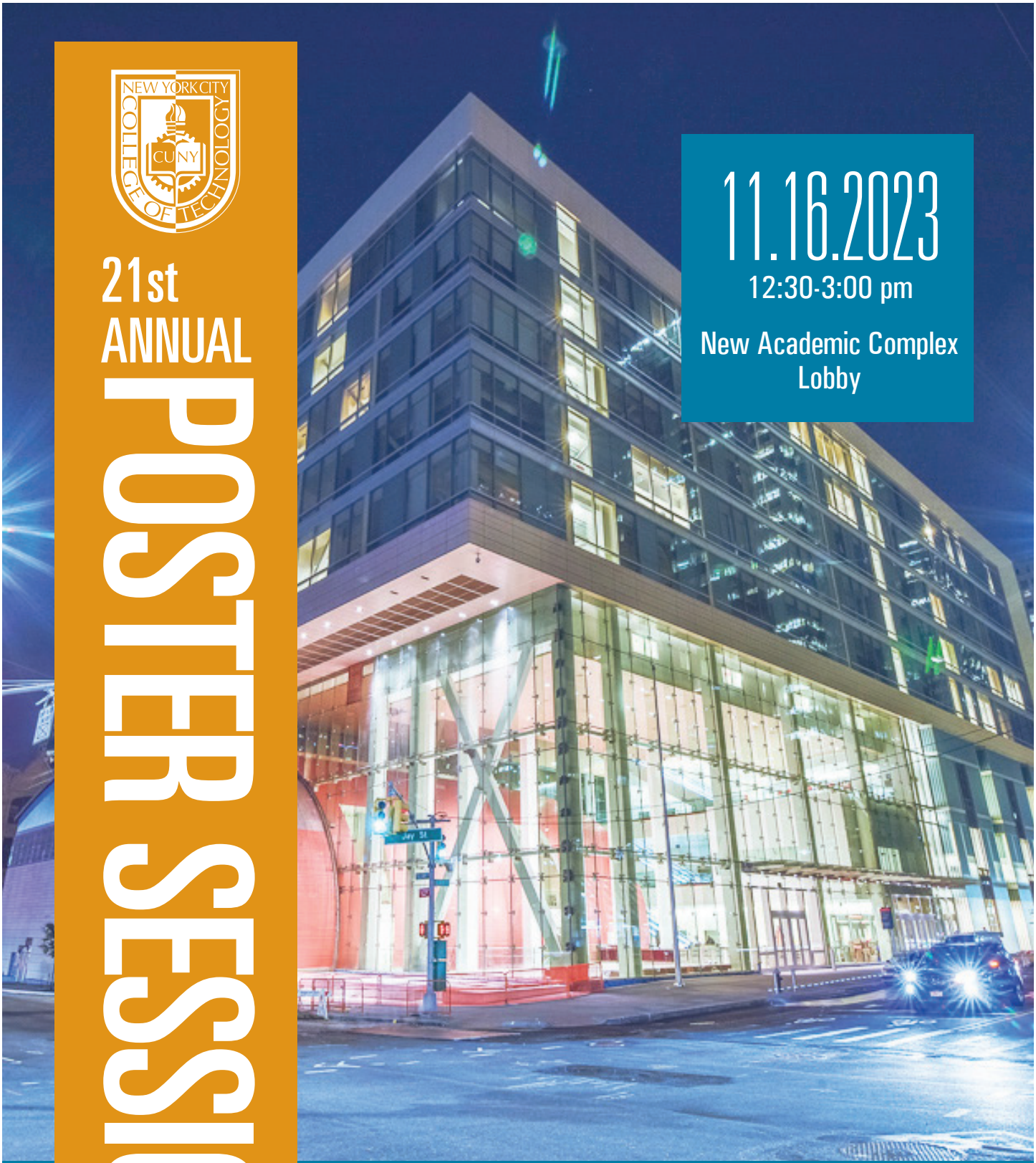

21st ANNUAL POSTER SESSION

11.16.2023

12:30-3:00 pm

New Academic Complex Lobby

A Showcase of City Tech Faculty and Students' Research and Publications

BIOLOGY AND HEALTH SCIENCES

BUSINESS

CHEMISTRY

COMPUTER ENGINEERING AND INFORMATION SYSTEMS TECHNOLOGY

EDUCATION

ELECTRICAL, MECHANICAL AND CIVIL ENGINEERING

HUMANITIES, SOCIAL SCIENCES AND ENGLISH

MATHEMATICS

PHYSICS

21st POSTER SESSION, 2023

12:30 pm - 3:00 pm

WELCOME AND GREETINGS

1:00 pm -1:15 pm

Dr. Russell Hotzler
President

Dr. Pamela Brown
Provost

Dr. Reginald Blake
Associate Provost and Dean of Curriculum and Research

Dr. Justin Vazquez-Poritz
Dean of the School of Arts & Sciences

Dr. Gerarda Shields
Dean of the School of Technology & Design

Dr. Maureen Archer
Interim Dean of the School of Professional Studies

AWARDING CEREMONY

1:15 pm -1:30 pm

ONE-MINUTE FACULTY POSTER PRESENTATION

1:30 pm -2:00 pm, Auditorium A105

12:30 – 3:00 pm

Informal Q&A in the lobby with refreshments.

The program is organized by topics rather than by departments. Frequently the presentations are cross-disciplinary or difficult to assign to the discipline represented by the department with which the presenter is affiliated.

AWARDING CEREMONY

The Organizing Committee of the 20th Annual Faculty and Student Research Poster Sessions has selected for special recognition the following awardees from among over 55 excellent posters. The names of presenters of the awarded posters are given in bold and identified with an asterisk*.

20th POSTER SESSION AWARDEES, 2022

Nazanin Hedayat Munroe.*

The Digitization of Fashion.

Ivana Radivojevic Jovanovic,* Colleen M.B. Gallagher, Ramsey Salcedo, Wayne W. Lukens Jr., Jacopo Samson, Charles M. Drain, Donna McGregor, Benjamin P. Burton-Pye, and Lynn C. Francesconi.

Reduction of Pertechnetate by Chemical and Photochemical Approaches and Incorporation of Tc(IV) into Titanium Dioxide.

A. F. Patricia Medina.*

Heuristic Framework for Multi-Scale Testing of the Multi-Manifold Hypothesis on 3D LiDAR Point Clouds.

POSTER SESSION

BIOLOGY AND HEALTH SCIENCES

1 **WintPyae LynnHtaik**, **Tassadit Lounes**, **Raecine Greaves**, **Mehnaz Hoque**, and **Pegah Khosravi**. LightCnnRad: A Lightweight CNN for Efficient Radiology Image Analysis.

2 **Subhendra Sarkar**. Secondary electron scattering with Compton origin in simple to complex porous solids: developing a new generation of spectral x-ray imaging for medical and industrial applications.

