2014 tjSTAR SYMPOSIUM

THOMAS JEFFERSON HIGH SCHOOL FOR SCIENCE AND TECHNOLOGY

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Symposium to
Advance Research

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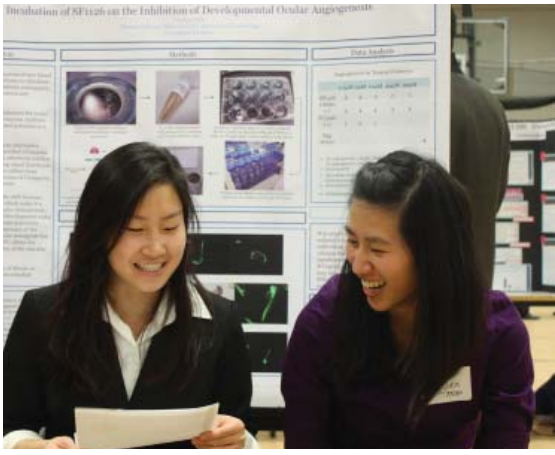

introducing tjstar

Welcome to the sixth annual Symposium to Advance Research for Thomas Jefferson High School for Science and Technology (tjSTAR). This is a great opportunity to view hundreds of creative and innovative science and technology projects designed by our students as part of their coursework throughout the school year. During this special school day, we celebrate our students' research spanning from freshmen IBET (Integrated Biology English and Technology), sophomore CHUM (Chemistry and Humanities), to our senior science and technology research labs and mentorships. Older students can learn about their peers' work, and younger students can witness the many possibilities they can pursue while they are at TJ.

In addition to the research presentations, students can attend interactive sessions, listen to expert speakers on panels, participate in design competitions, learn about One Question projects, and explore innovative technologies through demonstration sessions. Students have opportunities to meet professionals who are connecting research to real world problems.

In addition to our own stars, this day would not be possible without the leadership and support from our community partners. They have contributed exponentially to this program, not only through monetary donations and research equipment for our labs, but through their time and scientific expertise as well.

Use this day as an opportunity to not only learn about what can be done at TJ, but what you can do, both individually and collaboratively, to contribute to a field of research in the future. Have a remarkable day!

dr. evan glazer

"I grew up wanting to be Captain Nemo from 20,000 Leagues Under the Sea."

Best known for his 1985 discovery of the TITANIC, Dr. Robert Ballard has succeeded in tracking down numerous other significant shipwrecks, including the German battleship BISMARCK, the lost fleet of Guadalcanal, the U.S. aircraft carrier YORKTOWN (sunk in the World War II Battle of Midway), and John F. Kennedy's boat, PT-109.

While those discoveries have captured the imagination of the public, Dr. Ballard believes his most important discoveries were of hydrothermal vents and "black smokers" in the Galapagos Rift and East Pacific Rise in 1977 and 1979 along with their exotic life forms living off the energy of the Earth through a process now called chemosynthesis.

keynote speaker

dr. robert ballard

president, ocean exploration center and ocean exploration trust

In addition to being a National Geographic Society Explorer-In-Residence and a commissioner on the U.S. Commission on Ocean Policy, Dr. Ballard is the president of the Ocean Exploration Center (OEC) at Mystic Aquarium in Mystic, CT.

Ballard was born June 30, 1942, in Wichita, KS but moved to California at a very young age and grew up exploring the shore in San Diego. Dr. Ballard has a Ph.D. in marine geology and geophysics from the University of Rhode Island. He spent 30 years at Woods Hole Oceanographic Institution, where he helped develop telecommunications technology to create "tele-presence" for his JASON Project, which allows hundreds of thousands of schoolchildren to accompany him from afar on undersea explorations around the globe each year.

His discoveries also include sunken remains of ships along ancient trade routes in the Mediterranean Sea; two ancient Phoenician ships off Israel, the oldest shipwrecks ever found in deep water; and four 1,500-year-old wooden ships, one almost perfectly preserved in the Black Sea. Dr. Ballard's Black Sea project seeks evidence of a great flood that may have struck the region thousands of years ago.

An explorer, discoverer and historian, Dr. Ballard's fascinating journeys can teach us a great deal about our past, and they have encouraged others to take tremendous strides in the survey of the undiscovered mysteries of the deep sea.

one question

what if we all asked the same question?
what if we all answered it together?
how could one question change our life at tj?
how could our answers affect the world beyond our building?

How can we maintain a passion for learning in a school system where a pronounced emphasis on achieving good grades has a tendency to reduce genuine interest in gaining a deeper understanding of subject material?

The question, submitted by Emily Rogers (Class of 2015), was discussed during a school-wide conversation and explored in lectures by guest speakers. The entire school took part—whether through reading and analyzing TJ's One Book, "Drive" by Daniel H. Pink, participating in "Flow Day" or the fifth annual Service Week. Some enrolled in a semester course, where they involved themselves in community projects and class discussions on ethics and morality. Others took advantage of the One Question Grant to pursue projects that would benefit the TJ community.

As students realized this year, anyone can help answer a question.

