source

SYMPOSIUM OF UNIVERSITY RESEARCH AND CREATIVE EXPRESSION

FRIDAY, APRIL 24, 9 A.M. – 3 P.M.
16 W. 61ST ST., 11th FLOOR

NEW YORK TECH

SPONSORED BY THE OFFICE OF THE PROVOST AND ACADEMIC AFFAIRS

Dear NYIT Faculty, Staff, Students, and Friends,

Welcome to the Symposium of University Research and Creative Expression (SOURCE) 2026 on April 24 at our New York City campus starting at 9:00 AM. We are so happy that you will be a part of the celebration of the event's 23rd anniversary!

Creative expression and participating in research with faculty members have become integral parts of a student's educational experience at New York Tech. SOURCE is intended to provide a unique opportunity for students to present their research and creative scholarly work in collaboration with faculty members and their mentors. SOURCE also provides a common ground for interdepartmental, interschool, and interdisciplinary communication. I am very excited to inform you that this year a total of about 165 abstracts were accepted for presentation involving over 330 undergraduate and graduate students of New York Tech. This significant set of abstracts represent all our campuses, schools, and colleges, and all disciplines. The depth and breadth of the projects are strong indicators of the quality of our teaching and learning at New York Tech.

I would like to take this opportunity to congratulate all the students for their academic excellence at NYIT. Many individuals in the NYIT community have worked on the event to make it a success. I would like to extend a very special thank you to all the students, faculty, administrators, and volunteers who assisted with the preparation, management, and operation of SOURCE 2026.

Sincerely,
Roger Yu, Ph.D.
Chair, SOURCE Committee
New York Institute of Technology

A Message from the Vice Provost for Research

Welcome to the New York Tech SOURCE Symposium of University Research and Creative Expression—a celebration of imagination, perseverance, and the transformative power of student inquiry.

Each project represented in this symposium tells a story. It is a story of curiosity sparked, challenges embraced, and ideas brought to life through dedication and courage. Our students are not only learners—they are creators, problem-solvers, and innovators who are actively shaping the future through their research and creative expression. Their work reminds us that discovery is not confined to the classroom; it is driven by passion, resilience, and the willingness to explore the unknown.

This remarkable achievement does not happen in isolation. It is made possible by a community deeply committed to student success. Our faculty serve as mentors and guides, inspiring students to think critically and boldly. Our staff provide the essential support that allows these endeavors to flourish. And our institutional leadership continues to invest in opportunities that empower students to pursue meaningful scholarly work.

Together, we have built an environment where ideas can grow, where creativity is encouraged, and where students are supported every step of the way. The SOURCE Symposium is a reflection of that shared commitment—and of what is possible when talent meets opportunity.

To our students: your work inspires us. Your determination fuels our mission. And your achievements today are only the beginning of the impact you will make tomorrow.
It is with great pride and optimism that I welcome you to this year's symposium and celebrate all that you have accomplished.

Sincerely,
Jared E. Littman, PhD, MPA
Vice Provost for Research
New York Institute of Technology

Symposium on University Research and Creative Expression (SOURCE) 2026 Program	
9:00 a.m.	**DOORS OPEN**
9:00 - 10:00 a.m.	**REGISTRATION** **POSTER PREPARATION/INSTALLATION** **16 W 61st St, 11th Floor**
10:00 – 12:00 p.m.	**ORAL PRESENTATIONS** **16 W 61st St, Rooms 623, 624, 722**
12:00 – 1:15 p.m.	**LUNCH** **16 W 61st St, 11th Floor**
1:00 – 1:15 p.m.	**KEYNOTE ADDRESS:** **NEW YORK TECH ADMINISTRATION** **16 W 61st St, 11th Floor Auditorium**
1:15 – 2:15 p.m.	**POSTER EXHIBITION I** **16 W 61st St, 11th Floor**
2:30 – 3:30 p.m.	**POSTER EXHIBITION II** **16 W 61st St, 11th Floor**
4:00 p.m.	**BUS TO LI CAMPUS DEPARTS** **16 W 61st St**

Oral Presentations 10:00 a.m. – 12:15 p.m.	16 W 61st St Room 623 Moderator: Millie Gonzalez	16 W 61st St Room 624 Moderator: Subhabrata Chaudhury	16 W 61st St Room 722 Moderator: Berin Karaman Mayack
10:00 a.m.	**"Investigating the Techniques Taught and Practiced by Radiologists"**	**"Effects of the che-2 gene and Parkinson's Disease Risk Factor Gene pdr-1 on Isofragrant Navigation in Caenorhabditis elegans"**	**New York History Panel:** **"The Yankee Stadium (1923-2009)"** Parker Flanagan **"NYC Rent Century to Century"** Tyler Merolle **"A Slice of the 20's"** Giselle Austria **"From Lectors to Labor Movements: Afro-Diasporic Consciousness in Bernardo Vega's Narrative"** Citlally Diaz Mar **"LGBTQ Rights in 1990s I Like it Like That (1994) Film"** Brenda Berenice Gonzalez
	Ahaylee Rahman, Talia Lilikakis, Victoria Carrero	Gamana Gogineni	
10:15 a.m.	**"A Novel Conference-Based Approach to Studying Radiologic Visual Search and Cue Precision"**	**"Role of C elegans odr-10 and shn-1 in Decision-Making Between Equally Attractive Stimuli"**	
	Ayesha Mulla, Jana Radwan, Maha Naveed, Talia Lilikakis, Audrie Saad	Justin Tin	
10:30 a.m.	**"Detecting Pulmonary Nodules on CT: Pitfalls and Patterns"**	**"UNC, why'd you SET your mind on this?"**	
	Kenzy Abdelatif, Talia Lilikakis, Layla El-Rowmeim	Annemary Ummacheril	
10:45 a.m.	**"From Waiver to Welcome: Institutional Reform and the Opening of ACS Fellowship to Osteopathic Surgeons"**	**"Understanding the Roles of Biogenic Amine Release and Synapse Formation Receptors in Decision-making"**	**"Developing an Interactive Game to Improve Fine Motor Skills in Children with Autism Spectrum Disorder (ASD)"**
	Samuel Zev Pavlovsky, Nathaniel E Roth, Benjamin Galinson	Manogna Rachapudi	Neethu Thalappan Koroth
11:00 a.m.	**"Research Gaps in Vitamin D Deficiency Studies on South Asian Immigrants: Insights from a Scoping Review for Osteopathic Advocacy"**	**"Low Testosterone Damages Bone Health: Evidence from a Preclinical Study"**	**"Earbud EEG for Mental Workload Monitoring"**
	Ayesha Siddiqua	Jac Lin, Eddie Louz, Henry Ruiz	Ishaan Singh

11:15 a.m.	**“A novel behavior in a ruminant (Prolibytherium; Climacoceridae, Mammalia): Was it an ostrich dance or a moose fight?”**	**“Cortical Representation & Criminality: Assessing Facial Motor Control as a Biomarker for Violent Predisposition”**	**“From Textbook to Touch: Automating Tactile Graph Conversion and Braille Labeling Using Deep Learning and a Large Language Model API”**
	Athena Baronos	Asil Arar, Kajal Malik, Lauren Bui, Farzana Alam, Katelyn Shibilski	Anila Khan
11:30 a.m.	**“Why People Use Dating Apps”**	**“Modulating Aberrant Pyruvate Carboxylase (PC) Activity through a Structure-Based Drug Discovery Program”**	**“AI Warfare”**
	Sharodiya Dutta, Karen Calderon	Zakir Hossain	Dong Wang
11:45 a.m.	**“Assessing differences between Auditory and Visual False Memory Using the DRM task”**		**“Generative EEG Harmonization and Graph Attention for Cross-Cohort Major Depressive Disorder Recognition”**
	Kylee Crain		Tahereh Vasei

Poster Presentation Session I 1:15 – 2:15 p.m. 11th Floor 16 W 61st St	
A critical perspective on new potential players in Pyoderma Gangrenosum	Messarah Al Taee, Leyla Nasr
A Radical Response to OMT Post Root-Canal Procedure: A Case Report	Sahar Alsaidi, Grace Durbin
A Rare and Severe Case of Rapidly Progressive Granulomatous Mastitis	Rumana Rahman
A Review of the Relationship Between Environmental Pollutants and Hidradenitis Suppurativa Disease Severity	Corinne Rutkowski
Absence of αβ T cells accelerates disuse bone loss after immobilization with spinal cord injury	Salma Habib, Sara Rehman Noor, Mohammad Abuzaydeh, Sanjana Thahura, Saubia Zareen, Hannah Kim, Kyrollos Ibrahim
Acute Aphasia and Dysarthria Responding to Benzodiazepines	Atieh D. Ashkezari
Age is a Number when deciding a specialty: A Survey of OMS-IV after Match Day	Portia Madiment, Portia Maidment, Leigha Tierney
Are binucleate neurons present in the Cntnap2 mouse models of autism	Deonarine Rampershad
Assessing Medical Students' Ability to Estimate Cardiac Function Using Simple Echocardiographic Techniques	Georgi Savov Ms, Rohan Sundaran, Benjamin Dolbier
Assessment of Diet-Induced Models of Hypertension and Diabetes with High-Salt and High-Sucrose Feeding in Sprague Dawley Rats	Hema Devi Rampersaud
Association Between Facility Type and Hpv Vaccine Completion Among a Population Of Us Female Adolescents Sampled From The Nis-Teen 2018 Dataset	Jasky Karem, Brett Weinstein, Mph Ms Do
Attenuation of transforming Growth factor-β signaling promotes completer recovery of Trabecular bone structure following immobilization with traumatic spinal cord injury	Marina Metrus, Mishal Rahman, Anis Ansari, Tanzila Chowdhury, George Armanious, Kyrollos Ibrahim
Bead-Based Three-Dimensional Scaffolding Platform Promotes Multicellular Tumor Spheroid (MCTS) Formation of U87 Glioblastoma	Kevin Louis Zhang, Matthew Duazo, Dr. Rabab Hamzah, Amena Ikhlaq
Biopsychosocial Determinants of Pain: Implications for Osteopathic Manipulative Treatment in Individualized Pain Management	Jenika Patel, Gursimran Singh, Nancy Mahfouz, Rumana Rahman
Bridging Silos: An Interdisciplinary Educational Approach for Ambulatory Care Expansion on Long Island	Sofia Bauer, Shwana Noorani, Kayla Torres-Betancourt, Zoe Leung

Cardiac Electrophysiological Effects of Chronic Alcohol Consumption in a Rat Model	Naman Kapoor, Matthew Duazo, Eddie Louz, Ezra Mokhtar, Samantha Sanger
Changes in Migraine Headaches Following SARS-CoV-2 Infection: A Case Series	Neil Shah, Deep Patel
Characterization of surface wear on resurfaced patellas in total knee arthroplasty (TKA) Utilizing surface topography to characterize wear patterns of resurfaced patellas in total knee arthroplasty (TKA)	Andres Salazar, Dillon Pekoff, Janie Huang, Rosario Troia, Anusha Imran
Clinical Based Approach to Understanding Menopause Symptoms	Deep Kaur, Antonio Gerbino
Clinical characterization and inpatient outcomes of hospitalized adults with ASCVD and coded elevated lipoprotein(a): a national inpatient analysis	Maria Shenouda, Alissa Winston, Brian Trinh, Arisa Hirose, Isabelle Shi
Comparison of acute skin toxicity with ultra-hypofractionated whole breast radiation therapy vs conventional radiation dosing after lumpectomy for breast cancer: a single institutional experience	Jasky Karem
Cyclical Reduction of OFF Time in a Patient with Advanced Parkinson's Disease Using Osteopathic Manipulative Treatment: A Case Study Report	Andrew Abdelmalak
Defining the Baseline: Quantitative Mapping of Human Skin Texture Variation with GelSight	Palwasha Zenul Khan
Demographic and Behavioral Determinants of Skin Cancer: A Cross-Sectional Analysis of NHANES 2017–2020	Chloe Kim, Arisa Hirose, Isabelle Shi, Brian Trinh, Kevin Liu
Dietary Sodium and Sugar Intake and Their Associations with Ankle-Brachial Index and Peripheral Artery Disease	Amrita Makhijani
Effects of High Salt and High Sucrose Diets in Rat Renal Vascular Morphology	Dokyeong Kim
Encountering the Landscape: An Artistic Field Journal of Montana	Molly Eileen Helie, Aminah Sarowar
Examination of Arthrobacter phage Gibbzilla determines that cluster FB phages are Temperate	Amina Ahmed
Exploring Astrocyte Morphology in a Thyroid Deficient Model	Zoe Leung
Exploring the Therapeutic Potential of Naltrexone in Dermatology: A Scoping Review	Sanjidah Ira
Fort Peck Native American Health Education Continuum: Strong Spirits, Healing Paths	Shwana Noorani, Sofia Bauer, Amelia Lam, Mahdia Begum, Courtney Brady, Xitlali Maceda
From Discussion to Reflection: A Longitudinal Evaluation of Peer Instructed Learning in Preclinical Medical Education	Georgi Savov
From Mentee to Mentor: The Role of Mentorship in Shaping Evidence-Based Medical Students	Paige Vinch, Oliva Caan, Erin Hong, Brian Trinh
Geographic Information Systems on Long Island: Evaluating Environmental Risk Factors for Autism Spectrum Disorder to Inform Groundwater Policy	Cristina Ruiz, Alayna Abraham, Puneet Dhaliwal, Farah Tasneem

Grief and Coping Education in U.S. Pre-Clinical Medical Curricula: Findings from an Exploratory Survey	Vineet Vishwanath
Has Informed Consent Been Outpaced by Medical Knowledge?	Nancy Hilton
Heat of the Crisis: A Health Policy Approach to the Impact of Climate Stressors on Mental Health in Los Angeles County	Suruchi Verma
Impact of Colonoscopy Timing on Clinical Outcomes in Low-Risk Lower Gastrointestinal Bleeding: A National Retrospective Cohort Study	Wendy Qu, Kevin Liu, Isabelle Shi, Brian Trinh, Alissa Winston
Improving Access to Tranexamic Acid in Postpartum Hemorrhage Emergency Department Management of Unplanned Vaginal Deliveries	Catherine Istafanos, Joseph Tawfellos, Leyla Nasr
Improving Dermatologic Education in Medical School Curriculum : A Survey Study	Mary Claire Swaim
Investigating the Association between Elevated Levels of HbA1c and Access to Health Care in Taxi/FHV drivers	Sahar Alsaidi
Learning Dynamics as an Indicator of Generalizable Models for Obesity and Diabetes Prediction	Ann Murickan
Live Cell Imaging Reveals Upregulation of Mitochondria-Lysosome Contact Dynamics and Lysosomal Motility in Doxorubicin-induced Cardiotoxicity	Chandrema Hossain
Longer-Term Effects of a Humanities in Medicine Workshop For Reducing Bias and Improving Empathy During Clinical Rotations	Nisansa Perera
Measles Resurgence and MMR Vaccine Policy in the United States: A Health Policy Brief	Robert Colbath, Ariel Karson
Median Arcuate Ligament Syndrome: A Case Report and Literature Review on the Challenges of Diagnosis	Emma Rivellese, Annette Pietraru
MicroCT evaluation of alveolar dimensions that differ between smoker and non-smokers	Jonathan Rodriguez, Dante Carbone
Nitrous Oxide Abuse: The Emerging Need for Regulatory Oversight	Portia S.N. Maidment, Leigha N. Tierney
Osteopathic Approach to Restoring Function After Post-Surgical and Post-Radiation Cervical Fibrosis: The Tongue as a Body Diaphragm: A Case Study	Elianna Sanchez, Andrew Abdelmalak
Osteopathic Manipulative Treatment in the Management of Posterherpetic Neuralgia: A Case Report	Catherine Chin
Post-Covid trends in the Utilization of Telepsychiatry Services by Medical Students and Graduates	Sophie Criss, Nikhil Bhutani, Nicole Basilan
Preparation of Human Achilles Tendon Sections Using Cryotome and Cryotape for Histological Analysis	Safwan Hassan, Anusha Imran
Quantitative Micro-CT Analysis of Apical Lung Airspace in Smokers and Nonsmokers	Tomotaka Mizuno, Helen Lee, Brian Begelman
Regional Condylar Component Influences Femoral Prosthetic Wear in Total Knee Arthroplasty	Janie Huang, Anusha Imran
Reveal the Role of Heparan Sulfate in Traumatic Brain Injury via Single-Cell Spatial Omics	Brianna Han

Sex-Specific Differences in Human Milk Composition and Infant Growth	Nina Cui
Significantly increased trends for gastrointestinal stromal tumors (GIST) during pandemic years (2020-2022)	Janie Huang, Marium Ghobriel, Shivangi Patel, Roma Pathak, Aditi Rathor
Socioeconomic and Racial Disparities in Rehabilitation and Long-Term Outcomes Following Spinal Cord Injury	Leyla Nasr, Catherine Istafanos, Messarah Altaee
Socioeconomic Trends within Patient Population of Hypertriglyceridemia and Acute Pancreatitis: A 7-Year Study	Alissa Winston, Dokyeong Kim, Brian Trinh
Structural and Pathophysiological Changes in the Enteric Nervous System of 5xFAD Mouse Model of Alzheimer's Disease	Syed Khidash Hussainy
The DormantTrigger: Is Parkinson's a Chronic Intracellular Infection?	Katie Mata
The Impact of NIH Budget Cuts on NIAID-Funded Research and Biomedical Innovation	Nardine Samuel, Halle Cann, Demitra Tzakas, Kayla Torres-Betancourt
The risk of parasite related malnutrition and failure to thrive in pediatric patients as it relates to water source in the Dominican Republic	Gabriella D. Fiakos, Layavarsha Mutte, Lauren Greenberg
The Role of Food Insecurity on Cardiovascular Disease Risk in Aging Populations	Shreya R Nagarajan, Amisha Tewari
When Demand Outpaces Supply: Impact of Semaglutide Shortages on Diabetes Care Access	Kevin Hom, Michelle Zhang, Shin Yu Chen, Caleb Sooknanan

Poster Presentation Session II 2:30 – 3:30 p.m. 11th Floor 16 W 61st St	
A Closed-Loop Soft Haptic Glove for Gesture Recognition and Motor Learning Enhancement in Children with Developmental Disorders	Shokoufeh Davarzani
A Computational Framework for Modeling Fusiform and Unipennate Muscle Mechanics	Johan Joseph Nunez Quispe, Dani R. Gulino
A Conceptual Framework and System Architecture for AI Assisted Augmented Reality Interfaces to Reduce Cognitive Load in Lunar Extravehicular Activities (EVA)	Hamza Khan, Zakreya Khan, Aftab Khan, Ibraheem Mahmood, Furqan Rehman, Justin Catagua, Saabir Beig, Zain Khan, Neeam Hayder
A Sewed Coil-Based Wearable Glove System for Sequential Hand Gesture Classification Using SVM	Ahmal Raheem Mais, Shokoufeh Davarzani, Shububham Mahesh Mandora
A Wearable-Derived Physiological Readiness Framework for Freediving Safety Screening	Zainab Faisal, Mihir Paragkumar Brahmbhatt, Levi Dong
AI and it's Enviormental Effects	Mike Roman
Arthrobacter Phage HiVe of cluster AP2 isolated from Brooklyn New York	Hiba Irfan, Venetiana Garyfallos
Arthrobacter phage Swim found to be pseudolysogen	Stanley Pierre Louis, Aminah Sarowar, Sumreet Baidwan
Association between Coaching Behavior Styles and Athlete Well-being: A Systematic Review	Matthew Benavides
Beyond Distribution	Monica Pena
Beyond the Average: Towards More Representative Human Body Models for Impact Simulations	Aditya Kumar Shakya, Omar Jaber
Biomaterial Selection for Artificial Skin	Dalaney Mangham
Blood Transfusion Administration Errors: A Quality Improvement Proposal	Emily Santos, Nina Leon, Taelor Allen, Emily Santos, Nina Leon, Taelor Allen
Building Bone Digitally: Simulating Trabecular Microstructure with Voronoi Tessellations	Dani Boshnack, Bryan Shivram
Carbon Emissions	Kevin Alvarez Solano
Chamber Of Light - Central Park Visitors Center	Satish Doobay
Clinical Applicability and Cross-Dataset Validation of Machine Learning Models for Binary Glaucoma Detection	David Remyes
Computational Modeling of Skeletal Muscle Microstructure: Development of Simulation-Ready Fascicle-ECM Geometries	Dani Gulino, Johan Joseph Nunez Quispe
Controlled Chaos	Sivapriya Janakiraman
Counting the Strongly-Connected States of a Biologically Motivated Vector Addition System	David Mushiyev

Creating Nanoscale Carbon Fiber Electrodes Through Alkaline Etching	Meet Boghani
Creative Connections: A Music and Art-Based Program for Individuals with Alzheimer's Disease	Gianna Marie Moncayo
DATA 101 Focus Groups on Student Perceptions of AI and Their Learning", New York Institute of Technology	Ameer Tayeh, Samiha Akter
Design and Validation of a UVC-based Bactericidal System	Ali Vaziri, Armand Ahmetaj
Designed for Demolition/Rethought for Reuse	Pauline Barsegyan
Designing the Unseen: AI as a Generative Field in Architectural Thought and Representation	Yasmine Koleilat, Naomie Copiatti, Chloe Witkin
Development of Phenylacetic Acidâ€“Derived Amide Analogs to Evaluate Potency and Specificity Toward Pyruvate Carboxylase	Aleeza Mughal, Alisha Marfani, Rachel Toro
Dietary Intake During the Last Month of Pregnancy Among Women Who Gave Birth to Term and Preterm Infants and Its Association With Infant Anthropometric Measurements at Birth	Samiha Akter
Differential Expression of DNA repair Genes and NF-κappaB associated genes in Cancer Cells in Response to Curaxin	Soham Raval, Ryan Dong, Winnie Yao
Does dance therapy improve balance for people with Parkinson's Disease? – A Systematic Review	Devjja Vaibhavkumar Joshi
Drug Delivery System via Skin Grafts	Christina Gagliano, Julius Bhattan, Anna Dykhno, Alana Singh
Dysautonomia and Postural Orthostatic Tachycardia Syndrome (POTS) in the ENT Clinic: Differentiating Orthostatic Dizziness From Vestibular Migraine and Persistent Postural-Perceptual Dizziness (PPPD)	Philip Zitser, Ilana Kolominyets, Maheen Imran, Aashi Kulkarni, Jenika Patel
Effects of hypertrophy Training in Youth Girls. A Systematic Review	Olivia Evola
Effects of Narrative Reflection on STEM Identity and Belonging in Undergraduate Researchers	Zainab Faisal, Melisa Sharkly, Jaelynn Wesley, Ahaylee Rahman
Enhancing Leisure Participation: An Educational Resource for Adults with SCI	Catherine Matteo
Enhancing Sensory Inclusivity in Salon Spaces: A Sensory Integration Resource for Hairstylists and Families	Gabriela Bernard
Escalation Hesitancy in New Nurses: Breaking barriers with peer mentorship programs	Alyssa Malave, Joseph Pilewski, Cailey Lopez, Steven Mcevoy
Estimating scale of matter density fluctuations in solar and supernova models using neutrino flavor evolution	Dhriti Rathod
Evaluating the Generalizability of Prostate Cancer Polygenic Risk Scores in men of African ancestry in the All of Us Research Program	Daniel Galvin Gusmano, Ifti Gazi
Fabricating 3D printed Biodegradable Scaffolds for Cellular Regeneration	Jeffrey Chu, Jiehui Li, Matthew Duazo
From Photons to Diagnosis: the Vision Science Foundations of Medical Imaging Display Standards	Parker Flanagan, Jana Radwan, Nancy Mahfouz
Future Remains: Density’s Answer	Yash Oza

High-Speed Rail: Why China Leads and the United States Is Falling Behind	Musa Md Fahim Islam
Identifying Chromatin and Multidrug Response Genes That Confer Resistance to Natural Insecticide, Using Saccharomyces cerevisiae	Jarin Tasnim
Impact of Cognitive and Dual-Task Training on Gait Performance for people with Parkinson's Disease: A Systematic Review	Arpita Milind Bedarkar
Integrating Genetic Connectivity and Network Modeling to Predict Viral Spread in the United States	Levi Dong, Gamana Gogineni
Investigation and Improvement of Stability in a Digital Holography System for Acoustics Applications	Brianna J. Hobert
Isolation and Characterization of MRSA-Targeting Bacteriophages for Potential Therapeutic Use	Mary Stein, Areebah Ahamed
LGBTQ+ Adversities Infographic	Okalahny Simeon
Linking Mechanics and Biology: Modeling Bone Remodeling in a Bobcat Skull	Bryan Shivram, Daniel Boshnack
Long-term Ambulatory Monitoring of Gastric Slow Wave Activity in Humans	Mauricio Cardenas
Micro Mobility Trauma and Operative Triage Algorithm for Craniofacial and Extremity Injuries	Philip Zitser, Edwin Sun, Henry Knox, Constantina Economou, Gregory Lipkovich
Naturescape room in organization	Sagarika Paturi
Objective Tools Detect Lower Extremity Asymmetry in Parkinson's During the Five Time Sit to Stand	Charles A Siguenza
Polygenic Risk Scores for Psychiatric Disorders in the All of Us Research Program	Melissa Oz
Pushing the Envelope	Deborah Seyilnen Parradang
Quality Improvement Proposal: A Multi-Modal Approach to Fall Prevention in the Elderly	Jo Kaur, Valeria Costa, Samantha Fernandez
Reducing Drug Diversion Among Nurses Through Education and Monitoring	Sascha Pacheco, Arielle Weiser, Beatrice Paul, Lauren Becker
SEPTAL (A Nasal Wearable; independent KEEN EM Design Competition project)	Aiesha Ayaana Hamid
Sox2 influences identity of glia-like prognitors and tumorigenesus in choroid plexus through LIM Homeodomain transcription factors	Mahek Chaudry, Asiye Susoglu
Synthesis and Characterization of New Functionalized Imidazolidinetriones (IZTs) and Their Monothio Analogs as Pyruvate Carboxylase (PC) Inhibitors	Luke Jacob, Hana Arafa
Synthesis of Pyocyanin for Prophage Induction Studies	Deep Patel
The Cost of Overfishing	Sherley Mercedes
The Healing Campus	Katrina Deicmane
The Health and Wellness of Caregivers for Children with Developmental Disabilities	Cheyenne Perry

The phylodynamic profile of Influenza across USA in September 2026	Lauren Donzella, Anita Lugina, Matthew Nemirov, Biol 487 Research Class
The River Studio- Mumbai: Edge to Edge	Manasi Bhise
The Role of Social Burnout in Shaping Classroom Engagement and Learning Outcomes	Jaelynn Wesley, Kayden Candelario, Kenzy Abdelatif
Theia	Christopher D'Antonio, Sharodiya Dutta, Karen Caldera Quesada, Yash Shetty
Too Many Patients, Too Little Support: Burnout Among New Nurses in New York	Christina Gargano, Hannah Alcotas, Lianna Mazzocchi
Universal Approximation Theorem for Quantum Machine Learning	Jonah Villafan
Values-Based Clinical Communication Training in Medical Education: An Analysis of Patient and Health System Outcomes	Riya Subbaiah
VUV Photoionization of Organic Systems: Insights into C–Br Bonds and 2,3-Dimethylfuran Reactivity	Yilan Lori Chen

A Closed-Loop Soft Haptic Glove for Gesture Recognition and Motor Learning Enhancement in Children with Developmental Disorders

Student Presenters: Shokoufeh Davarzani

Faculty Mentor: Maryam Ravan

School/College: Engineering & Computing Sciences

Nonverbal communication through hand gestures is essential for human interaction, yet individuals with motor or cognitive impairments often face significant challenges in performing these movements. While existing technologies like vision-based systems and sensor-based gloves can recognize gestures, they often lack the ability to provide the physical assistance or real-time correction necessary for motor learning. This paper presents a novel, closed-loop haptic glove system that integrates an inductive-sensor-based gesture recognition platform with a soft pneumatic actuation system designed for assistive learning, particularly for children on the autism spectrum.The system utilizes flexible inductive coils embroidered onto the glove to monitor multi-joint hand kinematics with high resolution and stability. When a gesture deviates from a predefined therapeutic target, a centralized pneumatic architecture—capable of simultaneous multi-digit flexion and extension—inflates to guide the user's fingers into the correct posture. Controlled by a real-time edge-computing architecture, the system employs a dual-model strategy that validates both static hand posture and dynamic temporal execution against "gold-standard" reference templates. Experimental validation across 15 predefined gestures demonstrates the system’s ability to reliably detect errors and provide effective corrective actuation. By combining perception, interpretation, and physical correction into a single wearable fram

A Computational Framework for Modeling Fusiform and Unipennate Muscle Mechanics

Student Presenters: Johan Joseph Nunez Quispe, Dani R. Gulino

Faculty Mentor: Wei Zeng

School/College: Engineering & Computing Sciences

Skeletal muscles exhibit distinct architectures, such as fusiform and unipennate arrangements, and these structural differences influence how muscles generate force and respond to deformation. This NSF-supported project develops a computational framework to investigate how muscle architecture affects mechanical behavior using finite element (FE) modeling. Representative volume elements (RVEs) were generated with a customized MATLAB routine based on Voronoi tessellation, producing regions representing muscle fascicles embedded within surrounding extracellular matrix (ECM). Different architectures were created by varying the pennation angle, which defines the orientation of muscle fibers relative to the direction of force. Unipennate geometries were generated with pennation angles of 10°, 20°, and 30° to examine how fiber alignment influences mechanical response. FE simulations incorporated two materials: fascicles governed by a Hill-type active model implemented through a user-defined subroutine in Abaqus, and ECM modeled as passive connective tissue. Controlled axial stretching evaluated passive and active responses of these tissues. Results highlight differences between fusiform and unipennate geometries, underscoring the need for morphology-specific modeling. This framework enables systematic exploration of how muscle architecture and activation influence mechanical performance and supports future patient-specific simulations for clinical and rehabilitation applications.

