume, Hive provides a data warehouse infrastructure to manage all the data corresponding to bridges and Pig etc. MS-SHMM-Hadoop is a multi-scale reliability analysis framework ranging from nationwide bridge-survey to structural components' reliability analysis. As one of its major contributions, this work presents a network model to formulate the integral serviceability of a bridge according to the serviceability its major components and the inter-component correlations. The inter-component correlations are specified using statistics-oriented machine learning method (e.g., association rule learning) or structural mechanics modeling and simulation. **Coauthors on the project: Drs. Dalei Wu, Cuilan Gao, and Weidong Wu*

Dr. Craig Tanis - *Accelerating Unstructured Codes* - Modern supercomputing systems are based on heterogeneous system architectures involving computational accelerators such as GPGPU devices. These accelerators perform optimally when data is presented in a structured, systematic way. We present our preliminary efforts accelerating unstructured codes with such devices.

Electrical Engineering

Dr. Abdelrahman Karrar - *On-site Low Voltage Zero Sequence Impedances Calculations for Transformers* - Many station auxiliary transformers (SATs) in service today were not tested for complete zero sequence impedance data prior to installation. It is impractical to send them to a testing facility, and on-site testing using standard methods is difficult to perform. This research proposes a new method to determine the primary-tertiary zero sequence short-circuit impedance for SATs by conducting simple measurements on the low voltage side. This eliminates the need to perform high voltage winding tests required by standard methods and simplifies on-site determination of missing zero sequence data. **Coauthors on the project: Mariana Kamel, Haytham Saeed, Dr. Ahmed Eltom, and TVA*

Dr. Daniel Loveless - *Radiation Effects and Reliability Resiliency of Advanced and Emerging Integrated Circuit Technologies* - Successful expansion of modern electronics capabilities into extreme environment applications, such as those found in space and nuclear environments, presents key reliability challenges in design lifetime, temperature and radiation tolerance. Little is known about the response to, or mitigation of, extreme environment effects in important emerging technology platforms. Less is known about best practice circuit design in advanced technologies (such as ultra-thin silicon-on-insulator and three-dimensional gate structures) operating low power and radio frequency (RF) regimes. My research aims to (1) detail the mechanisms important for reliable design of extreme environment electronics, (2) to provide hardened-by-design (HBD) techniques for digital, analog, and RF extreme-environment electronics, and to (3) demonstrate the feasibility of HBD approaches in deployable small satellite space systems such as the CubeSat.

Dr. Donald Reising - *Radio Frequency Fingerprints* - Radio Frequency (RF) fingerprints are based upon the concept of human biometrics in which an individual's identity can be established based upon sufficiently distinct and native attributes present within a given physical trait (i.e., human fingerprints). Similar to human fingerprinting, RF fingerprinting exploits sufficiently distinct and native attributes that are unintentionally imparted to the waveform by a given device's RF components during transmission. It has been shown that these innate attributes are adequately unique to enable specific identification of wireless devices.

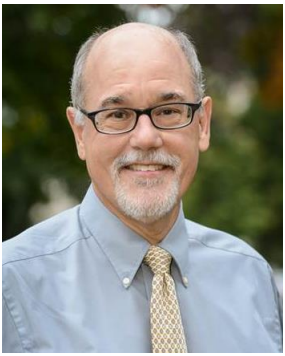
**Coauthor on the project: Charles Wheeler*

College of Health, Education and Professional Studies

Educational Opportunity Center

Cindy Long– *Educational Opportunity Center Outcomes* - The Educational Opportunity Center provides counseling and information about college admissions to adults who want to enter or continue a program of postsecondary education. We target low income, first generation students. The goal of the Educational Opportunity Center is to increase the number of local residents who enroll in postsecondary educational institutions. An overview of the center's outcomes and services will be presented.

