



Book of Abstracts

**The CUNY Research Scholars Program & Louis Stokes
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Heat Shocked Porous Media: X-ray Experiments to Reveal Abnormal Nutrient Distribution in Mineral-Rich Fruits

Aravis McBroom, Aaliyah Salmon, Joanna Syska
Prof. Subhendra Sarkar, Eric Lobel

Previous works from our laboratory studied X-ray and MR imaging of first-row transition metals in a porous matrix of fruits as models for biological systems. We hypothesize that Fe, Cu, and Mn distribution depend on surface charges and surface areas available and is responsible for biomineral distribution at the cortex and cores. Hence, this work aims to generate enough low-energy X-ray scatter radiation without using heavy metals or high keVs to image minor mineral distributions at different regions of a model biological tissue. Although porosity and texture vary substantially in many tumors, the density and composition do not. In addition, X-rays are not sensitive to firstrow transition metals that are vital for biochemical pathways. For this reason, tumor imaging is challenged by routine X-rays that primarily depend on tumor density or a high degree of metallic compositions, which are not naturally present in tumors. This work plans to demonstrate if spectrally and angularly divergent X-ray beams using Compton energy loss by alkali halide layers can produce observable image differences from region to region due to texture and pore variation in dry fruits geometry than hard beams without broad scattered X-ray contents.

Designing a Student Questionnaire to Research Issues of Retention in the Communication Design AAS/BFA Program

Abdullah Momin, Frank Lema
Prof. Daniel Wong

The purpose of this research touches upon the understanding of why students withdraw from different courses within communication design at any stage. Student retention in the program is a big concern. We do not know the exact reasons why they leave the program. We will help to Identify the problems students might face, such as scheduling conflicts and teacher-related issues, which is critical to finding effective solutions. Additionally, it is important to identify ways to keep students engaged and excited about the program, which can help increase student participation rates. By understanding course content and program expectations, students can feel more engaged with the curriculum, leading to higher learning rates. The reasons why students leave the program after the first year must be identified/fixed. One possible explanation is that first-year course lists do not match their initial interests or expectations. This issue can cause students to become frustrated and unmotivated to continue with the program. Another problem is the unmanageable scheduling of courses, which can make it difficult for students to balance their academic and personal commitments. In addition, some students may find it difficult to work with professors due to their teaching methods or general character, which may affect their motivation to participate in the program. Finally, some students may simply find a greater interest in another major and drop out. By understanding these reasons, communication design programs can make the necessary adjustments to better meet the needs and interests of students, ultimately leading to higher student retention. We aim to execute a variety of activities. We are designing a set of questionnaires to collect information on student motivations, expectations, and

frustrations. The questionnaires will cover multiple aspects, including who, what, where, why, when, and how, to achieve a comprehensive understanding of the challenges faced by students. The questionnaires will be distributed at key points during the semester and to specific courses to obtain relevant data. The obtained responses will be evaluated to provide feedback that can be utilized to enhance future course instruction. The students will be categorized into various groups to better comprehend the diverse challenges faced by each group. We will also create Miroboard to visualize the research design and outcome analysis. Additionally, previous research endeavors will be scrutinized, and prior initiatives will be expanded upon to ensure that the research is exhaustive. With a new questionnaire for students, we hope to discover the reason for students dropping out. School schedules not lining up with theirs, course expectations not being met, or even poor connection with professors. With that, we look forward to adjusting the courses into being more interactive with students. Keeping freshman numbers from dropping. As well, with continued interviews, we look forward to expand more into the skills necessary for future COMD graduates in their fields of preference.