A Conceptual Framework and System Architecture for AI Assisted Augmented Reality Interfaces to Reduce Cognitive Load in Lunar Extravehicular Activities (EVA)

Student Presenters: Hamza Khan, Zakreya Khan, Aftab Khan, Ibraheem Mahmood, Furqan Rehman, Justin Catagua, Saabir Beig, Zain Khan, Neeam Hayder

Faculty Mentor: Wei Zeng

School/College: Engineering & Computing Sciences

Extravehicular Activities (EVA) require astronauts to process large amounts of telemetry , navigation data and safety related information in real time, with limited communications and high stress levels. This mental load may wear and tear on the decision making, situational awareness and the overall performance of the mission. This paper describes a conceptual model and system architecture of an Artificial Intelligence (AI) guided augmented reality (AR) interface that will help avert cognitive load and assist astronauts in decision making in the course of lunar EVA activities.

The system proposed is SAFAR (Synchronized Adaptive Feedback with Augmented Reality), which includes an interface Lunar Mission Control (LMC) inside the pressurized rover and a head mounted display (HMD) on the extravehicular astronaut. The MARVIN contextual AI assistant, which is a collection of modular subsystems that constitute the core of the system, is built on environmental perception, biomedical monitoring, and risk assessment subsystems. MARVIN transforms multi source telemetry data and provides structured and prioritized feedback in AR overlay and natural language, making astronauts better interpret complex information and respond to changing mission requirements.

This paper describes the dual interface architecture of the system, data synchronization approach, and AI assisted decision support, and shows how it was applied to the scenario analyses in accordance with the workflow of the EVA oper

A critical perspective on new potential players in Pyoderma Gangrenosum

Student Presenters: Messarah Al Taee, Leyla Nasr

Faculty Mentor: Vladimir Grubisic

School/College: Osteopathic Medicine

Pyoderma Gangrenosum (PG) is a rare neutrophilic dermatosis that is associated with autoimmune disorders and particularly inflammatory bowel disease (IBD). Chronic intestinal inflammation leads to increased intestinal permeability which heightens downstream immune processes – notably the Th-17 neutrophil axis–driving pathological neutrophil activation and accumulation in the skin. However, the exact mechanism of PG is unclear. Growing evidence indicates the role of the enteric nervous system (ENS) and enteric glial cells as important regulators in neuroimmune signaling pathways and epithelial barrier integrity and function. Here we explore the potential role of enteric glia in pathogenesis of PG by critically reviewing published work. We conducted a literature review across multiple academic databases including PubMed, Web of Science, and UpToDate, using relevant keywords and combinations such as "enteric nervous system," "enteric glia," "gut–skin axis," "gut permeability," "inflammatory bowel disease," and "cutaneous manifestations."

A novel behavior in a ruminant (Prolibytherium; Climacoceridae, Mammalia): Was it an ostrich dance or a moose fight?

Student Presenters: Athena Baronos

Faculty Mentor: Nikos Solounias

School/College: Osteopathic Medicine

Prolibytherium is a deer-sized ruminant from the early Miocene of North Africa and Pakistan. It is classified as a Climacoceridae of the Giraffoidea. Two species are recognized: Prolibytherium fusus (18.75 Ma) and Prolibytherium magnieri (16.5 Ma). It is an interesting ruminant because it has palmate ossicones that are broad and flattened, resembling butterfly wings. The occipital condyles are fused into a single, ring-shaped structure around which the atlas can rotate, and the distal metapodials and distal phalanges are flattened. This study is about a hypothesized behavior, based on osteology, involving a head and forelimb display of species of Prolibytherium. We hypothesize that these animals engaged in head rotation in the coronal plane while forcefully pressing their thoracic limbs into the ground by comparing the osteology of Prolibytherium to modern ruminants. This behavior is supported by osteological evidence from cranial, cervical, and forelimb structures, including ossicones, occipital condyles, mastoid processes, vertebrae, and limb elements. Such osteological evidence constitutes the first inferred behavior ever proposed for the extinct family Climacoceridae.

A Novel Conference-Based Approach to Studying Radiologic Visual Search and Cue Precision

Student Presenters: Ayesha Mulla, Jana Radwan, Maha Naveed, Talia Lilikakis, Audrie Saad

Faculty Mentor: Robert Alexander

School/College: Arts & Sciences

Radiologists often search medical images for multiple potential abnormalities, such as cancerous nodules, increasing the chance of missing subtle findings when attention is focused on a specific target. Prior work shows that precise cues ("find the red apple") guide search more efficiently than imprecise cues ("find the apple"), but this has primarily been explored in hue-based tasks, which do not reflect the grayscale nature of radiologic images. This project examines whether precise non-hue cues can improve performance in radiologic search tasks. This presentation highlights our novel approach to collecting data from radiologists, who rarely have time for laboratory testing. We brought eye-tracking equipment to a major radiology conference (the Society of Thoracic Radiology) and rented an exhibitor booth. Radiologists were recruited on-site through brief explanations of the research, allowing participation during breaks without interrupting conference sessions. The close-knit nature of the thoracic radiology community facilitated participation as well, as radiologists often traveled with colleagues and spread word of the experiment. Logistical revision is needed for future conferences, as factors such as external light and the display screen being positioned farther than it is in typical reading environments may have influenced viewing behavior. Overall, we successfully collected data from 24 radiologists, demonstrating the feasibility of this conference-based approach.

A Radical Response to OMT Post Root-Canal Procedure: A Case Report

Student Presenters: Sahar Alsaidi, Grace Durbin

Faculty Mentor: Reem Abu-Sbaih

School/College: Osteopathic Medicine

Post-operative complications after endodontic procedures may persist despite conventional treatment. Pain can be related to cranial somatic dysfunction (SD) aggravated by procedural factors, infection, or neuropathic injury, with complications reported in up to 56% of patients. This case demonstrates osteopathic manipulative treatment (OMT) as an adjunct for persistent endodontic pain associated with a posterior maxillary periradicular lesion limiting oral intake. A 40-year-old female with a history of bilateral root canals, hemithyroidectomy for carcinoma, and remote head trauma was referred for osteopathic evaluation after four dental consultations. She reported 7–8/10 pain with mastication and a persistent 2-cm gingival lesion for 7 months that prevented solid food intake. Prior evaluation included imaging, aspiration, and antibiotics without improvement, and tooth extraction was being considered. Structural exam revealed cranial/intraoral, cervical, rib, and sacral SD. OMT was initiated using intraoral and cranial techniques, balanced ligamentous tension, and lymphatic drainage. The following day, the patient reported transient fever and pharyngitis that resolved along with disappearance of the gingival lesion, return of solid food intake, and 90% pain reduction. Exam confirmed improvement. After three OMT sessions, pain remained minimal with no recurrence. These findings support growing evidence for osteopathic–dental collaboration in managing persistent dental pain.

A Rare and Severe Case of Rapidly Progressive Granulomatous Mastitis

Student Presenters: Rumana Rahman

Faculty Mentor: Mervat Mourad

School/College: Osteopathic Medicine

Granulomatous mastitis (GM) is a rare, benign inflammatory breast disease of unclear etiology that may be autoimmune or infectious and often mimics malignancy. Diagnosis is challenging, and management remains controversial, ranging from antibiotics to immunosuppressive therapy. GM most commonly affects non-white women of childbearing age, typically within two years of breastfeeding.

We present a 30-year-old African American woman who developed progressive right breast pain, erythema, edema, and a rapidly enlarging ulcerative lesion measuring 6.5 × 3.5 cm after breastfeeding. Initial treatment with doxycycline followed by trimethoprim-sulfamethoxazole failed to improve symptoms. Ultrasound-guided biopsy confirmed granulomatous mastitis, and MRI revealed a 7.1 × 4.9 × 6.4 cm mass involving the lower central right breast.

Due to refractory disease, rheumatologic evaluation was pursued and revealed Hashimoto's thyroiditis, supporting an autoimmune etiology. After minimal response to rifampin, therapy was transitioned to methotrexate, resulting in marked clinical improvement and eventual discontinuation of treatment.

This case highlights an aggressive ulcerative presentation of GM and underscores the importance of early biopsy, autoimmune evaluation, and individualized management in refractory cases.

A Review of the Relationship Between Environmental Pollutants and Hidradenitis Suppurativa Disease Severity

Student Presenters: Corinne Rutkowski

Faculty Mentor:

School/College: Osteopathic Medicine

Hidradenitis suppurativa (HS) is a chronic, inflammatory skin disorder of the folliculopilosebaceous unit that predominantly affects intertriginous areas. While genetic, hormonal, and lifestyle-related risk factors are well-established, the potential role of environmental pollution in HS pathogenesis remains largely unexplored. This review aims to evaluate the emerging evidence linking environmental pollutants to the incidence, severity, and progression of HS, drawing comparisons to other chronic inflammatory skin diseases such as psoriasis and atopic dermatitis. Environmental pollution represents a potentially modifiable risk factor in HS that warrants further investigation. Future research should prioritize prospective cohort studies, pollutant-specific exposure tracking, and the development of biomarkers to elucidate the impact of environmental triggers on HS onset and severity. Understanding this link may improve disease management and open avenues for preventative strategies.

A Sewed Coil-Based Wearable Glove System for Sequential Hand Gesture Classification Using SVM

Student Presenters: Ahmal Raheem Mais, Shokoufeh Davarzani, Shububham Mahesh Mandora

Faculty Mentor: Maryam Ravan

School/College: Engineering & Computing Sciences

The fine motor control of hand gestures requires a specific approach for observation and guidance, enabling broad applications in rehabilitation, assistive technology, and human-computer interaction. This project presents a functional, wearable glove system that captures analog signals from eight sewn coils across the thumb, index, middle, ring, pinky, palm, wrist, and ulnar regions, using a custom PCB and Arduino microcontroller. This raw sensor data is streamed serially into MATLAB, where the signal is processed through a pipeline to remove spikes, apply block-mean smoothing, and perform baseline subtraction. Extensive trial data were collected across a predefined set of 13 gestures and used to train a multi-class Support Vector Machine (SVM) classifier using an ECOC framework with a polynomial kernel. The model was validated using 10-fold cross-validation across all 13 gesture classes, achieving a mean classification accuracy of 97–99%. The trained network is able to detect gestures in sequence with high accuracy, demonstrating the feasibility of low-cost wearable sensing combined with machine learning for gesture-based rehabilitation monitoring and assistive control.

A Slice of the 20's

Student Presenters: Giselle Austria

Faculty Mentor: Jonathan Goldman

School/College: Architecture & Design

This project examines the intersection of food history, industrial innovation, and domestic life in 1920s New York City through a case study of a sponge cake recipe published in The New Royal Cook Book by the Royal Baking Powder Company. Situating the recipe within the context of egg shortages during the decade, the research explores how commercial food producers adapted recipes and marketing strategies to address shifting economic and material conditions. The accompanying digital platform, A Slice of the 20s (https://gaustria8.wixsite.com/a-slice-of-the-20s), presents this analysis through curated historical context, visual materials, and an interpretive reconstruction of the recipe. This project will be presented as a 5-minute oral presentation as part of Professor Jonathan Goldman's NYC History Roundtable, with Professor Jonathan Goldman serving as faculty mentor.

A Wearable-Derived Physiological Readiness Framework for Freediving Safety Screening

Student Presenters: Zainab Faisal, Mihir Paragkumar Brahmbhatt, Levi Dong

Faculty Mentor: Leonidas Salichos

School/College: Arts & Sciences

Freediving risks, including shallow water blackout, hypoxic syncope, and panic-induced drowning, are closely linked to autonomic dysfunction, poor sleep, and psychological stress. Currently, no standardized pre-dive screening or wearable-based dataset links physiological markers to safety outcomes. This study uses real-world wearable data to develop and validate a physiological readiness framework.

For this project, we analyzed a continuous 4-week wearable dataset of 49 healthy adults, comprising 38,913 heart rate variability windows, sleep diaries, and clinical surveys for anxiety and depression. Linear mixed effects models identified predictors of daily SDNN, the primary HRV marker of autonomic recovery.

Between-person differences accounted for 43% of daily HRV variation, emphasizing the need for individualized baselines over population thresholds. Prior night sleep efficiency positively trended with next day SDNN, while anxiety, depression, smoking ($p=0.037$), and alcohol consumption ($p=0.026$) reduced autonomic readiness. A composite Readiness Score ($R^2=0.90$) integrating SDNN, sleep, anxiety, and depression classified readiness into three tiers: optimal ($>+1.5$), moderate (-1.5 to $+1.5$), and not ready (<-1.5).

These results are being used as indicators of general readiness. In the next steps, our goal is to develop a Diving Readiness Score based on diving performance data and conditions.

Absence of αβ T cells accelerates disuse bone loss after immobilization with spinal cord injury

Student Presenters: Salma Habib, Sara Rehman Noor, Mohammad Abuzaydeh, Sanjana Thahura, Saubia Zareen, Hannah Kim, Kyrollos Ibrahim

Faculty Mentor: Hesham Tawfeek

School/College: Osteopathic Medicine

Severe and resistant bone loss is one of the most common and devastating complications of immobilization after spinal cord injury (SCI) increasing fracture risk. T cells are negative players of bone loss but their role in SCI-induced bone loss is unknown. To address this, male wild type (WT) and αβ T-cell deficient ($Tcrb^{-/-}$) mice underwent sham or contusion SCI surgery to induce hindlimb paralysis. Mice were sacrificed 7, 14, or 35 days after surgery, and femurs were evaluated using micro-computer tomography (micro-CT) scanning analysis. Bone marrow (BM) supernatants were collected, and levels of bone turnover markers/factors were measured using ELISA. Micro-CT analysis of the distal femoral regions after 2 weeks revealed a 55% reduction in trabecular fractional bone volume, 40% in thickness, and 55% in connectivity in $Tcrb^{-/-}$ SCI but not in WT-SCI mice when compared to respective controls. Cortical bone regions showed reduced cortical thickness in $Tcrb^{-/-}$ SCI when compared to WT SCI animals. BM supernatants showed lower levels of bone formation marker, higher levels of resorption marker, and higher RANKL/OPG ratio in Tcrb-/- SCI mice than WT-SCI. At 5 weeks, both WT and $Tcrb^{-/-}$ SCI mice exhibited marked deterioration in all bone structural parameters but with overall greater magnitude in the $Tcrb^{-/-}$ mice. Together, T-cell deficiency accelerates disuse-induced bone loss, thus preserving T-cell function may be a promising strategy to prevent fractures in SCI individuals.

Acute Aphasia and Dysarthria Responding to Benzodiazepines

Student Presenters: Atieh D. Ashkezari

Faculty Mentor: Jennifer Maccagnano

School/College: Osteopathic Medicine

Background: Stiff person syndrome (SPS) is a rare autoimmune neurologic disorder (1–2/million) characterized by muscle stiffness, spasms, stimulus sensitivity, and speech changes. ED presentations are uncommon and often misdiagnosed. Stress may trigger exacerbations. Benzodiazepines are first line, while immunoglobulin (IVIG) provides long-term benefit.

Case Presentation: A 55-year-old woman with SPS presented to the ED for hyperkalemia with abdominal pain, dizziness, nausea, vomiting, and dysuria. Vitals were stable; exam showed abdominal and costovertebral angle tenderness. Neurologic exam showed intact cranial nerves, normal strength and sensation, but abnormal finger-to-nose. During her ED course, she developed increased tone with painful spasms, progressing to dysarthria and aphasia. Brain MRI showed no acute findings. Urinalysis was positive, and CT abdomen/pelvis showed no acute pathology. She received lorazepam with improvement and ceftriaxone for UTI. Neurology suspected an SPS flare, and she was admitted.

Discussion: SPS may be misdiagnosed due to overlap with common conditions, delaying care. Benzodiazepines are effective for acute control, while IVIG is used for long-term management.

Conclusion: SPS should be considered in ED patients with unexplained rigidity or evolving neurologic symptoms. Early recognition reduces morbidity.

Age is a Number when deciding a specialty: A Survey of OMS-IV after Match Day

Student Presenters: Portia Madiment, Portia Maidment, Leigha Tierney

Faculty Mentor: Maria A Pino

School/College: Osteopathic Medicine

The selection of a medical specialty is a critical decision in a medical student's career, as it shapes professional identity, long-term job satisfaction and even the healthcare system's workforce distribution. When considering the factors affecting medical students' specialty choices, most of the existing research focuses primarily on gender.

The goal of this study was to identify potential trends in specialty choice based on age groups, specifically whether age has an impact on the selection of a primary care specialty.

An electronic survey was administered to OMS-IV students, after the March 2025 Match Day. The questions included questions to obtain demographic information, undergraduate majors, and if previous experiences had a role in the choice of a specialty.

Results: There were no statistically significant differences found between older and younger medical students, that matched into a primary care residency vs a non-primary care residency. However, when asked if age and experience impacted their choice of a residency, the majority responded yes.

Conclusion: Factors that impact specialty choice should not limited to age alone. Previous experiences, work life balance, family planning, willingness to undergo extended training, financial considerations, and even physical stamina should be included. Understanding these factors will assist students in making important decisions about their future career, while addressing physician shortages throughout all specialtie

AI and it's Enviormental Effects

Student Presenters: Mike Roman

Faculty Mentor: Patty K. Wongpakdee

School/College: Architecture & Design

My poster is an infographic display on the environmental effects of artificial intelligence chat bots, It is no surprise that AI chat bots have become a widely used tool across all industries and even in daily life. With the widespread use of AI also comes the repercussions of using such intelligent programs. Training and use of a new model uses up large amounts of clean water, electricity and produces carbon emissions. The purpose of this poster is not to stop the use of AI, but to help the users understand the resources being consumed in the process and evaluate if there use is worth the environmental impact.

AI Warfare

Student Presenters: Dong Wang

Faculty Mentor: Yunlong Shao

School/College: Engineering & Computing Sciences

Artificial intelligence (AI) is reshaping the landscape of military-related strategic competitions, yet current understanding of "AI Warfare" remains fragmented and poorly defined. This paper develops a comprehensive, multidimensional framework for understanding AI Warfare—not merely as the application of AI technologies, but as international strategic competition conducted through the manipulation of algorithms, training datasets, AI-as-a-Service (AIaaS) and AI-generated contents (AIGC) to influence adversary decision-making, command structures, and cognitive processes. This paper examined the distinctive characteristics of AI-enabled conflict, analyze the technical and operational layers that constitute AI Warfare, propose the Wargaming Design model (WD Model) for algorithm transparency and data integrity, and outline defensive strategies appropriate to this emerging domain. The analysis draws on game theory, military history, organizational design, sociology and communication theory to assess how AI differs fundamentally from traditional cyber warfare and why conventional cybersecurity approaches are insufficient. The paper concludes that effective AI Warfare defense requires coordinated measures across infrastructure resilience, interaction design security, audience-centered research, and international governance frameworks.

Are binucleate neurons present in the Cntnap2 mouse models of autism

Student Presenters: Deonarine Rampershad

Faculty Mentor: Raddy Ramos

School/College: Osteopathic Medicine

Homozygous mutations of CNTNAP2 cause autism. A neuropathological finding from affected patients is the presence of binucleate neurons in the neocortex. Whether binucleate neurons are also present in the Cntnap2 mouse model of autism remains unknown. In the present study, we used histological approaches to examine the neocortex of Cntnap2 mice in search of binucleate neurons. We report our observations and discuss how our results have implications for using these mice as a model of autism as well as the role of CNTNAP2 in brain development and cytokinesis.

Arthrobacter Phage HiVe of cluster AP2 isolated from Brooklyn New York

Student Presenters: Hiba Irfan, Venetiana Garyfallos

Faculty Mentor: Bryan Gibb

School/College: Arts & Sciences

Bacteriophages constitute a major source of unexplored genetic diversity, with many genomic qualities still left uncharacterized. Isolated from a moist soil sample in Brooklyn, New York, Arthrobacter phage HiVe was purified through enrichment using bacterial host Arthrobacter globiformis B-2979. This was completed as part of the Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) program. Phage HiVe formed small and clear plaque. The genome of HiVe was sequenced at the University of Pittsburgh and found to be 69287 bp with an average GC content of 65.7%. Based on gene content similarity, HiVe was placed subcluster AP2 along with 17 other phages related phages. The phages in this cluster are predicted to be lytic consistent with this; we were unable to isolate any lysogens of HiVe. Genome annotation identified 127 genes. Of the 127 genes, 71 genes are assigned a putative function. The genome organization of HiVe is similar to other AP2 phages, where approximately half of the genes in the left part of the genome are transcribed from the top strand while the other half of the genome is transcribed from the reverse strand. Comparative genomic analysis indicates that the left arm of the genome is highly conserved among subcluster AP2 phages and encodes structural assembly proteins; whereas DNA metabolism genes are more centrally located. In contrast, the right arm is more variable and enriches in genes of unknown function.

Arthrobacter phage Swim found to be pseudolysogen

Student Presenters: Stanley Pierre Louis, Aminah Sarowar, Sumreet Baidwan

Faculty Mentor: Bryan Gibb

School/College: Arts & Sciences

Bacteriophages are some of the most complex organisms in the biosphere. Processes such as isolation and characterization can provide substantial understanding into interactions between bacteriophages and their hosts. One notable interaction is lysogeny, an instance in which a bacteriophage infects its host, however, lysis is temporarily repressed. As part of the Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) program, bacteriophage Swim was isolated through enrichment (selective growth) on Arthrobacter globiformis B-2979. Swim collected near a residential driveway in East Williston, Long Island. After sequencing at the University of Pittsburgh, it was found to have a linear genome length of 20,586 bp, a GC content of 59.2%, and 33 protein-coding regions, in which none show typical signs of lysogeny. The ends of the genome contained covalently attached proteins and it was placed into cluster FD, based upon similarities to the other phages in this cluster. Interestingly, it was exhibited to have a hazy plaque morphology with a diameter of 2-3mm, which is indicative of lysogeny. Another indicator was confirmed through a superinfection immunity assay, where lysogens show immunity to Swim phage, however, not to unrelated phages. Using SEA-PHAGES protocol of streak plate purification, an attempt was made to isolate the lysogen. When doing so, not all lysogenic colonies exhibited halo formation, suggesting unstable lysogen formation.

Assessing differences between Auditory and Visual False Memory Using the DRM task

Student Presenters: Kylee Crain

Faculty Mentor: Nicole Calma-Roddin

School/College: Arts & Sciences

The Deese-Roediger-Mcdermott (DRM) test is common in false memory research, generally focusing on visually-presented stimuli. In this study, we expand the DRM test by including an audio version. Further, we will compare the results of DRM presentation using images, visually-presented words, and sounds. The theme of the stimuli is animals (e.g., images of animals, visually-presented words for animals, and animal sounds). We have created our study to match the original DRM task while adding the audio task and the visual-picture task. For the stimuli we will present 12 different animal images/words/sounds, followed by a 10 minute intervention period that will match each condition. The intervention will match each condition's modality (i.e. playing a couple of songs if they are part of the auditory condition, having participants complete a drawing task if they are part of the visual-image condition, having participants complete a cross-word puzzle if they are part of the visual-word condition). Participants will then complete a free-recall test and a 36-question confidence scale.

We predict that the audio test will have the highest score of false memory shown in a confidence test, and the visual-image will have the lowest score of false memory in a confidence test. With a better understanding of auditory memory, this can be applied to legal cases where the victim/witness has heard something that could be a key part of a case and help determine if it could be a false memory

Assessing Medical Students' Ability to Estimate Cardiac Function Using Simple Echocardiographic Techniques

Student Presenters: Georgi Savov, Rohan Sundaran, Benjamin Dolbier

Faculty Mentor: Michael LoCurto

School/College: Osteopathic Medicine

This study evaluated whether preclinical medical students can acquire basic echocardiographic skills with minimal training. Ninety first and second year medical students performed 250 scans on 93 subjects after a two hour session consisting of a brief tutorial and hands on practice. Students were tasked with obtaining an apical four-chamber view of the heart and measuring lateral mitral annular plane systolic excursion (MAPSE). Their measurements were compared to expert values with accuracy defined as within 20% above or bellow the standard.

Overall, students achieved 59.6% accuracy. Individual student's accuracy tended to increase as the number of scans increased: from 44% on the first scan to 70% by the fifth. Similarly, the proportion of students achieving at least 50% accuracy rose from 44% to 100% with repeated attempts. In addition, student measurements demonstrated an overall underestimation of MAPSE value with 163 scans (65.2%) while overestimation was only seen in 79 scans (31.6%). The mean measurement error (underestimation or overestimation) revealed to be -1.4mm.

These findings demonstrate that preclinical students can develop basic echocardiographic skills with limited instruction and that performance improves rapidly with practice. Early identification of common errors may help refine training and improve accuracy. The steep learning curve suggests that additional instruction could further enhance reliability. Future studies are needed to confirm this.

Assessment of Diet-Induced Models of Hypertension and Diabetes with High-Salt and High-Sucrose Feeding in Sprague Dawley Rats

Student Presenters: Hema Devi Rampersaud

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Hypertension and diabetes mellitus are major global health burdens influenced by excess dietary sodium and sugar intake. Although dietary rodent models are widely used to study these conditions, their reproducibility remains inconsistent. This study aims to evaluate whether high-salt and high-sucrose diets reliably induce hypertension and diabetes in Sprague Dawley rats. Thirty-five rats were used; five were euthanized at baseline and the remainder randomized to standard chow, high-salt (4% NaCl), or high-sucrose (65% kcal) diets (n=10/group). After 16 weeks, half were euthanized for tissue endpoint studies, and the rest continued to week 32. BMI, blood pressure, heart rate, and non-fasting glucose were measured weekly. Longitudinal changes were analyzed using linear mixed-effects models; group proportions and cumulative burden were assessed with Fisher's exact tests and total/incremental AUC analyses. At 16 and 32 weeks, no significant differences were observed between diet groups in BMI, blood pressure, heart rate, or glucose. All groups demonstrated age-related increases in cardiometabolic measures over time, with the high-salt group showing the greatest rise in diabetic-range glucose by week 32. However, diet-specific effects were not identified. These findings highlight variability in diet-induced cardiometabolic models and emphasize the need for refined approaches to reliably reproduce hypertension and diabetes in preclinical studies.

Association between Coaching Behavior Styles and Athlete Well-being: A Systematic Review

Student Presenters: Matthew Benavides

Faculty Mentor: Amerigo Rossi

School/College: Health Professions

Coaching behavior plays a critical role in shaping athlete outcomes, including motivation, performance, satisfaction, and burnout. PURPOSE: Evaluates how different coaching styles are associated with athlete well-being and the psychological mechanisms involved. METHODS: A detailed search of ProQuest, Gale and EBSCO databases was done. Five peer-reviewed studies that met the inclusion criteria of college student athletes competing in NCAA or NAIA in the US or Canada and studies involving the coaching styles of either autocratic, democratic, transformational, congruent leadership or intrinsic motivation were systematically reviewed. 1,900 athletes were evaluated in the included studies of relationships between coaching behaviors and student athletes. Questionnaires were used to determine those outcomes. RESULTS: Leaderships were assessed to see the following outcomes: motivation, perfectionism, satisfaction and burnout toward their sport. Controlling coaching behaviors were associated with increased burnout (r =.63-.85). This was due to prescribed perfectionism and amotivation. Autonomy-supportive and transformational coaching were linked to increased intrinsic motivation (r =.27-.41) of the player, which improved performance and reduced burnout risk. Leadership congruency was associated with increased athlete satisfaction, while individual psychological characteristics directed toward preferred coaching styles. Democratic behavior, social support and positive feedback all ha

Association Between Facility Type and Hpv Vaccine Completion Among a Population Of Us Female Adolescents Sampled From The Nis-Teen 2018 Dataset

Student Presenters: Jasky Karem, Brett Weinstein, Mph Ms Do

Faculty Mentor: Joerg R. Leheste

School/College: Osteopathic Medicine

Human Papillomavirus is a sexually transmitted virus that is responsible for up to 90% of invasive cervical cancer cases. Black women displayed higher rates of both HPV infections and cervical cancer compared to non-Hispanic white women, despite increasing HPV vaccination rates.