3 **Sitaji Gurung**, **Christian Grov**, **Terry T-K Huang**, **H. Jonathon Rendina**, **Kit N. Simpson**, **Stephen Scott Jones**, **Demetria Cain**, **Richard Zhao**, **Tyra Dark**, and **Sylvie Naar**. Metabolic Syndrome and Cigarette Smoking as Cardiovascular Risk Factors and Their Association with Detectable Viral Load Among Youth Living with HIV: A Multi-Site Study of Electronic Health Records.

4 **Juan Rivera-Correa**, **Ana Rodriguez** and **Maria F. Yasnot-Acosta**. Investigating the Influence of Co-infection with Soil-Transmitted Helminths (STH) or Epstein-Barr Virus (EBV) on Humoral Autoimmunity in Malaria.

5 **Khrystina Vyprynyuk**. Surface Disinfection in a Dental Setting.

BUSINESS

6 **Denise H. Sutton**. Rudolf Steiner and *Lebensreform*: The Case of Dr. Hauschka Skin Care and Weleda Beauty Brands.

7 **Alyssa Dana Adomaitis** and **Diana Saiki**. Developing a Method to Study to Examine Lookism on Social Media.

8 **Nazanin Hedayat Munroe**. Sufi Lovers, Safavid Silks and Early Modern Identity.

CHEMISTRY

9 **Alberto Martinez**. Synthesis and Evaluation of the BACE 1 and AChE inhibition of Caffeic Acid Derivatives.

10 **Ivana Radivojevic Jovanovic**, **Colleen M.B. Gallagher**, **Ramsey Salcedo**, **Hossam Elshendidi**, **Jacopo Samson**, **Charles M. Drain**, **Donna McGregor**,**Wayne W. Lukens Jr.**, **Benjamin P. Burton-Pye**, and **Lynn C. Francesconi**. Reduction of Pertechnetate by Chemical and Photochemical Approaches and Incorporation of Tc(IV) into Titanium Dioxide.

COMPUTER ENGINEERING AND INFORMATION SYSTEM TECHNOLOGY

11 **Vincent Banek**, **Jordan Clarke**, **Sajeevan Rangeswaran**, **Mohammad Wahad**, and **Aparicio Carranza**. Efficient Internet of Things (IoT) Based Agricultural Automation System.

12 **Nelson Feng Feng**, **Imerson Memko**, **Alusine Jalloh**, and **Aparicio Carranza**. Server Fortification for Web Exposure.

13 **Eric Gadesseh** and **Aparicio Carranza**. Comprehensive Study on Cloud Computing Security Threats and Preventive Measures.

14 **Shannon Mars** and **Aparicio Carranza**. Performance, Optimization and Security Enhancement of Virtual Networks in VMware Workstation.

15 **Alex Miller**, **Raymond Manaf**, **Indrid Puka**, **Timothy Khan**, and **Aparicio Carranza**. The Operations and Safety Behind Using Virtual Machines.

16 **Ibrahim Muhammad**, **Justin Andrew**, **Clifford Compere**, **Jeremiah Champagnie**, and **Aparicio Carranza**. Business Potential Maximization Using Cloud Computing for Enhanced Productivity, Efficiency and Innovation.

17 **Pranto Bala**, **Kevin Roa**, **Modhumita Dey**, and **Aparicio Carranza**. Cloud Networking Framework: Connectivity, Security, and Scalability in the Digital Age.

18 **Peter Dinh**. Mobile Application for Skin Cancer Classification Using Deep Learning.

19 **Marcos S Pinto**. Genetic Algorithm in Machine Learning: Image Reconstruction.

20 **Yu-Wen Chen**. Successive Interference Cancellation Based Defense for Trigger Backdoor in Federated Learning.

EDUCATION

21 **Diana Samaroo** and **Ivana Radivojevic Jovanovic**. Strategies to Improve Career Mentoring of Chemistry Undergraduates.

22 **Sandie Han**, **Diana Samaroo**, **Nadia Kennedy**, and **Urmi Duttagupta**. The Impact of a Scholarship Program in Supporting Undergraduate Women in Applied Mathematics and Computer Science.

ELECTRICAL, MECHANICAL AND CIVIL ENGINEERING

23 **Samaneh Gholitabar**. Risk Analysis of Delay on Construction Schedule Due to High Wind.

24 **Max Rios Carballo**, **Xavier Brown**, and **Andy S. Zhang**. The Potential of the Implementation of Offline Robotic Programming into Automation-Related Pedagogy.

25 **Susan Brandt** and **Anne Marie Sowder**. Contextualising Tragedy in Places of Assembly Through Cases of New York City Social Club Fires.

HUMANITIES, SOCIAL SCIENCES AND ENGLISH

26 **Inés Corujo Martín**. Latin American Fashion and Style.

27 **Lisa Pope Fischer**. Goulash Populism as Neo-Revitalization Movement: Political Ideology and Coping.

MATHEMATICS

28 **H. Schoutens**. A Model of ZFC Inside the Category of Compact Hausdorff Spaces.

29 **A. F. Patricia Medina**. Heuristic Framework for Multi-Scale Testing of the Multi-Manifold Hypothesis on 3D LiDAR Point Clouds.

30 **Qing Chen (Charlotte)**, **Dezjeron Dorsey**, **Mark Hughes**, **Mia McGuire**, , and **F. Patricia Medina**. NLP Analyzing on Mental Health Issues among College Students using Reddit Data.

31 **A. F. Patricia Medina** and **Randy Paffenroth**. The Neighbor Matrix: Feature Engineering Dimension reduction to Improve Machine Learning in 3D Point Clouds.

32 **Alexander Rozenblyum** and **Satyanand Singh**. On the Pythagorean Reciprocal Identity $a^{-2}+b^{-2}=d^{-2}$ and the Generation of All Solutions for Fixed $d>0$.

33 **A. F. Patricia Medina** and **Rasika Karkare**. Product Coefficients on Dyadic Sets Applied to 3D Point Clouds.

PHYSICS

34 **Charlotte Welker**. The Gotham Web Lab: understanding how galaxies evolve in the cosmic web.

35 **A. Ferroglia** and **M. C. Fiolhais**. The Dirac-Delta Rogue Wave.

36 **J. Luo**, **C. R. Malvino**, and **R. Ya. Kezerashvili**. Exactly Solvable Two-body Problem in Two-dimensional Quantum Mechanics.

37 **C. Olsen** and **C. Welker**. Finding Fingerprints of Filaments with Galaxy Star Formation Histories.

38 **Pedro Sotomayor**, **Keven Cruz**, **Mikheil Vardoshvili**, and **Vitaliy Dorogan**. Fabrication of 2D Semiconductor Materials by Exfoliation Method.

39 **A. Spiridonova** and **R. Ya. Kezerashvili**. Superfluidity of Indirect Excitons in Transition Metals Trichalcogenides van der Waals Heterostructures.