Potential Application of Alkali Halide Filters for Imaging of Key Minerals in Fresh Porous Fruits

Angela Moore, Katie Tam

Prof. Subhendra Sarkar, Evans Lespinasse

There is a significant interest in quality control of salts by mammography imaging and electrical resistance measurements. This experiment shows X rays can be manipulated by salt filters to generate modified beams based on Compton scattering. This can be used to enhance or steal intensity from nearby iron complexes that are difficult to image by high energy commercial X ray beams. This will be extended for various salts including effects of Gd complexes to prepare scattered X ray beams (dispersed in energy spectrum). While it is accepted that dry fruits maintain the nutrient content, our prior works by this group have shown a dynamic readjustment in mineral distribution with heat shocks and drying of fruits. The researchers hypothesize that iron (Fe), copper (Cu) and manganese (Mn) distribution depend on surface charges and surface areas available and is responsible for biomineral distribution at cortex and cores of fruits. A drawback of current characterization tools is the lack of knowledge about oxidation or charge states of nutrients and minerals during ripening and drying of fruits. The role of moisture in tissue is hard to understand but seems to control internal tissue geometry. This work plans to demonstrate if spectrally multi energetic X ray beams produced by alkali halide filters can characterize the porosity changes between fresh and dried states in model fruits. A potential application would be the tissue structure changes in radiation resistant tumors and during wound healing where tissue fluid affects imaging results. Current radiological tools with X rays or MRI do not address such internal tissue texture changes. This work focuses on the role of moisture or tissue fluid on X ray scatter compared to dry tissue.

Studying Factors of Environmental Injustice and Ways to Achieve Equity

Arham Hussain, Reginald Metellus

Prof. Marzi Azarderakhsh

In this day and age, the biggest concern for current and future generations: the environment. The urban heat island (UHI) with its significant energy, health, and societal impacts is among the major environmental issues in urban regions, especially in historically underserved and socially vulnerable communities (HUSVCs). In the 1930s, the former federal agency, Homeowners' Loan Corporation (HOLC), created "Residential Security" maps of major cities known today as "redlined" areas. These neighborhoods were often designated as "hazardous" due to the high percentages of people of color living there. Consequently, this leading to systematic disinvestment based on race. While the program ended in 1968, the impacts of discriminatory lending are still experienced in redlined areas in the form of urban hotspots. Fortunately, the advent of new technologies and availability of environmental data from satellite alongside ground observations such as ArcGIS and QGIS, could improve our understanding of these heat impacts as well as be used to develop, assess mitigation, and resiliency strategies.

How Will Climate Change Affect the Future

Ashanti Belone

Prof. Farrukh Zia

Climate is an important aspect of the world we live in today. It dictates the major characteristics of our lives . Climate dictates whether our crops will grow or not , the clothing we wear , the food we'll be able to eat , plant and harvest and so much more . The main question is how it will affect the future as there are many effects happening now in the ecosystem we currently have and they are not beautiful . These effects will lead to tremendous circumstances that we will have to navigate changes toward. Necessary changes are needed to prevent a nuclear wipeout of the earth we know and love . If our climate is not where it's supposed to be then our lives will change drastically and definitely not for the best and the world we come to know and love will eventually be no more.

STEM or Social Studies: Online Education Preference Based on Subject Area

Fatimah Asad

Prof. Lubie Alatraste

In this project, we can examine the benefits of online education as well as its shortcomings. We aim to look at specific areas such as STEM and compare them to social studies. We want to see if there is any difference in how students perceive online education based on their area of study. We hypothesize that STEM may be more challenging to do online, but our results, which we can collect via carefully designed survey instruments, will either confirm or disconfirm the hypothesis. Online learning is one of many ways that students can learn, apart from being in their in-person classrooms. At the height of the pandemic, remote, or online learning, was the singular