This study explores sociodemographic factors to identify obstacles to vaccine completion in higher risk populations, particularly in populations at higher risk of cervical cancer. In a sample of 4,154 female adolescents from the NIS-Teen 2018 survey, multivariable logistic regression was utilized to examine the relationship between facility types where Black and non-Hispanic white teens were vaccinated and the HPV vaccine completion rates, adjusting for protective factors

Private facilities were associated with higher odds of completing the vaccine series compared to public facilities (Odds Ratio, OR = 1.37). STD/School/Teen clinics had the lowest odds of vaccine completion (OR = 0.525), even compared to public facilities. Results indicate that there is an increased likelihood of Black teens receiving their vaccines in public facilities than whites (19.7% vs. 9.3%), and this decreases their odds of completing the vaccine series.

Attenuation of transforming Growth factor-β signaling promotes completer recovery of Trabecular bone structure following immobilization with traumatic spinal cord injury

Student Presenters: Marina Metrus, Mishal Rahman, Anis Ansari, Tanzila Chowdhury, George Armanious, Kyrollos Ibrahim

Faculty Mentor: Hesham Tawfeek

School/College: Osteopathic Medicine

Severe and refractory sublesional trabecular bone loss is a very common complication of immobilization with spinal cord injury (SCI) with the highest incidence of fracture. We previously reported elevated transforming growth factor-β (TGF-β) signaling in bone cells after SCI. Whether reducing TGF-β signaling will restore bone integrity with SCI remains unknown. To address this, male mice underwent sham or thoracic contusion SCI surgery and were administered a TGF-β–neutralizing (1D11) or IgG control antibody for 5 weeks starting 5 weeks after surgery. Changes in bone structure, bone cells, and levels of bone turnover markers were assessed using micro-computed tomography (micro-CT) scanning, bone histology, and ELISA analyses, respectively. Analysis of the distal femoral region showed that treatment of SCI mice with ID11 restored trabecular fractional bone volume (107% ID11 vs 65% IgG), thickness (109% ID11 vs 88% IgG), and connectivity (99% ID11 vs 78% IgG). Conversely, 1D11 treatment partially restored cortical bone thickness (91% 1D11 vs 84% IgG). There were no differences in osteoblast or osteoclast numbers/surfaces between SCI-IgG and SCI-1D11 groups. Femoral bone marrow demonstrated no differences in levels of bone turnover markers, but elevated TGF-β1 levels in the SCI-IgG group compared to sham-IgG controls, and levels were reversed with 1D11 treatment. Collectively, our findings suggest TGF-β blockers as promising therapeutics to prevent fractures in SCI individuals.

Bead-Based Three-Dimensional Scaffolding Platform Promotes Multicellular Tumor Spheroid (MCTS) Formation of U87 Glioblastoma

Student Presenters: Kevin Louis Zhang, Matthew Duazo, Dr. Rabab Hamzah, Amena Ikhlaq

Faculty Mentor: Karrer Alghazali

School/College: Osteopathic Medicine

This project introduces a bead-based three-dimensional scaffold designed to support in vitro multicellular tumor spheroid formation of glioblastoma. The current landscape of three-dimensional systems have allowed for greater accuracy in the characterization of the tumor microenvironment as well as the efficacy of therapeutic agents, however, there exist limitations in diffusion capacity, mechanical stability, and production scalability. We introduce a novel bead-based scaffold fabricated from a medial grade polymer with tunable porosity and stability. A varying concentration of U87 GBM (1x10^6 & 5x10^6 Cells/Scaffold) were seeded into pre-packed scaffold constructs assembled in six-well plates and cultured for up to four weeks. An analysis of cell attachment, viability, and spheroid formation were assessed at 48 Hours, 1 Week, 2 Weeks, and 4 Weeks using fluorescence staining and Two-Photon Microscopy. An analysis of scaffold porosity was assessed with Micro-Computed Tomography. An analysis of scaffold mechanical integrity was assessed with Elastosens Bio. Overall, our scaffold platform supports consistent spheroid formation with substantial cell viability over an extended four-week period. Additionally, our scaffold's modular, porous architecture is inherently amenable to integration with cell co-cultures as well as perfusion bioreactor systems, offering a standardized foundation for long-term tumor microenvironment modeling across a variety of tumor and tissue cell lines.

Beyond Distribution

Student Presenters: Monica Pena

Faculty Mentor: Farzana Gandhi

School/College: Architecture & Design

My thesis focuses on rethinking the Hunts Point waterfront which is home to one of the nation's most critical food-distribution hubs here in New York City.

The food insecure community at Hunts Point can be transformed into multi-functional corridors that combine recreation, resiliency, and community-scaled food production. Beyond these systems, my design introduces a food hub where food production, education, market, distribution and other systems come together and are organized as a cooperative network staffed and governed by local residents. So now the waterfront can become an educational, economic, and cultural asset that counters existing food deserts, improves public health, and reveals the process of food production to the public.

Beyond the Average: Towards More Representative Human Body Models for Impact Simulations

Student Presenters: Aditya Kumar Shakya, Omar Jaber

Faculty Mentor: Wei Zeng

School/College: Engineering & Computing Sciences

Vehicle crash simulations are widely used to evaluate vehicle safety, but many rely on human body models (HBMs) representing a single “average” adult, (e.g., a 50th percentile male). This simplification overlooks much of the real population, including children, older adults, and individuals with different body sizes and sexes, which may limit how well simulations represent real-world occupants. This project explores a computational approach to adapt existing HBMs so they better reflect diverse populations using the PIPER tool. A midsize adult male body model is used as a baseline. PIPER enables researchers to modify body posture and scale anatomical features of models that are normally distributed in a fixed size and position. Two key techniques are used in this workflow. First, node selection identifies specific points on the body model that control anatomical regions to be modified. Second, Kriging, a mathematical interpolation method, is used to smoothly scale and reshape the geometry while preserving model continuity. After modification, the updated HBM can be exported into formats compatible with engineering simulation software such as HyperMesh and LS-DYNA for crash analysis. This workflow provides a practical approach for improving population representation in crash simulations and supports the development of vehicle safety evaluations that better reflect the diversity of real-world occupants.

Biomaterial Selection for Artificial Skin

Student Presenters: Dalaney Mangham

Faculty Mentor: Karrer Alghazali

School/College: Engineering & Computing Sciences

My project is centered around the development of artificial skin using biomaterials and extracellular matrices to improve healing in patients with severe burns. This idea would be ideal for 3rd degree burn victims, who lack sufficient surface areas of donor skin for traditional grafts. This approach would also give us the benefit of reduced rejection rate from a non-self donor. In the project I will evaluate existing natural, synthetic, and hybrid biomaterial technologies to better understand what the best mechanical and chemical properties are, along with degeneration rates to make the most skin like extracellular matrix. In the future I would like to move forward by testing types of hydrogels made of PEG and/or GELmA that can be photo-crosslinked with UV light as they are coming out of a 3D printer. With hopes that one day cells from an unaffected area of a burn victims skin can be taken and grown on the scaffold. Then allowing for a seamless regrowth of the skin while the self cells and extracellular matrix degrade in the patients body.

Biopsychosocial Determinants of Pain: Implications for Osteopathic Manipulative Treatment in Individualized Pain Management

Student Presenters: Jenika Patel, Gursimran Singh, Nancy Mahfouz, Rumana Rahman

Faculty Mentor: Mervat Mourad, Jayme Mancini, German Torres

School/College: Osteopathic Medicine

Pain is a multifactorial experience, shaped by genetic, psychological, and socioeconomic determinants. Variability in pain sensitivity and disparities in pain management contribute to decreased quality of life and long-term health consequences. This narrative review of studies from the past 15 years (2011-2026) evaluated biopsychosocial factors affecting pain sensitivity and treatment response to better understand the role of osteopathic manipulative treatment (OMT) as an adjunctive, individualized therapeutic approach. Evidence demonstrated that pain sensitivity involves neurological and inflammatory pathways, gene-ethnicity interactions, and sex-specific loci. Genetic analyses demonstrated that psychological and metabolic traits are associated with pain perception. Observational, cohort, and experimental studies reported persistent disparities in pain severity, access to care, mental health stressors, and implicit bias, with minority populations disproportionately affected. Clinical trials and pilot studies demonstrated that OMT can reduce musculoskeletal pain, improve functioning and quality of life, and may decrease reliance on medications. These findings support the integration of a biopsychosocial framework with OMT into patient care to improve pain outcomes across diverse populations with disparities in pain management, aligning with the osteopathic philosophy of whole-person care.

Blood Transfusion Administration Errors: A Quality Improvement Proposal

Student Presenters: Emily Santos, Nina Leon, Taelor Allen, Emily Santos, Nina Leon, Taelor Allen

Faculty Mentor: Jessica Varghese

School/College: Health Professions

Errors in blood transfusion administration are often linked to systemic failures and are largely preventable, yet they can result in severe, life-threatening consequences. This quality improvement project aims to reduce transfusion-related errors by improving protocol adherence and strengthening safety interventions in clinical practice. Key strategies include reinforcing two-nurse verification, enhancing staff education and competency training, and standardizing transfusion protocols. The project will also incorporate technological solutions such as RFID systems and barcode scanning to improve patient identification and blood product matching. Electronic health records and haemovigilance systems will support accurate documentation and monitoring, while designated transfusion safety officers will oversee compliance and promote best practices. Data will be collected through incident reports, chart audits, and protocol adherence monitoring. Pre- and post-intervention comparisons will evaluate effectiveness. Primary outcomes include reduced transfusion errors, improved protocol compliance, and enhanced patient safety. Secondary outcomes include decreased near-miss events, reduced blood product wastage, and improved staff adherence. Expected results include increased accuracy in patient identification, improved adherence to safety protocols, and a reduced risk of adverse transfusion reactions. These findings may inform future quality improvement initiatives in transfusion safe.

Bridging Silos: An Interdisciplinary Educational Approach for Ambulatory Care Expansion on Long Island

Student Presenters: Sofia Bauer, Shwana Noorani, Kayla Torres-Betancourt, Zoe Leung

Faculty Mentor: Joerg R. Leheste

School/College: Osteopathic Medicine

This study was part of a new interdisciplinary academic program integrating medicine, architecture, and business (ARCH291) to develop an ambulatory care center in Hauppauge, NY. A New York State Certificate of Need (NYSCON) feasibility analysis was done to assess if the project met state health needs. Ensuring equitable access to affordable, quality, community-centered care requires strategically planned medical infrastructure responsive to health needs. This project drew lessons from a previously established clinic in Central Islip, NY, that compared site-specific needs and the potential to address disparities in a sustainable way. A mixed-methods approach was used to evaluate community needs and determine how the planned services aligned with the resident population. Demographics (income, existing access to care, disease burden, and expected utilization) were compared between the established and planned sites, as they were relevant to the NYSCON. Findings from Hauppauge resulted in rejection of the proposal due to the risk of overlap with the area's current healthcare resources, which sparked creativity to discover new solutions. The project shifted to refocus on a better site focused on osteopathic treatment and specialized ambulatory services. The interdisciplinary course proved valuable in fostering collaboration and problem-solving, highlighting how adaptability across disciplines can support the development of more effective and equitable community-centered care.

Building Bone Digitally: Simulating Trabecular Microstructure with Voronoi Tessellations

Student Presenters: Dani Boshnack, Bryan Shivram

Faculty Mentor: Wei Zeng

School/College: Engineering & Computing Sciences

Trabecular bone is a porous structure found in many bones, and its sponge-like structure is key in determining bone strength and mechanical behavior. To better understand how trabecular bone responds to mechanical loads, researchers often create digital models for computational analysis. However, reproducing the complex internal structure of trabecular bone remains challenging. In this project, a Voronoi tessellation based approach is used to generate cubic digital trabecular bone samples. Using MATLAB code developed for this study, multiple trabecular bone models are generated with variable structural features that mimic the porous networks of plates and rods in real bone. The initial models have rough, stepped surfaces from voxel-based generation, so they are further processed and smoothed using Blender to produce more realistic geometries. To evaluate model fidelity, the digital structures are compared with micro–computed tomography (μCT) scans of bone samples. Structural properties such as anisotropy and porosity are examined to assess similarity between synthetic and real trabecular bone. The resulting models provide a flexible platform for studying trabecular bone mechanics through computational simulations. This work supports ongoing research in biomechanics and computational modeling, including understanding how diseases can affect the ability of bones to withstand mechanical loading.

Carbon Emissions

Student Presenters: Kevin Alvarez Solano

Faculty Mentor: Patty K. Wongpakdee

School/College: Architecture & Design

This infographic poster presents a comparative analysis of carbon dioxide (CO2) emissions within the United States and as well at a global level. Focusing on data collected from both the past several decades as well as data from recent events. Specifically highlighting historical trends, sectoral contributions and emerging patterns that shape the discussion of its policies. Creating discussion regarding its recent decline, often driven by the shifts in uses of natural gasses, renewable energy, and improved energy efficiencies.

Cardiac Electrophysiological Effects of Chronic Alcohol Consumption in a Rat Model

Student Presenters: Naman Kapoor, Matthew Duazo, Eddie Louz, Ezra Mokhtar, Samantha Sanger

Faculty Mentor: Todd J. Cohen, Youhua Zhang

School/College: Osteopathic Medicine

Binge alcohol drinking can induce cardiac arrhythmias (commonly atrial fibrillation, AF), known as the holiday heart syndrome. However, whether chronic alcohol consumption similarly enhances AF is not well studied. This study aims to assess the atrial electrophysiology (EP) and AF inducibility in a chronic alcohol consumption model in rats. Sprague-Dawley rats (3-4-month-old, both sexes) were randomized into the following groups: 1. Control (non-alcohol) group (n=10), 2. Chronic alcohol group (n=10) and 3. Chronic alcohol treated with Metoprolol (Met, n=10). Alcohol groups were provided with 20% alcohol in drinking water for 8 weeks. In the Met group, Met (50mg/kg, SC) was administered every other day in the final 2 weeks before the test. At the end of the 8-week treatment, atrial EP study and AF inducibility were performed. There were no significant changes in body weight, atrial effective refractory period (ERP) and AF inducibility among the study groups, although the induced AF duration was significantly longer in the alcohol group compared to the control group (0.626 ±1.06S vs 0.293±0.803S, $p<0.05$). This study indicates that chronic alcohol consumption is less arrhythmogenic compared to our previous acute binge drinking model, suggesting that binge drinking and chronic consumption may have different pathophysiology on cardiac arrhythmogenesis, and further investigation is required to determine the mechanistic differences between a binge drinking and chronic alcohol model.

Chamber Of Light - Central Park Visitors Center

Student Presenters: Satish Doobay

Faculty Mentor: Bradley Engelsman

School/College: Architecture & Design

The Camber Of Light is a proposed visitor's center located in Central Park, New York. Nested within the hill of the Hallett Nature Sanctuary, only the peak of structure breaks through the surface, allowing for a programmatic experience experience that follows the path of the sun reflected within the chamber.

Changes in Migraine Headaches Following SARS-CoV-2 Infection: A Case Series

Student Presenters: Neil Shah, Deep Patel

Faculty Mentor: Amber Sousa

School/College: Osteopathic Medicine

This case series examines the impact of SARS-CoV-2 infection on patients with a pre-existing history of migraine disorder, highlighting a significant worsening of symptoms following infection. In a study of seven subjects, the majority experienced an increase in migraine frequency and intensity, often accompanied by a transition from localized to diffuse pain. Furthermore, the infection was associated with the development of neuropsychiatric symptoms in some, such as brain fog and aphasia, and a notable decrease in the efficacy of standard migraine treatments. These findings suggest that COVID-19 may exacerbate migraine pathology through neuroinflammatory mechanisms, necessitating more aggressive or alternative management strategies for affected patients.

Characterization of surface wear on resurfaced patellas in total knee arthroplasty (TKA) Utilizing surface topography to characterize wear patterns of resurfaced patellas in total knee arthroplasty (TKA)

Student Presenters: Andres Salazar, Dillon Pekoff, Janie Huang, Rosario Troia, Anusha Imran

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Patellar resurfacing is commonly performed during total knee arthroplasty to improve joint articulation and reduce anterior knee pain. This study characterizes wear on resurfaced patellae retrieved during knee surgeries to support future research on wear patterns and implant performance.

Six retrieved patellar components were analyzed using a Sensofar S neox 3D optical profilometer at 20× magnification. A standardized square region (2455 × 1849 µm) was selected along the midline vertical axis. Surface parameters included roughness (Sq), peak height (Sp), pit depth (Sv), surface spacing (Sal), texture direction (Std), and smooth-rough crossover, and means and standard deviation were calculated to assess wear characteristics.

Wear patterns were identified across samples. Overall roughness was moderate (Sq = 0.674 ± 0.362), with high variability in peak height (Sp = 19.879 ± 9.801) and pit depth (Sv = 15.01 ± 13.271), indicating inconsistent wear severity. Surface organization was irregular (Sal = 0.185 ± 0.075), and wear direction varied (Std = 138.04 ± 43.729°). Smooth-rough crossover (17.148 ± 12.319) further showed differences in surface behavior.

These findings highlight the long-term course of resurfaced patellas in TKAs. Limitations include small sample size (n = 6) and lack of temporal data. Future studies should include larger cohorts and assess implant positioning, activity level, and material type, with longitudinal correlation to clinical outcomes.

Clinical Applicability and Cross-Dataset Validation of Machine Learning Models for Binary Glaucoma Detection

Student Presenters: David Remyes

Faculty Mentor: Milan Toma

School/College: Health Professions

Glaucoma is a leading cause of irreversible blindness worldwide, and early detection is critical to preventing vision loss. Machine learning systems applied to retinal fundus photographs have shown promise as scalable tools for automated glaucoma screening. However, many studies evaluate these models using only the dataset on which they were trained, which may overestimate real-world performance.

This project evaluates the reliability and clinical applicability of three machine learning approaches for detecting glaucoma from retinal fundus images: a convolutional neural network (CNN), a feature-based deep neural network (DNN), and a Light Gradient Boosting Machine (LGBM) ensemble model. Models were trained and internally validated using a dataset of 9,542 labeled fundus images and subsequently evaluated on an independent external dataset of 1,923 images to assess their ability to generalize to new populations.

Although the models demonstrated strong internal performance, external validation revealed a consistent decline in diagnostic accuracy across all architectures, with performance converging to approximately 72-73%. These findings highlight the importance of cross-dataset validation when developing artificial intelligence systems for clinical use. Ensuring that diagnostic models generalize reliably across diverse patient populations is essential before these technologies can be safely deployed in real-world screening programs.

Clinical Based Approach to Understanding Menopause Symptoms

Student Presenters: Deep Kaur, Antonio Gerbino

Faculty Mentor: German Torres, Mervat Mourad

School/College: Osteopathic Medicine

Human average life expectancy has significantly increased throughout the developed world. Although higher average life expectancy is considered to be a major achievement in biomedicine, the ability of humans to live into their middle age and beyond has also brought a number of health challenges among older individuals. One of these health challenges is the onset of menopause in women reaching a certain chronological state of normative reproductive aging. Here, we review the data available in the literature within an integrated physiological, environmental and clinical perspective. First, we present a hypothetical clinical vignette related to menopause to illustrate chief complaints, physical examinations and management plan. The clinical vignette highlights some of the symptoms and signs that are explained by the physiological changes involved in menopause. Along with endocrine physiology, we also discuss female reproductive history and suggest that precision medicine- based approaches along with AI algorithms might help tailor appropriate interventions for women with increased average life expectancies. Finally, we raise a number of clinical questions about menopausal symptoms to help guide research, diagnosis and alternative treatment.

Clinical characterization and inpatient outcomes of hospitalized adults with ASCVD and coded elevated lipoprotein(a): a national inpatient analysis

Student Presenters: Maria Shenouda, Alissa Winston, Brian Trinh, Arisa Hirose, Isabelle Shi

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Lp(a) is a heritable risk factor for atherosclerotic cardiovascular disease (ASCVD) with limited data on the impacts of social determinants of health (SDOH) on patient outcomes with high levels. NIS data from 2018-2021 was used for this retrospective study with weighted descriptive sampling to evaluate the association between demographic or clinical factors and in-patient outcomes. ASCVD and Lp(a) adult hospitalizations were included, while end stage renal disease on dialysis and active malignancy cases were excluded. ICD-10 codes were used for ASCVD and Lp(a) diagnoses. Heart failure (HF) exacerbation, myocardial infarction (MI), ischemic stroke, acute peripheral arterial disease (PAD), and multiorgan failure were the outcomes measured. Patient characteristics included age, sex, race, ethnicity, median household income, region, and Charlson Comorbidity Index (CCI). Weighted hospitalizations with ASCVD and high Lp(a) increased from 70 to 425 cases (N=1,100). There were HF and ischemic stroke race/ethnicity and higher CCI variations in unadjusted analyses. Age and CCI were the main predictors of HF exacerbation in multivariable regression models. Patients aged 65-74 with CCI ≥ 3 had the highest adjusted odds ratio, while 40-64 years had lower odds (aOR 5.77) than those ≥75 years (aOR 9.15). Adverse events affected clinical severity (CCI) more than hypothesized SDOH, which showed the need for longitudinal studies to clarify gaps in care and long-term risk.

Comparison of acute skin toxicity with ultra-hypofractionated whole breast radiation therapy vs conventional radiation dosing after lumpectomy for breast cancer: a single institutional experience

Student Presenters: Jasky Karem

Faculty Mentor: Dong Zhang

School/College: Osteopathic Medicine

Randomized control trials have shown that adjuvant radiation therapy (RT) after breast conserving surgery reduces the local recurrence of breast cancer. A common side effect of RT is radiation dermatitis seen in up to 90% of patients. Conventional RT spans over 5-6 weeks with administering 4256 cGy in 16 fractions with or without a boost dose of 1000 cGy. Efforts have been made to decrease the timeframe of RT to improve compliance and reduce the risk and severity of skin toxicity. Hypofractionated RT (HF-RT) addresses this by shortening the time frame to 3-4 weeks. Additional evidence suggests that HF-RT also lowers the degree of skin toxicity.

The most recent advance related to HF-RT was the FAST-FORWARD trial in which ultra-hypofractionated RT (UHF-RT) was given to patients with 2600 cGy in 5 fractions with or without a boost dose of 520 cGy while preserving the same 5-year efficacy as conventional RT . In this study, we compared a cohort of patients that received conventional RT treatment (4256 in 16 fractions with or without a boost dose of 1000 cGy) and a cohort that received UHF-RT (2600 cGy in 5 fractions with or without a boost dose of 520 cGy) to compare acute skin toxicity at the primary and secondary follow-up after treatment.

Computational Modeling of Skeletal Muscle Microstructure: Development of Simulation-Ready Fascicle-ECM Geometries

Student Presenters: Dani Gulino, Johan Joseph Nunez Quispe

Faculty Mentor: Wei Zeng

School/College: Engineering & Computing Sciences

Skeletal muscle has a complex internal structure composed of muscle fascicles embedded within an extracellular matrix (ECM). Variations in this microstructure can influence mechanical behavior- particularly in conditions such as aging or fibrosis where connective tissue content increases. Computational modeling provides a powerful approach to investigate how these structural features influence muscle mechanics. This NSF-sponsored project contributes to the development of a mesoscale finite element (FE) modeling framework designed to investigate how fascicle organization and ECM volume fraction affect skeletal muscle responses during passive stretching and active contraction. Representative volume element (RVE) geometries were generated using centroidal Voronoi tessellation to produce heterogeneous fascicle-ECM microstructures that resemble real tissue organization. Two-dimensional skeletal muscle geometries with controlled fascicle architecture and ECM distribution were generated using a MATLAB code, and then converted into CAD models. Then using AutoCAD, Fusion360, and HyperMesh, geometry cleanup and mesh preparation were performed to ensure compatibility with FE simulations. These simulation-ready models enable investigation of how structural variability affects muscle mechanical behavior, and support ongoing research into skeletal muscle biomechanics- including studies of muscle degeneration, aging, and rehabilitation strategies.

Controlled Chaos

Student Presenters: Sivapriya Janakiraman

Faculty Mentor: Farzana Gandhi

School/College: Architecture & Design

This thesis investigates how informal spatial practices in Jackson Heights, Queens can be architecturally supported rather than regulated away. Jackson Heights is home to 68,000 residents speaking over 167 languages. Its sidewalks, plazas, and underused lots extend domestic, commercial, and civic life yet remain vulnerable to displacement through code enforcement and redevelopment. Using Jan Gehl's public life study methods, community surveys, and vendor interviews, the research catalogued recurring spatial behaviors and translated them into architectural parameters. The design proposes a mixed-use public hub on a 15% fixed and 85% flexible model. The fixed component is a structural spine containing stairs, mechanical risers, wet walls, and enclosed programs needing four-wall enclosure such as daycare and classrooms. Everything around that spine is flexible, organized by a floor-mounted track grid. Eight human-powered modules sit on the tracks: Storage, Seating, Display, Play, Platform, Low Table, Canopy, and High Table. Each rolls into position and nests flat when not in use. Combinations are user-determined. A vendor sets up the floor each morning. A community class reconfigures it by afternoon. By evening the modules clear, the facade opens, and the space becomes the plaza. No manager dictates program. It positions tactical urbanism as a planning methodology capable of producing permanent architecture encoding spatial intelligence already present in immigrant communities.

Cortical Representation & Criminality: Assessing Facial Motor Control as a Biomarker for Violent Predisposition

Student Presenters: Asil Arar, Kajal Malik, Lauren Bui, Farzana Alam, Katelyn Shibilski

Faculty Mentor: Joerg Leheste

School/College: Osteopathic Medicine

Our research focuses on recent advances in artificial intelligence (AI) and its potential use in recognizing violent criminals through facial muscle motor control towards the prevention of violent crimes. Our hypothesis is informed by the established sensory insensitivities of violent criminals and the search for a motor equivalent in the area of the highest density of motor units and the largest cortical representation - the human face. This study builds on prior facial musculature research with a novel algorithm, NOLDUS, a software that quantifies facial muscle movements. This pilot study investigates whether facial muscle movement patterns differ between individuals with a history of violent crime and nonviolent controls. Notably, this study does not aim to predict criminality from facial features, but rather to assess if AI can be used to determine measurable differences.

Using a case-control design, our study involves analysis of publicly available video footage of adult white males with and without convictions of violent crime with NOLDUS. Our control group consists of high-profile adult white male business executives. This model limits confounding factors. Depending on our findings, future studies will expand these parameters.

This research topic requires ethical considerations to ensure responsible use of this emerging technology. The expansion of AI into surveillance and security settings raises concerns that overgeneralization may lead to unintentional harm.

Counting the Strongly-Connected States of a Biologically Motivated Vector Addition System

Student Presenters: David Mushiyev

Faculty Mentor: William Letsou

School/College: Arts & Sciences

How cells extract information from DNA is not fully understood. A major mystery is how a single developing cell can simultaneously read its DNA program in multiple different ways. Vector addition systems (VAS) are an abstract model of concurrency networks that can be used to understand the computational logic of cells. In this study, we used reachability analysis to model the folding and unfolding actions of a molecule of DNA. We determined that a certain type of state, characterized by a property which we call strong connectivity, can be reached by a series of reversible actions. To computationally determine the number of strongly-connected states in a VAS with n chromatin regulators, we used the New York Tech high-performance computing (HPC) cluster. Our approach was to generate a list of all possible states and then eliminate those which did not satisfy the connectivity condition. The task was separated into independent jobs, and then executed in parallel. As a result, the time of counting was reduced from approximately 4.6 days to 4.6 hours. Furthermore, it was determined that as n increased, the number of reachable states increased dramatically: for n = 5, there were 12,191 strongly-connected states, while for n = 6, there were 337,068,162. This result helps us to understand the computational complexity of problems that cells solve during the process of gene regulation and autonomous development.

