CASA RESEARCH FLASHTALK 3.0 PRESENTATIONS

CRITICAL ENVIRONMENT INTERFACING, ECOSYSTEM SERVICE RESOURCING, AND COMMUNITY DESIGN PRACTICES: COMPARATIVE CASE STUDIES AND OPERATIVE METHODOLOGIES IN FOOD PLAIN DEVELOPMENT

Craig Anz, Architect - BED, MArch, MSAS, PhD.
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Rolando Gonzalez-Torres, Architect - BArch, MLA, MAEd, PhD.
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 "Every such organism is reflected and refracted in the changes it wreaks in its 'milieu' or 'environment – in other words, in its space." **Henri Lefebvre**

This research collaborates interdisciplinary efforts to develop strategies for revitalization and resilient development for at-risk communities and urban settings within the Mississippi region. It compares embedded case studies and methodologies, particularly in light of current flooding and recent changes in practices/policies toward land-reallocations, riparian setbacks, and development-oriented interfaces within floodplains and conservation areas, which have shown positive effects in counteracting flood damages and fostering more productive interfaces with ecosystem resources. However, scarce follow-thru research has been performed to document multi-level, long-term outcomes and in developing formal design strategies as to how to best repair, revitalize, and re-form productively (and in new ways) in conjunction, particularly at urban and community scales that are most co-effectual. Multi-disciplinary university and stakeholder teams, as well as collaborators within the Vital Lands Illinois consortium, have been engaging varying complex challenges and documenting various ways to inform potential strategies. The research reorganizes key facets within these reports and into useful guidelines (score-card approaches) to re-inform the framework of proximal development, albeit at co-informing urban, community, and regional scales, via varying levels of agential stakeholder engagements, community dialogics, and eco-systems resources in conjunction to supply a critical scaffold that community organizers, designers, and planners can further cultivate.

A FLIPPED CLASSROOM APPROACH FOR LAB INTENSIVE AUTOMOTIVE COURSES

Sean Boyle, MSEd
Associate Professor- Department of Automotive Technology, Southern Illinois University

Can a flipped classroom for a lab-intensive automotive course be successful? In this flash talk, I will cover test results from years of teaching a traditional freshman level lecture/lab and compare them to a few semesters of flipped classroom where students view lectures online, complete worksheets, and then do the lab work on-site. The results show that students do well with the flipped concept, as long as worksheets are required to guide their study. Also, a post-course survey shows that many students appreciate the flexibility of viewing the lecture and the ability to re-watch complex topics.

QUANTITATIVE ANALYSES OF DEMOGRAPHICS AND REMINDERS REGARDING FAILED APPOINTMENTS

Amy Bro, MSRS
Clinical Instructor, Radiologic Sciences, School of Allied Health, Southern Illinois University
Katlynn Hutchcraft, MPH
Assistant Lecturer, Radiologic Sciences, School of Allied Health, Southern Illinois University

Failed appointments negatively impact healthcare facilities. At the SIU Dental Hygiene Clinic, a failed appointment can be a revenue loss of up to $900. We will look at the failed appointments of the SIU Dental Hygiene Clinic to determine a common factor. The parameters recorded were the use of telephone reminders and primary payment methods. The data was analyzed to arrive at the conclusion that although telephone reminders had no significant effect on failed appointments, patient means of payment held significance.

UTILIZING FLIGHT DATA MONITORING TO EXAMINE FLIGHT INSTRUCTOR MODELING

J. Kenneth Bro
Chief Flight Instructor, Department of Aviation Management & Flight, Southern Illinois University
Michael F. Robertson, Ph.D.
Associate Professor, Department of Aviation Management & Flight, Southern Illinois University

Flight Data Monitoring (FDM) is designed to continuously monitor and ensure that all flight operations are safe and in compliance with operating standards and regulations. An FDM program assists organizations in identifying and addressing operational deficiencies and trends that are not generally detectable with other procedures. Instructor modeling is a form of latent learning, wherein the student gleans habits and mannerisms from their instructor. Often instructor modeling is used to embody professional characteristics and positive behaviors; examples include: punctuality, etiquette, and honesty. This research focuses on identifying instructor modeling of negative behaviors utilizing FDM data over a seven-year period. The initial findings uncover a pattern of risky behavior being demonstrated by a flight instructor, replicated by a student, and then, as the student progresses to become an instructor, the behavior repeats in another generation. By comparing the total number of abnormal flight events to the number of abnormal events with a traceable genealogy, we are able to demonstrate a significant portion of abnormal behavior may be due to instructor modeling. Incidental findings have led to the preliminary conclusion that instructors can model poor aeronautical decision-making (ADM) with the student imitating this behavior.

ADVANCED INTERACTIVE ROBOT USES PREFERRED BEHAVIORS TO IMPROVE PATIENT OUTCOMES

Sandra Collins, PhD.
Professor, Health Care Management - School of Allied Health, Southern Illinois University
Valerie Boyer, MPA, PhD.
Associate Professor, Rehabilitation Institute, Southern Illinois University
Rick McKinnies, MSEd
Associate Professor, Radiologic Sciences - School of Allied Health, Southern Illinois University
Stacey McKinney, RDH, MSEd
Assistant Professor, Dental Hygiene - School of Allied Health, Southern Illinois University

PARO is an advanced interactive robot that utilizes artificial intelligence technology to reduce patient stress, stimulate interaction between patients and caregivers, and improve relaxation and motivation. Designed to look and sound like a baby harp seal, PARO uses five kinds of sensors to perceive people and the environment including tactile, light, auditory, temperature, and posture. Invented for use in areas where live animal therapy may not be suitable, PARO learns to respond based on the preferred behaviors of the user. In the largest dementia case study of its kind in the United States, PARO was shown to reduce patient symptoms which decreased the amount of needed medication by 30%. Furthermore, the calming effect of the therapeutic seal lasted almost two hours longer than many of the commonly used anxiety drugs given to elderly dementia patients.[2] PARO, to be named Sammy, will join the School of Allied Health at Southern Illinois University Carbondale (SIUC) in the spring of 2019. Initially, researchers are investigating Sammy's potential use in collaboration with SIUC's Center for Autism Spectrum Disorders, but aspire to launch research projects in a variety of other areas as well.