Health and Human Performance



Dr. Gregory W. Heath - *Grow Healthy Together Chattanooga: Effects of Policy/Environmental Interventions on Physical Activity Among Urban Children* - The Grow Healthy Together Chattanooga (GHTC) project allowed us to assess the impact of physical activity (PA) policy and environmental interventions on the PA among African-American children living in the inner city. Using the System for Observing Physical Activity and Recreation in Communities (SOPARC) we examined pedestrian/bike routes/trails and recreational park areas within the boundaries of the GHTC communities to assess the PA of children. Our findings support the hypothesis that policy and environmental interventions targeting enhanced infrastructure increase PA levels among children exposed to such interventions over ~ 3 years. *Coauthors on the project: John Bilderback, Doug McInnis, and Strom Wilson*

Dr. Shewanee Howard-Baptiste - *D.A.N.C.E.: Determining Adolescents Needs for Culturally-Appropriate Exercises: Investigating the Barriers to Physical Activity for African American Female Adolescents* - This study connects undergraduate students with community-based opportunities for research. Four undergraduate students who are currently members of the Sugar MOCS Dance Team have worked collaboratively with faculty and community members to create an inclusive climate where African American and Latina female adolescents feel more comfortable and confident to engage in activities that make them feel better about themselves physically, socially and emotionally. The proposed study will supplement previous studies that suggest the need to speak to social and environmental barriers based on the narratives of African American female adolescents in addition to developing an intervention that focuses more on gross body movement (dance) instead of using words that may question their ability level.

**Coauthor on the project: Dr. Elgin Andrews*

Dr. Diedri White - *Dietetic Students' Reflections about Experiential Learning* - Dietetic students enrolled in Medical Nutrition Therapy courses during the senior year of the didactic program from Spring 2013 through Spring 2015 participated in various interprofessional activities along with undergraduate students from varied healthcare professions. A Health Resources and Service Administration Grant provided opportunities for students to increase understanding and direct experience in interprofessional collaboration. Qualitative results of the students' reflections about experiences in these interprofessional activities and working collaboratively with students from other health care disciplines will be presented.

**Coauthors on the project: Drs. Charlene Schmidt, Melissa Powell, and Kathy Barry*

Tonya Miller - *ROVER: A Case Study in Service-Learning Projects as a Tool for Promoting Evidence-Based Design Solutions* - This poster explores how service-learning projects can be used in interior design education to promote community engagement, professional competence, and evidence-based design solutions. For this case study, interior design students partnered with a local non-profit organization aimed at providing assistance to veterans in need. The organization, ROVER, solicited the students' help in developing designs for their new regional facility. The presence of a real design problem and the interaction with an actual client provided students with a level of reality not achievable through fictitious design scenarios. This mutually-beneficial relationship not only provided the design students with practical professional experience, it also provided an opportunity for them to begin serving their community

Dana Moody - *#INTERIORDESIGNSTUDENTS #BESTSCHOOLEVER: Using the Internet to Recruit Students* - This study explored websites and social media as tools to recruit interior design students. It was determined that Instagram was the most popular social media site for potential college students, therefore an Instagram account was created. Images with strategically chosen hashtags were posted. This effort led to a quick international following from, not only potential students, but designers and design manufacturers. Far reaching implications directly linked to recruiting are still to be determined, but a survey of 37 entering freshman revealed that those who followed the Instagram account as a potential student were influenced by its content when deciding where to study Interior Design.
**Coauthors on the project: Jill Weitz, Jessica Etheredge, Catherine Kendall, & Tonya Miller*

Dana Moody - *Capturing History: Using First-Person Videography to Create a Living Document* - This study investigates the role of using GoPro technology to increase interior design student critical thinking while recording exploration of a historic environment in action. All interior design students within this study were required to complete a Senior Thesis Project consisting of documenting a historic building, writing a historic structure report, and creating a revitalization plan for the building. GoPro cameras were attached to hardhats to record the first time students were introduced to the interior of the building. The videos created a living document of the structure in its present state. They captured the architectural details and materials of the building, the interior flow of circulation, as well as the students' impressions and reactions as they experienced the space first-hand. Throughout the following weeks, these videos were used to study the space while creating a plan for revitalization. Video clips from the building walk-through were integrated into videos used to present their final project ideas. The students presented their solutions to local building industry professionals and the owners who evaluated the projects for critical thinking skills. **Coauthors on the project: Jessica Etheredge, Catherine Kendall, & Tonya Miller*

Occupational Therapy

Elicia Dunn Cruz - *Mindful Crafts: Facilitation of Engagement in a Twelve-Step Substance Abuse Recovery Model* - This research explores the use of therapeutic crafts to engage adolescents who are in an in-patient substance abuse program in the recovery process. The inpatient program in which this researcher participates uses cognitive-behavior therapy and Twelve-Step facilitation (TSF). This researcher currently provides weekly OT services at an inpatient addiction recovery program, structuring OT services to complement the agencies' TSF and cognitive-behavior intervention approaches. Mindful crafts are designed to shape participants' ability and willingness to engage in TSF. This poster describes this evolving line of research by elucidating the nature of the Twelve-Step model & TSF, discussing the skills needed for engagement in this recovery approach, and presenting an analysis of the therapeutic activities, particularly crafts, that may be effective for the Twelve-Steps approach.