Creating Nanoscale Carbon Fiber Electrodes Through Alkaline Etching

Student Presenters: Meet Boghani

Faculty Mentor: Jacqueline Keighron

School/College: Arts & Sciences

Carbon fiber microelectrodes (CFMEs) are a valuable tool for detecting neurotransmitters in vivo due to their electrochemical properties and small relative size. Etching CFMEs under basic conditions while applying a controlled constant potential allows for the further reduction of the tip diameter, allowing the electrodes to fit inside smaller spaces such as synaptic junctions. We etched CFMEs under 0.500M NaOH under various time intervals to see differences in tip diameter and to potentially enhance neurotransmitter detection at smaller diameters. Even after this reduction in size, the CFMEs are still sensitive to detecting dopamine, proving to be a potentially viable way to detect this neurotransmitter in smaller spaces. We aim to pair our etched CFMEs with enzyme-functionalized nanomaterials to be able to create biosensors that detect glutamate and similar neurotransmitters that are non-electroactive.

Creative Connections: A Music and Art-Based Program for Individuals with Alzheimer's Disease

Student Presenters: Gianna Marie Moncayo

Faculty Mentor: Ling Wan Albert

School/College: Health Professions

Creative Connections is an occupation-based music and art program designed to support social participation, emotional regulation, and memory reminiscence in adults living with Alzheimer's disease. Through weekly group sessions, participants engage in familiar music, rhythm activities, creative expression, and social participation. Music and art are used as accessible and meaningful modalities to encourage engagement, evoke memories, and foster connection among participants. The program provides a supportive environment where individuals can express themselves, interact with others, and experience enjoyment despite cognitive changes. By incorporating creative occupations into structured yet flexible sessions, Creative Connections highlights the role of occupational therapy in promoting meaningful participation, enhancing well-being, and improving quality of life for individuals with Alzheimer's disease.

Cyclical Reduction of OFF Time in a Patient with Advanced Parkinson's Disease Using Osteopathic Manipulative Treatment: A Case Study Report

Student Presenters: Andrew Abdelmalak

Faculty Mentor: Adena Leder, Patricia Kooyman, Sheldon Yao

School/College: Osteopathic Medicine

Introduction:

Parkinson's disease (PD) often presents with motor fluctuations despite optimized pharmacologic therapy, with patients experiencing "off periods" during which rigidity, tremor, and gait dysfunction worsen. Prior studies suggest that osteopathic manipulative treatment (OMT) may improve gait, posture, and select motor and non-motor symptoms in Parkinson's subjects, likely through modulation of neuromusculoskeletal function and sensorimotor integration. This case examines the cyclical effects of weekly OMT on off-time reduction in a patient with advanced PD.

Case:

A 32-year-old male with advanced PD receiving continuous levodopa infusion was monitored over ten weeks. Two weeks of pre-treatment symptom logs served as baseline. Daily logs tracked off-time duration, gait quality, tremor, rigidity, dyskinesia, oral rescue medication use, and pump adjustments. Eight weekly OMT sessions were performed by a board-certified osteopathic physician and included articulatory, muscle energy, and cranial osteopathic techniques addressing key somatic dysfunctions of the cranium, spine, pelvis, and extremities.

Results:

Compared with the two-week baseline, daily logs demonstrated a 1–1.5 hour reduction in off-time within 24 hours of OMT without changes in infusion settings. Maximal benefit was observed two to three days post-treatment, with greatest improvements in rigidity, gait initiation, and tremor during off periods. Across treatment cycles, average off-time decreased by 40–5

DATA 101 Focus Groups on Student Perceptions of AI and Their Learning", New York Institute of Technology

Student Presenters: Ameer Tayeh, Samiha Akter

Faculty Mentor: Jennifer Griffiths

School/College: Engineering & Computing Sciences

The Data 101 Focus Group's primary objective was to gather quantitative data regarding students' perspectives and interaction with AI. The method that was utilized was using open-ended questions to form a discussion during class visits. We targeted 11 classes and engaged with roughly 175 students in both the NYC and LI campuses. The qualitative data were organized into categories for consistent tagging of thematic ideas from all the group transcripts. After the tagging process, we applied thematic analysis to discover any patterns established in the tagging process, so that we can interpret how students utilize AI and what support should be provided.

After interpreting the results and utilizing external knowledge and resources, we've concluded that students typically express concern regarding AI in the classroom due to professors' differences of opinion and limited transparency regarding the utilization of AI in the classroom. Students also understand the limitations of AI, such as Emotional Intelligence Quotient, originality, and, to some extent, academic and intellectual integrity. Ultimately, the way we should promote and use AI in higher education while retaining originality and students' cognitive ability is to utilize AI as a supplementary tool rather than a replacement. In a sense where students remain in control and are prompted, for example, for AI to provide resources, generate initial ideas, and consult AI on certain topics while requesting sources from AI.

Defining the Baseline: Quantitative Mapping of Human Skin Texture Variation with GelSight

Student Presenters: Palwasha Zenul Khan

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Recent advances in skin imaging show that surface microtopography reflects underlying structural, functional, and pathological variation. While techniques such as polarized light imaging can quantify some surface and subsurface features, they are limited in capturing high-resolution three-dimensional (3D) architecture. GelSight technology, a portable tactile-optical sensing system, enables rapid, non-invasive acquisition of detailed 3D skin texture data.

The objective of this study is to establish a baseline dataset of skin microtopography across anatomical regions in a broad population of healthy individuals. Using a GelSight Mobile II device, high-resolution scans will be collected from sites including the forehead, cheek, arm, hand, wrist, and digits, selected based on differences in sun exposure, mechanical use, and aging. Participant data on age, behavioral factors (e.g., handedness), and sun exposure will be collected via survey and linked to de-identified measurements.

Quantitative parameters, including surface roughness, ridge morphology, and statistical descriptors of topographic variation, will be extracted to characterize normal skin variation. We hypothesize that skin microtopography varies with anatomical location, age, and environmental exposure, and can be captured using GelSight. Establishing normative profiles will provide a foundation for future studies investigating skin texture as a non-invasive biomarker in dermatologic disease (Beatty et al., 2026)

Demographic and Behavioral Determinants of Skin Cancer: A Cross-Sectional Analysis of NHANES 2017–2020

Student Presenters: Chloe Kim, Arisa Hirose, Isabelle Shi, Brian Trinh, Kevin Liu

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Demographic and environmental factors influence skin cancer, but the role of modifiable behaviors remains unclear in population-based datasets. This cross-sectional study used NHANES 2017–March 2020 pre-pandemic data (N=4,211) to explore whether occupational outdoor time, sun-protective clothing, dietary vitamin D intake, and sociodemography are associated with self-reported skin cancer history (n=41). Analyses incorporated NHANES weights, with Rao–Scott chi-square tests and survey-weighted logistic regression. Bivariate analysis revealed significant associations for race/ethnicity ($p < 0.001$), income ($p < 0.001$), education ($p = 0.006$), marital status ($p = 0.004$), and birthplace ($p = 0.011$), but not for behavioral factors. In multivariable models, occupational sun exposure (OR 0.84; 95% CI 0.19–3.63; $p = 0.803$) and infrequent long-sleeve use (OR 0.91; 95% CI 0.17–4.81; $p = 0.901$) were not associated with skin cancer. Relative to Non-Hispanic White participants, Mexican American (OR 0.08; 95% CI 0.01–0.64), Non-Hispanic Black (OR 0.005; 95% CI 0.001–0.052), and Non-Hispanic Asian participants (OR 0.16; 95% CI 0.03–0.78) had significantly lower adjusted odds. Due to the small sample size (n=41), vitamin D and socioeconomic estimates were unstable with zero-case reference groups. These findings suggest demographic patterns outweigh measured behaviors, highlighting the limits of cross-sectional proxies and the need for longitudinal studies to refine targeted prevention.

Design and Validation of a UVC-based Bactericidal System

Student Presenters: Ali Vaziri, Armand Ahmetaj

Faculty Mentor: Aydin Farajidavar

School/College: Engineering & Computing Sciences

Bacteria and viruses are highly susceptible to ultraviolet (UV) irradiation, particularly UVC (≤280 nm), due to its ability to induce reactive oxygen species (ROS) formation and DNA damage. Although the antimicrobial effects of UVC have been studied for decades, previous systems were limited in controlling key parameters, primarily allowing adjustment of exposure dose and distance, but not stimulation frequency.

In this work, we present a UVC irradiation system designed within a sealed plexiglass enclosure to prevent UVC leakage. The system utilizes five UVC LEDs with peak emission around 270 nm, intended for controlled irradiation of samples in Petri dishes. To enhance light delivery, commercially procured aluminum-deposited mirrors optimized for UVC reflection were incorporated to concentrate and distribute the emitted radiation.

A key feature of this system is the ability to precisely control stimulation frequency up to 1 kHz while maintaining a 50% duty cycle, and precise control over distance from the point of interest. System performance was evaluated by comparing irradiation levels with and without the reflective mirrors. Additionally, frequency-dependent behavior was validated using an industrial-grade UVC meter with a sufficient sampling rate to capture high-frequency variations in irradiance.

Designed for Demolition/Rethought for Reuse

Student Presenters: Pauline Barsegyan

Faculty Mentor: Farzana Gandhi

School/College: Architecture & Design

Demolition is one of the greatest global contributors to waste generation in the construction industry. In New York State alone, about 7.7 millions tons of C&D debris coming from buildings are generated annually. Most of that debris could have been repurposed or reused in other building projects, but is instead combusted, landfilled, or downcycled. One primary reason why demolition is the status quo for the removal of structures is building design. Modern buildings are designed with complex envelopes, systems, and connections. This presents an obstacle for material reuse, as the buildings are difficult to take apart at their end of life. This project challenges demolition through reuse and redesign. It implements design for disassembly, material reuse, adaptability strategies, with a priority on the first, through a demonstrator project that can be multiplied, modified, and applied to construction in New York and beyond. It also aims to rethink conventional materials processing, which tends to be wasteful, obscure, industrial-scale, and intimidating, as a deeply local, circular, transparent process, open and engaged with the public. As part of a larger reuse network, the project facilitates the local circular economy and promotes and raises awareness of reuse-centered design strategies.

Designing the Unseen: AI as a Generative Field in Architectural Thought and Representation

Student Presenters: Yasmine Koleilat, Naomie Copiatti, Chloe Witkin

Faculty Mentor: Fadhil Fadhil

School/College: Architecture & Design

This project positions artificial intelligence not as a tool of optimization nor as a question to be resolved, but as an active participant in the formation of architectural thought. Rather than defining how AI will impact architecture, it establishes an iterative and experimental framework that produces an expanding field of responses. Developed collaboratively with graduate students, the work operates through recursive, feedback-driven workflows in which visualization becomes a continuous driver of design. AI-generated outputs act as catalysts within cycles of prompting, translation, and reinterpretation, where ambiguity and indeterminacy are cultivated as productive forces. At the same time, non-AI tools such as digital surface modeling play a critical role in reintroducing human intuition, enabling designers to interpret and reconstruct outputs into coherent spatial and tectonic systems. Authorship remains firmly human-led, with designers guiding selection, refinement, and realization. A key aspect of the project lies in the translation across representational states—from image to model, drawing, and fabrication—foregrounding interpretation as a central design act. Pedagogically, students act as co-authors, developing individual workflows within a shared framework of inquiry. The conference board presents these processes through curated workflows, iterative sequences, and visual material, revealing the interplay between AI generation and human-led design development.

Detecting Pulmonary Nodules on CT: Pitfalls and Patterns

Student Presenters: Kenzy Abdelatif, Talia Lilikakis, Layla El-Rowmeim

Faculty Mentor: Robert G. Alexander

School/College: Arts & Sciences

We performed a critical review of the literature to identify multifactorial reasons radiologists miss thoracic nodules, focusing on nodule characteristics, perceptual/cognitive factors, and environmental influences. The objective is to delineate patterns of inaccuracy and propose actionable solutions to mitigate future errors. Literature was queried using terms including "thoracic nodules," "pulmonary nodules," and "perinodular features." Selected articles were those that provided insight into nodule properties, CT imaging conditions, human factors, and inter-reader variability. We also identified additional references through citations within initial publications. CT literature indicates that missed nodules are often small, have indistinct margins, or are located in anatomically complex regions. Errors are primarily perceptual but are exacerbated by cognitive biases—such as anchoring and satisfaction of search. Workload, fatigue, and inattentional blindness significantly reduce detection rates; for example, performance is lower after prolonged reading sessions. Advances in CT technology and computer-aided detection show promise for improving radiologist performance, although limitations remain. Both personal and environmental factors contribute to nodule detection errors on CT. Addressing specific error sources—including perceptual/cognitive biases and mental fatigue—may enable implementation of targeted interventions, such as structured training or AI-assisted review.

Developing an Interactive Game to Improve Fine Motor Skills in Children with Autism Spectrum Disorder (ASD)

Student Presenters: Neethu Thalappan Koroth

Faculty Mentor: Maryam Ravan

School/College: Engineering & Computing Sciences

The "Glove Sense" project represents a transformative leap in pediatric occupational therapy, specifically designed to address the intricate fine motor and sensory processing challenges faced by children with Autism Spectrum Disorder (ASD). At its core, the system is a sophisticated bio-interactive ecosystem that merges custom-engineered hardware with a high-fidelity digital interface to bridge the gap between physical exertion and cognitive reward. Children with ASD often struggle with dyspraxia and motor planning, finding traditional repetitive exercises either sensorially overwhelming or insufficiently engaging. Glove Sense solves this by transforming essential therapeutic movements into a series of "Micro-Quests," where a wearable Arduino-powered glove tracks precise finger flexions and translates them into immediate, non-threatening, and aesthetically pleasing SVG-animated reinforcements. This real-time feedback loop, built on a robust React 19 framework, ensures temporal contiguity, allowing the child to feel a direct sense of agency as their physical actions manifest as "magical" digital consequences.

The technical architecture of the system is meticulously designed to facilitate neuro-inclusive learning through sensory harmony and cognitive ease. The hardware layer utilizes a suite of flex sensors and an Arduino microcontroller to capture multi-point data from the thumb and fingers independently. This raw data is processed through a Python-based backend that implemen

Development of Phenylacetic Acidâ€“Derived Amide Analogs to Evaluate Potency and Specificity Toward Pyruvate Carboxylase

Student Presenters: Aleeza Mughal, Alisha Marfani, Rachel Toro

Faculty Mentor: Subhabrata Chaudhury

School/College: Arts & Sciences

Pyruvate carboxylase (PC) is an important mitochondrial enzyme involved in cellular metabolism, particularly in pathways that support cell growth and proliferation. Phenylacetic acid (PAA) has previously been studied as an inhibitor of PC; however, its relatively low potency requires high concentrations to achieve partial inhibition, which may lead to unintended effects on other cellular processes. In this study, we aimed to investigate whether structural modification of PAA into amide derivatives could improve both the potency and specificity of inhibition. We prepared a series of amides by reacting various amines with analogs of PAA that showed similar or improved potency as compared to parent PAA molecule. This series of amides will be assayed against enzyme assay to determine their ability of PC inhibition compared to the parent compound. This work focuses on identifying trends in structure–activity relationships that may contribute to enhanced binding and selectivity. Overall, these findings may support the development of more effective PC inhibitors and provide further insight into targeting metabolic pathways in disease contexts.

Dietary Intake During the Last Month of Pregnancy Among Women Who Gave Birth to Term and Preterm Infants and Its Association With Infant Anthropometric Measurements at Birth

Student Presenters: Samiha Akter

Faculty Mentor: Noura El Habbal

School/College: Arts & Sciences

We aimed to assess dietary intake using the latest Dietary Guidelines for Americans (DGA) during the last month of pregnancy among women who gave birth to 51 term and 45 preterm infants, compared participants' intake to analyze maternal characteristics and their association with infant anthropometric measurements at birth. We conducted a retrospective observational study evaluating maternal dietary intake of 7 factors (fruits, vegetables, dairy, calcium, grains, fiber, and added sugar) using a Dietary Screener Questionnaire (DSQ) at a hospital in Boston, Massachusetts. Maternal characteristics and infant anthropometric measurements at birth (weight, length, body mass index, and head circumference) were collected from electronic medical records and statistically analyzed through pairwise testing, adjusted and unadjusted linear models. None of the women met the 2020-2025 DGA recommended intake of all 7 dietary factors. Among preterm group, 2% met the recommended fruit and dairy intake, 27% met the calcium intake, and 16% were below the threshold for added sugar. Among the term group, 2% met the recommended fruit intake, 22% met the calcium intake, and 51% were below the threshold for added sugar intake. There were significant associations between maternal characteristics, dietary intake, and infant anthropometric measurements, reinforcing the need to raise awareness about pregnancy dietary intake, the new pregnancy-specific DGAs, and nutritional interventions.

Dietary Sodium and Sugar Intake and Their Associations with Ankle-Brachial Index and Peripheral Artery Disease

Student Presenters: Amrita Makhijani

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Excess dietary sodium and sugar intake associations with peripheral artery disease (PAD) are not well defined. We examined the relationship between sodium and sugar intake and ankle-brachial index (ABI) in a U.S. sample.

The study population was obtained from the 2003-2004 NHANES database. Sodium intake and sugar intake, normalized to total caloric intake, were modeled as continuous variables and categorized as high vs. low intake. Survey-weighted linear regression assessed associations with ABI, and logistic regression estimated odds ratios (ORs) for PAD (ABI < 0.9), adjusting for multiple variable factors.

Higher sodium intake was associated with lower ABI (β (95% CI): -0.013 (-0.025, -0.001); P = 0.037), though this association was attenuated and lost statistical significance after adjustment (-0.009 (-0.027, 0.008); P = 0.191). A high sodium diet was associated with increased odds of PAD in unadjusted analyses (OR (95% CI): 1.70 (1.16, 2.49); P = 0.010), but not after adjustment (1.44 (0.78, 2.63); P = 0.155). High sugar intake was inversely associated with PAD in unadjusted models (0.55 (0.36, 0.83); P = 0.008), this association was no longer significant after adjustment.

Our findings suggest that higher sodium intake was associated with lower ABI and greater odds of PAD in unadjusted models, but associations were attenuated after multivariable adjustment. Sugar intake showed no independent association with ABI or PAD.

Differential Expression of DNA repair Genes and NF-κappaB associated genes in Cancer Cells in Response to Curaxin

Student Presenters: Soham Raval, Ryan Dong, Winnie Yao

Faculty Mentor: Niharika Nath

School/College: Arts & Sciences

Cancer accounts for approximately 1 in every 6 deaths worldwide, claiming an estimated 9.7 million lives. Curaxin (CBL0137) is a small molecule that has anticancer effects by targeting the FACT complex, affecting DNA repair processes, activating p53, and blocking NF-κB signaling. In our earlier study, we looked at differentially expressed genes (DEGs) from three datasets involving CBL0137 treatment in glioma (GSE153441), cervical cancer (GSE117611), and multiple myeloma (GSE117611), and identified seven important hub genes related to p53 activation. To further study genes that might be involved in NF-κB inhibition and DNA repair, we included a newer dataset (GSE223327) from HT-1080 fibrosarcoma cells treated with 0.5 μM CBL0137, along with the previous datasets. We selected DEGs using cutoffs of −log10(p-value) > 1.3 and log2FC >1 or <-1, and analyzed them using GEO2R, Enrichr, STRING, and Tableau. From this analysis, we found 43 genes that were common in at least 3 datasets, with BTG2 and IFIT2 showing consistent changes across all four datasets. Enrichr analysis of the 43 common genes showed that CBL0137 could indirectly impact the DNA repair genes in addition to the activity mediated by FACT, p53, and NF-κB. Further analysis revealed that the DNA repair-associated genes such as CCNA2, FIGNL1, BLM, NEIL3, PARP2, POLD3, EXO1, POLQ, DCLRE1A, and DTL - are all downregulated. In particular the last six genes can cause genomic instability and lead to cell death of cancer cells.

Does dance therapy improve balance for people with Parkinson's Disease? – A Systematic Review

Student Presenters: Devjja Vaibhavkumar Joshi

Faculty Mentor: Amerigo Rossi

School/College: Health Professions

BACKGROUND: Parkinson's disease (PD) impairs balance, gait, and functional mobility, reducing independence and quality of life. Dance-based interventions are increasingly used as complementary rehabilitation because they combine rhythmic cueing, postural challenge, cognitive engagement, and social participation. PURPOSE: To determine the effects of dance-based interventions on balance and functional mobility in individuals with PD. METHODS: A systematic review was conducted using PubMed, ProQuest, and Scopus. Sixteen studies involving 570 participants met the inclusion criteria. Dance modalities included tango, Irish set dancing, Sardinian folk dance, Yang-ge, Biodanza, ballroom dance, Kathak, virtual reality dance, and adapted dance therapy. Outcomes focused on Tinetti, Functional Reach, miniBEST, One Leg Standing, Timed Up and Go (TUG), and Berg Balance Scale (BBS). RESULTS: Session duration averaged 66±20 minutes; interventions were performed 2.3±1.2 times per week for a median of 10 weeks. Mean TUG improved from 11.5±2.6 seconds to 10.1±2.7 seconds, with -1.4±1.3s improvement. Mean BBS improved from 47.7±3.8 to 50.6±2.2, with an average change of 2.8±2.5 points. Two studies showed significant TUG improvement relative to control, while 5 showed significant improvement in at least one balance measure. CONCLUSION: Dance-based interventions appear promising for mild-to-moderate PD, especially for mobility and balance. Longer studies with complete outcome reporting are needed.

Drug Delivery System via Skin Grafts

Student Presenters: Christina Gagliano, Julius Bhattan, Anna Dykhno, Alana Singh

Faculty Mentor: Karrer Alghazali

School/College: Engineering & Computing Sciences

The proposed multilayer skin graft is designed to mimic the natural structure and function of skin while providing enhanced healing capabilities. It consists of three key layers: a gas-permeable super-hydrophobic top layer, a hydrophilic intermediate layer, and a super-hydrophilic base layer. This hierarchical design ensures optimal moisture balance and oxygen exchange while protecting the wound from external contaminants. The super-hydrophobic surface prevents fluid accumulation and bacterial infiltration, while the hydrophilic and super-hydrophilic layers promote cell adhesion, nutrient transport, and tissue integration. We aim that this multilayer matrix can deliver antibiotics to prevent infection and pain-management agents for improved patient comfort.

Using the electrospinning machine, we create polymer layers, changing the rate of deposition and concentration of the solvent to achieve different fiber features (diameter and porosity structure). We examine the system based on various hydrogel compositions. The morphology will be studied by scanning 3D laser microscopy; hydrophilicity will be measured through contact angle measurement; drug intake of this graft will be characterized through total fluid intake.

Dysautonomia and Postural Orthostatic Tachycardia Syndrome (POTS) in the ENT Clinic: Differentiating Orthostatic Dizziness From Vestibular Migraine and Persistent Postural-Perceptual Dizziness (PPPD)

Student Presenters: Philip Zitser, Ilana Kolominyets, Maheen Imran, Aashi Kulkarni, Jenika Patel, Nina St. Martin

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

A common complaint in ENT clinics is dizziness. Although most cases are vestibular in nature, non-vestibular causes also exist. This study intends to review current literature on the symptoms and pathophysiology of POTS, VM, and PPPD; discuss findings that differentiate autonomic and vestibular involvement; and develop a model for evaluating dizziness in practice. One non-vestibular cause is postural orthostatic tachycardia syndrome (POTS). Unlike vestibular dizziness, dizziness from POTS is dysautonomic. Identifying the autonomic nature of non-vestibular dizziness is important for diagnosis. Tilt table testing, neuroimaging, orthostatic vital signs, oculomotor, gait, balance, and vestibular function assessments are important diagnostic tools for differentiating between vestibular and dysautonomic symptoms. POTS is defined by orthostatic tachycardia and posture-dependent symptoms that improve with recumbent position, which rules out vestibular involvement. VM presents with vertigo and migraine features such as photophobia, phonophobia, or headaches triggered by external stimuli, but not posture. PPPD presents as chronic non-spinning dizziness and imbalance for at least three months in association with motion, upright posture, and complex visual environments. The similarity in symptoms makes the aforementioned diagnostic tools vital to systematically identify the diagnosis. Such a model would enable physicians to offer focused interventions post-diagnosis.

Earbud EEG for Mental Workload Monitoring

Student Presenters: Ishaan Singh

Faculty Mentor: Maryam Ravan

School/College: Engineering & Computing Sciences

Wearable ear-centered electroencephalography (EEG) has emerged as a promising alternative to conventional scalp systems for unobtrusive, long-term brain monitoring. However, most in-ear solutions either occlude the ear canal, limiting audio functionality, or rely on conductive fabrics that can degrade with moisture and wear. In this work, we present a wireless earbud EEG prototype that integrates solid copper dry electrodes directly onto the acoustic nozzle, enabling simultaneous audio playback and EEG acquisition while maintaining a durable low-impedance interface. A dual-channel ADS1299-based front end streams ear-EEG wirelessly via an ESP32 microcontroller. Signal fidelity was benchmarked against a commercial OpenBCI Cyton at the T7 temporal site, showing near-identical morphology. We evaluated cognitive-load decoding in 12 healthy participants using Stroop and Mental Math protocols. After preprocessing and feature extraction, a random forest (RF) classifier with subject-specific 5-fold cross-validation achieved 85.19% average accuracy for Stroop and 80.11% for Mental Math, with pooled-data accuracies of 77.31% and 75.85%, respectively. These results demonstrate that the proposed earbud EEG platform can reliably detect cognitive engagement in mobile-friendly form factors.

Effects of High Salt and High Sucrose Diets in Rat Renal Vascular Morphology

Student Presenters: Dokyeong Kim

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Background:

High-salt and high-sucrose diets induce complex changes in renal hemodynamics, endothelial function, and microvascular integrity, ultimately contributing to chronic kidney disease. However, the 3-D architecture of the renal vasculature and its remodeling in response to these dietary stressors remain incompletely characterized. In this study, we aim to investigate high-salt and high-sucrose diet-induced alterations in renal vascular architecture using iodine-enhanced micro-CT.

Methods:

Twenty rats were assigned to baseline, control, high-salt, or high-sucrose groups (n=5 each). Baseline specimens were collected at Week 0 and others were maintained for 16 weeks. Kidneys were stained with 3.75% Lugol's iodine, scanned via micro-CT, and analyzed using Dragonfly software. Primary metrics were vascular/kidney volume ratio, anisotropy, segment length and tortuosity, and corresponding coefficients of variability (CV).

Results:

The vascular/kidney ratio differed across groups (baseline: 0.88%, control: 1.23%, high-salt: 1.53%; high-sucrose: 1.92%; $p=0.028$), though post-hoc comparisons were not significant. Variability was increased across groups. Trends toward significance were observed for anisotropy ($p=0.072$) and tortuosity CV ($p=0.097$).

Conclusions:

High-salt and high-sucrose diets and aging may drive renal vascular remodeling in rat models, although larger studies are needed to confirm these effects.

Effects of hypertrophy Training in Youth Girls. A Systematic Review

Student Presenters: Olivia Evola

Faculty Mentor: Amerigo Rossi

School/College: Health Professions

BACKGROUND: Resistance training is often overlooked in adolescent girls due to misconceptions about its effects on growth and development.

PURPOSE: To examine the effects of structured resistance training on lean body mass (LBM) in girls aged 13–18.

METHODS: Studies were included if they involved girls aged 13–18 completing structured resistance training for at least eight weeks with LBM assessment. Boolean search terms were used in PubMed and Scopus, yielding 785 articles, with eight meeting inclusion criteria. Data extracted included participant characteristics, intervention details, and LBM outcomes. The review was registered with PROSPERO.

RESULTS: A total of 646 participants completed an average of 21 weeks of training. Programs typically included exercises such as squats, pushups, and dynamic movements, performed at ~75% 1RM, twice per week. Sessions ranged from 20–60 minutes. LBM increased by an average of 2.6 kg.

CONCLUSIONS: Structured resistance training is safe and effective for increasing lean body mass in adolescent girls. These findings support its inclusion in exercise prescriptions.

Effects of Narrative Reflection on STEM Identity and Belonging in Undergraduate Researchers

Student Presenters: Zainab Faisal, Melisa Sharkly, Jaelynn Wesley, Ahaylee Rahman

Faculty Mentor: Robert G. Alexander

School/College: Arts & Sciences

Science identity and belonging are critical predictors of STEM persistence, particularly among underrepresented students. Reflective storytelling has been shown to support identity and belonging in STEM; however, most research focuses on structured, in-person settings and primarily involves graduate students.