ANOTHER WAY TO REDUCE DIESEL EMISSIONS

Andrew Croxell, MSEd
Assistant Professor, Department of Automotive Technology, Southern Illinois University

Multiple makes and models of diesel vehicles have been in trouble for producing too much of the pollutant known as 'NOx.' NOx is formed from high combustion chamber temperatures and then is supposed to be 'scrubbed' in an emissions after-treatment system. This research looks at a simple system known as water/alcohol injection that can be added to cool the combustion chambers in diesel vehicles as a means to greatly reduce the amount of NOx that is created in the first place.

THE RAMIFICATIONS OF TEACHING DESIGN STUDIO ONLINE

Jon Daniel Davey, PhD., AIA
Distinguished Professor, School of Architecture, Southern Illinois University

During the late 1980s, I presented myself as a "techno-evangelist" and am now today teaching design studio online, in particular the final thesis project. This study and reflection is a review of the process and product of these projects now in its third year. With the advent of the smartphone, blockchain, bitcoin, the internet of things, augmented reality, 3D printing, real-time conferencing and artificial intelligence teaching, architecture has changed and so have the students of architecture. Greenfield in his text Radical Technologies: The design of everyday life, which some liken to the work of Jane Jacobs repeats Winston Churchill's famous dictate, "We shape our building and afterwards they shape us." He continues on "Now we make networks, and they shape us every bit as much as any building ever did, or could." Some fellow architects question the online approach as noted in Peter Raisbeck's Face to Face vs. Online Teaching: The destruction of culture in architectural schools, …" the ability to formulate architectural ideas, concepts, schema, systems, forms, compositions, theories and ways of knowing in practice is best taught through a vibrant educational culture. A culture which understands and puts face to face teaching first is central in this endeavor. In our universities and architecture schools architects will need to fight to preserve the integrity of their education systems and their canon against the onslaught of mindless managerialism disguised as "innovation." Our student's brains are being restructured via "technology" maybe sometimes not for the best. A report published in the journal Current Biology, notes that London Cabbies learning the mental atlas of London's spaghetti streets causes structural changes in the brain which affects memory and creates a greater volume of nerve cells in the brain's hippocampus. With Google Maps and other directional apps a person's hippocampus is smaller. The study investigates the current ramifications of not only online studio teaching but also the effect that these technologies have upon architectural pedagogy.

THE GENDER WAGE GAP OF CIVIL SERVICE EMPLOYEES AT ILLINOIS PUBLIC FOUR-YEAR UNIVERSITIES

Cara Doerr, MAEd, PhD.
Recruitment & Retention Coordinator, College of Applied Sciences & Arts, Southern Illinois University

Despite the progress women have made in education and the workforce over the past several centuries, challenges and inequities remain. There is deep-rooted gender segregation within the academy for both female students and female faculty, staff, and administrators. Women outnumber men in attainment of all degree types yet men outnumber women in all faculty ranks and in administrative and leadership roles at all types of four-year institutions. There are numerous studies on gender discrepancies in higher education for students, faculty, and administrators; however, there is little research of the relationship between male and female non-instructional academic staff on university campuses. The study examines non-instructional civil service staff member's average salary broken out by gender (male and female) from the seven largest four-year public universities in Illinois in the professional, semi-professional, managerial, and clerical occupational classifications within the State Universities Civil Service

System. In addition to gender theory and theorizing universities as gendered organizations, explored are the implications of unions and collective bargaining agents for non-instructional academic staff on university campuses. Included is a review of the salary distributions, discrepancies, inequalities, and inequities that exist within U.S. institutions of higher education. The findings indicate gendering of positions and gender wage discrepancies exist on all seven Illinois public university campuses in the study despite the highly bureaucratic and detailed salary rates and labor policies of the State Universities Civil Service System.

PUBLIC PERCEPTION OF AIRLINE SAFTEY

Steven C. Goetz, MSEd
Assistant Professor, Department of Aviation Management & Flight, Southern Illinois University
Matthew J. Romero, MPA
Assistant Professor, Department of Aviation Management & Flight, Southern Illinois University

Public perception is a powerful force. Public perception can sway decisions and influence decision makers regardless of the data. Public perception can create its own truth and should be of great concern to aviation. There have been numerous events in recent years that have shed a negative light on the airline industry. From forcefully removing passengers on flights to accidental pet deaths to the recent accidents of Lion Air 610 and Ethiopian Air 302. If the perception of safety in air carriers is disturbed, it can have repercussions throughout the industry as the public generally does not differentiate between the aviation industry and the airlines. This research is proposed to survey the public accessible through social media and Amazon's M-Turk service to determine if the recent media attention on global airline service has impacted the perception of the safety of the US airline industry and to what extent. We propose to take a convenience sample from social media and Amazon M-Turk. While not perfect tools, both social media and M-Turk has been used effectively in survey research in the past (Buhrmester, Kwang, & Gosling, 2011; Fryrear, 2015; Paolacci & Chandler, 2014; Wright, 2005).

EXPANDING INSTRUCTIONAL OPPORTUNITIES

Todd Grant
Assistant Instructor, Department of Automotive Technology, Southern Illinois University

This presentation will discuss how the Department of Automotive Technology at Southern Illinois University thinks outside of the box to promote the program.