ONE-MINUTE FACULTY POSTER PRESENTATION

1 **Sitaji Gurung**, **Christian Grov**, **Terry T-K Huang**, **H. Jonathon Rendina**, **Kit N. Simpson**, **Stephen Scott Jones**, **Demetria Cain**, **Richard Zhao**, **Tyra Dark**, and **Sylvie Naar**. Metabolic Syndrome and Cigarette Smoking as Cardiovascular Risk Factors and Their Association with Detectable Viral Load Among Youth Living with HIV: A Multi-Site Study of Electronic Health Records.

2 **Juan Rivera-Correa**, **Ana Rodriguez** and **Maria F. Yasnot-Acosta**. Investigating the Influence of Co-infection with Soil-Transmitted Helminths (STH) or Epstein-Barr Virus (EBV) on Humoral Autoimmunity in Malaria.

3 **Nazanin Hedayat Munroe**. Sufi Lovers, Safavid Silks and Early Modern Identity.

4 **Ivana Radivojevic Jovanovic**, **Colleen M.B. Gallagher**, **Ramsey Salcedo**, **Hossam Elshendidi**, **Jacopo Samson**, **Charles M. Drain**, **Donna McGregor**, **Wayne W. Lukens Jr.**, **Benjamin P. Burton-Pye**, and **Lynn C. Francesconi**. Reduction of Pertechnetate by Chemical and Photochemical Approaches and Incorporation of Tc(IV) into Titanium Dioxide.

5 **Eric Gadesseh** and **Aparicio Carranza**. Comprehensive Study on Cloud Computing Security Threats and Preventive Measures.

6 **Diana Samaroo** and **Ivana Radivojevic Jovanovic**. Strategies to Improve Career Mentoring of Chemistry Undergraduates.

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ABSTRACTS OF PRESENTATIONS

BIOLOGY AND
HEALTH SCIENCES

LightCnnRad: A Lightweight CNN for Efficient Radiology Image Analysis

WintPyae LynnHtaik, Tassadit Lounes, Raecine Greaves, Mehnaz Hoque, and Pegah Khosravi / Department of Biological Sciences

LightCnnRad is an innovative Convolutional Neural Network (CNN) algorithm tailored for precise radiology image analysis. It boasts a minimalist architecture that strikes a fine balance between complexity and efficiency, making it efficient and robust to overfitting. This adaptability is especially well-suited for rapid, accurate insights in radiology.

LightCnnRad was trained on four datasets from Kaggle and TCIA, delivering impressive AUC scores for prostate cancer, brain tumors, pneumonia, and Alzheimer's disease classifications (0.75, 0.72, 0.80, and 0.81, respectively). It's openly accessible on our GitHub repository (https://github.com/PKhosravi-CityTech/LightCnnRad) including a user-friendly Colab file for easy model training.

LightCnnRad is poised to redefine radiology image analysis standards, merging efficiency, precision, and accessibility. It promises to inspire and empower a new generation of deep learning researchers and practitioners in radiology.

Secondary Electron Scattering with Compton Origin in Simple to Complex Porous Solids: Developing a New Generation of Spectral X-Ray Imaging for Medical and Industrial Applications

Subhendra Sarkar / Department of Radiologic Technology & Medical Imaging

X rays have got new attention due to secondary radiation generation in nanotechnology. Our goal is to extend medical and industrial applications of secondary electrons (including Auger) and Compton photons from soft x-ray sources particularly when a mix of ordered and disordered solids are used as intermediate medium (filters) to enhance inelastic scattering leading to low energy photon flux that can image low atomic weight minerals including alkali and transition metal ions in nanotechnology and biomineral roles. This could help develop next generation of x-ray methods to identify calcium and iron related disorders and metal dependent cell signaling in memory and cancer.

Metabolic Syndrome and Cigarette Smoking as Cardiovascular Risk Factors and Their Association with Detectable Viral Load Among Youth Living with HIV: A Multi-Site Study of Electronic Health Records

Sitaji Gurung[1], Christian Grov[2], Terry T-K Huang[3], H. Jonathon Rendina[4], Kit N. Simpson[5], Stephen Scott Jones[6], Demetria Cain[7], Richard Zhao[7], Tyra Dark[8], and Sylvie Naar[8]

[1] Department of Health Sciences, NYC College of Technology
[2] Department of Community Health and Health Policy, CUNY Graduate School of Public Health and Health Policy
[3] Center for Systems and Community Design, CUNY Graduate School of Public Health and Health Policy
[4] Milken Institute School of Public Health, The George Washington University
[5] Department of Healthcare Leadership and Management, Medical University of South Carolina
[6] Whitman-Walker Institute, The George Washington University
[7] Department of Psychology, Hunter College
[8] College of Medicine, Florida State University

Background: Youth living with HIV (YLH) are at increased risk of cardiovascular disease (CVD), influenced by factors including HIV infection, antiretroviral therapy (ART), and lifestyle. Metabolic syndrome and cigarette smoking are potential CVD risk factors among YLH, yet their relationship with detectable viral load (VL), an important indicator of HIV disease progression, remains underexplored. We conducted a multi-site study using electronic health records to assess the prevalence of metabolic syndrome and cigarette smoking among YLH and their association with detectable VL, aiming to inform targeted CVD reduction strategies.

Methods: Data were extracted from electronic health records of 398 YLH who received care in 2016 from adolescent HIV clinics across the U.S. Multivariable logistic regression was used to examine the relationship between smoking, metabolic syndrome components, and detectable VL in YLH aged 14-26 years.

Results: The sample predominantly included Black youth (76.8%), males (69.6%), with an average age of 21. Overall, 44.4% had detectable VL, 26.9% were smokers, and 27.6% met metabolic syndrome criteria. Smokers had a higher proportion of detectable VL than non-smokers (54.7% vs. 40.6%; $P=.01$). Those with low HDL cholesterol also had a higher proportion of detectable VL (54.9% vs. 37.1%; $P=<.001$). After adjusting for demographic and clinical factors, smokers had 2.051 times the odds of having detectable VL compared to non-smokers (AOR = 2.051; 95% CI = 1.101, 3.823; $P=.02$). Metabolic syndrome components did not show significant associations with VL.

Conclusions: Our study demonstrates a significant association between smoking and non-suppressed VL among YLH, highlighting the need for smoking cessation interventions to improve viral suppression and reduce CVD risk. Routine monitoring of metabolic syndrome is also crucial for YLH, given its high prevalence. Addressing modifiable risk factors such as smoking and metabolic syndrome is essential to improve the health outcomes of YLH.