Dr. Susan J. Barlow - *Identifying the Brain Regions Associated with Acute Spasticity in Patients Diagnosed with an Ischemic Stroke* - Spasticity is a common impairment found in patients that have been diagnosed with a stroke. Little is known about the pathophysiology of spasticity at the level of the brain. This retrospective study was performed to identify an association between the area of the brain affected by an ischemic stroke and the presence of acute spasticity. Physical and occupational therapy assessments from all patients (n=441) that had suffered a stroke and were admitted into a local hospital over a four year period were screened for inclusion in this study. This is the first study to describe an association between a region of the brain affected by an infarct and the presence of acute spasticity. Understanding the regions associated with acute spasticity will aid in understanding the pathophysiology of this musculoskeletal impairment at the level of the brain.

Debbie Ingram - *Attitudes, Beliefs, Knowledge, and Perceived Barriers to Evidence-Based Practice in Physical Therapists Working in Long-Term Care* – This pilot study examined the attitudes, beliefs, knowledge and perceived barriers to evidence based practice (EBP) of physical therapists (PTs) working with the elderly in long-term care (LTC) facilities in the United States (US). We found that those who were certified clinical specialists felt more strongly about incorporating patient preferences into their practice and that incorporating EBP into practice did not place unreasonable demands on them. PTs reported positive feelings toward evidence based practice and the use of EBP, but a lack of time continues to present as the largest barrier to implementing EBP in everyday practice, with lack of facility support following as the next highest reported barrier.
**Coauthors on the project: Nancy Fell, David Levine, Julie Crenshaw, Adam Griffith, Christin Bryso*

Dr. David Levine - *Topical lotions and creams utilized in outpatient rehabilitation clinics as a potential source of bacterial contamination* - Soft tissue mobilization and massage are frequent interventions that are used in outpatient rehabilitation settings by occupational and physical therapists to improve scar tissue mobility, increase joint range of motion, decrease muscle trigger points, and decrease pain. Lotions or creams are often used to minimize friction. The purpose of this study was to determine potential bacterial contamination in lotions and creams commonly utilized in clinics. Bacterial contamination was found in both brands sampled, and in all three container sampling locations. However, the jar threads displayed the highest incidence of bacterial contamination ($p<0.01$). The findings of this study may encourage clinics to set standardized protocols to help reduce bacterial contamination associated with these lotions/creams. * *Coauthors on the project: Henry Spratt, PhD, Julie Bage, PT, DPT, OCS, Grace Collier*

Dr. David Levine - *Effects of Transcutaneous Electrical Nerve Stimulation on Neuropeptides in Healthy Subjects* - The purpose of this study is to measure the effect of transcutaneous electrical nerve stimulation (TENS) on neuropeptides and hormone levels in blood plasma. TENS is a widely used modality in physical therapy for pain control despite the physiological mechanisms for achieving the pain control being poorly understood. An existing theory is that various neuropeptides (such as beta-endorphins) are released into the blood stream during this treatment. This study will examine various neuropeptides and hormones in the blood prior to, during, and after TENS to study this effect. The pilot study revealed a presence of endorphin in the blood serum after subjects were exposed to TENS. Using UV-Vis Spectroscopy, Fluorescence Spectroscopy, High Pressure Liquid Chromatography, and protein assay, the serum contained various amounts of the protein. The next stage of this pilot investigation is to increase the number of subjects (control group and TENS exposed group) to analyze the protein production and identify other endogenous opioids produced during nerve stimulation. **Coauthors on the project: Arjun Chander, Grayson King, Nicholas Seay, Gareth May, Elizabeth Forrester Ph.D., Manuel F. Santiago Ph.D.*

Dr. Deborah A. McAllister - *Robotics for Middle Grades: Preservice Teacher Survey Results* - This project addressed mathematics and science skills using robotics with preservice teachers, in elementary and middle grades programs. This presentation will focus, specifically, on the results of a 10-item, participant self-assessment survey, to gauge understanding of concepts, note areas for improvement, and suggest areas for further study.