This study addresses that gap by examining whether digital storytelling enhances researcher identity and STEM belonging among undergraduate research assistants. Conducted as a multi-university collaboration across institutions in the Eastern United States, this project represents the first study of Psi Chi's NICER initiative (Network for International Collaborative Exchange–Regional), with New York Tech serving as the host institution.

In a three-week, three-group pre-post design, undergraduate research assistants are randomly assigned to single-platform narrative, transmedia narrative, or non-narrative control conditions. Primary outcomes are measured using the Undergraduate Research Student Self-Assessment (URSSA) and the Science Motivation Questionnaire II (SMQ-II). We hypothesize that narrative conditions will produce greater increases in researcher identity and belonging than the control, with transmedia yielding the largest effect. Data collection is ongoing; completion is expected prior to the conference.

Effects of the che-2 gene and Parkinson's Disease Risk Factor Gene pdr-1 on Isofragrant Navigation in Caenorhabditis elegans

Student Presenters: Gamana Gogineni

Faculty Mentor: Navin Pokala

School/College: Arts & Sciences

Understanding how animals decide between equally attractive options may provide insights into the biological mechanisms that underlie decision-making. Using the nematode Caenorhabditis elegans as a model system, this study investigates the genetic factors that modulate behavioral integration. We previously identified the isofragrant point: the specific concentration ratio at which the odorants isoamyl alcohol (IAA) and diacetyl (DA) are equally attractive to wild-type worms. Because IAA and DA are sensed by distinct neurons (AWC and AWA, respectively), this assay serves as a robust platform for studying interneuronal integration. In this phase of the study, we are characterizing the decision-making profiles of two mutant strains: che-2, an anosmic cilia-defective mutant, and pdr-1, the ortholog of the human E3 ubiquitin ligase PRKN (PARK2) often mutated in early-onset Parkinson's Disease patients. By subjecting these mutants to the choice assay at the isofragrant point, we aim to determine how structural sensory deficits (che-2) and disrupted protein degradation pathways (pdr-1) alter the worm’s ability to process competing stimuli. These results may provide a deeper understanding of how specific gene products maintain the integrity of neural circuits required for resolving environmental uncertainty, and how they go awry in Parkinson's Disease.

Encountering the Landscape: An Artistic Field Journal of Montana

Student Presenters: Molly Eileen Helie, Aminah Sarowar

Faculty Mentor: Joerg Leheste

School/College: Osteopathic Medicine

Selected watercolor and gouache artworks depict the landscape extending from the city of Wolf Point, Montana to the Town of Poplar, Montana within the Fort Peck Indian Reservation. The artists traveled to Fort Peck through the Edward Guiliano Global Fellowship, where they conducted research in partnership with Poplar Middle School with the shared vision of creating a health education continuum. Creating visual artworks served as a means for careful reflection and close observation.

The Fort Peck Indian Reservation is home to the Assiniboine and Sioux American Tribes headquartered in Poplar, MT. A history of oppression and governmental negligence have led to massive health inequalities including high rates of mental health crises, chronic disease, and low life expectancies. Part of this health injustice is attributed to a shortage of physicians; many residents find themselves traveling for hours to receive basic care.

During the trip to Poplar, the artists held in-person conversations with community members and attended a conference on tribal-led healthcare. Meditating on these conversations, the artists created visual journals, filled with photographs, paintings, and sketches. These pieces showcase the emotions the artists felt during their visit to the reservation– excitement, inspiration, discomfort, growth, connectedness.

This submission is intended to be viewed as a gallery display combining original artworks, photographs, and accompanying creative prose and poetry.

Enhancing Leisure Participation: An Educational Resource for Adults with SCI

Student Presenters: Catherine Matteo

Faculty Mentor: Pamela Karp

School/College: Health Professions

Participation in leisure and recreation is a critical component to our health, well-being, and quality of life, and individuals with spinal cord injuries (SCI) face significant environmental, physical, and informational barriers limiting their engagement in these meaningful activities. My capstone project aims to address the gap in accessible leisure and recreational resources for adults ages 20-60 living with SCI. I am working on developing a comprehensive, digital resource that compiles accessible leisure opportunities including adaptive sports, community programs, and other social activities. This resource will also include four client-facing resources, as well as a clinician guide, designed to support individuals with SCI in engaging in meaningful leisure. The expected outcomes of my project include increased awareness of available opportunities, increase participation and autonomy of adults with SCI while also serving as a useful tool for occupational therapy practice.

Enhancing Sensory Inclusivity in Salon Spaces: A Sensory Integration Resource for Hairstylists and Families

Student Presenters: Gabriela Bernard

Faculty Mentor: Mary Squillace

School/College: Health Professions

This doctoral capstone project addresses significant sensory barriers pediatric populations face during routine community participation and activities of daily living, specifically within the hair salon environment. Children with sensory integration challenges often experience heightened anxiety and behavioral distress during haircuts due to the intense tactile, auditory and olfactory demands of a salon.

Conducted within a specialized sensory integration clinic and extending into the local community, this project focuses on bridging the cap between clinical expertise and community practitioners. The primary goal was the development of a comprehensive educational handbook and evidence-based resources rooted in Ayres Sensory Integration (ASI) principles. These materials provide hairstylists and parents with specific preparatory and compensatory strategies, such as environmental modification and proprioceptive techniques, to improve the child's regulation and participation. By translating clinical sensory strategies into accessible community tools, this project aims to transform a traditionally distressing task into a successful, participation-focused experience.

Escalation Hesitancy in New Nurses: Breaking barriers with peer mentorship programs

Student Presenters: Alyssa Malave, Joseph Pilewski, Cailey Lopez, Steven Mcevoy

Faculty Mentor: Jessica Varghese

School/College: Health Professions

New nurses often hesitate to escalate patient concerns due to communication barriers, hierarchical culture, and low confidence, which can contribute to adverse patient outcomes. This project aims to develop a solution to reduce new nurse hesitancy. The quality improvement project will be conducted in an inpatient setting targeting new nurses. A mentorship program will be implemented, pairing new nurses with experienced staff. The project will utilize Plan-Do-Study-Act cycles alongside the Rutgers Nursing Mentorship Program Toolkit. Data will be collected through surveys of new nurses during their first 90 days of employment. The intervention involves pairing novice nurses with trained, experienced nurse mentors who provide weekly check-ins and real-time clinical guidance, including debriefing escalation experiences. This approach is expected to improve escalation confidence and frequency by reducing barriers. Primary outcomes include self-reported escalation frequency and confidence scores measured through pre- and post-surveys, while secondary outcomes include the frequency of escalation events documented in the electronic medical record. Data will be analyzed using descriptive statistics and pre- and post-comparisons. It is anticipated that this intervention will improve escalation confidence, reduce delays, and promote a greater willingness to escalate concerns. This project has the potential to improve patient outcomes, interprofessional communication, and onboarding.

Estimating scale of matter density fluctuations in solar and supernova models using neutrino flavor evolution

Student Presenters: Dhriti Rathod

Faculty Mentor: Chinmoy Bhattacharjee

School/College: Arts & Sciences

Neutrinos are nearly massless, weakly interacting particles that travel largely unimpeded through matter, making them unique probes of otherwise inaccessible astrophysical environments such as the Sun and core-collapse supernovae (CCSN). As they propagate, neutrinos undergo flavor oscillations between electron, muon, and tau states due to quantum mixing. In astrophysical settings, chaotic variations in matter density can disrupt smooth (adiabatic) flavor evolution and leave measurable imprints on the neutrino signal. While solar neutrino data have enabled precise modeling of neutrino oscillations, CCSN observations remain limited, leaving density fluctuations and turbulence poorly constrained.

In this work, we applied a statistical data assimilation (SDA) framework to investigate whether information about such irregularities can be extracted from neutrino flavor observations. Using simplified models of neutrino propagation in solar and CCSN environments, we incorporated stochastic density fluctuations and compared predicted signals with observational constraints.

Our results showed that, although SDA cannot uniquely determine the exact scale of density fluctuations, it can reliably establish upper bounds on their magnitude when adiabatic flavor evolution is perturbed. This demonstrates that neutrino observations can be used to constrain dynamics inside astrophysical environments while defining the limits of what information can be extracted from such data.

Evaluating the Generalizability of Prostate Cancer Polygenic Risk Scores in men of African ancestry in the All of Us Research Program

Student Presenters: Daniel Galvin Gusmano, Ifti Gazi

Faculty Mentor: William Letsou

School/College: Arts & Sciences

Men of African ancestry are known to be at increased risk for prostate cancer compared to men of European descent. As some of this disparity is due to genetics, it is imperative to find alleles that predispose to disease risk. The polygenic model of disease risk assumes that the cumulative effect of many genetic variants of small effect is to dramatically increase the lifetime probability of disease. In this study, we sought to determine if a polygenic risk score (PRS) derived in a European ancestry population could distinguish risk in an African American sample as well. We identified 8,957 men (age ≥ 50 years) of African genetic ancestry, 578 cases in the All of Us Research Program, and calculated the 147-variant PGS from Schumacher et al. (2018) to determine the distribution of risk among prostate cancer cases and controls. We used two methods to calculate the PRS, one based on Hail matrix tables, and the other based on raw VCF files. We found that the VCF-based extraction was hindered by severe computational bottlenecks, while the Hail matrix was not as hindered in this process with the rotation of the table for the needed format being the largest obstacle. Survival analysis and PRS histograms showed that a higher proportion than expected of those in the top percentiles of the score represented cases, suggesting that this score can differentiate risk in African ancestry samples as well.

Examination of Arthrobacter phage Gibbzilla determines that cluster FB phages are Temperate

Student Presenters: Amina Ahmed

Faculty Mentor: Bryan Gibb

School/College: Osteopathic Medicine

The isolation and characterization of bacteriophages provide valuable insights into evolutionary relationships between phages and their host bacteria. Arthrobacter phage Gibbzilla was isolated by enrichment on Arthrobacter globiformis B-2979 from moist soil collected near a driveway in Long Island, NY, as part of the Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) program. Gibbzilla forms medium, hazy plaques. The genome of Gibbzilla, sequenced at the University of Pittsburgh, was found to be 38986 bp long, with an average GC content of 63.8%, and 11 bp 3' sticky overhang ends. Structural annotation by SEA researchers has identified 79 coding genes. Based on gene content similarity, Gibbzilla was placed in a cluster with other diverse phages that have unclear life cycles. We generated and purified five lysogens of Gibbzilla, confirmed by liquid-phage-release and superinfection immunity assays, which provided experimental evidence for a temperate lifecycle. And likely, all cluster FB phages. Consistent with a temperate lifecycle, we have identified a putative tyrosine integrase in a central region of the genome that is part of a cluster of five genes coded on the reverse strand. These genes, along with others nearby, are predicted to code for proteins that contain helix-turn-helix motifs. We predict that those genes form a regulatory cassette that contains candidate DNA-binding proteins with functions that support lysogeny.

Exploring Astrocyte Morphology in a Thyroid Deficient Model

Student Presenters: Zoe Leung

Faculty Mentor: Randy Stout

School/College: Osteopathic Medicine

Thyroid deficiency negatively affects biological functions including metabolism, cell-cell interaction, and cellular development. We hypothesize dysfunction in neurological cells, though this is understudied. Astrocytes are responsible for metabolic processes, maintaining the blood-brain-barrier, regulating ion concentrations, and initiating damage repair. They communicate with each other through gap junctions, composed of a protein Connexin 43 (Cx43). These channels depend on thyroid hormone (T3) to function. In T3 deficiency, we propose that gap junction morphology, astrocyte communication, and overall cell function are compromised. Brain tissue was removed from female rats with the thyroid gland removed with or without T3 treatment, and brains from control rats. Half of the brain was fixed, the other half flash-frozen in liquid nitrogen. IHC was then used to visualize Cx43 and related proteins using high-resolution imaging of STED and Zeiss980 confocal microscopes. Processing and quantitative analysis were conducted in Dragonfly and SVI Huygen's software to identify gap junction cellular distribution, and gap junction integrity across different brain regions. This data will indicate that the thyroidectomized rats have reduced Cx43 expression and form less plaque structures, which reflects the lack of functional communication in astrocytic networks. The rats treated with T3 are expected to have marginally restored Cx43 expression and connectivity.

Exploring the Therapeutic Potential of Naltrexone in Dermatology: A Scoping Review

Student Presenters: Sanjidah Ira

Faculty Mentor: Joseph Simone

School/College: Osteopathic Medicine

This project explores the therapeutic potential of naltrexone in dermatology through a comprehensive scoping review of existing literature. Naltrexone, traditionally used for opioid and alcohol use disorders, has demonstrated emerging utility in dermatologic conditions due to its immunomodulatory and anti-inflammatory effects. This review analyzed 13 studies evaluating both low-dose naltrexone (LDN) and standard-dose therapy across a range of skin disorders, including psoriasis, Hailey–Hailey disease, lichen planus, lichen planopilaris, frontal fibrosing alopecia, and chronic pruritus conditions.

Findings suggest that LDN is associated with improvements in inflammation, pruritus, and disease stabilization, particularly in treatment-refractory cases. Strong evidence was observed in Hailey–Hailey disease, where patients experienced rapid and sustained symptom relief. Additionally, standard-dose naltrexone demonstrated efficacy in reducing severe pruritus in cholestatic and uremic conditions.

Overall, naltrexone appears to be a safe and promising adjunctive therapy in dermatology, with minimal adverse effects reported. However, current evidence is limited by small sample sizes and a lack of large randomized controlled trials. Further research is needed to define optimal dosing strategies, long-term safety, and its role in clinical practice.

Fabricating 3D printed Biodegradable Scaffolds for Cellular Regeneration

Student Presenters: Jeffrey Chu, Jiehui Li, Matthew Duazo

Faculty Mentor: Karrer Alghazali

School/College: Engineering & Computing Sciences

Volumetric Muscle Loss is a major condition in the body where the body has lost an excessive amount of muscle that cannot be regenerated naturally. As it stands, there are no readily available treatment options that can fully heal all muscle that was lost in the body. By using FDM 3D printing with biodegradable polymers, including poly(lactic-co-glycolic acid) (PLGA) and lactic-co-caprolactone (PL-CL), we are exploring the ability to create implantable scaffolds that, once in the body, supports cell regeneration and muscle growth to treat VML. We will be presenting our iterative design process to create scaffolds along with scaffold characterization toward effectiveness of scaffolds in cellular regeneration.

Fort Peck Native American Health Education Continuum: Strong Spirits, Healing Paths

Student Presenters: Shwana Noorani, Sofia Bauer, Amelia Lam, Mahdia Begum, Courtney Brady, Xitlali Maceda

Faculty Mentor: Joerg R. Leheste

School/College: Osteopathic Medicine

The Fort Peck Indian Reservation faces persistent health disparities marked by high rates of chronic disease, shortened life expectancy, and a shortage of local providers. The Health Education Continuum is a collaborative initiative between Poplar School District and the Center for Health Policy Research at NYITCOM, built around an “educating the tribe’s own” model. The program builds wellness, self-efficacy, and sustained interest in health careers, with the goal of tribal members returning to Fort Peck as health care professionals.

Eighth-grade students are introduced to a health curriculum that integrates evidence-based education, osteopathic principles, and native tribal principles, emphasizing cultural identity and chronic disease prevention. The curriculum is divided into six units: Health, Identity, and Medicine; Body Systems and Common Pathogens; Chronic Disease and Epidemiology; Mental Health and Wellbeing; Environmental Medicine; and Community Health and Careers in Medicine.

With secured formal support from all key stakeholders, implementation is planned for Spring 2027 with the first phase of the curriculum: Strong Spirits, Healing Paths. The long-term goal is to develop a culturally sensitive educational framework that supports students in pursuing careers in healthcare and returning to practice on the reservation, thereby improving quality of life and reducing healthcare disparities.

From Discussion to Reflection: A Longitudinal Evaluation of Peer Instructed Learning in Preclinical Medical Education

Student Presenters: Georgi Savov

Faculty Mentor: Leslie Goldstein

School/College: Osteopathic Medicine

Peer Instructed Learning (PIL) is an active learning class implemented at NYITCOM during the preclinical curriculum as a 2-hour in-person session held twice per block (~6 weeks) to enhance critical thinking and test-taking skills . Initially, PIL followed a discussion-first format where groups of 8–10 students analyzed case vignettes and concepts prior to answering questions. In 2024, student perceptions were largely negative: 52% disagreed PIL improved test-taking skills, 61.5% reported no improvement in exam confidence, and 81% felt it was not better than prior formats.

In 2025 PIL was redesigned to include individual reflection, with students completing 15 questions independently (20 min) prior to group discussion (10 min). This resulted in marked improvement: 71.7% agreed the combined format was more effective than discussion alone, 71.9% reported improved discussion quality, and 69% felt more confident contributing. These trends persisted in 2026 (65–70% agreement), though overall satisfaction declined.

Qualitative feedback revealed individual reflection improved independent reasoning, identified knowledge gaps, and increased confidence. Ongoing concerns included limited discussion time, large-group logistics, and alignment with exams.

Overall, incorporating individual reflection significantly improved student perceptions of PIL, supporting its value in promoting deeper learning and engagement in the preclinical curriculum.

From Lectors to Labor Movements: Afro-Diasporic Consciousness in Bernardo Vega's Narrative

Student Presenters: Citlally Diaz Mar

Faculty Mentor: Jonathan Goldman

School/College: Management

Bernardo Vega's Memoirs of Bernardo Vega is often read as a personal account of Puerto Rican immigrant life in the early twentieth century New York: a narrative of struggle, community and survival. Vega describes his life as an immigrant tabaquero and explicitly describes the cigar factories filled with debate, lectors reading political texts aloud and workers who were more politically and intellectually engaged than the average laborer of his time. He recounts racial tensions with Italians and Jews, discrimination from police, and the ambiguous racialization of Puerto Ricans within the United States. These details are meaningful on their own, but become even more impactful when placed within the broader context of the political culture of tabaqueros, the lector tradition and Black labor movements both in the Caribbean and the U.S. South. Through close reading and analysis of key passages, it becomes evident that Vega's memoir is much more than a personal chronicle of immigrant adaptation but furthermore develops the argument that Puerto Rican identity, class consciousness, and racial experience in the United States can not be separated from larger hemispheric histories of Black labor, socialism and colonialism.

From Mentee to Mentor: The Role of Mentorship in Shaping Evidence-Based Medical Students

Student Presenters: Paige Vinch, Oliva Caan, Erin Hong, Brian Trinh

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

This study examines how mentorship and research exposure influence the development of evidence-based medicine (EBM) skills among NYITCOM students. Early research experience supports critical appraisal, communication, and clinical reasoning, yet access varies by campus and training year. We surveyed 112 students across the Old Westbury, NY and Jonesboro, AR campuses, evaluating research participation, mentorship quality, and EBM confidence.

Overall, 45% of students participated in early research, while 82% reported having faculty mentorship, highlighting mentorship as a key gateway to involvement. Disparities were observed between campuses and training years, suggesting differences in access to research opportunities and institutional resources.

Mentorship quality emerged as a strong predictor of EBM confidence. Each one-point increase in mentorship quality was associated with a meaningful rise in overall confidence, particularly in evaluating scientific literature, applying evidence to clinical questions, and communicating findings. These results emphasize that mentorship most strongly shapes the interpretive and communicative aspects of evidence-based practice.

Research participation further reinforced these findings. Students who engaged in research demonstrated significantly higher overall EBM confidence, with an average increase of 0.54 points and statistically significant association. Together, mentorship and research strengthen students' ability to apply EBM skills.

From Photons to Diagnosis: the Vision Science Foundations of Medical Imaging Display Standards

Student Presenters: Parker Flanagan, Jana Radwan, Nancy Mahfouz

Faculty Mentor: Robert Alexander

School/College: Arts & Sciences

Presentation of a literature review paper which explains the hardware specifications for medical monitors and the vision science behind those specifications.

From Textbook to Touch: Automating Tactile Graph Conversion and Braille Labeling Using Deep Learning and a Large Language Model API

Student Presenters: Anila Khan

Faculty Mentor: Maryam Ravan

School/College: Engineering & Computing Sciences

Tactile graphics are essential for making mathematical content accessible to visually impaired students, yet their production remains largely manual and time-intensive. This research presents an automated pipeline that converts standard textbook graph images into tactile-ready graphics with Braille-annotated axis labels. A dataset of about 5,000 paired graph image samples was generated in MATLAB. Three separate UNet-based image translation models were trained to handle graphs containing one, two, and three mathematical curves respectively, each outputting individual tactile curve representations as separate channels. Models were trained on an 80/20 train-validation split with model checkpointing, achieving training and validation losses of 0.0103/0.0291, 0.0228/0.0427, and 0.0180/0.0317 for the three models. A second pipeline stage handles Braille annotation: the GPT-4.1 API extracts axis tick values and titles from the input image, which are then passed to a custom-built Braille encoder that converts them to Braille Unicode and overlays them spatially on the predicted tactile output. This system demonstrates that deep learning combined with a large language model API and custom Braille encoding can automate a previously manual accessibility workflow, representing a meaningful step toward scalable tactile graphics generation for visually impaired students.

From Waiver to Welcome: Institutional Reform and the Opening of ACS Fellowship to Osteopathic Surgeons

Student Presenters: Samuel Zev Pavlovsky, Nathaniel E Roth, Benjamin Galinson

Faculty Mentor: Gerard Baltazar

School/College: Osteopathic Medicine

Until 2009, osteopathic surgeons seeking Fellowship in the American College of Surgeons (FACS) faced a structural barrier unrelated to operative ability: because eligibility standards were aligned with American Board of Medical Specialties pathways, osteopathically trained surgeons were required to submit a Petition of Waiver for consideration. Using archival governance records, this study traces how the waiver requirement was gradually dismantled through a series of policy revisions from 2002–2009 rather than through a single decisive vote. An early effort toward parity was withdrawn in 2002, osteopathic medical students gained ACS student membership in 2006, and formal Board of Regents action between February and June 2009 eliminated the waiver requirement, transitioning osteopathic applicants from exception-based review to standardized eligibility. Situating this shift within the broader history of osteopathic surgery including independent residency systems, specialty boards, military-era service, and expanding scholarly output, this project argues that the 2009 policy change reflects a larger institutional recalibration in how organized surgery defined equivalence, credentialing, and professional legitimacy in the early twenty-first century.

Future Remains: Density's Answer

Student Presenters: Yash Oza

Faculty Mentor: Farzana Gandhi

School/College: Architecture & Design

Cities reveal their values through what they celebrate and what they conceal. New York celebrates the library. It hides the cemetery. Yet both are repositories — one stores knowledge, the other stores identity. Both preserve what a civilization cannot afford to lose. This thesis asks: why have we kept them apart?

Future Remains proposes a new architectural typology — the land-scrapper — a hybrid civic building that extends above and below grade, housing a library and a burial repository within a single, continuous spatial experience. It argues that the storage of books and the storage of human remains are not categorically different acts, and that a building designed to do both is not a provocation but an urban necessity.

The project challenges the architectural taboo around death. When we exile cemeteries to the city's edges, we don't just relocate a program — we sever a fundamental human relationship. Grief loses its civic container. The building proposes the opposite: a space where mortality is absorbed into daily life, not hidden from it.

In a city where every square foot demands justification, density becomes the discipline. The monofunctional cemetery cannot survive New York on its own terms. But fused with the library — reimagined as a space for storing not just books but people — it earns its ground twice over.

One building. Two repositories. One living civic space for everyone.

Generative EEG Harmonization and Graph Attention for Cross-Cohort Major Depressive Disorder Recognition

Student Presenters: Tahereh Vasei

Faculty Mentor: Maryam Ravan

School/College: Engineering & Computing Sciences

Electroencephalography (EEG) offers a promising avenue for objective Major Depressive Disorder (MDD) screening. However, the reliability of deep learning models is often compromised by "domain shift"—variability caused by differences in recording hardware, protocols, and demographics across different clinics. This study proposes a unified framework to achieve robust MDD recognition across heterogeneous cohorts. We introduce a two-stage pipeline combining generative harmonization with graph-theoretic learning. First, we employ a Conditional Variational Autoencoder (CVAE) to disentangle physiological content from site-specific acquisition artifacts, reconstructing EEG signals into a harmonized, domain-invariant reference space. Second, we model functional brain connectivity as sparse graphs and utilize a second generation Graph Attention Network (GATv2) to capture non-Euclidean inter-electrode dependencies. The framework is validated on a large-scale composite database aggregated from six distinct sources (totaling over 800 subjects) using a rigorous subject-independent cross-validation protocol.

The proposed Generative Harmonization and Connectivity-Aware Graph Attention Network (CVAE+GATv2) framework achieves a Grand Total accuracy of 84.0\% and a Matthews Correlation Coefficient (MCC) of 0.69, significantly outperforming state-of-the-art baselines.

Geographic Information Systems on Long Island: Evaluating Environmental Risk Factors for Autism Spectrum Disorder to Inform Groundwater Policy

Student Presenters: Cristina Ruiz, Alayna Abraham, Puneet Dhaliwal, Farah Tasneem

Faculty Mentor: Joerg Leheste

School/College: Osteopathic Medicine

In recent years, there has been a surge in research studies connecting the rise of Autism Spectrum Disorder (ASD) prevalence with an increase in environmental pollutants.

Most of the research focuses on the effects of airborne pollution on neurological development, however, there are limited studies that look into the impact of water contamination on the health of the populations affected. This is particularly relevant to Long Island, New York, as septic systems, which are particularly abundant, are confirmed to be a major contributor to groundwater pollution. With increasing reports of ASD, it raises concerns on how a population's aquatic environment can influence neurological development.

The goal of this study is to use existing Autism diagnosis registries as well as documented environmental data provided by Nassau, Suffolk, Queens and Brooklyn counties to examine the relationship between ASD prevalence and environmental factors across Long Island, while visualizing potential location clusters through Geographic Information Systems (GIS) mapping. This study aims to provide visualizations for potential correlations that can be further investigated and ultimately lead to policy changes preventing harm.

Grief and Coping Education in U.S. Pre-Clinical Medical Curricula: Findings from an Exploratory Survey

Student Presenters: Vineet Vishwanath

Faculty Mentor: Maria Maratta Plummer

School/College: Osteopathic Medicine

Physicians frequently encounter emotional distress and grief in response to patient suffering and death. While these experiences are common, the skills required to process and cope with them are often assumed to develop naturally over time. Although many U.S. medical schools incorporate end-of-life (EOL) education into their pre-clinical curricula, less attention has been given to how trainees are formally taught to manage physician grief and develop healthy coping strategies.

This exploratory survey examined how U.S. medical schools address grief and coping during the pre-clinical years. A 30-item questionnaire was sent to curricular leaders at 192 LCME- and COCA-accredited institutions between November and December 2024. Items assessed the prevalence, structure, and depth of grief- and coping-related instruction. Responses were analyzed descriptively.

Ten institutions responded (5.2%). While 70% reported required EOL content, formal instruction on physician grief and coping was limited. Most schools devoted fewer than five hours to coping education, lacked structured curricula, and reported variable opportunities for reflection and faculty-led discussion. Only one institution had a dedicated curriculum committee on grief and coping.

These findings suggest that structured grief education remains limited in the pre-clinical years, highlighting opportunities for curricular development to better support professional identity formation and physician well-being.

Has Informed Consent Been Outpaced by Medical Knowledge?

Student Presenters: Nancy Hilton

Faculty Mentor: Joerg Leheste

School/College: Osteopathic Medicine

This essay proposes and explores a dilemma between the constant expansion of the breadth and depth of medical knowledge and the clinician's ability to communicate effectively with patients of any background. This dilemma pushes us to have a new conversation on the old debate of autonomy vs. paternalism and explore what the implications are for fundamental ethical practices such as informed consent. Any obstruction to imparting medical knowledge threatens the essence of informed consent and shared medical decision making. In recent decades physician values have skewed much more towards patient autonomy than previous. Many clinicians know or have seen in practice however that when patients cannot reach understanding themselves, the entire healthcare team relies on a degree of paternalism to move care forward. We act on patient autonomy but we need paternalism to make the medical world turn sometimes. I argue that if we as clinicians cannot effectively impart medical knowledge to our patients that we might instead reform our approach and swing the pendulum back towards a degree of paternalism. I propose that while we continue to give our patients a robust understanding of their own health, we might also formally acknowledge with our patients that they don't know what they don't know, ie. there will be some parts of their care that they may not understand. Acknowledging the unknown unknowns of a decision making process has potential to foster more trusting patient-physician care.