WASTE MOTOR OIL TO DIESEL FUEL PROJECT

Blaine M. Heisner, MSEd
Assistant Professor, Department of Automotive Technology, Southern Illinois University

It is estimated that over 1.3 billion gallons of waste motor oil (WMO) are generated each year in the United States. SIUC alone is responsible for multiple thousands of these gallons. WMO is typically collected and re-refined into products such as lubricants and asphalt. In the past, WMO was a valuable commodity and generators were paid for the product. Due to recent softness in the petroleum market, generators now have to pay a fee to have WMO disposed. Our project focuses on collecting SIUC generated WMO and converting it into a useable diesel fuel for University vehicles. Not only will this save WMO disposal costs, it saves on fuel costs as well. Thanks to an initial funding from the SIUC Green Fund, we have a working WMO processor. We have also successfully tested the fuel in multiple vehicles. Our plan is to expand the project to collect and repurpose all SIUC generated WMO into diesel fuel.

MACHINE LEARNING-DRIVEN COAL QUALITY ANALYSIS AND PREDICTION FOR MINIMIZING POLLUTING GAS GENERATIONS IN COAL-FIRED POWER PLANTS

Qian (Jenny) Huang, PhD.
Assistant Professor, School of Architecture, Southern Illinois University

Machine learning is changing the future of energy. At present, big data and machine learning play an important role in coal-fired power generation. Despite their increasing prevalence, there are still unrealized opportunities in the rapid coal quality analysis, which fully and effectively utilizes coal resources and reduce polluting gas emissions. Boiler efficiency can be increased when they are fed a real-time known coal quality. In addition, coal consumption is reduced, harmful gas emissions are lessened, maintenance is minimized, and unplanned outages are avoided. After rapidly knowing the coal quality, pro-active control decisions can be made to improve the efficiency of power plants. Up to date, existing rapid coal quality analysis methods have a low degree of automation, a long analysis time, and cannot timely feedback the quality of coal in the process of coal processing and utilization. To address this critical challenge, we propose to generate spectra of coal samples using laser-induced breakdown spectroscopy (LIBS) and Fourier transformed infrared spectroscopy (FT-IR), respectively. The SIU power plant will provide us with sufficient coal samples and their corresponding analysis report provided by third-party chemical analysts. Based on the spectra obtained by LIBS and FT-IR as well as the analysis reports provided by the SIU power plant, we will investigate and explore various machine learning algorithms to model the coal properties hidden in the coal spectrum. The outcome of this research is the development and determination of a new high-precision, low-complexity, machine learning-driven, rapid coal analysis method, which can capture the comprehensive chemical nature of coal samples. This project is of great significance and broad prospect for rational utilization of coal resources and promoting sustainable coal-fired power plants.

A MULTIDISCIPLINARY COLLABORATION: FASHION & ELECTRICAL AND BIOMEDICAL ENGINEERING

Seung-Hee Lee, PhD.
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Jun Qin, PhD.
Associate Professor, Electrical & Computer Engineering, Southern Illinois University
Yuli Liang, PhD.
Lecturer, Fashion Design & Merchandising Program, School of Architecture, Southern Illinois University

In recent years, fashion and technology have become more integrated, resulting in more digital innovation. Thus, fashion designers and marketers need to be able to predict how consumers' fashion adoption is affected by new technologies. To understand this current phenomena, those the fashion industry or fashion academic area need to understand and adopt digital innovation in a more efficient and creative way. The more collaboration between teams, the more innovative fashion products will be developed, and the more fashion consumers will have access to new products. This collaboration work will help fashion designers and marketers improve the creativeness and effectiveness of fashion products for their fashion business. Thus, last year a multidisciplinary collaboration team between Fashion and Electrical and Biomedical Engineering was formed. For this research forum, we will share what we have already done, what we are doing now, and what we will do next for further research.

FAMOUS IN A SMALL TOWN: EXPLORING ELITE SOCIAL NETWORKS IN RURAL COMMUNITIES

Scott McClurg, PhD.
Acting Director, School of Journalism
Professor, Department of Political Science & School of Journalism, Southern Illinois University
Malinda Suprise
Doctoral Candidate, Applied Psychology, Southern Illinois University
Viloshanakumaran Veeramani
Doctoral Candidate, Applied Psychology, Southern Illinois University
Alan Franklin
Doctoral Candidate, Applied Psychology, Southern Illinois University

The goal of this research is to better understand how community perceptions operate within social networks of elite members of small, rural communities. Participants ($N = 63$) were surveyed about the structure of their social networks and about their individual characteristics, beliefs, and perceptions of their communities. Social network analysis (SNA) techniques and community perceptions will be discussed along with directions for future analyses.

TRANSPORTATION AND AFFORDABLE HOUSING LINKAGES

Shannon Sanders McDonald, MArch
Associate Professor, School of Architecture, Southern Illinois University

Creating successful affordable housing is directly related to transportation and their connections and interrelationships are currently being explored across the country. A grant from the Mineta Transportation Institute brought together many academics and professionals from around the country to seek the most innovative ideas that are being implemented to create more affordable housing. Working with *Home for All,* the grant was supported by San Mateo County, CA where the problem of affordable housing is particularly acute. A four person family with a median income of $117,400.00 at 80% of the area median income is eligible for housing assistance in San Mateo County. The intent of the grant was to produce a toolkit of strategies that municipalities could implement to create affordable housing. The presentation will cover the top case study ideas of parking, land use and accessibility to transit along with innovative data collection strategies in order to understand the specific challenges. From architectural to planning, data collection and changes to the laws and guidelines, the case studies and toolkit hopefully will assist with this challenging problem.