Investigating the Influence of Co-infection with Soil-Transmitted Helminths (STH) or Epstein-Barr Virus (EBV) on Humoral Autoimmunity in Malaria

Juan Rivera-Correa[1], Ana Rodriguez[2], and Maria F. Yasnot-Acosta[3]

[1] Department of Biological Sciences, NYC College of Technology
[2] Department of Microbiology, NYU School of Medicine
[3] GIMBIC, Universidad de Córdoba, Montería, Córdoba, Colombia

All are senior authors that contributed equally (collaborative work)

Malaria remains a top infectious cause of morbidity and mortality around the world. Most human infections are considered of polymicrobial origin, involving at least two co-infecting pathogens. Being malaria one of the top 3 global infections, it is largely known to co-exist with other chronic infections such as Soil-transmitted Helminths (STH) and Epstein-Barr virus (EBV). Additionally, human malaria is associated with complex immune responses that lead to autoimmune pathologies such as anemia. The mechanisms leading to this phenomenon during malaria remain elusive, suggesting multifactorial contributors such as co-infections whose influence in this scenario has not been studied. Using plasma samples from two previously characterized cohorts: one of single or STH-co-infected *P. vivax* malaria patients and another cohort of uncomplicated vs complicated *P. vivax* malaria patients where we will assess the influence of STH or EBV-co-infection respectively in promoting humoral autoimmunity during *P. vivax* malaria. We hypothesize that STH-malaria co-infection will result in a reduction of the pathological autoimmune responses due to the known anti-inflammatory responses associated with STH infection. On the other hand, we hypothesize that EBV-malaria co-infection will result in enhanced humoral pathological autoimmunity due to lytic and pro-inflammatory responses associated with EBV infection/reactivation. We believe the results of these studies will not only augment our knowledge about the influence of relevant co-infections in human malaria pathology but also the findings could be extended to relevant scenarios of human immune responses to different global infections, such as HIV, SARS-CoV-2 and vaccine responses.

Surface Disinfection in the Dental Setting

K. Vyprynyuk / Dental Hygiene Department

With the focus of most infection control procedures centered around mitigating the spread of the COVID-19 virus since early 2020, it is important to review and discuss the importance of infection control procedures in the dental setting for the post-COVID era.

This presentation is designed to aid dental professionals in improving their understanding of cross-contamination and disease transmission and avoid breaking the chain of infection transmission by incorporating proper surface disinfection into their routine. A review of available literature will answer questions on which diseases are most commonly spread in the dental setting. A review of the disease transmission process through cross-contamination of environmental surfaces will offer recommendations for best practices of surface disinfection and inform of the environmental hazards of disinfecting products.

BUSINESS

Rudolf Steiner and *Lebensreform*: The Case of Dr. Hauschka Skin Care and Weleda Beauty Brands

Denise H. Sutton / Department of Business

In the late 19th century, in response to industrialization, reformers in Austria, Germany, and Switzerland advocated a new relationship to the body and a return to nature. The establishment of beauty brands Dr. Hauschka Skin Care and Weleda coincided with and were influenced by *lebensreform*, a ''life reform'' social movement that promoted alternative medicine, health food, and fitness. Both brands are also based in the anthroposophical teachings of the Viennese philosopher and scientist Rudolf Steiner. Weleda was founded in 1921 by Rudolf Steiner and Dr. Ita Wegman, a physician. Dr. Hauschka Skin Care was founded in 1967 by Rudolf Hauschka, a chemist, and Elizabeth Sigmund, a researcher and esthetician. This research explores the legacy of the *lebensreform* movement as it relates to these two beauty brands and examines how a range of practices and trends in beauty today reflect some of the values and aspirations that this movement was advocating more than a 100 years ago as an alternative modernity.

Developing a Method to Study to Examine Lookism on Social Media

Alyssa Dana Adomaitis and Diana Saiki /
Department of Business, Business and Technology of Fashion

"**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). In popular literature, it has been called "beauty prejudice" (Etcoff, 1999, p. 1). The notion that a pleasing appearance results in favorable outcomes (e.g., higher wages, promotions) from others is not necessarily new, as literature on physical attractiveness is rather extensive. **Lookism** can be influenced by a number of appearance cues, such as visible demographic traits (e.g. race, gender, age), body size, and clothing. The influence of appearance on others has been noted, particularly race, gender, and age. Social media is the primary promoter of **lookism**, particularly among youth. It repeats images of beauty standards whereby the viewer becomes obsessed with achieving these standards and influences the adoption of beauty biases (Yoobin & Minyoung, 2022; Mason, 2021). The purpose of the research is to assess a method to examine **lookism** that may exists on social media. Assessing lookism on social media can provide awareness of the issue and prompt future longitudinal studies.

Sufi Lovers, Safavid Silks and Early Modern Identity

Nazanin Hedayat Munroe /
Department of Business, Business and Technology of Fashion

The height of fashion at the sixteenth century Safavid court was an ensemble of shimmering gold and silk, interwoven with scenes of legendary lovers from the Khamsa (Quintet) of epic Persian poetry. Imbued with Sufi symbolism by Nizami Ganjavi, whose tales demonstrate earthly love as a divine phenomenon, silk garments portraying the romance held deep symbolic meaning for wearer and viewers, projecting messages of mystic aspiration. As Persian poetry was adopted in court circles from Iran to South Asia, Sufi behavior codes embodied by the characters were adapted and propagated by early modern rulers. The migration of textile specialists from Safavid Iran to the Mughal court, where expert designers produced luxury goods for a sophisticated and educated elite, presents new evidence for reattribution. Examining textiles alongside Khamsa poetry, manuscript paintings, and primary accounts, the silks reveal cross-cultural expressions of piety and allegiance in a world unified by language and behavior codes, while fragmented by religion and politics.

CHEMISTRY

Synthesis and Evaluation of the BACE 1 and AChE inhibition of Caffeic Acid Derivatives

Alberto Martinez / Department of Chemistry

Alzheimer's disease (AD) is the most common form of dementia that affects more than 6 million Americans and more than 40 million people around the world. The incidence is expected to rapidly increase due to the lack of any effective treatment. Several enzymes have been related to the progression of the disease, especially acetylcholinesterase (AChE) and β-secretase (BACE 1). Phenolic acids have shown to possess anti-AD properties. Caffeic acid is an abundant phenolic acid widely distributed in plant tissues that occur in foods such as fruits, spices, vegetables, wine, olive oil, and coffee. Its antitumor, anti-inflammatory, and anti-AD properties have been described. In addition, quinoline and quinacrine-based compounds have also shown promising potential as anti-AD agents. In this work we report the synthesis, the ability to inhibit both AChE and BACE 1 enzymes, and preliminary molecular docking studies to both enzymes of three caffeic acid derivatives, AM67, AM68 and AM70. Results were compared to parent compound caffeic acid, as well as clinically used inhibitors. Experimental IC_{50} values were promising, with AM68 in the low micromolar range against AChE, and AM70 in the nanomolar range against BACE 1. All three compounds displayed high binding affinity to the active site of the tested enzymes, with scores that generally correlated well with the experimental IC_{50} values. In conclusion, these compounds represent a promising strategy in the development of new anti-AD agents.