Heat of the Crisis: A Health Policy Approach to the Impact of Climate Stressors on Mental Health in Los Angeles County

Student Presenters: Suruchi Verma

Faculty Mentor: Joerg Leheste

School/College: Osteopathic Medicine

This health policy study is investigating the effect of Global warming on mental health in Los Angeles (LA) County. This area is known for heat stressors, wildfires and associated air pollution as well as extreme heat waves. The study investigates how that may affect mental health, particularly vulnerable populations, in the region. These include seniors who live alone, unsheltered individuals, people diagnosed with anxiety, depression, post-traumatic stress disorders (PTSD), those having suicidal thoughts and other mental health conditions impacted by climate change. Studies using medical claims data from visits to the emergency department (ED) during days with extreme heat and related calamities in the LA region, highlight the disproportional impact on vulnerable populations and their mental health. These heat-related emergencies have significantly increased ranging from between 456-1352 ED visits annually to now consistently more than 1500 additional ED visits per day on days of extreme heat. This highlights an increasing socio-economic and health care burden on health programs and medical systems. LA officials and public health professionals are calling for action particularly amidst the current national mental health crisis, exacerbated by effects of global warming. Transdisciplinary action involving advocacy at local and global levels, community education, smart urban planning, and increased access to mental health services, are key in addressing the current crisis.

High-Speed Rail: Why China Leads and the United States Is Falling Behind

Student Presenters: Musa Md Fahim Islam

Faculty Mentor: Jeaniffere Vila

School/College: Engineering & Computing Sciences

This project examines why China leads in high-speed rail development while the United States is falling behind. High-speed rail is an important modern transportation system that allows fast, safe, and efficient travel. Through research, this project analyzes key factors such as government planning, funding, construction speed, and technological advancement. China's success is mainly due to strong centralized planning, large investment, and fast project execution, while the United States faces challenges such as political disagreements, slow decision-making, and fragmented planning systems. The project also discusses real-world examples, including China's national rail network and delays in U.S. projects like California's high-speed rail. Overall, this study highlights how different political and economic systems affect infrastructure development and suggests that better coordination and long-term planning are needed for the U.S. to improve its high-speed rail system.

Identifying Chromatin and Multidrug Response Genes That Confer Resistance to Natural Insecticide, Using Saccharomyces cerevisiae

Student Presenters: Jarin Tasnim

Faculty Mentor: Navin Pokala

School/College: Arts & Sciences

Drug A is a natural insecticide. I am exploring the genetic mechanisms of drug resistance, using in Saccharomyces cerevisiae. To establish a baseline for all subsequent assays, I first determined the minimum inhibitory concentration (MIC = 6.76×10^{-3} mg/mL). Metabolic measurements using an ATP biosensor showed that Drug A suppressed ATP synthesis more strongly in YPG than in YPD, indicating a greater effect under respiratory growth conditions. To uncover genes that improve survival in the presence of Drug A, I screened both genome-wide high-copy libraries and CRISPRi knockdown libraries. Resistant isolates from these screens were sequenced, revealing two notable candidate genes within genomic fragments: LDB7 and PDR3. LDB7 functions in chromatin organization and transcriptional regulation, processes that support cellular adaptation to stress. PDR3 is a transcription factor that activates multidrug resistance pathways, including efflux pumps that reduce intracellular accumulation of toxic molecules. Future studies, such as cell cycle analysis, targeted manipulation of LDB7 and PDR3, and physiological comparisons across wild-type, CRISPR strains, and high-copy isolates, should be conducted to further define the mechanisms underlying resistance to Drug A.

Impact of Cognitive and Dual-Task Training on Gait Performance for people with Parkinson's Disease: A Systematic Review

Student Presenters: Arpita Milind Bedarkar

Faculty Mentor: Amerigo Rossi

School/College: Health Professions

People with Parkinson's disease (PD) experience gait abnormalities and cognitive impairments that reduce mobility and increase fall risk. Cognitive and dual-task training have emerged as potential strategies to improve gait performance. Purpose: To evaluate the effects of cognitive and dual-task training on gait outcomes in individuals with PD. Methods: A systematic review was conducted using PubMed and Scopus databases. English-language experimental studies involving cognitive or dual-task interventions with quantitative gait outcomes in idiopathic PD were included. Data extracted included participant characteristics, intervention type, cognitive domains, and gait outcomes. Results: Ten studies (210 participants; mean age ~66 years; disease duration ~7 years) were included. Interventions targeted executive function, attention, and dual-task processing. Improvements were observed in gait speed (68 to 74 cm/s; n=9), stride length (68 to 72 cm; n=8), and cadence (109 to 114 steps/min; n=4). Dual-task training showed greater improvements than single-task interventions, with ~5 cm/s higher gains in gait speed. Conclusions: Cognitive and dual-task interventions improve gait in PD, though findings are limited by variability. Future research should prioritize standardized dual-task training to support clinical outcomes.

Impact of Colonoscopy Timing on Clinical Outcomes in Low-Risk Lower Gastrointestinal Bleeding: A National Retrospective Cohort Study

Student Presenters: Wendy Qu, Kevin Liu, Isabelle Shi, Brian Trinh, Alissa Winston

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Colonoscopy is the primary diagnostic tool for lower gastrointestinal bleeds (LGIB). The optimal timing of colonoscopy in low-risk LGIB remains unclear; early intervention is the standard of care, but delayed intervention may have its clinical advantages. A retrospective cohort study was conducted using a national dataset of approximately 76,430 admissions for low-risk LGIB. Patients were stratified into four colonoscopy timing groups: 0–24 hours, 24–48 hours, 48–72 hours, and >72 hours. Multivariable regressions were performed to assess associations with mortality, acute kidney injury (AKI), myocardial infarction (MI), shock, composite outcomes, length of stay (LOS), and total hospital charges, adjusting for demographic and clinical covariates. Colonoscopy >72 hours was associated with increased odds of AKI (OR 2.11, 95% CI 1.33–3.35, p=0.002) and the composite adverse outcome (OR 1.59, 95% CI 1.06–2.39, p=0.024), while no significant differences were observed in mortality of MI across timing groups. Colonoscopy timing also demonstrated a consistent association with shock, with all delayed groups showing significantly lower adjusted odds compared to early intervention (<24h). Intermediate timing (24–72h) showed no significant differences in AKI, composite outcomes, mortality, or resource utilization. Delayed colonoscopy >72 hours does not confer any benefit and may be associated with worse outcomes. Moderate delays up to 72 hours may be comparable to early intervention.

Improving Access to Tranexamic Acid in Postpartum Hemorrhage Emergency Department Management of Unplanned Vaginal Deliveries

Student Presenters: Catherine Istafanos, Joseph Tawfellos, Leyla Nasr

Faculty Mentor: Dharav Patel

School/College: Osteopathic Medicine

The goal of this project is to assess the barriers to timely administration of tranexamic acid (TXA) in emergency department (ED) settings for postpartum hemorrhage (PPH), especially in cases of unplanned vaginal delivery. PPH is one of the leading causes of maternal morbidity and mortality worldwide, and early administration of TXA is known to reduce mortality by 27% if administered within three hours of delivery. However, in ED settings, healthcare providers might lack knowledge and experience in managing PPH, which might delay treatment. A multidisciplinary simulation-based training was conducted to improve knowledge and comfort in acquiring and administering TXA in emergency situations. Surveys comparing ED and obstetric (OB) nurses revealed significantly lower comfort levels among ED nurses, indicating a lack of familiarity with acquiring and administering TXA, knowledge of its location, and standardized PPH protocols in their respective departments. To address this, a simplified emergency department-specific PPH protocol was developed, focusing on early recognition, prompt administration of TXA, and escalating care. This project aims to highlight the importance of educating healthcare staff and providing them with better access to protocols to improve emergency preparedness and, in turn, reduce morbidity and mortality from PPH in emergency settings.

Improving Dermatologic Education in Medical School Curriculum : A Survey Study

Student Presenters: Mary Claire Swaim

Faculty Mentor: Kinsey Cornick

School/College: Osteopathic Medicine

Background: Around half of osteopathic medical students enter primary care, often in underserved areas with limited dermatologic access, where they are the first to evaluate skin conditions.

Objectives: To assess student preparedness in recognizing and managing common dermatologic conditions, identify perceived barriers to care, and evaluate curriculum effectiveness.

Methods: An anonymous, cross-sectional REDCap survey was distributed to OMS I–IV students at NYIT College of Osteopathic Medicine in Jonesboro, AR. Domains included lesion morphology, systemic disease manifestations, treatment and counseling, and rural-based cases. Confidence in recognition and management was assessed using Likert scales.

Results: Students performed well in identifying lesion morphology and recognizing systemic disease manifestations. Gaps included distinguishing psoriasis vs atopic dermatitis, rosacea treatment, and hidradenitis suppurativa counseling. Confidence was low, with 42.9% reporting low confidence in recognition and 52.4% in management. Most students (95.2%) felt dermatology education should improve, and 85.7% wanted more training.

Conclusion: Gaps in dermatologic preparedness highlight the need for improved education in diagnosis, management, and counseling to better prepare future primary care physicians in underserved settings.

Integrating Genetic Connectivity and Network Modeling to Predict Viral Spread in the United States

Student Presenters: Levi Dong, Gamana Gogineni

Faculty Mentor: Leonidas Salichos

School/College: Arts & Sciences

We developed a computational pipeline to study viral spread in the United States by integrating phylogenetic genetic connectivity analysis with network-based infectious disease modeling. This work focuses on SARS-CoV-2 and Influenza A subtypes H1N1 and H3N2 using genomic datasets collected between 2018 and 2023 from GISAID, together with public epidemiologic datasets for model parameterization. Viral sequences were filtered, aligned with MAFFT, and analyzed with RAxML to infer phylogenetic structure and estimate normalized state-to-state genetic connectivity. In parallel, we developed a regional SEIRD network model parameterized with observed population, case, mortality, mobility, and vaccination-related datasets to examine how within-state and interstate transmission contribute to disease spread. The first goal of this project is to validate our prediction for the spread of the infectious diseases using real data in current and future outbreaks and the second goal is to identify Points of Health Interest (PoHI), defined as geographic hubs with high centrality and potential public health importance to support more targeted surveillance, mitigation planning, and resource allocation for future outbreaks.

Investigating the Association between Elevated Levels of HbA1c and Access to Health Care in Taxi/FHV drivers

Student Presenters: Sahar Alsaidi

Faculty Mentor: Franseca Gany

School/College: Osteopathic Medicine

Taxi and For-Hire Vehicle (FHV) drivers represent a large and growing workforce in New York City, with over 177,000 drivers registered through the New York City Taxi and Limousine Commission. Previous studies have shown that drivers experience a higher prevalence of chronic diseases such as hypertension, cardiovascular disease, and type II diabetes mellitus (DM), partly due to occupational factors including prolonged sedentary work, irregular shifts, limited opportunities for healthy meals, and barriers to healthcare access. Uncontrolled DM can lead to serious complications including cardiovascular disease, kidney disease, neuropathy, and vision impairment, which may also affect driving safety.

This study assessed the prevalence of abnormal hemoglobin A1c (HbA1c) levels among taxi/FHV drivers and examined associations with healthcare access. Between December 2022 and July 2024, 391 drivers were recruited through worksite-based health fairs at taxi garages, airport holding lots, and driver hubs across New York City. Participants completed questionnaires on demographics, medical history, insurance status, usual source of care, and recent primary care visits. HbA1c levels were measured using fingerstick testing.

Overall, 51.3% of drivers had abnormal HbA1c levels: 26.7% in the prediabetes range and 24.6% in the diabetes range. Drivers with diabetic-range HbA1c but no prior diagnosis were less likely to have health insurance, a source of care, or recent primary care contact.

Investigating the Techniques Taught and Practiced by Radiologists

Student Presenters: Ahaylee Rahman, Talia Lilikakis, Victoria Carrero

Faculty Mentor: Robert Alexander

School/College: Arts & Sciences

Radiologists must search for complex medical images to detect abnormalities, yet there is no standardized way they are trained to do so. Instead, training often depends on mentors, institutions, and individual experience. Analyzing the range of existing training methods provides valuable insight into effective learning tools that can be used to improve future radiological training. Data were collected in person from radiologists attending the Society of Thoracic Radiology conference, where participants reported how they approach visual search tasks, including eye movement patterns and navigation through image stacks. We were particularly interested in differences in strategies such as “scanning” (broad viewing before progressing) versus “drilling” (rapid scrolling with focused attention). Preliminary findings reveal substantial variability in reported strategies, suggesting that radiology training is highly inconsistent and often based on informal techniques rather than standardized methods. Ongoing work will expand data collection to practicing radiologists across broader settings using online methods. By identifying common and uncommon strategies, this research aims to inform the development of evidence-based training approaches to improve diagnostic accuracy and reduce medical error.

Investigation and Improvement of Stability in a Digital Holography System for Acoustics Applications

Student Presenters: Brianna J. Hobert

Faculty Mentor: James Scire

School/College: Engineering & Computing Sciences

Mechanical and thermal stability are important characteristics of optical metrology systems. We have been using digital holography to measure the dynamics of acoustic levitation. Our digital holography system uses an interferometer to provide optical phase and intensity images of the acoustic field and floating objects. Mechanical vibrations and thermal drift are sources of noise in those images.

That noise appears as per-pixel fluctuations and as disturbances, affecting the image. We have identified and characterized noise sources by measuring these variations. We tracked the phase and intensity of individual pixels and the angle between the measurement and reference beams of the interferometer over time. Those measurements were conducted over short and long time scales, from half-second intervals to hours. For the shorter intervals, we analyzed the frequency content of the high-speed measurements. We added weights to the optical elements to perturb those frequencies in order to identify which elements are more susceptible to vibrations. For the longer intervals, we measured the correlation between drift and thermal fluctuations.

The study of metrology stability has applications in acoustics, fluid mechanics, precision pointing systems for satellites, and ultra-stable space telescopes. This work is supported by NASA's Science Mission Directorate through the MOSAICS (Mentorship Opportunities in STEM with Academic Institutions for Community Success) program.

Isolation and Characterization of MRSA-Targeting Bacteriophages for Potential Therapeutic Use

Student Presenters: Mary Stein, Areebah Ahamed

Faculty Mentor: Bryan Gibb

School/College: Arts & Sciences

Staphylococcus aureus is a notable gram-positive cocci bacterium that causes significant health deterioration in humans. This opportunistic pathogen commonly presents as skin infections, which can lead to more life-threatening diseases. A striking characteristic of Staphylococcus aureus is its antibiotic resistance among certain strains. Methicillin-resistant Staphylococcus aureus (MRSA) is a resistant form of S. aureus that causes community and hospital-acquired Staph infections. Not only is MRSA resistant to methicillin, but it also exhibits resistance towards many other drugs, making infections difficult to treat with conventional therapies and highlighting the imperative need for continued research to develop alternative, non-conventional therapies, such as bacteriophage therapy. Bacteriophages are viruses that selectively target and infect bacterial cells. They are highly specific to a particular host bacterium, allowing specialized targeting of the host bacterium via the phages' lytic life cycle pathways. We aim to create a library of S. aureus bacteriophages with therapeutic potential that can be used in downstream experiments to investigate the efficacy of bacteriophages in treating MRSA infections. Here, we describe the isolation and characterization of ten bacteriophages that infect MRSA, including wet lab assays and genome sequencing and analysis to determine their therapeutic potential.

Learning Dynamics as an Indicator of Generalizable Models for Obesity and Diabetes Prediction

Student Presenters: Ann Murickan

Faculty Mentor: Milan Toma

School/College: Osteopathic Medicine

As artificial intelligence becomes more widely used in healthcare, combining clinical knowledge with machine learning (ML) methods is important for developing useful diagnostic tools. In this study, we compared several ML models, including gradient boosting, random forest, and logistic regression, to predict obesity and diabetes using clinically labeled datasets. Rather than focusing only on accuracy, we examined learning curve behavior to better understand model generalizability and potential clinical usefulness. We also addressed challenges such as class imbalance through approaches such as RUSBoost and explored how data preprocessing and feature selection influenced model performance. Gradient boosting achieved the most balanced accuracy (68.2%) and demonstrated stable learning behavior. In contrast, random forest showed signs of overfitting, while logistic regression produced less consistent performance. This work highlights the value of combining human expertise with AI to develop reliable and interpretable decision-support tools for healthcare.

LGBTQ Rights in 1990s I Like it Like That (1994) Film

Student Presenters: Brenda Berenice Gonzalez

Faculty Mentor: Jonathan Goldman

School/College: Arts & Sciences

Using evidence from the 1994 film "I Like It Like That" to bring awareness to the struggle the LGBTQ community suffered in the 1990s. The challenge of having the older generation understand and transition from what was seen unacceptable to still trying to learn to accept the LGBTQ community in the 1990s. The Latinx community struggles in seeing out of the norm, and misogynistic way of having an outlook on the LGBTQ individuals. Lastly touching heavily on the stigma that was put onto the LGBTQ community during the 1990s and how that affected individuals mental health and encounters with violence throughout daily life.

LGBTQ+ Adversities Infographic

Student Presenters: Okalahny Simeon

Faculty Mentor: Patty K. Wongpakdee

School/College: Architecture & Design

As a nonbinary graphic designer, I aimed to bring attention to the challenges faced by the LGBTQ+ community. Drawing on my design expertise, I created an infographic that advocates for my community in a powerful, artistic way. Many people are unaware of the discrimination, disadvantages, and violence that we continue to endure.

Linking Mechanics and Biology: Modeling Bone Remodeling in a Bobcat Skull

Student Presenters: Bryan Shivram, Daniel Boshnack

Faculty Mentor: Wei Zeng

School/College: Engineering & Computing Sciences

Bone remodeling is a biological process where bone density and structure continuously adapt to mechanical loading. Traditional Finite Element Analysis (FEA) predicts force distribution but does not capture the biological adaptation that occurs over time. This project develops a computational framework to simulate how a bobcat skull remodels in response to bite forces by combining mechanical analysis with a mathematical model of bone cell activity. The study applies the Komarova bone remodeling model, which describes interactions between osteoclasts (bone-resorbing cells) and osteoblasts (bone-forming cells). Micro-computed tomography (μCT) scans of a bobcat skull are processed in MATLAB to extract density and anatomical data, which are used to build a detailed 3D finite element (FE) model in HyperMesh. Grayscale values from the scans are converted into local mechanical properties. Bite forces are then applied in Abaqus to calculate strain energy density across the skull. This mechanical signal updates bone cell activity in MATLAB via the Komarova model, altering local bone stiffness. The updated properties are fed back into the FE model, and the simulation iterates over multiple time steps to capture how the skull remodels over time. This framework offers a computational approach to exploring how bone structures adapt to functional loading, providing insight into the relationship between mechanical forces and biological adaptation in skeletal systems.

Live Cell Imaging Reveals Upregulation of Mitochondria-Lysosome Contact Dynamics and Lysosomal Motility in Doxorubicin-induced Cardiotoxicity

Student Presenters: Chandrema Hossain

Faculty Mentor: Satoru Kobayashi

School/College: Osteopathic Medicine

Doxorubicin (DOX) is an effective anticancer drug, but it is limited by dose-dependent cardiotoxicity leading to heart failure. Disruption of mitochondrial and lysosomal homeostasis is a key feature of DOX-induced heart injury, though the role of mitochondria–lysosome contact dynamics remains unclear. We examined whether changes in organelle interactions and movement contribute to DOX cardiotoxicity. Human AC16 cardiomyocytes were treated with 1 μM doxorubicin for 16 hours and analyzed using live-cell imaging with Zeiss LSM 980 Airyscan confocal microscopy to track mitochondria and lysosomes in dual-channel images. Quantitative analysis revealed that cells treated with DOX had a significant increase in the frequency of contacts between mitochondria and lysosomes, along with increased mitochondrial fragmentation and a higher number of lysosomes. DOX greatly increased lysosomal movement while decreasing mitochondrial speed. These results suggest that DOX enhances mitochondria–lysosome contact interactions and alters organelle trafficking. This may indicate activation of lysosomal Ca^{2+}-dependent signaling as an adaptive response to DOX stress. Understanding how mitochondria–lysosome membrane contact sites are regulated could lead to new therapeutic strategies to reduce the cardiotoxic effects of anthracyclines.

Longer-Term Effects of a Humanities in Medicine Workshop For Reducing Bias and Improving Empathy During Clinical Rotations

Student Presenters: Nisansa Perera

Faculty Mentor: Julia Molnar

School/College: Osteopathic Medicine

Narrative medicine emphasizes attentive listening, reflection, and patient storytelling to promote holistic care, yet evidence on its short- and long-term impact in medical education remains limited. This study evaluates how a narrative medicine workshop influences medical students' ability to connect with and understand patients in clinical practice.

Nine pre-clinical NYITCOM students participated in a Humanities in Medicine Workshop (2024) featuring expert-led discussion, patient narratives on obesity and mental health, and interactive exercises. Participants completed surveys immediately before and after the workshop assessing communication, empathy, feedback, bias, and openness. A follow-up survey, modified for clinical experiences, was completed by seven participants over one year later after most clinical rotations were completed.

Significant improvements were observed between pre- and post-workshop scores in communication (6.27 to 8.44, p=0.002), empathy (7.74 to 8.66, p=0.038), and ability to provide feedback (6.55 to 8.17, p=0.003). Longer-term results showed improved ability to address sensitive topics, reduce bias, and connect with patients (mean scores 7–9/10).

These findings suggest that narrative medicine workshops can enhance communication, empathy, and patient understanding in students, with effects that persist into clinical training. Integrating narrative medicine into curricula may support the development of compassionate, patient-centered physicians.

Long-term Ambulatory Monitoring of Gastric Slow Wave Activity in Humans

Student Presenters: Mauricio Cardenas

Faculty Mentor: Aydin Farayidavar

School/College: Engineering & Computing Sciences

This study developed and validated a wireless system for continuous ambulatory monitoring of gastric slow-wave activity in gastroparesis patients over five days, demonstrating stable acquisition of low-frequency gastric electrophysiological signals during acute and extended periods. Using endoscopically placed gastric electrodes and a compact wireless module, the research continuously recorded slow-wave frequency, amplitude, and morphology during daily activities, revealing consistent pacemaker frequency (~3 cpm) across meal phases and days but notable patient-specific variability and decoupling in amplitude metrics. These findings indicate preserved pacemaker activity but impaired electromechanical coupling in gastroparesis, supporting the feasibility of chronic ambulatory monitoring to inform adaptive neuromodulation strategies prioritizing amplitude and propagation over frequency normalization.

Low Testosterone Damages Bone Health: Evidence from a Preclinical Study

Student Presenters: Jac Lin, Eddie Louz, Henry Ruiz

Faculty Mentor: Maria Alicia Carrillo Sepulveda

School/College: Osteopathic Medicine

Osteoporosis is a skeletal disease characterized by reduced bone mass, leading to increased fragility and fracture risk. It the United States, approximately 10 million people aged ≥50 years have osteoporosis, 2 million of which are men. The U.S Preventative Services Task Force recommends screening for all women aged ≥65 and younger postmenopausal women with risk factors. However, recommendations for men remain Grade I due to insufficient evidence, contributing to delayed diagnosis and under-recognition of osteoporosis in this population. We hypothesize that testosterone deficiency in middle-aged men contributes to osteoporotic changes in skeletal structure. To model this condition, middle-aged C57Bl/6 male mice were randomized into sham-operated (SHAM, n=5) and bilateral orchidectomy (ORC, n=10) groups and followed for 30 weeks. Validation of the ORC model was confirmed by significant atrophy of the seminal vesicles in the ORC group (0.112 ± 0.002g vs. 0.532 ± 0.029g controls, $p<0.05$). ORC mice exhibited weight loss (27.88 ± 0.74g vs. 33.38 ± 1.04g controls, $p<0.05$), and demonstrated significant bone loss on dual-energy X-ray absorptiometry (DEXA) (L5-L6: 0.034 ± 0.001g/(cm)^2 vs. 0.049 ± 0.004g/(cm)^2 controls, $p<0.05$) and micro-CT (L5-L6: 31.37 ± 0.75% vs. 23.11 ± 0.93% controls, $p <0.05$). These findings indicate testosterone deficiency is associated with reduced bone density and may serve as a potential criterion for osteoporosis screening in men.

Measles Resurgence and MMR Vaccine Policy in the United States: A Health Policy Brief

Student Presenters: Robert Colbath, Ariel Karson

Faculty Mentor: Regina Olasin

School/College: Osteopathic Medicine

Background

A recent resurgence in measles cases highlights declining national vaccine uptake and public vaccine hesitancy—exacerbated by widespread misinformation around vaccine safety— and threatens the United States' elimination status. A ~92-95% community vaccination rate maintains herd immunity. This project characterized health policies on the measles vaccine at the federal and state levels in a health policy brief format.

Methods

A health policy research review compared measles-related immunization policy across three levels: federal guidance (Center for Disease Control [CDC]), professional pediatric guidance (American Academy of Pediatrics [AAP]), and state school-entry requirements and exemptions.

Discussion

The Department of Health and Human Services' measles vaccine guidelines remain unchanged, yet several states have lost the target vaccination status. Increased vaccine exemptions, declining kindergarten measles vaccine coverage, and a polarizing public narrative are major factors. NYS maintains a high vaccination rate and a measles vaccine requirement for school-entry, however, low-vaccine areas persist and contribute to local outbreaks.

Conclusion

State school-entry policy and exemption guidelines are determinants of measles outbreaks. Aligning these mandates with AAP/CDC guidance can reduce under-immunization and protect vulnerable populations. Community-based immunization campaigns may combat misinformation, vaccine hesitancy, and declining coverage.

Median Arcuate Ligament Syndrome: A Case Report and Literature Review on the Challenges of Diagnosis

Student Presenters: Emma Rivellese, Annette Pietraru

Faculty Mentor: Bernadette Riley

School/College: Osteopathic Medicine

Median Arcuate Ligament Syndrome (MALS) results from the extrinsic compression of the celiac artery by the median arcuate ligament causing inflammation of the celiac ganglion. Patients with MALS present with postprandial abdominal pain, weight loss, and nausea.

The patient described in this case study began experiencing abdominal pain in 2019. She underwent extensive gastrointestinal workups which found no structural abnormalities. In 2023, the patient was diagnosed with hypermobile Ehlers-Danlos Syndrome (hEDS). Given the association between connective tissue disorders and vascular compression syndromes, MALS was suspected as an underlying etiology of her symptoms. Alleviation of the pain via celiac plexus nerve block supported the diagnosis of MALS. Open surgery was performed to remove the median arcuate ligament, celiac plexus nerves, and allow for partial ganglion resection. Open surgery was preferred to mobilize the pancreas and resect damaged nerves. Six months post-operatively, the patient reported sustained symptomatic improvement.

Earlier awareness and recognition of vascular compression syndromes could have expedited the diagnosis of MALS. Although a relatively rare syndrome, improved familiarity of MALS among gastroenterologists and radiologists is essential for diagnostic evaluation of celiac artery blood flow. Greater interdisciplinary awareness may allow for earlier diagnosis in MALS patients, with more timely interventions and improved quality of life.

Micro Mobility Trauma and Operative Triage Algorithm for Craniofacial and Extremity Injuries

Student Presenters: Philip Zitser, Edwin Sun, Henry Knox, Constantina Economou, Gregory Lipkovich

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Micro-mobility vehicles (MMVs), including electric scooters and electric bicycles, have rapidly emerged as a dominant mode of urban transportation, accompanied by a parallel rise in orthopedic trauma. This narrative review synthesizes current epidemiologic trends, injury mechanisms, and fracture patterns associated with MMV-related extremity trauma. A comprehensive literature search (2015–2025) identified studies evaluating orthopedic injuries, mechanisms of injury, and contributing risk factors. MMV injuries are predominantly fall-related, with spontaneous loss of control accounting for the majority of cases. The fall-on-outstretched-hand (FOOSH) mechanism is central, resulting in a high prevalence of upper-extremity fractures, particularly distal radius, radial head, and clavicle injuries. Device-specific differences were observed: e-scooter injuries are primarily fall-driven, whereas e-bike injuries more commonly involve motor vehicle collisions and higher-energy trauma. Contributing factors such as low helmet utilization and alcohol intoxication are associated with increased injury severity and hospital admission rates. Biomechanical analyses highlight the role of abrupt deceleration, rotational torque, and lateral impact forces in generating predictable fracture distributions and cervical spine injury risk. Lower-extremity injuries, including tibial plateau and ankle fractures, are less common but often reflect axial and torsional loading. Recognition of these injury patterns is critical for timely diagnosis, imaging, and operative decision-making. As MMV use continues to expand, understanding evolving orthopedic trauma phenotypes is essential to optimize patient outcomes, improve triage strategies, and inform injury prevention efforts.