INTERDISCIPLINARY COLLABORATION BETWEEN DENTAL HYGIENISTS AND CANCER TREATMENT FACILITIES

Stacey L. McKinney, RDH, MSEd
Assistant Professor, Dental Hygiene, Southern Illinois University
Jennifer S. Sherry, RDH, MSEd
Associate Professor, Dental Hygiene, Southern Illinois University

Oral complications have major effects on treatment, quality of life, and overall survival. These complications can affect the proposed course of treatment, treatment dose, location of head and neck radiation therapy, and even the ability to continue treatment. If patients cannot continue treatment or the regimen is adjusted, the risk of tumor growth and recurrence increases (ultimately leading to decreased survival rates). Moreover, if the hospital or cancer treatment facility does not have a dentist or dental hygienist on staff, this can be a barrier to care. Our research will initially survey radiation oncologists in cancer treatment facilities in Illinois. Data will be gathered to determine radiation oncologists' attitudes regarding the collaboration between dental hygienists and how their utilization in these treatment facilities affects the patients' oral conditions throughout their treatment process.

PROBLEMS EXPEIRIENCED WITH AIRDUINO AND MOVING FORWARD

Don Morris, MAS
Assistant Professor, Department of Aviation Technologies, Southern Illinois University

While the current published Airduino configuration makes an attractive and economical package, system accuracy is demonstrably lower than the sensor manufacturer's published specifications. This is primarily attributed to the manufacturer's firmware being optimized for rapidly moving dynamic systems such as quad-copters and remote cameras. These differ significantly from the dynamic but more sustained forces which typically occur in manned aircraft flight. This ongoing research reports on other sensors that are being investigated, as well as the potential development of new firmware. This would free up the Airduino to begin flight tests in an experimental aircraft currently being prepared for this role. This is an ongoing research report, and includes an invitation for interested parties to join in this research.

A NEW PERSPECTIVE ON FEDERAL GOVERNMENT DEFICITS, DEBT, AND TRUST FUNDS

Samuel R. Pavel, MA, MDiv, PhD.
Associate Professor, Department of Aviation Management & Flight, Southern Illinois University

This presentation uses an emerging school of economic thought called Modern Money Theory (MMT) to analyze Federal Government fiscal and monetary policy. MMT expands on a variety of sources to understand how an economy with sovereign issued money operates, including: Monetary theory developed by economists Keynes, Innes, Knapp, and Minsky; Functional finance developed by Learner; Bufferstock and monopoly price setting developed by Minsky, Mitchell, and Mosler; Sectoral Balance accounting developed by Godley.The foundation of MMT stands on nine concepts: 1) Money is an IOU denominated in a socially sanctioned state chosen unit of account; 2) Taxes (including fees, fines, tribute, tithes, and like payments) drives the use of the money by accepting the state money in payment ("redemption"); 3) Anyone can issue money, but acceptance of the money is difficult without state backing; 4) Sovereign debt is different than any other debt; 5) Finance should be "functional" – (to achieve a public purpose) not "sound" (to achieve an arbitrary balance between spending and revenue); 6) A Job Guarantee program to remove any involuntary unemployment; 7) Any financial system is inherently unstable; 8) Federal government debt is a financial asset; 9) The central bank is independent of the treasury and not a potent economic stabilizer. The Airport and Airway Trust Fund (Trust Fund) was established in 1970 to help finance the FAA's investments in airports and the National Airspace System (NAS). Revenue for the Trust Fund is generated by a series of excise taxes levied on the users of the NAS. My research indicates that funding this important national infrastructure using a Trust Fund is inefficient and unfair. Analysis using MMT shows there is a more efficient way of funding important FAA programs than relying on the Trust Fund.

ANNA HE PURNABRAMHA: WOMEN'S AGENCY IN THE MAKING OF BODIES, CUISINES, AND CULTURE IN MAHARASHTRA, INDIA

Gauri A. Pitale, PhD.
Assistant Professor of Practice, Saluki Success Program & Anthropology, Southern Illinois University

The world is changing. India is changing. Food is changing. Bodies are changing. What does this mean for the women of Maharashtra, India? Globalization and modernity manifest in new and interesting ways the world over. As people establish networks of global commodity, capital, and human circulation, anthropologists raise pertinent concerns. While some are apprehensive about cultural loss and western cultural imperialism, others make a case for the rise of globalization. While some espouse the positives of a free market economy, others are critical of the nutrition transition in developing countries and what this means for the health of the people undergoing this transition. The site of this study is the region of Konkan in Maharashtra, India. India is undergoing fast-paced culture change since liberalizing its economy in the year 1991. I focus on the experiences of present day rural and urban Deorukhe Brahmin women (mothers and their daughters), who belong to an endogamous upper caste group that claims to be indigenous to Konkan. Generally, rural Indian regions are modernizing more slowly than urban areas. This study looks at how women are active agents in the changes that are taking place in their bodies, diet, and gender identities. A biocultural study, this dissertation takes into consideration anthropometric data and ethnographic data to comprehend the manner in which women, who are the gastronomic decision makers at the household level, are responding to the increasing influx of non-traditional foods. My study focuses on the moral implications of changing dietary practices and the appearance of chronic non- communicable diseases on the notions of the self. By discussing the manner in which Indian women practice their agency, using traditional gender roles, I aim to demonstrate how these women adjoin that which is thought to index the global and the local to shape a new India.

SPIRITUAL BELIEFS AMONG INDIVIDUALS WITH DEMENTIA AND APPROPRIATE FAITH-BASED INTERVENTIONS

Robert Rados, PhD.
Assistant Professor, Health Care Management Program, Southern Illinois University

To investigate the influence of "spiritual belief" among individuals with dementia (IwD) living in a memory care center, this exploratory study will conduct a mixed method research design to examine the conceptualization and operationalization of faith as a measure of belief. Participants' current spiritual state (i.e., level of spiritual well-being vs spiritual distress) will be identified based on published spirituality instruments and used to guide selection of appropriate faith-based interventions matched with the individual's level of spirituality, religion and personal beliefs. A review of faith-based literature associated with IwD will be used to identify and adapt existing interventions and research methods. Qualitative information from participants may provide a better understanding of how conscious effects of spirituality prevail for IwD and its connection in

association with their recognition of self-well-being. The holistic philosophy of person-centered healthcare acknowledges a wide range of individual needs including cultural, spiritual, and religious.