Dr. Sarah Jo Sandefur - *Teachers HELP (Helping English Language Proficiency)* - The number of students in Tennessee schools who do not speak English proficiently has increased dramatically in recent years. These English Learners face substantial challenges including lower academic achievement and lower graduation rates. To address the critical shortage of teachers prepared to work with English Learners, UTC and partners formed the Teachers HELP consortium to provide an additional 140 ESL endorsed teachers in six school districts in southeast Tennessee. Each year, participating pre-service and in-service teachers earn six hours of course credit through the Teachers HELP Summer Academy, an intensive two-week session incorporating core, research-based ESL competencies. Our research indicates that intensive, evidence-based instruction is effective in preparing both current and future teachers to work with English learning students.

**Coauthors on the project: Amye R. Warren, Ph.D., Valerie C. Rutledge, Ed.D. Kay Cowan, Ph.D., Anne Gamble, M.Ed., Rebecca Holsonback Amos, B.S.*

Dr. Britt Cusack - *I like to move it, move it: The implementation of an early progressive mobility protocol and algorithm in the critical care setting for the reduction of hospital-acquired delirium* - Does the implementation of an early progressive mobility protocol compared to standard care practices reduce the incidence of delirium in critically-ill patients? This study was a quality improvement, pre-intervention and post-intervention comparison that required retrospective chart auditing in the electronic medical record, EPIC, and the program that interfaces with EPIC for data auditing, CLARITY. Baseline, or pre-protocol, data was collected for patients admitted to the medical ICU and medical intermediate units at OSF Saint Francis Medical Center in Peoria, Illinois, between 11.1.2013-12.31.2013. There is still work to be done in the ICU microsystems regarding the culture of mobility, but this was believed to be a good starting point.

Dr. Linda Hill - *Creating Pathways: an Educational Outreach Partnership* - The CRNAs in 3D: Increasing Diversity, Reducing Disparities, and Understanding the Social Determinants of Health is a federal grant awarded to the UTC by the Health Resources and Services Administration (HRSA) to help create entry-level pathways into nursing for those from minority and/or disadvantaged backgrounds to earn the Certified Registered Nurse Anesthetist (CRNA) credential. One component of the grant is to practice social-level strategies, including advanced nursing career education and exposure. Entitled "Intro to Nursing Lab Series," the pilot event enabled UTC MSN Anesthesia students (SRNA) to share their education and experience with high school students by leading various stations in a university nursing lab setting. Partnering with UTC's Upward Bound and Upward Bound Math and Science outreach programs enabled CRNAs in 3D to offer nursing career education in a unique, hands-on lab environment otherwise unavailable to these high school students. **Coauthors on the project, Dr. Marclyn D. Porter, Farron Kilburn, and Robin Sturne*

Jenny Holcombe - *Collaborative Campus Partnerships: Experiences, Strategies, and Reflections* - Multidisciplinary research and collaborations have been steadily moving from fringe to norm status with increasing recognition that the answers to important research questions often transcend the scope of individual disciplines. It is important in academia to acknowledge and strive for interdisciplinary research, but it is also important to begin exploring how our teaching can incorporate interdisciplinary knowledge. Cross-disciplinary faculty partnerships have the potential to offer just such an opportunity. Two UTC faculty members share their experiences, and the experiences of other faculty on campus, working together on a common research project. Research/Evidence based strategies for facilitating collaborative partnerships will be presented. Reflections on the interdisciplinary experience will include lessons learned and advice for pursuing/facilitating relationships.

**Coauthor on the project: Chapel Cowden*

Jenny Holcombe - *Critical Thinking in Undergraduate Nursing Students: Do We Attract Critical Thinkers or Develop Them?* - The development of critical thinking skills in nursing students is a priority outlined by the AACN in The Essentials of Baccalaureate Education for Professional Nursing Practice. Such skills prove useful in daily nursing practice when interacting with patients and colleagues. Previous studies have examined the effectiveness of integrating critical thinking activities into the undergraduate curriculum resulting in many positive findings. The current study aims to examine critical thinking in undergraduate nursing students at a mid-sized, Southeastern university. The primary interest is whether the school of nursing attracts students who are higher critical thinkers or whether critical thinkers are cultivated and nurtured during the five semester BSN program.