and the only way that students were able to continue their education safely. Through this brief introduction to the world of technology, teachers and students worked together toward a common goal: furthering education. Yet, sometimes, the goal was not always clear, as we were all in an environment that had its limitations. Could I learn even with background noise? What about when my internet goes out? What if my teacher's internet goes out? Considering a time that did not leave many options, we can examine the benefits of online education as well as its shortcomings. By looking at specific areas such as STEM and comparing them to our research studies, we can effectively see how students perceive online education. Online education, currently, is not considered to be favorable amongst in-person or hybrid learning. Rather, in the conducted study, students share no favoritism and do not share any preference toward a particular learning method. 4 students shared that they prefer in-person learning, 4 students shared that they prefer hybrid learning, and 4 other students shared that they preferred remote learning. Our experience with COVID tells us nothing about the possibilities of publicly available virtual learning as part of our educational environment since most teachers were inexperienced virtual teachers and few had the assistance or time to learn how to teach successfully online. We know that effective education, both virtual and in-person, involves students interacting with the teacher and with one another about the subject (Durant, 2022). Every student works differently. One student may prefer writing notes on flashcards before an assessment; whereas, another student may prefer just glancing over their homework. Regardless of their studying habits, the newly-implemented instructional policy has created a system that has affected every student's school routine. Last year, waking up early in the morning was the norm. In contrast, most students now wake up minutes before their classes to attend the class for roughly four hours a day. Although many may argue that a shorter school day should be considered easier for students, the new remote learning environment has conclusively led students to spend their days staring at a device absorbing little to no information. The adverse effects that remote learning has on a students' mental and physical health can be derived from how students are easily distracted due to their surrounding environment. Most students do not have a suitable home environment for remote learning, for which they might opt for the blended learning option. Over the years, the discipline has accumulated knowledge regarding how to give successful in-person training. However, virtual learning has not been widely used prior to March 2020. Many students initially struggled to gain access to a comprehensive instructional program, and even while schools' attempts to give students with digital access succeeded in many locations, teachers were experimenting with foreign pedagogies, with typically poor outcomes (Binkley, 2022). Increased contact points between instructor and student and between peers (e.g., phone calls, small group teaching, and focused feedback) improved the quality of virtual learning, but few teachers have learnt how to foster dynamic interactions in their classrooms (Mineo, 2022). As a result, for many students, virtual learning is still a poor substitute for in-person education.

Development of Practical Method to Quantify Infiltration Rate Through Building Entrance

Ferasuddin Siddiqui, Louidelson Deguerre, Steven Boodram,
Prof. Daeho Kang

Infiltration has a large impact on the energy consumption of a building and indoor air quality. To that end, it is critical to understand the characteristics of the natural airflow through the building entrance that is one of the main sources of infiltration. While some studies conducted field measurements, the impact of infiltration on building energy consumption and indoor air quality has not been well studied. This study aims to establish a comprehensive method to characterize such natural airflow in buildings. Literature review suggested that the differential pressure between the outdoor and indoor air affects the direction of airflow, along with the outdoor weather conditions. An effective method to help measure infiltration is trace gas method. This allows us to evaluate the performance of air curtains and other systems used to help control the entrance of outdoor air which bring in air pollutants and moisture. Indoor temperature needs to be monitored to understand the air diffusion of the mixture throughout the lobby area. Given lack of such experimental studies, further study is required to accurately control air infiltration, which results in lowering buildings carbon footprint and maintaining comfortable indoor environment.

Animal Research and Mother Cells

Fernando Santana Perez
Prof. Lubie Alatraste

The subject of mental health is a topic that is talked about a lot, but it is not given much attention either, which is not surprising and is completely understandable, since many of us have more important things to do and we forget that the Mental health is just as important as physical health. My focus on mental health and medical sciences will be on university students and medical patients mostly with diseases that carry a bad stigma or cloud of sadness as terminal illnesses, since poor mental health can affect their bodies already weak from the tragedy that they are living day by day. The purpose of my research is to raise awareness not only on our campuses, hospitals and homes, but everyone in general and make them reflect a few minutes a day about mental health and just talk about something that many people have as a taboo or something that that they are ashamed to speak publicly or that they simply no longer give it the required importance. The reason why I mixed mental health with medicine is because despite seeing it every day, not many stop to think about their own mental health or that of those around them. Students live under constant stress of always living up to class expectations, a specific grade, or simply not knowing what to do with their lives. Medical patients are a separate but similar case, as many people are involuntarily unaware of what they suffer on a day-to-day basis, knowing that they may not survive or that they are a large financial burden on their families, with the elderly being the most affected. For the data collection I will use a questionnaire of 6 questions (in addition to the demographic ones such as age, GPA, semester, major, etc) in order to analyze the relationship between demographics, age and the responses of NYCCT students, since the questionnaire would serve to find out what percentage of students have mental health

issues, how to solve them and what is their level of awareness or perspective on the mental health of their sick relatives or acquaintances in order to generate a change in our community, and later, our American society.