APPLYING THE PSYCHOMOTOR VIGILANCE TEST TO FATIGUE MANAGEMENT TRAINING

Matthew J. Romero, MPA
Assistant Professor, Department of Aviation Management & Flight, Southern Illinois University
Steven C. Goetz, MSEd
Assistant Professor, Department of Aviation Management & Flight, Southern Illinois University

Fatigue was a contributing factor in numerous aircraft accidents since the 1970's and was found to contribute to 23% of aircraft accidents that occurred between 2001 and 2012 (Marcus & Rosekind, 2017). As a result, the Federal Aviation Administration (FAA) regulates flight duty limits, crew rest requirements, and fitness for duty requirements in commercial aviation (14 C.F.R. § 117, 2013) to reduce the risks associated with fatigue in operational settings. This study aims to understand the degree to which fatigue impacts flight student check ride performance by administering the psychomotor vigilance test (PVT) before those evaluative situations. The PVT is used to measure fitness for work evaluations "by providing objective, quantitative assessment of alertness deficits" (Lerman, Mollicone, & Coats, 2017, p. 716). The PVT requires users to respond to visual stimuli to evaluate alertness levels based on the timeliness and accuracy of their responses to the stimuli. The results of the PVT will be compared to the result of the flight portion of a check ride to see if any relationships exist between PVT scores and success or failure on the check ride.

HOTSPOTTING: LEARNING BY DOING-BUILDING INTERDSCIPLINARY BRIDGES LEADING TO IMPROVED OUTCOMES

Thomas Shaw, Ph.D
Associate Professor, Health Care Management Program, Southern Illinois University
Jessica Cataldo, MPH
Clinical Instructor, Health Care Management Program, Southern Illinois University
Sandra Collins, Ph.D
Professor, Health Care Management Program, Southern Illinois University

This is an interprofessional learning collaborative sponsored by The National Center for Complex Health and Social Needs; the Camden Coalition of Healthcare Providers; and the Association of American Medical Colleges. This experiential curriculum involves a myriad of healthcare interdisciplinary programs ranging from medicine, health administration, nursing, public health to business, social work, and medical dietetics. By exposing HCM students to assisting patients with complex medical and social needs by using a patient-centered interdisciplinary team approach provides real-life exposure to health, social and the economic challenges that influence high risk patient access to healthcare. The process of addressing patient needs allows students

to utilize course competencies and apply them to specific circumstances to gain a greater understanding of the competencies and the interdependence of the various patient/client challenges. Students will have opportunities to work on role defining and responsibility assignment within a team framework. Student exposure to this opportunity will provide part of the foundational acumen to enable them coalesce into contributing members of the healthcare profession.

A CASE STUDY MEASURING IMPACT OF ILLINOIS MINIMUM WAGE INCREASES ON INFORMATION SYSTEMS AND TECHNOLOGIES ACADEMIC PROGRAM RETENTION

James D. Sissom, MPA
Associate Professor, Information Systems Technologies, Southern Illinois University

Most students (71%) leave college because they are working to support themselves and going to school at the same time. At some point, the stress of work and study just becomes too difficult (Public Agenda, 2016). What impact will future minimum wage increases have on technology-related student work and academic internship opportunities for Illinois college students? Illinois Public Act 94-1072 will increase wages twice in 2020; on January 1, the minimum wage increases from $8.25 to $9.25 per hour, and will increase again to $10.00 an hour on July 1. In 2021, a $1.00 per hour annual minimum wage increase occurs on January 1, until the minimum wage hits $15.00 an hour in 2025 (Littler Mendelson PC, 2019). Augmenting the new law, Illinois HB 2180 proposes employers to pay interns at full minimum wage, regardless of college credit. Empirical research of the effect of minimum wages on employment dates back over 100 years (Totty, 2015) thus this research will not attempt to resolve issues in the minimum wage-employment debate. A critical instance case study is proposed to analyze Information Systems Technologies students in order to determine the extent student employment makes a difference in retention (cause and effect). The case study will make use of the annual increase intervals to determine which wage level has the greatest impact on retention. An emphasis will be placed on information technology and cybersecurity student work and academic internships; however, all minimum wage employment will be discussed. In addition, the author will attempt to capture disparity between disability groups and racial categories in the study and use findings in future research and practice.

AUTOMOTIVE FAULT DETECTION AND ISOLATION METHODOLOGIES

Jessica Suda, MSE
Assistant Professor, Department of Automotive Technology, Southern Illinois University

Part degradation is inevitable in the automotive world and current On-Board Diagnostics (II) are limited in isolating the root-cause of many faults. I have been exploring/researching the utilization of classification algorithms on real-world data when a (misfire) fault is present in an automobile to ultimately aid technicians in isolating the root-cause of a fault. Currently, aerospace and automotive manufacturers are collecting vehicle data at a centralized location and are exploring means of using it to determine how faults progress over time and classify faults (and appropriately

compensate) in a short period-of-time. With the aid of my background in both Automotive Technology and Electrical/Computer Engineering, I have started coordinating efforts with these major automotive/aerospace manufacturers to explore different fault-isolating methodologies with their data.