Reduction of Pertechnetate by Chemical and Photochemical Approaches and Incorporation of Tc(IV) into Titanium Dioxide

Ivana Radivojevic Jovanovica [1], Colleen M.B. Gallagher [2], Ramsey Salcedo [2], Hossam Elshendidi [3], Jacopo Samson [2], Charles M. Drain [2], Donna McGregor [3], Wayne W. Lukens Jr. [4], Benjamin P. Burton-Pye [3], and Lynn C. Francesconi [2]

[1] Department of Chemistry, NYC College of Technology
[2] Department of Chemistry, Hunter College
[3] Department of Chemistry, Lehman College
[4] Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley

Technetium-99 is a prevalent fission product from nuclear waste. The long half-life (211,000 yr) and environmental mobility of pertechnetate (TcO_4-), render Tc particularly challenging to isolate and stabilize. Here we present two approaches for development of potential wasteforms using titanium dioxide, TiO_2. Approach 1 is a low temperature chemical synthesis of TiO_2 doped with Tc(IV) from (TcO_4-), intended to mimic the Tc waste stream from the UREX family of separations and removes 98.5% of the Tc, mainly present as edge-shared Tc(IV) pairs. Approach 2 utilizes TiO_2 to photocatalytically reduce (TcO_4-), to Tc(IV) stabilized on the surface of or within the TiO_2 lattice. The %Tc removed from solution and adsorbed to TiO_2 is pH dependent, with the maximum Tc(IV) adsorbed at pH 3–4 as either TcO_2 or edge-sharing Tc(IV) octahedra. The Tc(IV)-TiO_2 composites materials formed by both approaches are suitable for consolidation into a dense wasteform by Hot Isostatic Pressing (HIPing).

COMPUTER ENGINEERING AND INFORMATION SYSTEM TECHNOLOGY

Efficient Internet of Things (IoT) Based Agricultural Automation System

Vincent Banek, Jordan Clarke, Sajeevan Rangeswaran, Mohammad Wahad, and Aparicio Carranza / Computer Engineering Technology

Due to overwork farmers misallocate their time and this leads to the accidental miscare of plants and they die due to over or under watering, etc., resulting in lots of food being wasted. We have designed and implemented an efficient Internet of Things (IoT) Agricultural System using the power of ESP32 module, temperature and humidity sensors, solenoid valves, and a convenient User Interface (UI). The communication subsystem module uses the Mesh Networking over Bluetooth Low Energy (LE) for compatibility with more devices. The web interface has been written in C#, a low level web development language, to use lower system resources to reduce the overall cost.

Server Fortification for Web Exposure

Nelson Feng Feng, Imerson Memko, Alusine Jalloh, and Aparicio Carranza / Computer Engineering Technology

In an increasingly interconnected global landscape, cyber attacks have become an evolving threat to the security and stability of individuals, businesses, and nations alike. This paper details fundamental security principles and measures for safeguarding a server before exposing to the wider web. We focus our solution on Linux based servers to demonstrate the concepts of firewall configuration, robust user authentication protocols, encryption techniques, backup strategies, and effective log management. Furthermore, we delve into the nuances of threat assessment and mitigation strategies to foster the understanding of how to secure digital assets.

Comprehensive Study on Cloud Computing Security Threats and Preventive Measures

Eric Gadesseh and Aparicio Carranza / Computer Engineering Technology

Multiple surveys conducted around the globe highlight rapid adoption of cloud computing by companies. However, this paradigm shift towards the cloud has also commenced a new era of security challenges and threats. We present a thorough examination of the multifaceted security threats that loom over cloud computing environments. We have identified and categorized diverse array of security vulnerabilities that organizations face when migrating their data and operations to the cloud. We present the design and implementation of a unified Multi-Factor Authentication (MFA) system that works seamlessly with popular cloud service providers such as AWS, Azure or GCP. MFA has emerged as a critical component of cloud security, offering an additional layer of defense against unauthorized access.

Performance, Optimization and Security Enhancement of Virtual Networks in VMware Workstation

Shannon Mars and Aparicio Carranza / Computer Engineering Technology

In this growing age of technological improvements, we have seen how communications and management of our computer networks have changed. During the COVID-19 pandemic we saw the increased use of virtual networking for interacting online and doing remote work. We have investigated virtual networking within VMware Workstation Pro with emphasis on performance analysis and security. In this project we created a virtual network with four Virtual Machines (VMs) that interact with each other. We have conducted performance analysis, created, and included optimization strategies, evaluated its security measures, and located potential threats as we simultaneously managed comparing the before and after results made through the extensive testing and validations for potential improvements and effectiveness.

The Operations and Safety Behind Using Virtual Machines

Alex Miller, Raymond Manaf, Indrid Puka, Timothy Khan, and Aparicio Carranza / Computer Engineering Technology

Nowadays, almost all aspects of our lives are becoming digitized and shifted online. We explore and roam sites all over the world whether it is for shopping, booking appointments, or general social media. In this project we demonstrate enhanced pathways of defense from Trojans, Viruses, and Malware through virtualization. The functionality, operation and safety of our system requires the use of virtualization software such as VMware workstation hypervisor, viruses from different websites which are programs that attempt to destroy an operating system or computer, and the experimenter who demonstrates how to avoid and escape a threatening situation with ease using virtualization. The Virtual Machine acts as a bait as the user downloads a program from an untrusted website, the virus only affects the Virtual Machine and not the user's actual computer.

Business Potential Maximization Using Cloud Computing for Enhanced Productivity, Efficiency and Innovation

Ibrahim Muhammad, Justin Andrew, Clifford Compere, Jeremiah Champagnie, and Aparicio Carranza / Computer Engineering Technology

The rapidly evolving technological landscape mandates the adoption of cloud computing for businesses seeking to remain competitive and innovative. The multifaceted advantages and power of cloud infrastructure and services enable companies to unlock new dimensions of productivity, streamline operations for heightened efficiency, and stimulate a culture of continuous innovation. We have analyzed case studies, best practices, and industry trends that elucidate how cloud computing strategies empower organizations across various sectors. We present results the way cloud technology optimizes resource allocation, remote work facilitation, acceleration of data-driven decision-making, and the scalability and flexibility of this dynamic technology.

Cloud Networking Framework: Connectivity, Security, and Scalability in the Digital Age

Pranto Bala, Kevin Roa, Modhumita Dey, and Aparicio Carranza / Computer Engineering Technology

Cloud networking has become the standard approach to building and delivering applications to modern Enterprise. Cloud networking plays a critical role in the way organizations address their growing infrastructure needs, regional expansions, and redundancy plans. We investigate Connectivity, Security and Scalability features of Cloud Networking and the major roles that play for business continuity. Additionally, we discuss why and how cloud networking is very significant to be used in Enterprises that develop modern day technologies. We have also explored and report the benefactors of cloud networking and demonstrate why businesses nowadays turn to the cloud to drive agility, deliver differentiation, accelerate-time-to market, and improve scalability.