The Impact of Polio onto the Modern US Healthcare System

Gabriel Martinez

Prof. Jose Martinez

Air ambulances are an essential part of contemporary healthcare, enabling healthcare providers and first responders to quickly transport injured and critically ill individuals. However, the costs associated with this vital transportation service have skyrocketed in recent years, most notably in our past decade, a familiar sounding story in many aspects of healthcare. This research exposé examines the implications of the rising cost of air ambulances on patient access and the financial burden by utilizing a systematic review of already existing literature and data analysis.

Additive Manufacturing Process Development of Geopolymer Based Habitable Construction on Space

Husnain Khan

Prof. Akm Samsur Rahman

Extraterrestrial travel and housing are topics that have come up in recent times. There is a possibility of living on the moon. In order to do that while keeping costs at a minimum, we are researching and developing a geopolymer using lunar dust to 3D print houses on the moon. Because we are using lunar dust, the number of materials that need to be shipped out gets cut dramatically. We are studying the composition of both lunar mares and lunar highlands in order to fully understand what needs to be added to make a strong durable geopolymer that can withstand the varying factors and temperaments of the moon. By looking at aluminum and silicon ratios, as well as KOH, we aim to create a geopolymer that can make houses on the moon.

City Prime: A Heteromorphism Robot

Iqra Khan

Prof. Xiaohai Li

In this research project, we will design and develop a heteromorphism robot that can reform its structure and locomotion mechanism between a ground rover and a humanoid robot depending on the environment, terrain, and desired tasks. Such robots may find great use in disaster search and rescue situations. Our project will create a novel robotics platform that may lead to new application opportunities for robotics in disaster response, service, education, and other related fields. In this project, we will first design and build a humanoid robot, then create additional

morphism and locomotion mechanism design, and add and integrate additional components to enable heteromorphism . We will program the robot to perform various tasks including changing from a ground rover form to a humanoid form. Currently we are working on designing a testbed, testing the servos, and determining the torque requirements of the motor used in the robot's design. This will enable us to ensure that the motor can withstand the weight of the robot's body in both its ground rover and humanoid forms. Once we have determined the required torque, we can finalize the project design.

Code Cyber: Using an AI model to Analyze the Rate of Inflation in the United States within a Statistical and Data Science Context.

Jason Lin, Ethan Pruzansky, Kazi, Tasin, Tanvir Rahman

Prof. Patrick Slattery

Artificial intelligence (AI) attempts to replicate human intelligence in robots trained to think and act similarly to humans. The word can also be applied to any computer that demonstrates characteristics linked with the human mind, such as learning and problem-solving—improving critical business processes by accelerating and refining strategic decision-making processes. To determine the inflation rate in the United States, we intend to employ an AI model. By creating an AI model to find the inflation rate, we can predict and determine how high it might become throughout the coming years as the US dollar loses its value yearly. We will explore how data science helps people discover how it can be used in real-world situations, such as determining the inflation rate. We will be compiling the data in an easy-to-read format that is straightforward and coherent for the average user. We also aim to highlight the importance of data science in our project.

The Impact of Climate Change

Junxi Chen

Prof. Ann Ngana Mundeke

Climate change is long term shifts in temperatures and weather patterns by human actions. as most scholars including physicists, climatologists, meteorologists, historians, and geographers would agree. However, Climate change has brought significant and increasingly devastating changes to the world. This Research Project points out the main factors that cause climate change. The impacts of Climate Change are numerous including economic impacts, social impacts, and environmental. This project focuses on the economic impacts of climate change. The study recalls recent cases of natural disasters and the tremendous economic impacts they have caused.