EMPLOYER RECRUITING

Eugene Talley, MBA
Associate Professor, Department of Automotive Technology, Southern Illinois University

SIU's Automotive Technology program has worked very hard to maintain strong relationships with industry. These relationships, along with quality students, have produced an 80% or higher job placement rate before graduation for many years. Working with the companies and SIU career services to maintain these numbers is a strong recruiting tool for the program. Students and parents can see a value in attending the Automotive Program at SIU during their school decision process.

DESIGN AND DEVELOPMENT OF GENERAL PURPOSE INSTRUMENTATION

Ralph Tate, MSE
Associate Professor, Department of Automotive Technology, Southern Illinois University

The design and development of general purpose instrumentation for an electric vehicle using open-source hardware and software will be described.

PREDICTIVE ANALYTICS IN HIGHER EDUCATION

Andy Wang, PhD.
Professor and Dean, College of Applied Science and Arts, Southern Illinois University

We have entered a new era in which data is pervasive and critical for business and academia as well. Nearly everything we do in teaching, research, service and learning generates data. Higher education administration can benefit enormously through data-mining and predictive analytics. Data can help us run our physical plant more efficiently at lower costs. Data can be used to provide just-in-time interventions to help at-risk students realize their full success. Data can assist us to know better about prospective and current students thus to increase enrollment and retention rate as well as graduation rate. This presentation provides an overview of current predictive analytics projects in the College of Applied Sciences and Arts, analyzes its impact and limitation, and suggests improvement and future work to use data analytics to support strategic and data-driven decision making.

AUTHORING AND DESIGNING AN ONLINE JOURNAL: ARTIZEIN ARTS AND TEACHING JOURNAL

Gregory Wendt, MAT
Instructional Technology Specialist & Video Producer, Center for Teaching Excellence, Southern Illinois University

The foundational premise of Artizein is that the practice and pedagogy of the arts is relational and vital for restoring, sustaining and transforming life. Artizein aims is to enlarge the domain of the arts and teaching by creating a visually enticing journal dedicated to articulating multiple perspectives on the arts and what the arts are for. Artizein offers its readers original material from artists, teachers, and researchers, in the hopes of providing fresh insight into the creating and teaching of the arts for and by many populations, both contemporary and historical. The journal welcomes manuscripts addressing the consequence of understanding the state of our teaching of the arts relative to the arts themselves. Published annually in OpenSIUC, Artizein is an Arts and Teaching journal founded in 2015 by SIUC professors, Sally Gradle and Barbara Bickel, (both now emeritus), along with Peter London. SIUC Art History Assistant Professor, Laurel Jean Fredrickson, is currently co-editor. As a media contributor and graphic designer for the latest issue of Artizein, my presentation will focus on the collaborative process of creating this online journal, potentially sparking ideas for aspiring journal creators.

CASA RESEARCH FLASHTALK 3.0 POSTER PRESENTATIONS

CYBER VULNERABILITIES IN AVIATION

Malik Alassaf
Department of Aviation Management & Flight, Southern Illinois University

The aviation industry is considered a part of the nation's critical infrastructure sector as designated by the United States Department of Homeland Security. With millions of cyber attacks daily against critical infrastructure, and with the potential for catastrophic consequences as a result, how can aviation become more protected from these threats? What resources and tools are available to improve cybersecurity in critical infrastructure sectors such as aviation, and how can they be most effectively implemented? This research project seeks to better understand cyber vulnerabilities in aviation now and in the future and to provide a pathway for improving security now and in the future.

EMERGING PRACTICES IN HEALTH INSURANCE UNDERWRITING

Ethan Bently
Health Care Management Program, Southern Illinois University

Insurance underwriting has been a popular technique used by insurers since the inception of insurance. As insurance has evolved, so have the underwriting practices. Social and socioeconomic scores are an emerging new practice in the world of health insurance, although its legality is in a grey area according to the Affordable Care Act. Looking at existing social credit systems can give insurers and consumers an idea where social and socioeconomic scores might move forward in the next decade. Taking these examples and exploring possible applications raises the issue of regulations that need to be set in place to protect consumers. Without a push for a decision on the legality of such practices, health insurance is likely to become more of a burden on Americans.

HEALTH CARE MANAGEMENT STRATEGIES TO ADDRESS SOCIAL DETERMINANTS OF HEALTH AND HEALTH DISPARITIES TO IMPROVE HEALTH OUTCOMES

Vicki Brown
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Medical care accounts for only 10% of health outcomes. All other contributions to health outcomes are attributed to genetics, environment, social circumstances, and behaviors. These categories are known as the social determinants of health (SDOH). The social determinants of health can cause health inequities and disparities among a population. As a result of health

disparities related to social determinants of health, an increased proportion of the population develops chronic medical conditions that consume more health care expenditures. It is becoming increasingly more important to address the underlying factors of health outcomes as the reimbursement for quality of care becomes the norm in healthcare. Effectively integrating new programs, technology, and community partnerships that target the vulnerable populations into a healthcare organization can prove to be beneficial in improving health outcomes and lowering healthcare costs.

AIRDUINO LAUNCH REPORT: AN ARDUINO BASES OPEN SOURCE GLASS COCKPIT PROJECT

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We detail the building the single board computer based glass cockpit for experimental aircraft that was described at previous flash talks, and launching it as an open source project. Utilizing modern low-cost computer boards such as the Arduino to procure flight data information will significantly lower the cost of this type of system. So will the open source software we have written. Our open source Airduino is now available for anyone to build and experiment with. While we do not yet recommend that anyone tries to fly with it on an aircraft, we do believe that it will be useful for education as it is. We also hope that we will see others collaborate to make this into a useful system for experimental aircraft, and we hope that easy availability and low cost can eventually help save lives.

HOW CAN HEALTH CARE PROFESSIONALS HELP COMBAT THE SEX TRAFFICKING DILEMMA?