MicroCT evaluation of alveolar dimensions that differ between smoker and non-smokers

Student Presenters: Jonathan Rodriguez, Dante Carbone

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Emphysematous changes in lungs are strongly associated with cigarette smoking and are most often seen in the apical regions. However, standard clinical CT imaging does not provide sufficient resolution to directly evaluate alveolar level changes. While micro CT has been used to study lung structure in more detail, most prior work has focused on the entire lung rather than specific regions like the apex. This study aimed to compare airspace characteristics in the lung apex between smokers and nonsmokers using micro CT and to explore how these findings relate to measurements obtained from clinical CT. Tissue samples measuring ten millimeters were obtained from cadaveric lung apex specimens and treated with a 2.5 percent Lugol's iodine solution to enhance soft tissue contrast before imaging. The samples were left in the solution for a minimum of two weeks to ensure adequate diffusion. Airspace measurements were then analyzed using Dragonfly software, which allows for three dimensional image segmentation. Early results indicated that smokers had a greater airspace fraction than nonsmokers. Specifically, nonsmoker samples showed values of 35.56 percent and 51.57 percent, whereas smoker samples showed higher values of 51.33 percent and 69.98 percent. Although these findings point toward increased airspace in smokers, the small number of samples limits the strength of this conclusion. Further data collection are underway to determine statistical significance and confirm observations

Modulating Aberrant Pyruvate Carboxylase (PC) Activity through a Structure-Based Drug Discovery Program

Student Presenters: Zakir Hossain

Faculty Mentor: Subhabrata Chaudhury

School/College: Arts & Sciences

Pyruvate carboxylase (PC) is a biotin dependent mitochondrial enzyme that converts pyruvate to oxaloacetate (OAA), a reaction essential for maintaining tricarboxylic acid (TCA) cycle intermediates. Its activity supports several metabolic pathways, and growing evidence shows that PC plays a critical role in cancer biology. Functional studies have shown that siRNA-mediated suppression of PC in cancer cells, including MDA-MB-231 breast cancer cells, significantly impair cell proliferation, migration, and invasion. Dysregulated PC activity are also linked to malignancies such as non-small cell lungs, thyroid, colorectal, and pancreatic cancer. PC is also central to glucose regulation, as OAA serves as an intermediate in gluconeogenesis. These findings highlight PC as a therapeutic target for both cancer and metabolic disease, such as type II diabetes.

Despite its biological significance, developing potent and selective PC inhibitors has been challenging. Our recent work identifies 1,3 disubstituted imidazolidinetriones (IZTs) as a new chemotype PC inhibitor. These compounds exhibit low micromolar potency and selectivity, showing no inhibition of related metalloenzymes such as carbonic anhydrase II and matrix metalloproteinase 12. Moreover, IZTs display improved cellular permeability compared to earlier α hydroxycinnamic acid derivatives. This presentation highlights our efforts to advance IZTs as selective PC inhibitors for probing cancer metabolism and potential therapeutic.

Naturescape room in organization

Student Presenters: Sagarika Paturi

Faculty Mentor: Hamid Kazemi

School/College: Management

Naturescape Rooms in Organizations: A Nature-Centric Approach to Workplace Well-Being

This study introduces the concept of Naturescape Rooms—dedicated indoor spaces designed to integrate natural elements into organizational environments to reduce workplace stress and enhance employee well-being. In modern workplaces, employees often experience high stress levels due to prolonged indoor work and limited exposure to nature. The proposed model addresses this challenge by creating accessible restorative spaces featuring plants, green walls, natural lighting, and calming textures.

A key innovation of this approach is employee engagement through plant-care activities, where individuals or teams take responsibility for maintaining designated plants. This not only promotes regular interaction with nature but also fosters collaboration, social connection, and a sense of belonging within the workplace.

Drawing on insights from organizational behavior and environmental psychology, this study highlights how structured exposure to nature can improve focus, reduce stress, and enhance overall job satisfaction. The concept offers a practical and scalable solution for organizations seeking to build healthier, more engaging, and sustainable work environments.

Nitrous Oxide Abuse: The Emerging Need for Regulatory Oversight

Student Presenters: Portia S.N. Maidment, Leigha N. Tierney

Faculty Mentor: Maria Pino

School/College: Osteopathic Medicine

Nitrous oxide (N2O), an inhalational anesthetic, has demonstrated persistent recreational misuse since 1772. Contemporary trends indicate substantial abuse increases among American adolescents, amplified by social media and commercial products like Galaxy Gas™. SAMHSA estimates 25 million individuals over age 12 have engaged in recreational inhalant use, with the 12-17 age cohort showing highest prevalence.

Recreational N2O inhalation causes significant morbidity and mortality including subacute combined degeneration secondary to vitamin B12 inactivation, irreversible neurological sequelae, cryogenic injury, cardiovascular complications, psychosis, and asphyxiation. Despite these risks, federal oversight remains inadequate. Unrestricted online sales without age verification have escalated public health consequences. National Poison Data System shows increasing adverse events; Michigan reported 132% increased emergency visits (2022-2023).

This policy paper employs systematic review and legislative analysis examining N2O misuse patterns, health outcomes, and regulatory frameworks. Only 32 states have enacted restrictive legislation with heterogeneous enforcement; 18 states lack restrictions. Federally, N2O remains unscheduled.

Proposed federal reforms include: restricting sales to licensed vendors; prohibiting online sales; requiring age verification; mandating risk labeling; and establishing criminal penalties. Comprehensive federal frameworks are essential to mitigate harm.

NYC Rent Century to Century

Student Presenters: Tyler Merolle

Faculty Mentor: Jonathan Goldman

School/College: Arts & Sciences

A sample webpage using a NYCPL rent map as the artifact focus and modern websites to compare rent from the 1920's to the 2020's. This is meant as a 5-minute presentation as part of Professor Goldman's NYC history class from the Fall Semester.

Objective Tools Detect Lower Extremity Asymmetry in Parkinson's During the Five Time Sit to Stand

Student Presenters: Charles A Siguenza

Faculty Mentor: Rosemary Gallagher

School/College: Health Professions

Parkinson's disease (PD) presents with asymmetrical motor symptoms that are difficult to detect early, highlighting the need for more sensitive assessment tools. Individuals with early PD (PwPD) often remain physically active and may benefit from evaluation by exercise professionals (EPs). Tools commonly used in healthy populations may identify subtle lower extremity (LE) impairments not captured by the Five Times Sit-to-Stand test (FTSTS), a standard timed measure of LE function.

Purpose: To examine LE asymmetry, force, and velocity during the FTSTS using performance tools in PwPD compared to healthy controls (HC).

Methods: Twenty PwPD (mean age 68.8 years; mean Hoehn & Yahr 2.25) and 11 HC (mean age 63.6 years) completed FTSTS testing with a Tendo Power Analyzer and VALD ForceDecks, plus hip and knee dynamometry. Analyses included Spearman correlations, Mann–Whitney U tests, and t-tests.

Results: Higher Hoehn & Yahr stage correlated with slower FTSTS time ($\rho = 0.577$, $p = 0.008$). PwPD demonstrated greater single-leg sway asymmetry ($p = .011$), greater hip peak force asymmetry ($p = .036$), and slower average ($p = .006$) and peak velocities ($p = .026$) compared to HC. FTSTS time showed a moderate effect but was not statistically different ($p = .090$).

Conclusion: Although FTSTS time did not differ significantly, PwPD showed greater asymmetry and reduced force and velocity, suggesting these tools detect subtle impairments not captured by time alone.

Osteopathic Approach to Restoring Function After Post-Surgical and Post-Radiation Cervical Fibrosis: The Tongue as a Body Diaphragm: A Case Study

Student Presenters: Elianna Sanchez, Andrew Abdelmalak

Faculty Mentor: Denise Burns

School/College: Osteopathic Medicine

Introduction:

Scar contracture, fascial fixation, and autonomic imbalance following surgery and radiation can cause pain, dysphagia, and postural restriction. Osteopathic manipulative treatment (OMT) provides a method to improve mobility, lymphatic drainage, and autonomic regulation in affected tissues. This case demonstrates an osteopathic approach to managing complex post-radiation fibrosis.

Case:

A 70-year-old female with tongue cancer underwent partial tongue resection and postoperative radiation. Fibrotic adhesions secondary to cancer treatment led to severely limited cervical and tongue motility, cervical pain, dysphagia, and dysarthria. Examination revealed anterior fascial restriction from the mandible to the thoracic inlet and impaired tongue-hyoid-diaphragm coordination.

Results:

OMT techniques like myofascial release of the neck and oral floor, balanced ligamentous tension to the hyoid and larynx, lymphatic drainage, suboccipital release, and respiratory diaphragm balancing were used over multiple visits. The patient reported improved posture, enhanced swallowing capacity, and clearer speech articulation. Palpatory findings suggest restored fascial connection and autonomic balance.

Discussion:

Although OMT cannot reverse radiation-induced fibrosis, this case suggests it may improve physiologic motion and serve as an adjunct to improve quality of life in post-treatment cancer patients. Further research with objective physiologic measures is needed.

Osteopathic Manipulative Treatment in the Management of Posterherpetic Neuralgia: A Case Report

Student Presenters: Catherine Chin

Faculty Mentor: Priya Bhushan

School/College: Osteopathic Medicine

Postherpetic neuralgia (PHN) is a chronic neuropathic pain condition that may persist after the resolution of a herpes zoster rash and is often difficult to manage due to treatment-resistant pain and medication side effects. While evidence is limited, case reports such as Volokitin et al suggest Osteopathic Manipulative Treatment (OMT) may provide symptomatic benefit. This case describes an 87-year-old female who presented with left-sided head pain due to PHN diagnosed in 2023 following an episode of shingles. Although the rash resolved with valacyclovir, the patient developed a constant cranial squeezing sensation with intermittent shock-like pain worsened by stress and touch. Trials of gabapentin, escitalopram, and oxycodone caused significant cognitive dysfunction, including balance impairment and hallucinations, leading to discontinuation. Osteopathic exam revealed a left-sided dural strain with cranial, cervical, thoracic, and sacral restrictions. OMT using balanced membranous tension, facilitated positional release, and sutural/myofascial release was performed, but limited by hypersensitivity. Two weeks after one OMT session, cranial tension improved from 7/10 to 3/10 with decreased oxycodone use and fewer shock-like episodes. These findings suggest OMT may serve as an adjunctive therapy in the management of PHN.

Polygenic Risk Scores for Psychiatric Disorders in the All of Us Research Program

Student Presenters: Melissa Oz

Faculty Mentor: William Letsou

School/College: Arts & Sciences

Psychiatric disorders such as bipolar disorder (BPD) is a complex condition influenced by both genetic predisposition and behavioral factors, including sleep patterns. Wearable technology provides an opportunity to investigate these relationships in a more integrated manner. Using data from the All of Us Research Program, we examine associations between genetic risk and sleep-derived behavioral metrics in individuals with psychiatric conditions.

Genetic data were processed using variant call format (VCF) files within the Hail framework, enabling the polygenic risk scores (PRS) based on variant-specific effect sizes and allele counts. Special attention was given to data integrity, including validation of allele orientation and alignment between annotation and VCF formats. Additionally, sleep data from Fitbit devices were analyzed to compute individual level metrics.

Cohorts were defined with a focus on bipolar disorder and premenstrual dysphoric disorder (PMDD), alongside a control population restricted to individuals aged 18–35 with available wearable data. Preliminary statistical modeling, including regression-based approaches, were initiated to evaluate whether individuals with psychiatric conditions exhibit distinct sleep patterns and elevated genetic risk compared to controls.

Approaches such as frequency analysis (Fourier transform) are being considered to investigate potential cyclic patterns in behavioral data, relevant for disorders characterized by periodic symptoms

Post-Covid trends in the Utilization of Telepsychiatry Services by Medical Students and Graduates

Student Presenters: Sophie Criss, Nikhil Bhutani, Nicole Basilan

Faculty Mentor: Liat Jarkon

School/College: Osteopathic Medicine

Context:

Medical students face a significantly elevated risk of mental health issues compared to the general population, yet frequently encounter barriers to accessing appropriate care. The COVID-19 pandemic accelerated the adoption of telepsychiatry as a means of expanding mental health service accessibility. A prior study conducted by NYITCOM's Center for Behavioral Health (CBH) in 2020 demonstrated a marked rise in telepsychiatry utilization among medical students during 2019–2020, coinciding with the onset of the pandemic. While this shift improved access at the time, it remained unclear how student engagement with telepsychiatric services evolved in the post-pandemic period.

Objective:

To investigate longitudinal trends in medical student utilization of telepsychiatric services across the pre-pandemic, pandemic, and post-pandemic periods, and to assess whether pandemic driven changes in mental health service engagement persisted over time. We hypothesized that while utilization would remain elevated compared to pre-pandemic levels, the magnitude of increase would be less pronounced than the peak observed during the height of the COVID-19 pandemic.

Methods:

A retrospective observational study was conducted using electronic medical record data from NYITCOM's Center for Behavioral Health (Old Westbury, NY) from 2019 to 2025. Telepsychiatry encounters were aggregated monthly and categorized by matriculation year (first through fourth year medical students and graduates).

Preparation of Human Achilles Tendon Sections Using Cryotome and Cryotape for Histological Analysis

Student Presenters: Safwan Hassan, Anusha Imran

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

The human Achilles tendon is made up of dense connective tissue, composed of highly aligned type I collagen fibers. Histological analysis of this tissue is crucial in understanding the biology, injury, and repair process of tendons. However, traditional histological techniques such as paraffin embedding and microtome sectioning has led to poor results in the analysis of fibrous tissues. Tissue sections prepared using these techniques have shown disrupted native structures and fragment easily. Thus, the aim of this study is to use a viable technique for preparing thin sections of human cadaver Achilles tendon tissue for histological staining. Achilles tendon samples were placed in optimal cutting temperature (OCT) compound and sectioned using a cryomicrotome. A cryotape assisted approach was used during sectioning to maintain tissue integrity. The sections were then placed on chitosan-coated slides and subjected to ultraviolet light for separation from the slide. The sections were found to be intact, measuring 15 microns thick. This optimized technique has shown improvement in tissue sections compared to traditional techniques. With this histological approach, the reliability of analysis in dense connective tissues can be enhanced and can help support future research in tendon pathology and regenerative medicine.

Pushing the Envelope

Student Presenters: Deborah Seyilnen Parradang

Faculty Mentor: Clarke Snell, Farzana Gandhi

School/College: Architecture & Design

The project rethinks toxic construction and material assembly systems with a goal to reconcile environment, materials and man through circular and agro-based assembly prototypes and community building within an urban context like New York.

During my research I became aware of the harmful cycle the materials we design and build with cause. Leading to health challenges and also affecting vulnerable communities at large. So I believe advocating for and deciding with healthier materials can help undo the tangible and intangible harm conventional materials are causing.

I am working with a select group of materials including rammed earth, straw,mass timber hemplime and bamboo.

As a strategy to make construction cheaper and easier I created replicable modules using this material selection . This notion allows for different design solutions within a dynamic scene like NYC.These modules are further refined, evaluated and tested for efficiency using NYIT climate testing kits . The results manifest as a system used in design valuable community and residential test projects to further reconcile material production use with society .

Quality Improvement Proposal: A Multi-Modal Approach to Fall Prevention in the Elderly

Student Presenters: Jo Kaur, Valeria Costa, Samantha Fernandez

Faculty Mentor: Jessica Varghese

School/College: Health Professions

Falls represent a critical safety gap in geriatric care, as approximately one-third of adults over 65 fall annually, often resulting in severe complications like hip fractures (Headley & Keller, 2013; Tay & Xie, 2023). This quality improvement project aims to reduce fall incidence by 20% and related fractures by 15% within six months. Moving beyond "one-size-fits-all" exercise, our evidence-based proposal integrates the "FallProof!" physical protocol (strength, flexibility, and balance) with technological safety nets, including bed/chair exit alarms and motion sensors. Additionally, the intervention incorporates 12 weeks of Virtual Reality (VR) exergaming and cognitive-motor dual-task training to address the neurological deficits that cause instability in complex, real-world environments. Utilizing a Plan-Do-Study-Act (PDSA) framework, progress will be tracked via EMR fall reports, alarm logs, and the Berg Balance Scale weekly. We anticipate that this multi-layered approach will significantly decrease serious injuries and improve patient independence. These findings will provide a scalable model for rehabilitative nursing and long-term care settings to enhance geriatric safety through the intersection of physical, technological, and cognitive care.

Quantitative Micro-CT Analysis of Apical Lung Airspace in Smokers and Nonsmokers

Student Presenters: Tomotaka Mizuno, Helen Lee, Brian Begelman

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Cigarette smoking causes emphysematous changes in the lung, which are predominantly seen in the apex. Conventional clinical CT lacks the resolution to directly assess alveolar microstructure, and prior micro-CT studies have focused on whole lung analysis rather than region specific quantification. This study aims to quantify airspace in the lung apex of smokers and nonsmokers using micro-CT and to evaluate how these measurements correlate with clinical CT parameters. Ten millimeter punch core tissue samples were harvested from cadaveric lung apex specimens and stained with a 2.5% concentration Lugol's iodine solution to enhance soft tissue radiopacity prior to microCT imaging. Specimens were stained for a minimum of two weeks to allow adequate iodine diffusion. Total airspace was quantified using Dragonfly, a software platform for 3D segmentation and analysis of micro-CT images, and compared between groups. Preliminary analysis of total airspace fraction demonstrated higher values in smokers compared to nonsmokers. Two nonsmoker samples showed airspace percentages of 35.56% and 51.57%, whereas two smoker samples demonstrated values of 51.33% and 69.98%. These early findings may suggest a trend toward increased airspace fraction in smokers. However, interpretation is limited by small sample size. Additional data collection and analysis are ongoing to assess statistical significance and validate these findings.

Reducing Drug Diversion Among Nurses Through Education and Monitoring

Student Presenters: Sascha Pacheco, Arielle Weiser, Beatrice Paul, Lauren Becker

Faculty Mentor: Jessica Varghese

School/College: Health Professions

Drug diversion among nurses happens when medications—usually controlled drugs—are taken for personal use or given away without permission. This is a serious issue because patients may not get the pain relief or treatment they need. It also breaks trust and can put patient safety at risk. Hospitals try to prevent this by monitoring medication use, checking records, and educating staff, but it's still an ongoing challenge.

Regional Condylar Component Influences Femoral Prosthetic Wear in Total Knee Arthroplasty

Student Presenters: Janie Huang, Anusha Imran

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Total knee arthroplasty restores joint function through articulation between a metallic femoral part and a polyethylene tibial insert. Surface topography enables quantitative assessment of three-dimensional surface changes corresponding to wear. This study aims to evaluate regional differences in the metallic femoral aspect by comparing surface texture at the apex and edge regions.

Seven cadaveric femurs were analyzed using a Sensofar Neox 3D optical profilometer and surface scans were collected across each condyle. Surface texture characteristics including root mean squared height (Sq), maximum peak height (Sp), maximum pit depth (Sv), auto-correlation length (Sal), and Sdq (root mean square gradient), were recorded and compared using independent two-sided t-tests.

Significant differences ($p<0.05$) were observed in the apex and edge regions. The apex showed higher roughness and surface damage with greater Sq (apex: 0.73 ±0.26 µm; edge: 0.15 ±9.5e-3 µm; $p=0.036$), Sp (apex: 13.92 ±2.53 µm; edge: 5.73 ±1.51 µm; $p=0.007$), and Sv (apex: 12.11 ±1.98 µm; edge: 4.89 ±0.25 µm; $p<0.001$), revealing greater wear. Edge regions displayed smoother textures with higher Sal (apex: 88.94 ±1.88 µm; edge: 96.80 ±1.51 µm; $p=0.001$) and lower Sdq (apex: 0.82 ±0.33; edge: 5.6e-2 ±1.2e-2; $p=0.027$).

These findings illustrate differences in load bearing contact mechanics and characterizing them can help improve understanding of prosthetic wear, implant design, and long-term durability.

Research Gaps in Vitamin D Deficiency Studies on South Asian Immigrants: Insights from a Scoping Review for Osteopathic Advocacy

Student Presenters: Ayesha Siddiqua

Faculty Mentor: Francesco Cerritelli

School/College: Osteopathic Medicine

Vitamin D deficiency is a modifiable risk factor for adverse musculoskeletal, bone and cardiometabolic outcomes- conditions that are frequently managed in osteopathic primary care. South Asian immigrants, a rapidly expanding group in developed countries including the US, are disproportionately affected by this deficiency. Yet, the extent of research on this population remains unclear. This scoping review maps existing research on vitamin D deficiency in South Asian immigrants in developed nations. A PubMed search (2015–2025) was conducted which combined keywords for vitamin D deficiency, South Asian ethnicity, immigrants, and developed countries. Studies were screened using pre-defined inclusion/exclusion criteria and tracked via PRISMA-ScR flow diagram. Seven records were identified of which four cross-sectional studies met the criteria (Canada n=2, UK n=2). Prevalence of vitamin D deficiency among South Asian immigrant adults ranged from 42.7% - 68.9%, compared to 4.5%– 29.1% in host/majority populations. Ethnicity and immigrant status were strong independent predictors of low serum vitamin D levels. No US-based research on South Asian adult population was identified, exposing a significant evidence gap.The high burden of vitamin D deficiency in South Asian immigrants contrasts with the scarcity of US data to inform osteopathic practice. Expanded research is urgently needed to develop culturally responsive screening, prevention, and management strategies in primary care.

Reveal the Role of Heparan Sulfate in Traumatic Brain Injury via Single-Cell Spatial Omics

Student Presenters: Brianna Han

Faculty Mentor: Jerry Zhao

School/College: Osteopathic Medicine

Traumatic brain injury (TBI) is a severe brain injury that leaves permanent damages to the brain and causes long-term physical and mental effects. Recovery from TBI is not ideal for most patients and treatments are limited, mainly due to our poor understanding of the molecular mechanisms underlying TBI. Heparan sulfate (HS) is an abundant brain glycosaminoglycan and a key extracellular matrix component that is highly associated with TBI. Clinical studies also suggest HS has therapeutic potential for TBI. Astrocytes and microglia are central to TBI response and scar formation. Astrocytes, the most abundant glial cells and major producers of extracellular matrix HS, while microglia are the resident immune cells in the brain and are the first responders to TBI. The overall objective of this project is to reveal the role and mechanisms of astrocytes and microglia HS in TBI. However, current approaches are limited by the lack of single-cell resolution. To address this, we used CosMx spatial omics to analyze spatial transcriptome and proteomic changes at single-cell resolution. We disrupted HS in astrocytes and microglia separately in mice, induced TBI via stab wound injury, and will analyze brain tissue 2-4 weeks post-injury to assess transcriptome, proteome, and scar formation. Together, this study will reveal the role and molecular mechanisms of astrocyte and microglia HS in TBI, which may identify new therapeutic targets for TBI.

Role of C elegans odr-10 and shn-1 in Decision-Making Between Equally Attractive Stimuli

Student Presenters: Justin Tin

Faculty Mentor: Navin Pokala

School/College: Arts & Sciences

Understanding the biological mechanisms that guide decision-making will offer insights into the basis of behavioral choice and psychiatric conditions that affect sensory processing. Using the Caenorhabditis elegans worm as a model system, This study investigates how specific molecular and synaptic components influence decision-making between conflicting sensory inputs. We have identified the isofragrant point, odor concentrations at which C elegans shows no overall preference between equally attractive isoamyl alcohol (IAA) and diacetyl (DA) odors.

We focused on two mutant strains in C. elegans: odr-10, the G-protein coupled receptor specifically required for diacetyl detection, and shn-1, the C. elegans ortholog of the human SHANK family. The human SHANK genes encode critical synaptic scaffolding proteins. Mutations in these proteins are high-confidence risk factors for Autism Spectrum Disorder (ASD), a condition characterized by compromised social communication and sensory processing.

By subjecting these mutants to a chemotaxis choice assay at the isofragrant point, we assess whether impairments in sensory input and synaptic scaffolding bias decision-making to make a behavioral choice when options are equally matched. This research bridges the gap between molecular genetics and the understanding of how synaptic dysfunction, common in disorders like ASD, can lead to altered decision-making.

SEPTAL (A Nasal Wearable; independent KEEN EM Design Competition project)

Student Presenters: Aiesha Ayaana Hamid

Faculty Mentor:

School/College: Engineering & Computing Sciences

My idea is to develop a wearable micro sensor for the nostril that can detect humidity levels in your nasal passage to warn against low humidity levels to the user via a mobile app, who may access notifications. It will be a small medical device shaped as botanical petal filaments that can be word inside the nasal cavity, particularly at the septum. Hence the name, SEPTAL (septum + petal). Additionally, the device can have multifunctional uses in respiratory support, sleep apnea, and nasal airway purification etc. I want to show my research progress via literature review in development of SEPTAL and prototypes that I am working on 3D-printing accompanied by a poster.

Sex-Specific Differences in Human Milk Composition and Infant Growth

Student Presenters: Nina Cui

Faculty Mentor: Noura El Habbal

School/College: Osteopathic Medicine

Human breast milk composition may vary by infant sex, yet evidence remains limited. Our study examined sex-specific differences in milk macronutrients and their relationship with infant growth in mother–infant dyads enrolled in the Infant Metabolism and Gestational Endocrinopathy (IMAGE) study. Mother-infant dyads were enrolled while admitted for birth at two participating hospitals in Ann Arbor, Michigan, USA. Milk samples collected at two weeks and two months postpartum were analyzed for protein, fat, carbohydrate(CHO), and energy content. Infant anthropometric measures were obtained from electronic medical records during the scheduled physician visits at two weeks and two months postpartum.

At two weeks, milk produced for male infants had higher protein content compared to females(1.3vs1.2g), approaching significance ($p=0.083$). Male infants were significantly heavier than females at two weeks($p=0.027$)and remained heavier through 24 months($p<0.05$). The feeding method was not associated with infant weight. Among exclusively breastfed dyads, milk for female infants had higher fat ($p=0.045$) and trending higher energy ($p=0.078$) at two weeks. In contrast, mixed-fed dyads showed higher fat and energy in milk for males($p=0.009$), though this is limited by small sample size.

These findings suggest early, sex-specific differences in milk composition and complex, time- and feeding-dependent relationships with infant growth.

Significantly increased trends for gastrointestinal stromal tumors (GIST) during pandemic years (2020-2022)

Student Presenters: Janie Huang, Marium Ghobriel, Shivangi Patel, Roma Pathak, Aditi Rathor

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Gastrointestinal (GI) cancer is a major public health concern in the US, with an estimated 362,000 new cases in 2025. Changes in healthcare utilization may have influenced cancer detection patterns, particularly for gastrointestinal stromal tumors (GIST). Emerging data suggests shifts in the incidence of GIST in the US from 2% to 7% from 2000 to 2019, highlighting the need for further examination of recent trends.

Primary GIST (n=1,985,422) data obtained from SEER-21, was selected by ICD-10 codes C15.0-C20.9. Age-adjusted incidence rates (ASIRs) were computed, followed by a regression analysis with Joinpoint. APC significance testing was performed between time periods ($p<0.05$).

We found significant differences in APC values between years 2000-2019 and 2020-2022 in GIST of the stomach ($p<0.01$), small intestine ($p<0.001$), large intestine ($p<0.0001$), males ($p<0.001$), females ($p<0.001$), non-Hispanic whites ($p<0.001$), non-Hispanic blacks ($p<0.01$), non-Hispanic Asian/Pacific Islanders ($p<0.01$) and Hispanics ($p<0.0001$).

The rising GIST rates may warrant the implementation of screening methods. It is often an incidental finding, and many patients are asymptomatic at the time of diagnosis. GIST has a 5-year survival rate of over 85%, but risk factors are largely unknown due to the relative recency of GIST as a diagnosis. It most commonly arises as sporadic mutations in KIT and PDGFRA, thus endoscopy with genetic testing could serve as a potential screening tool.

Socioeconomic and Racial Disparities in Rehabilitation and Long-Term Outcomes Following Spinal Cord Injury

Student Presenters: Leyla Nasr, Catherine Istafanos, Messarah Altaee

Faculty Mentor: Dharav Patel

School/College: Osteopathic Medicine

A narrative literature review across multiple academic databases including PubMed and UpToDate, that examine disparities related to socioeconomic status (SES), race/ethnicity, and social determinants of health in SCI care and outcomes was conducted. Keywords and combinations, such as “socioeconomic status,” “race,” “ethnicity,” “spinal cord injury,” and “employment” were used. Priority was given to sources that included longitudinal cohort analyses and those that evaluated employment, discharge disposition, functional recovery, and access to rehabilitation services. Disparate outcomes were compared across sociodemographic groups as reported in existing research.