Mobile Application for Skin Cancer Classification Using Deep Learning

Peter Dinh / Department of Computer Systems Technology

Malignant melanoma is the deadliest skin cancer and early detection is important to improve patient prognosis. Recently, deep learning neural networks (DLNNs) have proven to be a powerful tool in classifying medical images for detecting various diseases and it has become viable to address skin cancer detection. In this research we propose a serverless mobile app to assist with skin cancer detection. This mobile app is based on the best performance of five convolutional neural network (CNN) models designed from scratch as well as four state-of-the-art architectures used for transfer learning (Inception v3, ResNet50v2, DenseNet, and Exception v2). Since the skin cancer dataset is imbalanced, we perform data augmentation. We also use the fine-tuning top layers technique for feature extraction on all models to improve the results. The main novelty of the proposed method is deploying the model as part of mobile app where the classification processes are executed locally on the mobile device. This approach reduces the latency and improves the privacy of the end users compared with the cloud-based model where user needs to send images to a third-party cloud service. The achieved accuracy of pre-trained Inception v3 model is 99.99%. Therefore, the proposed mobile solution can serve as a reliable tool that can be used for melanoma detection by dermatologists and individual users.

Genetic Algorithm in Machine Learning: Image Reconstruction

Marcos S. Pinto / Computer Systems Technology

Genetic Algorithm (GA) are algorithms based on the Darwing principle of evolution "Survival of the Fittest" where a fitness function selects (search) the best solution to a problem by selecting elements (individuals) that are best suited (optimization) for reproduction and creation of an offspring (solution(s)). Image reconstruction being applied to medical imaging is a fast growing machine learning field. This presentation provides a gentle introduction to writing genetic algorithms for medical imaging applications.

Successive Interference Cancellation Based Defense for Trigger Backdoor in Federated Learning

Yu-Wen Chen / Computer Systems Technology Department

Federated Learning (FL) provides a decentralized training mechanism that ensures users' data privacy. However, FL is vulnerable to backdoor attacks, a type of data poisoning attack. The adversaries tampered with the local models by injecting a trigger into a subset of training data. After the aggregation process, the global model would be poisoned and mispredict the input images that injected a trigger designed by an adversary. Unlike the existing defense methods attempting to identify and remove the abnormal model updates on the aggregation step, this poster presents our paper that proposes a Successive Interference Cancellation-based Defense Framework (SICDF) to detect and eliminate the trigger during model inference. SICDF first employs Explainable AI to infer where the trigger is and then uses image processing skills to eliminate potential trigger effects. Experiment results show that SICDF can effectively recover the poisoned data while only slightly reducing the accuracy of the clean model and benign data.

EDUCATION

Strategies to Improve Career Mentoring of Chemistry Undergraduates

Diana Samaroo and Ivana Radivojevic Jovanovic / Department of Chemistry

As a result of participating in a COMPASS workshop, we implemented an open education resource website to improve on the Chemistry Department's career mentoring of undergraduate students at New York City College of Technology (City Tech) of the City University of New York (CUNY). City Tech is primarily an undergraduate institution. The Chemistry Department offers an Associate in Science in Chemical Technology and a Bachelor of Science in Applied Chemistry. These programs lead to entry careers in industry or provide foundations to admissions to professional and graduate schools. While there are some professional development resources at City Tech, none are oriented specifically to chemistry careers. Our website houses information on internships, scholarships, research, and chemistry careers. Over the past year, we organized a series of events with the Chemistry Club related to graduate and professional schools. We will present our strategy for improving career mentoring at the Chemistry Department, share our website and demonstrate its impact on students.

The Impact of a Scholarship Program in Supporting Undergraduate Women in Applied Mathematics and Computer Science

Sandie Han [1], Diana Samaroo [2], Nadia Kennedy [1], and Urmi Duttagupta [1]

[1] Department of Mathematics
[2] Department of Chemistry

We present programmatic efforts to engage and support undergraduate women in Applied Mathematics and Computer Science programs at City Tech. These efforts were part of a scholarship program supported with funding from the NSF S-STEM (2015–2020) with the goal of increasing the participation, retention, and graduation rates of STEM students with financial need. The program utilized a holistic approach to providing a multidimensional student support system, which included faculty mentoring, organized events, research projects, and participation in STEM communities. The results show that supported women achieve higher GPAs and shorter times to graduation.

ELECTRICAL, MECHANICAL AND CIVIL ENGINEERING

Risk Analysis of Delay on Construction Schedule Due to High Wind

Samaneh Gholitabar /
Department of Construction Management and Civil Engineering Technology

Construction delays increase costs of projects. Therefore, planning for a construction project should include the possibility of weather-driven delays with proper likelihood. This research aimed at quantifying the effect of high wind in project planning using historical wind data in New York City and wind-related regulations for the construction industry. Moreover, the impact of regulations that limit activities in the presence of high winds was investigated. Some of those regulations were made, after a major accident without studying their effect on the construction industry. This study evaluated the consequences of these regulations on construction projects. Two schedules for typical NYC residential buildings (20-floor and 10-floor) were created. The impact of regulations that limit activities in the presence of specified winds was investigated. The findings of this study indicate that New York City wind can extend project durations from 5% to 20% depending on the level of wind limit and the size of the projects. This method can be used for other cities to take into account the impact of delay due to wind on construction schedules with reliable estimates.

The Potential of the Implementation of Offline Robotic Programming into Automation-Related Pedagogy

Max Rios Carballo, Xavier Brown, and Andy S. Zhang /
Department of Mechanical Engineering Technology

In this study, the offline programming tool RoboDK is used to program industrial robots for the automation sector. The study explores the feasibility of using this non-disruptive robot programming software for classroom use; assesses how well RoboDK can be used to program various robots used in the industry; creates and tests various applications; and pinpoints technical obstacles that prevent a smooth link between offline programming and actual robots. Initial results indicate that RoboDK is an effective tool for deploying its offline programming code to a Universal Robot, UR3e. There are many potential for advanced applications. The goal of the project is to utilize RoboDK, the offline robot programming software to respond to the rising need for knowledgeable robot programmers in the automation sector.