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Sex trafficking is the third most profitable criminal activity globally. This comes just after drug and gun smuggling. In 2016, it is estimated that roughly $31 billion is profited from sex trafficking. There are more than 8,000 new victims of trafficking each month in just the United States alone. Sex trafficking by definition is anyone who is transferred for the sole purpose of sexual exploitation. Victims of this crime, regardless of gender/age, are at high risk for developing severe health complications. These health conditions can include forced pregnancies and abortions, substance abuse, violence-related issues (beatings and rape), HIV/AIDS, and other sexually transmitted infections. It is important for health care professionals to be on the lookout for victims who are placed in the trafficking industry. The most common locations that victims will seek out care is emergency departments, jails, women's health clinics (Planned Parenthood), and any

source of free care. For some victims, jail is the first place where they were able to receive any medical care.

ZnO NANOWIRES BASED BIOSENOR TO EVALUATE RESPONSES FOR DIFFERENT TYPES OF CELLS

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ZnO nanowires-based sensors are widely used for their semi conductive and piezoelectric properties. In this project, we are trying to fabricate a noble ZnO nanowire-based biosensor to evaluate responses from different types of cells. ZnO nanowires are grown on Gold coated Silicon wafer by a facile hydrothermal growth.   The sensor will be incubated with the cell solution for 12 hours, in order to ensure the proper attachment of the cells with the nanowires' surface. The Keithley device will be used to measure the electric response from the sensor. As, different types of cells will be attached differently and apply different amount of traction forces on the nanowires' surface, we are hoping to observe different electrical responses for different types of cells.   This device will be useful for characterizing different types of cells as well as their mechanical properties under different environment.

PHYSICIAN BURNOUT

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Physician Burnout is a very important issue in the health care field, and it needs to be address and decreased as much as possible. One of the most important things physician burnout has an impact on is patient care. Factors associated with physician burnout include an immense amount of pressure to provide the best possible care to patients in a fast-paced environment and conducting a lot of their work while interacting with coworkers and patients. This flash talk will discuss how to address physician burnout. The three "cardinal" symptoms will be discussed as health care professionals need to know the symptoms in order to identify a physician who is suffering from burnout.   Once a physician has been identify as suffering from burnout, interventions need to be put into place in order to decrease the burnout as much as possible. Those possible interventions will be discussed as well.

GENERATING CONVERSATIONAL ANSWERS USING DEEP LEARNING

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We have built a free form and open-ended conversational answer generator in conjunction with the Contextual Question Generator (COQG hereafter, as presented in another work), thus form a complete automatic tutoring system called VTA (Virtual Teaching Assistant). It generates quiz

questions to assess students' learning, and it is able to answer frequently asked questions from students. This VTA could be perceived as a conversational cha-bot as it automatically engages with students and answers the queries raised by students. This presentation will discuss the features and capabilities of this VTA, focusing on its conversational aspect of answering questions. An intelligent tutoring system needs a good understanding of student questions and the context where questions are raised. Future work includes improving the interactivity with students and providing higher-level answers in the Bloom's taxonomy, through deep learning and contextual analysis.

TRANSLATING ARTIFICIAL INTELLIGENCE INTO HEALTH CARE BUSINESS PRACTICES

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Artificial Intelligence (AI) is the ability of machines to act and learn on their own. These autonomously intelligent systems have been implemented across a wide range of industries, from entertainment to automotive. Considering the vast benefits of these technologies, overall, healthcare organizations should make use of the advances to increase profitability and sustainability. However, specific cautions should be taken in the application of AI systems, including in its development and its potential security risks. This research looks at the use of artificial intelligence in various fields and its ability to be utilized in healthcare. Despite the risks, healthcare managers should thoughtfully implement AI technologies to reap the benefits for their organizations, patients, and communities.

USING TELEMEDICINE TO IMPROVE PATIENT CARE OF PEDIATRIC PATIENTS

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Telemedicine has been a growing field since its first practical use in the late 1950's. Since then, telemedicine is becoming the new trend for delivering fast, effective, and efficient medical services to patients all over the world. While the majority of research and investments for telemedicine has focused on adults and elderly patients, children create a new environment where telemedicine could prove to be significantly beneficial. Key benefits will be discussed, such as increased communication, the patient centered family care model, and infection control associated with utilizing telemedicine services with pediatric patients to improve their overall care and well-being. Common barriers of cost, insurance, and push back will also be evaluated associated with telemedicine utilization for pediatric patients. Telemedicine has the potential to be the future of

modern progressive healthcare, and organizations must implement actions now to capitalize on this technology in creating a more cost-efficient and quality care driven service on one of our most vulnerable populations.

THE EFFECTS THAT RURAL HEALTHCARE PLAYS ON ITS TARGET POPULATION

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The quality of care for patients residing in rural areas within the United States is alarmingly low. The popularity of this burden for nonurban patients is becoming more prevalent within the health care industry. This issue effects many different rural health care facilities' target populations, including the elderly, children, Veterans, those who suffer from disabilities, and those who suffer from mental health issues. Through a thorough literature review, it has been found that each of these demographics are negatively affected by rural health in significant ways. Common denominators of these concerns include lack of transportation, long distances between where the patient resides and the closest health care facility, lack of insurance coverage, higher poverty rates, and low staffing in nonurban health care facilities. Within the research conducted, solutions can be implemented by using telehealth, telemedicine, and using community health needs assessments (CHNA).