SES and ethnic disparities play a significant role in shaping rehabilitation access, functional recovery, and long-term outcomes following SCI, with post-injury employment rates highlighting persistent inequities. Literature demonstrates that structural and social determinants of health influence recovery trajectories independent of injury severity. Further research is required to address access to rehabilitation services and community resources to improve community participation, independence, and quality of life for individuals living with spinal cord injury.

Socioeconomic Trends within Patient Population of Hypertriglyceridemia and Acute Pancreatitis: A 7-Year Study

Student Presenters: Alissa Winston, Dokyeong Kim, Brian Trinh

Faculty Mentor: Brian Beatty

School/College: Osteopathic Medicine

Acute pancreatitis (AP) is a leading cause of GI hospitalization in the U.S., with hypertriglyceridemia (HTG)-related cases rising alongside obesity and diabetes. Socioeconomic influences remain understudied. This study evaluates national trends (2015–2021) and the impact of socioeconomic and clinical factors on outcomes.

Adults hospitalized with AP and HTG were identified in the National Inpatient Sample using ICD-10 codes. Baseline characteristics were compared using survey-weighted chi-square tests. Adjusted odds ratios (aORs) for outcomes were calculated with weighted multivariable logistic regression.

HTG-associated AP hospitalizations increased significantly from 143,240 in 2015 ($p<0.01$). Pancreatic necrosis risk was highest at BMI 20–24.9 and decreased at higher BMI (≥40: aOR 0.28). Acute renal failure was less common in females (aOR 0.73) but higher in Black patients (aOR 1.75). Sepsis risk was elevated in Hispanic (aOR 1.49) and Asian/Pacific Islander patients (aOR 1.75), and in the South (aOR 2.06) and West (aOR 1.76). In-hospital mortality was lower in females (aOR 0.52). Prolonged LOS was most frequent at BMI 30–34.9 and ≥40.

HTG-associated AP hospitalizations are increasing, with outcomes varying by sex, race, region, and BMI, highlighting disparities and targets for intervention.

Sox2 influences identity of glia-like prognitors and tumorigenesus in choroid plexus through LIM Homeodomain transcription factors

Student Presenters: Mahek Chaudry, Asiye Susoglu

Faculty Mentor: Haotian Zhao

School/College: Arts & Sciences

Choroid plexus (CP) tumors encompass a spectrum of rare brain neoplasms ranging from benign papilloma (CPP) to aggressive carcinoma (CPC) that collectively affect the pediatric population. Poor outcomes for high-grade lesions and side effects of current treatment paradigms underscore a critical need to develop safer and more efficacious therapies guided by biological understanding of these tumors. We developed mouse models from common molecular defects found in human disease. These models exploit sustained NOTCH signaling activation in the hindbrain upper rhombic lip to generate CPP and CPC. To delineate cellular composition of CP tumors, we conducted snRNA-seq in murine CP tumors. Similar to adult CP, cells in NOTCH-driven CPP partitioned into clusters identified as epithelial, mesenchymal, endothelial, immune, neuronal, and glial cells. Though tumor cells are confined to epithelial compartment based on inferCNV analysis of snRNA-seq data, they are derived from glia-like progenitors. Tumor cells are in a distinct differentiation state characterized by a lack of epithelial maturation, and aberrant expression of markers of neural progenitor/stem-like cells including SRY-Box Transcription Factor 2 (SOX2). Consistently, SOX2 inactivation decreased tumor cell proliferation and blocked NOTCH-driven CP tumor formation.

Structural and Pathophysiological Changes in the Enteric Nervous System of 5xFAD Mouse Model of Alzheimer's Disease

Student Presenters: Syed Khidash Hussainy

Faculty Mentor: Vladimir Grubisic

School/College: Osteopathic Medicine

Alzheimer's Disease (AD) is the most common form of dementia, characterized by development of key histological markers such as amyloid beta (Aβ) plaques and tau neurofibrillary tangles, and is associated with dysfunction of the gastrointestinal (GI) system. Bowel functions are under immediate control of the enteric nervous system (ENS), an intricate network of neurons and glial embedded in the gut wall, but the role of Aβ plaques or tau tangles within the ENS are still not well understood. We hypothesized that the AD animal model would exhibit physiological and structural deficits compared to their wild-type age-matched controls. We utilized 5xFAD mice, transgenic mice expressing five distinct familial AD mutations in APP and PSEN1 genes, to specifically investigate the role of Aβ plaques. To test our hypothesis, we performed physiological assays on live animals and live intestinal tissues. Intestinal and brain tissues were collected for downstream analysis via ELISA and immunohistochemistry for Aβ protein expression and plaque formation. We found a trend for increased whole GI velocity and reduced fluid content in 5xFAD mice in comparison to their controls. A subset of intestinal tissues was prepared to stain the myenteric plexus with neuronal and glial markers, such as HuC/D and GFAP, to quantify neuronal density and reactive gliosis. Taken together, we show that 5xFAD mouse is suitable model for investigating AD-related gut dysfunctions.

Synthesis and Characterization of New Functionalized Imidazolidinetriones (IZTs) and Their Monothio Analogs as Pyruvate Carboxylase (PC) Inhibitors

Student Presenters: Luke Jacob, Hana Arafa

Faculty Mentor: Subhabrata Chaudhury

School/College: Arts & Sciences

Cancer remains a major global health burden, creating an urgent need for new metabolic targets and inhibitors. Pyruvate carboxylase (PC) is a biotin-dependent mitochondrial enzyme that catalyzes the ATP-dependent conversion of pyruvate to oxaloacetate, replenishing tricarboxylic acid (TCA) cycle intermediates through anaplerosis and thereby supporting the biosynthesis of key cellular building blocks. In MDA-MB-231 breast cancer cells, siRNA-mediated PC knockdown significantly reduces proliferation, migration, and invasion, supporting PC as a therapeutic target. Aberrant PC expression or activity has also been linked to multiple cancers, including breast, non-small cell lung, pancreatic, and colorectal cancer.

Our group previously identified a novel class of 1,3-substituted imidazolidinetriones (IZTs) that inhibit Staphylococcus aureus PC at low concentrations with selectivity toward PC. Preliminary structure-activity relationship studies showed that aryl and ethanoate substituents on the IZT scaffold improve inhibitory potency, establishing IZTs as promising leads for PC inhibition. In this study, we further expanded this scaffold by introducing additional substituents, including alkylaryl, haloalkyl, ether, and amide groups, and by replacing one carbonyl oxygen with sulfur to generate monothio IZT analogs. These compounds were synthesized, characterized, and assayed against S. aureus PC to define the SAR of this scaffold and identify features that promote PC inhibition.

Synthesis of Pyocyanin for Prophage Induction Studies

Student Presenters: Deep Patel

Faculty Mentor: Jole Fiorito

School/College: Arts & Sciences

Pyocyanin, a redox-active phenazine produced by Pseudomonas aeruginosa, generates reactive oxygen species and promotes a stress response mechanism in bacterial cells, which can trigger prophage induction and cell death. Tuberculosis, induced by the microorganism Mycobacterium tuberculosis, constitutes a worldwide health concern. The goal of this project was to assess a method for the chemical synthesis of pyocyanin and to determine whether pyocyanin-induced oxidative stress can activate prophages in Mycobacterium smegmatis, a non-pathogenic species closely related to M. tuberculosis.

Pyocyanin was synthesized in 2 steps. Compound V-8 was obtained by stirring hydroxyphenazine with acetic anhydride in pyridine at room temperature under argon for 3 hours to acetylate the phenolic hydroxyl group by nucleophilic acyl substitution. Treatment of compound V-8 with methyl triflate in dichloromethane (DCM) at 0 °C for 2 hours resulted in the N-methylation of one phenazine nitrogen atom. The reaction mixture was treated with NaOH and DCM, and the organic layer was evaporated to yield a dark bluish compound, V-9. Thin-layer chromatography, UV–visible, 1H-NMR, and LC/MS analyses of V-9 compared to commercial pyocyanin confirmed that compound V-9 was pyocyanin.

Synthetically produced pyocyanin will be tested at various concentrations to assess its antimicrobial activity against Mycobacterium smegmatis and will serve as a starting point for the design of new small-molecule antimicrobials

The Cost of Overfishing

Student Presenters: Sherley Mercedes

Faculty Mentor: Patty K. Wongpakdee

School/College: Architecture & Design

This infographic poster explores the environmental, economic, and social impacts of fishing and overfishing on a global scale. As a graphic design student, I wanted to move beyond simply presenting research data and instead translate complex information into a visually engaging and accessible narrative. Through thoughtful layout, hierarchy, and data visualization techniques, I transformed extensive research into a compelling visual story that highlights both the urgency and scale of the issue.

The DormantTrigger: Is Parkinson's a Chronic Intracellular Infection?

Student Presenters: Katie Mata

Faculty Mentor: Joerg Leheste

School/College: Osteopathic Medicine

Parkinson's Disease (PD) is the most prevalent neuro degenerative motor disease. Nearly 9 million people are living with PD worldwide with the tendency sharply increasing. That prompts the question of the origin of the disease. Only 5-10% of PD cases are linked to genetic mutations and approximately 5% to secondary causes such as environmental toxins, medications, stroke, and trauma. Most PD cases (85-90%) are idiopathic with currently unknown causes.

Our work is based on the selective finding of Cutibacterium acnes bacteria in human brain sections of PD patients. More specifically, this work indicates that C. acnes bacteria can colonize human cells of epithelial origin, which includes neurons, in vitro and in vivo. An interesting observation is once these bacteria enter cells that they can lie dormant until an unknown trigger prompts cell division, inflammation and ultimately cell death. Similar work conducted by others demonstrates a similar paradigm in epithelial cells lining the human male prostate gland. Further work demonstrates that the route of entry into the human body may be through cranial nerves (CN), particularly the olfactory nerve propagation, the sense of smell and the vagus nerve, with gastrointestinal and other functions. Interestingly, the entry point for both cranial nerves into the human brain is associated with the first cellular signs of PD. This work is particularly interesting because a bacterial cause of PD could be addressed with proper antibiotics

The Healing Campus

Student Presenters: Katrina Deicmane

Faculty Mentor: Farzana Gandhi

School/College: Architecture & Design

My thesis proposes a new architectural typology for mental health care: the healing campus. It challenges the conventional model of psychiatric hospitals as controlled, isolating institutions and instead reimagines them as open, regenerative environments that prioritize dignity, autonomy, and long-term recovery.

Located at the Brooklyn Navy Yard, a site layered with military and medical history, the project transforms a former naval hospital ground into a contemporary ecosystem for healing. The design integrates inpatient and outpatient care, research facilities, and community spaces, dissolving rigid boundaries between treatment, daily life, and social connection.

Central to the project is the idea of “degrees of care,” expressed spatially through a gradient of environments—from structured clinical spaces to independent living and therapeutic landscapes. Circulation, massing, and program organization are used to support choice, movement, and psychological comfort, rather than surveillance and control.

By combining architecture, neuroscience, and social infrastructure, the healing campus reframes mental health care as an active, participatory process. It is not just a place for treatment, but a setting for rebuilding identity, agency, and connection.

The Health and Wellness of Caregivers for Children with Developmental Disabilities

Student Presenters: Cheyenne Perry

Faculty Mentor: Kelly Lavin

School/College: Health Professions

My capstone project is to develop a health and wellness program for caregivers of children with developmental disabilities. The focus areas I chose are program development and education. The population is caregivers of children with developmental disabilities. My hope for this program is that it positively impacts the lives of caregivers, and also that it encourages or inspires them to improve their well-being. The purpose of my project is to provide a guide and space for this population to focus on their own selves. The planned approach is to begin the project observing the programs I am being exposed to at my site and then to develop the material I created for my goals. The outcomes I am working towards are: positively impacting my site/representing Occupational Therapy, developing a program with slides and audio and creating a resource toolkit that provides educational material.

The Impact of NIH Budget Cuts on NIAID-Funded Research and Biomedical Innovation

Student Presenters: Nardine Samuel, Halle Cann, Demitra Tzakas, Kayla Torres-Betancourt

Faculty Mentor: Al Pheley, Joerg Leheste

School/College: Osteopathic Medicine

The National Institutes of Health (NIH) has been at the center of American biomedical research, funding and shaping work on infectious disease, cancer, and vaccine development for decades. The proposed FY2026 budget would cut NIH funding by more than 40%, reducing it from approximately $48 billion to $27.5 billion. The NIH branch, the National Institute of Allergy and Infectious Diseases (NIAID), would lose approximately $2.4 billion compared to its FY2024 budget. This decline in funding threatens ongoing clinical trials within infectious disease research while also potentially limiting other areas of science that have benefited from HIV/AIDS research. The development of cancer therapeutics, mRNA vaccines, and prophylactic agents is due to decades of foundational research by the NIAID. Stability of the NIH budget, specifically the NIAID, is necessary to protect the United States' role as a global leader in scientific research and to reduce healthcare costs. In addition, continued engagement between the public and private sectors, as exemplified by COVID-19 vaccine development, is essential for translating foundational research into widely accessible treatments. The research conducted at NIAID is crucial for advancing foundational science, the type of research that is not a focus of universities or private industry. Sustained NIH investment is not only a matter of public health but is necessary for the United States's role in continuing the momentum in scientific innovation.

The phylodynamic profile of Influenza across USA in September 2026

Student Presenters: Lauren Donzella, Anita Lugina, Matthew Nemirov, Biol 487 Research Class

Faculty Mentor: Leonidas Salichos

School/College: Arts & Sciences

Influenza A(H3N2) remains a significant seasonal public health burden in the United States, contributing to substantial morbidity and mortality each year, underscoring the importance of early outbreak detection and analysis. In this study, students investigated the transmission dynamics and infectious rates of Influenza A across all fifty U.S. states by integrating Bayesian statistical methods with epidemiological modeling.

Using BEAST for phylodynamic analysis—implemented through BEAUti for model configuration and Tracer for validation of convergence and effective sample sizes—students applied Bayesian Skyline and birth–death models to characterize viral evolution and spread. R was further utilized to visualize and compare effective reproduction number (Re) trends across states. The analyses enabled insights into evolutionary relationships, population dynamics, geographic influences, and transmission patterns nationwide.

Bayesian Skyline plots revealed diverse viral growth patterns, including exponential, logistic, and constant trends across different states. States with fewer than 15 sequences were excluded from the analysis.

Overall, this work highlights the critical role of integrating phylogenetics, Bayesian modeling, and data visualization tools to generate early, actionable predictions about outbreak trajectory and intensity, emphasizing the value of timely surveillance in managing infectious diseases.

The risk of parasite related malnutrition and failure to thrive in pediatric patients as it relates to water source in the Dominican Republic

Student Presenters: Gabriella D. Fiakos, Layavarsha Mutte, Lauren Greenberg

Faculty Mentor: Michael Gindi, Min-Kyung Jung

School/College: Osteopathic Medicine

The aim of our study is to evaluate whether water source is a significant predictor of parasite related developmental delay in the Dominican Republic through collection of height, weight, BMI, and head circumference measurements in prepubescent children.

The River Studio- Mumbai: Edge to Edge

Student Presenters: Manasi Bhise

Faculty Mentor: Jeannette Sordi

School/College: Architecture & Design

This thesis investigates how architecture can engage with informal economies that already sustain urban life under extreme environmental stress. Located along the Mithi River in Dharavi, Mumbai, the project focuses on one of the most productive yet vulnerable urban conditions, where industries such as recycling, leather work, food production, and pottery operate within dense, hybrid living and working spaces. Dharavi houses over 700,000 people within 2.1 square kilometers, and its river edge is increasingly exposed to flooding of up to 3 to 5 feet during monsoon events, alongside intensifying heat conditions that may exceed 250 days of extreme heat and humidity annually by 2100.

Through mapping, prototyping, and scenario building, this research examines how architecture can support systems that are already resilient but constantly under pressure. It introduces an adaptive infrastructural approach through elevated, modular piers that respond to fluctuating water levels while maintaining continuity of work and daily life. The system allows spaces to shift with seasonal conditions, accommodating both production and habitation without interruption.

By integrating passive cooling, water-based mobility, and flexible construction, the project strengthens resilience without displacement. It reframes architecture not as a fixed solution, but as a responsive system that evolves with environmental change and supports the economies it serves.

The Role of Food Insecurity on Cardiovascular Disease Risk in Aging Populations

Student Presenters: Shreya R Nagarajan, Amisha Tewari

Faculty Mentor: Bernadette Riley

School/College: Osteopathic Medicine

Cardiovascular disease (CVD) affects approximately 75–78% of adults over age 60 in the United States and remains a leading cause of morbidity and mortality. Food insecurity, defined as limited access to affordable, nutritious food, has been increasingly linked to chronic, diet-related diseases, including CVD. However, its role in shaping cardiovascular risk, disease progression, and management in aging populations remains underexplored. This study aims to examine the effects of food insecurity on CVD risk and management, the relationship between aging and CVD prevalence, and the intersection of food insecurity, CVD, and aging populations. A qualitative review of PubMed-indexed literature was conducted using predefined inclusion and exclusion criteria. Across the literature, food insecurity was consistently associated with increased CVD risk, including higher rates of hypertension, diabetes, and poor disease management. Key mechanisms included nutritional deficiencies, medication nonadherence, and limited access to heart-healthy foods. Older adults experiencing food insecurity faced compounding structural barriers, such as fixed incomes and reduced access to care. Food insecurity should be recognized as a modifiable cardiovascular risk factor, especially with aging populations. Integrating food insecurity screening into routine clinical care and strengthening policy-driven interventions may improve outcomes and reduce health disparities in aging adults with CVD.

The Role of Social Burnout in Shaping Classroom Engagement and Learning Outcomes

Student Presenters: Jaelynn Wesley, Kayden Candelario, Kenzy Abdelatif

Faculty Mentor: Robert G. Alexander

School/College: Arts & Sciences

Social burnout, which involves feeling drained from ongoing social interaction, was common among college students but had not been studied in depth. This study examined how social burnout changed across a semester and how it related to course comprehension and classroom engagement. Students completed repeated surveys based on the Social Burnout Scale. The findings helped identify factors that contributed to burnout and how these experiences influenced students academically.

The Yankee Stadium (1923-2009)

Student Presenters: Parker Flanagan

Faculty Mentor: Jonathan Goldman

School/College: Arts & Sciences

I will be presenting my research on the original Yankee Stadium built in 1923, as well as a website I created for it. This will be a 5-minute presentation as a part of Professor Goldman's NYC history roundtable.

Theia

Student Presenters: Christopher D'Antonio, Sharodiya Dutta, Karen Caldera Quesada, Yash Shetty

Faculty Mentor: Kevin Park

School/College: Architecture & Design

THEIA — Know when you stop thinking!

From Passive AI Use to Conscious Thinking

We've all been there. You open an AI tool to help with an essay or a coding problem, and before you know it, you've accepted five suggestions in a row without really reading them. The work gets done — but did you actually think?

That's the problem THEIA is trying to solve.

THEIA runs quietly in the background while you work. It watches for the small signs that you've mentally checked out — fast acceptance, copy-pasting without editing, low engagement with what the AI is giving you. When it notices that pattern building up, it doesn't yell at you or lock your screen. It just gently nudges: "Pause. Try explaining this idea in your own words first."

That one small interruption is the whole point. It creates a moment of reflection before you keep going — just enough friction to bring you back into the loop.

The idea isn't to make AI feel like the enemy or guilt you into using it less. It's about staying present while you use it. Writing your first draft before asking AI to refine it. Actually reading the suggestion before hitting accept. Small shifts that add up to something real — stronger understanding, healthier habits, and work that genuinely feels like yours.

THEIA doesn't fight AI. It just makes sure you don't disappear while using it.

Too Many Patients, Too Little Support: Burnout Among New Nurses in New York

Student Presenters: Christina Gargano, Hannah Alcotas, Lianna Mazzocchi

Faculty Mentor: Jessica Varghese

School/College: Health Professions

Burnout among new nurses is a growing problem, especially in New York where nurse-to-patient staffing ratios are not mandated. High patient loads are associated with increased burnout, turnover, and poor patient outcomes.

The aim of this project is to replicate nurse-to-patient staffing ratios and burnout among new nurses in California to New York hospitals.

The proposed intervention involves implementing mandated nurse-to-patient staffing ratios in New York hospitals, like those in California, along with structured transition to practice programs for new nurses.

Primary outcomes include changes in burnout and turnover rates among new nurses following implementation of mandated staffing ratios, with secondary measures including patient safety and quality of care. Data including staffing ratios and sentinel events, will be collected on a quarterly basis.

We anticipate that this intervention will result in reduced burnout and turnover among new graduate nurses, as well as improved patient safety and quality of care.

Implementing mandated staffing ratios like those in California, along with improved support for new graduate nurses, can reduce burnout, improve retention, and lead to better patient outcomes. These findings support the need for policy changes in New York hospitals.

UNC, why'd you SET your mind on this?

Student Presenters: Annemary Ummacheril

Faculty Mentor: Navin Pokala

School/College: Health Professions

People suffering from neuropsychiatric conditions often have difficulty making appropriate behavioral decisions. We are using C elegans worms to better understand how decisions are made and altered by genetic factors. The focus of our project is understanding how worms choose between two equally attractive stimuli. Using worms that are mutated in the unc-31 and set-2/SETD1A genes, we can see how these genes affect decision-making, and try to extrapolate information to apply to associated neurological afflictions. Mutations in the set-2/SETD1A gene are a major risk factor for schizophrenia. This gene encodes Histone Methyltransferases which are associated with gene regulation. The unc-31 gene encodes CAPS (Calcium-dependent Activator Proteins for Secretion) protein that affects exocytosis of vesicles that release neuropeptides and peptide hormones that can affect how an organism perceives and responds to stimuli.

Understanding the Roles of Biogenic Amine Release and Synapse Formation Receptors in Decision-making

Student Presenters: Manogna Rachapudi

Faculty Mentor: Navin Polka

School/College: Arts & Sciences

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by social communication deficits and repetitive behaviors, underpinned by a complex genetic architecture. Genetic studies have identified mutations in several genes regulating synaptic formation and transcription as risk factors. Central to ASD is the disruption of synaptic integrity and neuromodulation. Biogenic amines, such as dopamine and serotonin, are critical regulators of neural circuit excitability and the internal valuation of sensory stimuli. Deficiencies in these amines are linked to the maladaptive decision-making and social withdrawal observed in ASD, as they modulate the "gain" of synaptic signals required for flexible behavior. This study investigates the interplay between these neuromodulators and structural synaptic components. Using C. elegans as a model system, we examine mutations in cat-1 (regulating biogenic amine release) and nrx-1 (ortholog of the high-risk ASD gene NRXN1). By establishing a control "isofragrant point"—where organisms exhibit neutral preference between two odorants—we can quantify how defects in amine release and synapse-forming receptors shift the decision-making landscape. This research links the molecular pathology of synaptic release and receptor mutations to observable deficits in behavioral choice, offering insights into how human risk variants disrupt the neural computations necessary for navigating social and environmental stimuli.

Universal Approximation Theorem for Quantum Machine Learning

Student Presenters: Jonah Villafan

Faculty Mentor: John Zweck

School/College: Arts & Sciences

Machine learning with an artificial neural network can be used to learn a function that models the relationship between an input and an output dataset. Quantum Machine Learning is a new paradigm in which machine learning is performed on a quantum computer. A quantum computer performs operations on qubits by leveraging entanglement between quantum states. Unlike with large language models, the architecture of a quantum neural network must be as simple as possible to avoid noise-induced errors in the quantum computation. The Universal Approximation Theorem enables us to find a simple architecture in which to represent a given function that models the data. We use Fourier series, matrix calculations, and tensor algebra to discover more practical architectures than have previously been found.

Values-Based Clinical Communication Training in Medical Education: An Analysis of Patient and Health System Outcomes

Student Presenters: Riya Subbaiah

Faculty Mentor: Erin Cline, Thomas Chan

School/College: Osteopathic Medicine

This project examines the feasibility and potential impact of incorporating a longitudinal curriculum on spiritual responsiveness, disability informed communication, and end-of-life discussions into preclinical medical education. The primary hypothesis is that formal training in values-based clinical communication will improve physician preparedness for goals-of-care conversations, support more patient-centered decision-making, and decrease the use of high-intensity medical interventions.

The proposed curriculum model includes four major components: structured communication training focused on cognitive and emotional dialogue frameworks, foundational instruction on diverse belief systems and disability informed perspectives on health and quality of life, education on culturally informed end-of-life practices, and clinical integration that emphasizes systems-level advocacy and patient-centered care planning.

Economic modeling and data from prior educational programs were used to estimate implementation costs and potential downstream healthcare system effects. Findings suggest that structured communication and palliative care training are associated with higher patient satisfaction, greater use of supportive care services, and reduced utilization of non-beneficial intensive interventions. Estimated implementation costs appear modest relative to potential improvements in healthcare value, clinician well-being, and patient trust.

VUV Photoionization of Organic Systems: Insights into C–Br Bonds and 2,3-Dimethylfuran Reactivity

Student Presenters: Yilan Lori Chen

Faculty Mentor: Giovanni Meloni

School/College: Arts & Sciences

This work combines synchrotron VUV photoionization mass spectrometry with electronic structure calculations to investigate two systems. First, absolute photoionization cross sections and ionization energies of brominated compounds are measured to quantify C–Br bond ionization behavior and fragmentation pathways. Second, the oxidation chemistry of 2,3-dimethylfuran (2,3-DMF), a biofuel-relevant molecule, is explored to identify reaction intermediates and mechanisms. Together, these studies provide fundamental insight into bond-specific ionization and reaction dynamics of atmospherically and technologically relevant organic molecules.

When Demand Outpaces Supply: Impact of Semaglutide Shortages on Diabetes Care Access

Student Presenters: Kevin Hom, Michelle Zhang, Shin Yu Chen, Caleb Sooknanan

Faculty Mentor: Joerg Leheste

School/College: Osteopathic Medicine

Glucagon-like-peptide-1 (GLP-1) receptor agonists such as semaglutide are primarily indicated for glycemic control in type 2 diabetes; however, their demonstrated efficacy in weight management has driven a rapid increase in demand, contributing to a national shortage from March 2022 to February 2025. The shortage disproportionately impacted patients with diabetes and led to increased reliance on compounded formulations, raising concerns regarding access and safety. This health policy analysis synthesizes findings from peer-reviewed literature and federal policy reports published between December 2023 and February 2026. It examines how federal regulation, pharmaceutical marketing, and insurance policies have contributed to GLP-1 shortages and their effects on prescribing trends and access to care. Increases in direct-to-consumer (DTC) advertising, Medicare and Medicaid expenditures, and off-label prescribing were found to collectively contribute to the shortage. Current policies inadequately address demand-driven shortages, resulting in a misalignment between regulatory frameworks, prescribing trends, and patient access. At the same time, enforcement mechanisms governing DTC advertising, compounding practices, supply chain transparency, and prior authorization policies remain limited. Coordinated efforts between policymakers, manufacturers, and healthcare providers are necessary to ensure equitable access for patients who rely on GLP-1 agonists for disease management.

Why People Use Dating Apps

Student Presenters: Sharodiya Dutta, Karen Calderon

Faculty Mentor: Swati Panda

School/College: Architecture & Design

This research explores why people use dating apps, what keeps them coming back, and what ultimately frustrates them. Through interviews and survey data, it became clear that dating apps are not just tools to find partners, but emotional systems shaped by curiosity, hope, and repeated disappointment.

Most users initially join because it's hard to meet people organically—especially after moving to a new city or when social circles shrink. The apps feel like an easy, low-pressure way to put yourself out there. But over time, that ease comes with an emotional cost. People continue using them because there's always a sense of "maybe this time it'll work," even after multiple unsatisfying experiences.

The biggest breakdown happens during conversations. Users repeatedly experience low-effort replies, ghosting, and interactions that simply don't go anywhere. This leads to frustration, self-doubt, and eventually emotional fatigue. What starts as excitement slowly turns into a more guarded, selective, and sometimes disengaged approach to dating.

Another key insight is that people don't always use dating apps with intention—they often open them when they're bored, alone, or just looking for distraction. This shifts the experience from something meaningful to something more passive and repetitive.

Overall, while dating apps are great at creating matches, they fail at sustaining meaningful conversations, which is where users begin to feel drained and disconnected.