Contextualising Tragedy in Places of Assembly Through Cases of New York City Social Club Fires

Susan Brandt and Anne Marie Sowder /
Entertainment Technology Department,
Department of Construction Management and Civil Engineering Technology

Patrons of assembly spaces have a reasonable expectation of safe and healthy indoor environments, the subject of planned efforts to ensure safety from officials ranging from politicians to building inspectors. These efforts include inspecting building fitness, management and safety governance. A key component of guaranteeing safe assembly spaces is policy enforcement, an area overlapping inspections and governance. In New York City impartial inspectors are a necessity, due to the potential for local bribery and extortion. Quid pro quo, or a favour granted in expectation of a favour returned, is a symptom of a corrupt process of governance and can negatively impact the legitimacy of building safety enforcement when that enforcement is influenced by politics or corrupt agents. Requirements for building occupant safety are vulnerable to election cycles and priorities tend to shift in the aftermath of specific motivating events. They are further complicated by omissions in, and overlapping of, responsibilities for enforcement. Fire safety in New York City has been of distinctive relevance because of the role the New York Fire Department played as a building inspector and due to the Knapp Commission outcomes in 1972. This article has two aims: to use case studies of New York City social club fires to identify limiting factors in improving buildings for occupants in the wake of motivating events and to contextualise these factors within the broader history of politics in New York City. Policies are tracked through governing administrations to shed light on how political decisions can contribute to catastrophes in places of assembly. The resulting analysis highlights a typical conflict between political pressures on mayors while in office and occupant safety in social club venues, as well as how confusing rules for the enforcement of safety regulations contribute to unsafe conditions for building occupants. Vulnerable communities were especially at risk in the cases examined; specifically, immigrant communities as they migrated to and settled in New York City, moving to older neighbourhoods and socialising in converted spaces. Key issues identified relate to venue operations in building conditions, occupant behaviour and regulation and enforcement. Failures on all three counts were identified in each of the cases examined in this article. However, due to its recurring cycle of failures and its overarching relationship to the other two factors, regulation and enforcement stands out as the most pressing issue for improving safety for occupants of social clubs and other assembly spaces.

HUMANITIES, SOCIAL SCIENCES AND ENGLISH

Latin American Fashion and Style

Inés Corujo Martín / Department of Humanities

This poster reflects my current research in Latin American fashion, which I am now developing for my second book project, tentatively titled *Latin American Fashion and Style*, for the Fashion and Personal Style Studies collection (Ed. Lived Places Publishing; forthcoming in 2025). Connected to my research, I recently created the new course LATS 2204 *Latin American Fashion and Culture*, which provides an overview of dress history from a non-Western perspective. This poster showcases topics and case studies I am currently exploring with students, such as pachuca style, zoot suits, cultural icons like Frida Kahlo, and the impact of Indigenous textiles and designs on the global fashion industry.

Goulash Populism as Neo-Revitalization Movement: Political Ideology and Coping

Lisa Pope Fischer / Social Science Department

This poster presents a chapter in my book *Chorus of Experiences Capturing Moments in Time: From the Siege of Budapest to Goulash Populism* that uses oral histories of senior Hungarian women to explore the past and the present. This chapter looks at the ways in which societal uncertainty has led to the emergence of a right-wing leader, Viktor Orbán, who emphasizes an illiberal state at the risk of undermining democracy. Whereas some of my informants clearly question this rise in populism, many find his perspective compelling and convincing. I look at the ways in which Goulash Populism parallels anthropological understandings of revitalization movements to explore the way in which an uncertain society may lead some to grasp towards traditions to make sense of the present.

MATHEMATICS

A Model of ZFC Inside the Category of Compact Hausdorff Spaces

H. Schoutens / Department of Mathematics

We construct a chain of compact spaces whose union forms a model of set-theory. Moreover, this construction can be carried out in a first-order way, so that we can obtain non-standard models of ZFC using non-standard categories.

Heuristic Framework for Multi-Scale Testing of the Multi-Manifold Hypothesis on 3D LiDAR Point Clouds

F. Patricia Medina / Department of Mathematics

When analyzing empirical data, we often find that global linear models overestimate the number of parameters required. In such cases, we may ask whether the data lies on or near a manifold or a set of manifolds (a so-called multi-manifold) of lower dimension than the ambient space. This question can be phrased as a (multi-) manifold hypothesis. The identification of such intrinsic multiscale features is a cornerstone of data analysis and representation and has given rise to a large body of work on manifold learning. The workflow is suitable for empirical data analysis as we demonstrate on two use cases, one of them being a 3D LiDAR point cloud of the Golden Gate Bridge. This is joint work Linda Ness (Rutgers), Melanie Weber (Oxford), Karamatou Yacoubou Djima (Amherst College)

NLP Analyzing on Mental Health Issues Among College Students using Reddit Data

Qing Chen (Charlotte)[1], Dezjeron Dorsey[2], Mark Hughes[2], Mia McGuire[2], and F. Patricia Medina[1]

[1] Department of Mathematics, NYC College of Technology
[2] Department of Mathematics/ Department of Computer Science, Brigham Young University

Mental health issues among college students have become a prevalent concern in recent years. Understanding the main struggles and identifying factors that correlate with poor mental health can provide valuable insights for institutions to better support their students. In this project, we aimed to analyze mental health issues among college students using data from the Reddit platform. By leveraging the Reddit API and applying various natural language processing techniques, we sought to gain insights into the emotional well-being and challenges faced by college students. This project was originated during the City Tech-BYU Data Science Spring Semester Seminar 2023.

The Neighbor Matrix: Feature Engineering Dimension Reduction to Improve Machine Learning in 3D Point Clouds

F. Patricia Medina [1] and Randy Paffenroth [2]

[1] Department of Mathematics, NYC College of Technology
[2] Department of Mathematics and Department of Computer Sciences, Data Science Program, Worcester Polytechnic Institute

LiDAR point clouds contain measurements of complicated natural scenes and can be used to update digital elevation models, glacial monitoring, detecting faults and measuring uplift detecting, forest inventory, detect shoreline and beach volume changes, landslide risk analysis, habitat mapping and urban development, among others. A very important application is the classification of the 3D cloud into elementary classes. For example, it can be used to differentiate between vegetation, man-made structures and water. Our goal is to present a preliminary comparison study for classification of 3D point cloud LiDAR data that includes several types of feature engineering. In particular, we demonstrate that providing context by augmenting each point in the LiDAR point cloud with information about its neighboring points can improve the performance of downstream learning algorithms. We also experiment with several dimension reduction strategies, ranging from Principal Component Analysis (PCA) to neural network based auto-encoders, and demonstrate how they affect classification performance in LiDAR point clouds. For instance, we observe that combining feature engineering with a dimension reduction method such as PCA, there is an improvement in the accuracy of the classification with respect to doing a straightforward classification with the raw data.

On the Pythagorean Reciprocal Identity $a^{-2} + b^{-2} = d^{-2}$ and the Generation of All Solutions for Fixed $d > 0$

Alexander Rozenblyum and Satyanand Singh / Department of Mathematics

The Pythagorean reciprocal identity originates by way of a special perpendicular construct in a right triangle. Roger Voles in 1999 showed how to generate solutions to $a^{-2} + b^{-2} = d^{-2}$, with $\gcd(a, b, d) = 1$, via the primitive triples of the right triangle. We remove the requirement that $\gcd(a, b, d) = 1$ and show that this Diophantine equation has solutions if and only if $d \bmod 12 \equiv 0$. For fixed d, we generate all solutions to the identity by two different methods. Our techniques employ appropriate bounds on the variables and one of them is connected to the OEIS sequence A020884. As an example, for $d = 120$, $(a,b) \in \{(130,312),(136,255),(150,200)\}$ which as we will see results in three distinct triangles. You can switch the order of a and b to get three additional algebraic solutions. This example refers to a problem created by the second author for the MAA Metro NY problem of the month for March 2023.