PERFORMANCE EVALUATION OF THERMOCHROMIC GLAZING SOLUTIONS FOR RESIDENTIAL BUILDINGS

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The rising demand of energy worldwide has led to the need to reduce energy consumption wherever possible. The largest portion of energy consumed in the United States is through commercial and residential buildings, which account for almost 40% of energy end use. For both building types, the largest portion of energy consumed is by HVAC systems, and the second largest portion is from artificial lighting. One component of the building envelope that impacts both categories is fenestration. The goal of this research paper is to analyze the potential energy savings that may be obtained by using thermochromic smart windows in place of traditional glazing. Thermochromic windows will lead to a reduction of energy being transferred through the window openings, reducing the load on the building's HVAC system. Additionally, it may reduce the need for artificial lighting. This claim has already been proven for commercial buildings and office spaces using various simulation techniques. The focus of this research will be centered on a the potential energy savings for standard residential home in the United States, and the data will be obtained using EnergyPlus building energy simulation software.

STUDIES OF CORROSION ON PASSENGER CAR ROTORS (CAST IRON MADE)

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My research focuses on the study of corrosion on cast iron used to make passenger car rotors. As we know the brake pads and rotors are used for applying brake in vehicle. However, when the brake materials come in contact with water, and road salt solution during winter, the corrosion rate is increased and its function is impaired. Thus, in this research I am trying to find corrosion rate via different methods and compare. Finally, with this study, further research can be performed on the coating material that can enhance its function and make it more resistant to corrosion and wear.

NUMERICAL SIMULATION ON DELAMINATION OF MULTIAYER PDMS FROM SUBSTRATE AND EFFECT OF CHANGE OF CTE VALUES THROUGH THICKNESS

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PDMS is one of the most widely used silicon-based organic polymer and is particularly known for its unusual rheological properties. It is a hyperplastic polymer that is widely used as biomaterial and also used for microfluidics devices in various applications. The material shows different behavior in different thermal conditions. When oxidized PDMS is subjected to thermal stress, it produces different shape and size of PDMS flakes that is almost micrometer thin. Not only these flakes have different morphology in different conditions but also their failure process is different in each case. One of the possible failure causes might be partial oxidation of the PDMS which creates multiple layers and as the chemical composition changes the mechanical behavior also changes. Another cause might be- due to varying heating and cooling rate, the different layers might respond differently due to their varying thermal co-efficients. Other reasons might include different thermal conductivity and modulus of elasticity of the layers. As the heating/ cooling and oxidation occurs very quickly we specifically don't know which parameter/ parameters are responsible, or not for thermal deformation and delamination. Also, it is not known if the whole process is a transient one or has a steady-state end point. The goal is to observe through numerical simulation, how these flakes vary shapes and how heating/ cooling conditions & other mechanical properties change the outcomes of the whole procedure, so that we can use this knowledge to optimize the use of PDMS.

DIGITAL LASER SPECKLE IMAGE CORRELATION (DiLSIC)

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I am working on a new nondestructive evaluation (NDE) technique called Digital Laser Speckle Image Correlation (DiLSIC). It combines Digital Image Correlation (DIC), which is an advanced NDE technique commonly used to find displacement, in-plane strain, as well as deformation and the use of laser speckle patterns. In order to perform DIC, artifact speckle patterns must be applied manually to the surface of a specimen. Often the application of artifact speckles is not desirable or possible. DiLSIC needs no artifact speckle patterns to be applied to the specimen as a preparation for nondestructive testing. This method broadens the usage of the DIC technique to situations which previously were not possible.

DETECTION AND ANALYSIS OF HARD-LANDING AND NEAR-MISS WITH AVIATION FLIGHT DATA ANALYTICS

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Hard-landing and near-miss are two important factors of flight safety in aviation management, as miscalculation in any of them could lead to passengers discomfort or in some cases, a catastrophic disaster. This presentation aims at detecting the hard-landing and near-miss in our Cessna 172 with G1000 and hence providing safety measures to avoid them in our flight training. There are several devices that are available in industry to detect hard-landing and near-miss, such as piezoelectric accelerometers, which measures the depth of the shock absorbers of the landing gear among others. Sometimes it is also reliable to detect physiologically by a pilot who feels strong acceleration and reports it. However, this kind of industry devices is not available here in our College. This paper aims at detecting hard-landing and near-miss incidents by data analytics. A software package has been developed to process, analyze, and visualize the flying data. This software tool aids in uploading all the raw data from the microchip of the flight to a cloud database. The data is then queried to the backend by applying appropriate constraints. Further processing is done to filter out unnecessary rows and data pertaining to hard-landing and near-miss. They are sent to the front end for user to view through a web browser. We hope this tool will help improve safety and quality of our aviation flight program.

THE OPIOID CRISIS: AN EXPLORATION OF SOCIAL DETERMINANTS AND ARTIFICIAL INTELLIGENCE

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The opioid crisis in the United States has reached epidemic proportions. There is much to learn about the opioid crisis through a study of social determinants and new health care technologies, such as artificial intelligence. Exploring methods of using this technology, as well as other applicable methods of assisting providers of patient care is vital in reducing this crisis level issue. The goal of this research is to understand the opioid crisis as it relates to the United States, review historical issues related to social determinants as they correlate with opioid abuse, and explore possible forms of healthcare technology, such as artificial intelligence and how they may be used to aid in reducing opioid abuse.

AN INTELLIGENT TUTORING SYSTEM USING DEEP LEARNING

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In this work, we present a Contextual Question Generator (COQG hereafter), a deep neural sequence-to-sequence model for the task of generating factual questions from an input paragraph, which could be used in a conversational context. In a sense, COQG can be directly used as an intelligent teaching assistant to assess students' knowledge in a general course topic. Complementing with any machine comprehension models, such as SQuAD from Stanford University, COQG can be used as full–fledged intelligent tutoring system, which can ask questions in much more natural way and find whether the answer given by users is correct or not. A system that complements COQG is presented as a separate work. We use the popular encoder-decoder model, combined with an attention and a copy mechanism to generate questions. One of the key features of COQG is its contextual nature, that is, the input to our model is not only the paragraph and the rationale, but also the conversation history.