Comparing Skin Entrance Doses in Abdominal X-Ray With and Without Shielding

Lauren Gordon, Liana Reid, Ollana John

Prof. Anthony DeVito

Practicing radiation safety methods can reduce dose to both the patient and the radiographer. The purpose of this research is to evaluate dose absorbed on the surface of the patient's skin by analyzing the differences between the presence of a using a lead shield vs no lead shield. Also, to demonstrate that using a shield is effective in reducing dose. The test subject is a full body phantom, and the x-ray position is Abdomen AP KUB. All technical factors remained the same (40" SID, OID kept at a minimum, 85 KV, AEC. In the first radiograph, the pascal dosimeter was placed in the collimated light field under the shield, and in the second radiograph in the same area but with no shield present; The dosimeter was placed on the patient to observe dose. Collimation was 14"x17" for both radiographs. In the radiograph without the shield, the dose to the patient was 281.6 µgy and in the radiograph with the shield present, the dose was 5.062 µgy. There is a 55% reduction in dose when a shield is used. This research is useful in radiation protection and reinforces the importance of using radiation safety practices to reduce dose exposure.

The Motivating Factor Towards a Career in Radiologic Technology and Medical Imaging at New York City College of Technology

Makadeer Kassim

Prof. Jennett Ingrassia

For this project, our aim was to understand the reasons that motivate students to enroll in the Radiology Technology & Medical Imaging major. Despite its high competitiveness, some students may feel discouraged from pursuing this major without fully exploring all the options available to them. After talking to some people and conducting our own research, we realized that many of us lacked the information necessary to succeed in this field. The focus of our research is to provide information to students and collect data on their knowledge prior to deciding on the Radiologic Technology major. We will begin by seeking information from students currently enrolled in the RAD 1124 Introduction to Radiologic Technology course at City Tech. We will inquire about their reasons for taking the course, such as their interest in the Radiologic Technology profession or their need to fulfill a full credit load for the semester. Additionally, we will ask them about the modality in the field they want to pursue and whether they are aware of how City Tech can support them in achieving their goals. To gather this information, we will focus on demographics, such as gender and ethnicity, and other influential factors. Reading numerous research articles about the motivational factors behind pursuing a career in the health field provided us with a clearer understanding of what aspects to emphasize in our survey. Our poster will cover these topics and outline the information we gather through our research, which will allow us to continue this research for our survey. We are excited to learn more as we proceed with our project.

Green and Passive Architecture Prototyping

Mohammed Jalloh

Prof. Alexander Aptekar

The evaluation is specific to the project location. We worked on determining the embedded carbon and ecological costs of different materials, also comparing traditional light wood frame

construction to advanced design straw Bale construction. Start to looking up the different amounts of carbon that both materials would require and the distances suppliers to the site so that you can determine the transportation costs of the materials.

Database Migration: A Study of Challenges for DBMS Users and Administrators

Rex Wong
Prof. Patrick Slattery

Many organizations store volumes of data in relational databases of different designs and make. Now that large data sets are becoming more accessible to researchers and the public in general, those interested in available data would want to import and look at data for more efficient data analysis or improved data accessibility. One approach to parsing data into a database is converting a database schema into one accepted by the user's DBMS. Another way of parsing data into a new system is by importing the raw data and building a new schema based on the old database. This study will investigate these two migration methods by migrating multiple Microsoft Access databases to SQL Server and SQLite. Research on data migration between multiple DBMSs provides a history of complex technical and logistical problems as Database Systems age and new systems, such as Object-Oriented Database Management Systems, mature. However, this study focuses on the challenges of database migration for more minor use cases and users new to database management systems. Our study is essential as access to database tools allows individuals and small businesses to leverage databases and data analysis. However, this study finds that further research should emphasize the best or most common analysis strategies upon deployment of a DBMS.