Dr. Joanie Jackson - *Predicting Student Interest and Confidence in Providing Geriatric Care* – America's aging population needs interprofessional healthcare providers committed to providing high quality, patient-centered geriatric care. Considering older adult stereotypes and generalizations, it is important to explore demographic characteristics that influence student attitudes and seek clarity around factors that correlate with a desire to provide geriatric care. In this study, we surveyed 572 students entering Nursing, Physical Therapy, Athletic Training, Dietetics, and Social Work departments. Students reported on demographic factors, amount of contact with older adults, how rewarding that contact had been, and confidence and interest in working with elders. More confident students were likely to be female, studying nursing or physical therapy, and older. Results suggest that more exposure and more rewarding experiences with elders before entering a program is related to confidence and interest in working with the geriatric population upon graduation.
**Coauthor on the project: Dr. Amanda Clark*

Dr. Kate Kemplin - *Evaluating the incorporation of practice reflections in the clinical curricula of US Army Special Operations Forces medics* - Special Operations Forces (SOF) medics have published numerous case studies & practice reflections that intricately describe their practice environments, clinical dilemmas, and suggestions for teaching and practice. Curriculum used to teach medics should be specifically designed to incorporate their reflective practices and based on validated frameworks. The lack of real-time translation of SOF medics' experiential evidence to their curriculum creates a gap in evidence-based curricular development and reduces knowledge transmission & acquisition throughout the force. Because current epidemiological study of SOF-specific survivability from combat injuries is scant in scope, often not available to the public for replication nor independent analyses, and possibly lacking in specificity and rigor, SOF medics' practice reflections are the evidence upon which new curricula should be developed.

Dr. Amy Doolittle - *Utilizing E-Portfolios to Document Social Work Competence: A Qualitative Study* - The e-portfolio is a required document for all social work majors at a moderate sized state institution in the southeast region of the United States. Students are introduced to this project as they enter the program and encouraged to begin working on this document during their first semester in the program. Using an e-portfolio allows and encourages students to take leadership in their own learning and recognition of their own development as an emerging professional (Chang, 2001). In this faculty based qualitative research project, both current and past students (N=44) were sent an open-ended survey via Qualtrics. This poster presentation will provide a brief overview of the e-portfolio assignment, a review of the qualitative research, and an overview of the themes that emerged from this research.

**Coauthors on the project: Dr. Morgan E. Cooley and Alison Crane*

Dr. Kathyanne G. Purnell - *The World Cafe: Building Cultural Awareness Through Meaningful Conversations* - A collaborative experience between Faculty in the Social Work department and the Office of International Programs sought to broaden the cultural experiences of UTC students by having them participate in a foundation cultural assessment activity and an immersion experience. The foundation activity required students to participate in "The Things I Learned Growing Up" (TILGU) activity. TILGU explores how early familial socialization, the media and other societal entities influence the development of biased perceptions about diverse populations. This activity gave students the opportunity to self-reflect and identify their biases. The World Cafe experience was a follow up experience where students engaged in structured conversations with individuals from diverse backgrounds in a cafe-like style fashion. Based on the comments from the World Cafe experience, students were able to reconstruct their perspective as it relates to diversity and difference.

**Coauthors on the project: Takeo Suzuki and Dr. Cathy Scott*

UTC Research Dialogues 2016

Faculty Reception

5 P.M. – 7 P.M.

Library • 4th Floor

Faculty Reception remarks will be at 6 p.m.

Mr. Clint Schmitt - *Saxophone Quintet*
Clint Schmitt holds faculty positions at the University of Tennessee at Chattanooga and Southern Adventist University where he teaches applied saxophone and woodwind methods classes. He holds degrees in Music Education from Jacksonville State University and in Saxophone Performance from The New England Conservatory of Music.

Dr. Niki Tejero – *Clarinet Ensemble*
Dr. Tejero is currently on the faculty at the University of Tennessee at Chattanooga, where she directs the clarinet studio, teaches music theory courses, and coaches the Clarinet Ensemble and Woodwind Quintet. In 2009, she initiated the CAHS Clarinet Workshops, an instructional program designed to develop musical skills of high school clarinetists from the Greater Chattanooga area.