Product Coefficients on Dyadic Sets Applied to 3D Point Clouds

F. Patricia Medina [1] and Rasika Karkare [2]

[1] Department of Mathematics, NYC College of Technology
[2] Data Science Team, Moodys Corporation

Machine learning classification has been widely used to differentiate elementary classes such as water, vegetation and ground in particular natural scenes. A very important process before doing classification is feature engineering. Our goal is to study how product coefficients added as features at different scales can inform a multi-class classification with a neural network or any other classification algorithms. Most importantly, we want to explain how the abstract definition of product coefficient in dyadic sets can be computed in the 3D point cloud Lidar context. Overall, this is an example of how concepts coming from areas of mathematics such as measure theory can help us understand 3D point clouds better and improve ML tasks. We acknowledge the scientific support from Linda Ness (Rutgers) and Randy Paffenroth (Worcester Polytechnic Institute) with their unique expertise in Data Science and Mathematics.

PHYSICS

The Gotham Web Lab: Understanding how Galaxies Evolve in the Cosmic Web

Charlotte Welker / Physics Department

In this poster, I will present the research focus areas of the Gotham Web lab, a new research group at City Tech investigating how galaxy properties are affected by their large-scale environment. I will focus in particular on two extreme regimes: Galaxy clusters, the densest regions in the Universe, hosting thousands of galaxies in a bath of hot gas, and the much fainter Inter Galactic Medium (IGM) which, far from being an empty region, hosts myriads of dwarf galaxies connected by thin filaments of gas.

The Dirac-Delta Rogue Wave

A. Ferroglia [1] and M. C. Fiolhais [2]

[1] Physics Department, NYC College of Technology
[2] Department of Science, Borough of Manhattan Community College

This poster presents a double spatio-temporal localized Dirac-delta solution for the linear wave equation. The solution is the result of the interference of sinusoidal waves with a time-dependent frequency in dispersive media.

It is shown that the time-dependent frequency function required to produce a spatio-temporal Dirac delta solution is exclusively determined by the dispersion relation. Both numerical and exact analytical solutions of a typical physical scenario are obtained and discussed.

Exactly Solvable Two-Body Problem in Two-Dimensional Quantum Mechanics

J. Luo, C. R. Malvino, and R. Ya. Kezerashvili / Physics Department

It is well known that exactly solvable models play an extremely important role in many fields of quantum physics. In this study, the Schrodinger equation is applied for a solution of a two-dimensional (2D) problem for two particles enclosed in a circle, confined in an oscillatory well, trapped in a magnetic field, interacting via the Coulomb, Kratzer, and modified Kratzer potentials.

In the framework of the Nikiforov-Uvarov method, we transform 2D Schrodinger equations with potentials for which the three-dimensional Schrodinger equation is exactly solvable, into a second-order differential equation of a hypergeometric-type via transformations of coordinates and particular substitutions [1]. Within this unified approach which also has pedagogical merit, we obtain exact analytical solutions for wave functions in terms of special functions such as a hypergeometric function, confluent hypergeometric function, and solutions of Kummer's, Laguerre's, and Bessel's differential equations. We present the energy spectrum for any arbitrary state with the azimuthal number m. Interesting aspects of the solutions unique to the 2D case are discussed.

[1] R. Ya. Kezerashvili, J. Luo, C. R. Malvino, Few-Body Syst. **64**, 79 (2023).

Finding Fingerprints of Filaments with Galaxy Star Formation Histories

C. Olsen and C. Welker / Physics Department

It is broadly understood that the large-scale environment can influence galaxy evolution. For example, galaxies in dense cluster environments can undergo many processes such as ram pressure stripping, an increased number of mergers, and tidal interactions to name a few. It is not as clear how galaxies in less dense environments are affected by their interactions with large scale structure. The deep imaging provided by Rubin will allow us to trace faint large-scale structure as never before and enable the study of how galaxies are influenced over time by "cosmic" filaments and sheets in their proximity. We generate synthetic Rubin photometry along with the VISTA VIDEO YJHK bands from the New-Horizon and TNG50 simulations where we reconstruct the star formation histories (SFHs) of simulated galaxies near filaments. From the SFHs we search for traces of the influence of filament flows in the galaxy SFH and find what these traces reveal about the dynamical history of these surrounding structures. By studying correlations between the SFHs across diverse types of filaments at a given time we can apply this knowledge to actual Rubin observations, thereby discovering how filaments have helped form the galaxies near them.

Fabrication of 2D Semiconductor Materials by Exfoliation Method

Pedro Sotomayor, Keven Cruz, Mikheil Vardoshvili, and Vitaliy Dorogan / Physics Department

The TMX, transition-metal dichalcogenide, belongs to the family of semiconductor materials that have layered structures. It is relatively easy to separate the layers and achieve thin flakes with only several monoatomic sheets, or even down to a single monolayer. Thus, one can create a 2D material that has different properties than a 3D material of the same chemical composition. Such materials are needed as an active element for the quantum connectors, devices that will interconnect quantum computers into clusters and networks. In this project, we use the exfoliation technique to produce thin flakes of WS_2 and $MoSe_2$ semiconductor materials. The flakes are transferred onto a silicon chip. This poster presents the preliminary results of the research work done by the City Tech undergraduate students. The future work will include samples with flakes of two different kinds overlapping each other. This will allow the formation of a p-n junction between the two semiconducting flakes. Fully fabricated devices will undergo a series of electrical and optical measurements.

Superfluidity of Indirect Excitons in Transition Metals Trichalcogenides Van Der Waals Heterostructures

A. Spiridonova and R. Ya. Kezerashvili / Physics Department

Superfluidity of indirect excitons in transition metals trichalcogenides (TMTC) van der Waals heterostructures (vdWHs), where two TMTC monolayers are separated by a varying number of hBN layers, is studied within a mean-field approach and the Bogoliubov approximation. To study the influence of the screening on the superfluidity, we use Rytova-Keldysh and Coulomb interaction potentials. We predict angle-dependent superfluidity of indirect excitons in vdWHs that arise due to anisotropy of electron-hole mass. We demonstrate that angle-dependent critical temperature for superfluidity has minimum and maximum values of T_c along the chain and a-directions, respectively. In addition, the experiment to observe the electron-hole superfluidity in a dilute weakly interacting gas of indirect excitons in TMTC vdWH is proposed.

First row l to r:
Roman Kezerashvili,
Vitaliy Dorogan

Second row l to r:
Andrea Ferroglia
Calvin Grace

Third row l to r:
Alberto Martinez
Nazanin Munroe

Fourth row l to r:
Alexander Rozenblyum
Hans Schoutens
Mai Zahran

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