X-Ray and MRI Theory for Mineral-Rich Fruits Affected by Heat Waves During Climate Change

Sabina Rakhmatova, Somdat Kissoon, Zuonie Ke
Prof. Subhendra Sarkar, Zoya Vinokur, Lillian Amann

This work extends the inelastic x-ray scattering by Compton effect from individual atoms to simple molecules with electrons available in molecular valence orbitals. We started with the theory of Compton type angular scattering by individual alkali and halogen atoms and observed anomalous scattering results from alkali halide salts with molecules arranged in regular halide lattices. We are modeling the results in terms of two novel concepts, that may be named as "Compton Harmonic Generation" and "Compton Steal" and are presented in this work.

Lookism: An Investigation Into Discrimination in Workplace Practices

Shana Ramnarain

Prof. Alyssa Dana Adomaitis

The term “beauty prejudice”, otherwise known as “Lookism” is a term to describe appearance discrimination or “the practice of discrimination on the basis of physical appearance in the workplace” (Ghodrati, Joorabchi, & Muati, 2015, p.1). This phenomenon can result in unfair or biased treatment in the workplace environment based on favorable & superficial terms. Social media is the most used platform to determine the value of these beauty biases, encouraging the obsession over “looks” in order to receive workplace benefits for the youth. This issue requires a method to examine lookism prejudice that may exist on social media. A multitude of features were examined, such as dress, hair style, position more of a specific control and experimental group in order to determine this method of identification. These characteristics were compared to those of luxury brand presentation on social media, to determine the most preferred traits. The results yielded consisted of a bias towards males presented professionally, while non-white women were portrayed sexually; more can be concluded on the basis of Symbolic interaction Theory.

Importance of Incorporating Computer Ethics in Computer Curriculum

Tiya Williams

Prof. Elizabeth Milonas

Diversity has become a buzzword in the technology industry, and for good reason. The computer industry has been known for its lack of diversity. This lack of diversity poses a significant challenge, as it can hinder innovation and limit the industry’s potential for growth. The objective of this research is to uncover the reasons why diversity is so crucial in the computer science industry. I used surveys to investigate the importance of diversity from inside and outside of the computer science industry. I also conducted surveys for professionals at different levels in the industry. I also completed thorough research through CUNY colleges to find which colleges have diversity in their computer science departments. The data suggest that diversity has significant advantages within the computer science industry including innovation. With a diverse group of employees , companies can atop into a broad range of ideas and perspectives, leading top the development of new and unique products and services. Additionally, diversity can lead to better problem-solving skills and more efficient decision-making, as a team with diverse backgrounds can offer a variety of viewpoints and approaches to solving problems. These conclusions are more detailed than those in the past because it shows the potential top address the industry’s existing biases. Unconscious bias can impact recruitment, hiring and promotion practices within the technology industry, leading to a lack of diversity within the workforce. By

actively promoting diversity, companies can counteract these biases and create a more inclusive work environment.

Green Roof Media Parametric Study Methods

Yehya Elfgeeh

Prof. Ivan Guzman

Green roof farms have contributed to deliver the benefits of the suburban environment to the urban setting. If every commercial building has a green roof farm, we can reduce the amount of energy needed to heat/cool the building. However, buildings have a limited capacity to withstand the additional loads imposed by a green roof including green roof infrastructure, growing media, and vegetation. These additions need to be light in weight, so buildings can carry them without adversely affecting the structure. Adding repurposed textile to lightweight engineered soil can modify the hydraulic properties of the soil without compromising its weight. The project focuses on studying the effects of adding textile to green roof soil on the unit weight, water content and hydraulic conductivity of the host soil. In previous findings, adding textile fabric (3% by weight at an aspect ratio of 1:1) to lightweight engineered soil resulted in a significant change to the hydrogeological properties of the host soil. During the ongoing study we are mixing lightweight engineered soil with similar repurposed textiles at an aspect ratio of 4:1 and recording any changes in said properties. During the study the effects of aspect ratio on hydrogeological properties will be documented and compared to previous findings as part of a broader parametric study.