Jane Street

NORTHROP GRUMMAN

Grant Thornton

The generosity of our sponsor partners and their strong demonstration of support for tjSTAR is much more than a simple agreement to fund our event. It is an affirmation of the great expectations of businesses, civic leaders, and individuals that TJHSST will deliver on its promise of advancing educational excellence and producing future leaders of our community and nation. We are deeply grateful for the responsiveness of our partners in supporting the May 28th research symposium, and for their confidence in our school, its leadership and faculty, and our terrific students.

THANKS TO our sponsors

tjSTAR is a day to celebrate the research carried out by TJ students throughout the year, as well as an opportunity for them to interact with professionals in the world of science and technology. We are grateful to the students, staff, business partners, alumni and friends of TJ, who have come from near and far to discuss together scientific solutions to today's problems. We especially commend the directors of the Senior Tech Labs, teachers of the Freshman IBET program (Integrated Biology English & Technology), research mentors and all teachers for the wonderful job that they have done with our students. Other staff and community members have generously given their time to offer workshops and demonstrations, invite speakers and panelists, and lend a hand in the countless tasks that make tjSTAR possible.

acknowledgements

In addition to the assistance indicated above, the contributions of the following individuals, teams and organizations warrant additional thanks for their support:

Dr. Glazer and the TJHSST Administrative Team

Dr. Mary McDowell, tjSTAR Administrative Sponsor

Mr. Koji Otani, tjSTAR Committee Advisor

The Administrative JLC tjSTAR Team

The student members of the tjSTAR Planning Committee, with best wishes to our graduating members, Elizabeth Chang, Catherine Shi, Thomas Wang and Wendy Wu

Mr. Bruce Butler, Renovation Liaison, HL2

Mr. Andrew Hamilton, Registration Website Developer and Technical Advisor

The Thomas Jefferson Partnership Fund

Ms. Erinn Harris, TJHSST Yearbook Advisor and the yearbook staff photographers

TJHSST Technical Team

The Immanuel Christian School and Mr. Dale W. Pinkley, Jr., Assistant Administrator, for help with overflow parking

overview

activities and descriptions

IBET PRESENTATIONS
Freshmen present year-long research projects that address various aspects of biology and incorporate a student-designed technology component.

SENIOR RESEARCH AND MENTORSHIP PRESENTATIONS
Seniors present year-long projects that correlate with one of thirteen Tech Labs or the Mentorship Program.

PROFESSIONAL SPEAKERS
STEM professionals share their knowledge through interactive presentations and discussions.

PANELS
STEM professionals share perspectives on current STEM issues, while student panels discuss the Intel and Siemens competition process, additional exciting student research projects and One Question involvement.

DEMONSTRATIONS AND DISPLAYS
An exciting opportunity for students and faculty members to explore and experience cutting-edge technology at individual booths in our Exhibit Hall (aka, Main Gym).

DESIGN CHALLENGES
Students compete in groups to show the best creative and problem-solving skills.

schedule

8:30-9:20
Block A

9:30-10:15
Block B

10:25-11:10
Block C

11:20-12:05
Block D

12:05-12:50
LUNCH

12:50-1:35
Block E

1:45-2:30
Block F

2:40-3:45
Block G - KEYNOTE

CONCURRENT SESSIONS

DEMONSTRATIONS (Main Gym, running all blocks)

CHUM Presentations

Grant Thornton

Office of Naval Research:
The International Submarine Races is an international engineering competition where the competitors design, build and compete in human powered subs.

Endeavorist, LLC:
Learn about the world's first curiosity network, Endeavorist.org, and how it makes doing all kinds of science easier than ever before!

MicroStrategy:
Bluetooth, a QR code, and a Smartphone Walk Into the SATs...
MicroStrategy is revolutionizing how you authenticate your identity. Through cutting edge mobile technologies like Bluetooth, NFC, and beacons, you can walk through doors, access secure sites, and find your friends using only your smartphone. Our solution keeps your identity secure while enabling more convenience in your critical, everyday activities. Come by our table to see our demo. There, you can scan the QR Code on the vending machine screen or use your smartphone's Bluetooth or NFC to score some free snacks.

Honeywell:
Air Traffic Management (ATM) Modernization: check out the latest in Air Traffic Control technology, a survey of ATM technologies currently in development, and a glimpse into the future of ATM.

Honeywell:
Engineering Wearable Body Armor. See a demonstration on the key considerations that are used in the development of body armor.

Kashmir World Foundation:
Ultimate mission, using unmanned aircraft to assist with counter poaching and illicit wildlife trafficking. Emphasis on aircraft design & ability.

Our Task:
Opportunities to help teach Global Thinking 101, develop the Youth Plan B for Earth, and contribute to a youth-led study of the future of Earth.

NASA Goddard Space Flight Center:
Please visit the NASA exhibit and learn about spinoffs—technologies originally developed for use in space and commercialized for use on earth. The exhibit will also feature a thermographic (infrared) camera demonstration.

Japan Science and Technology Agency (JST):
Geo Scope allows you to access Earth observation data. PARO provides psychological and social effects to human beings through physical interaction.

Themopylae Sciences + Technology, LLC:
Google Glass an exciting wearable device that aims to change the way we interact with and access data and information. Join us for a demonstration!

Northrop Grumman Health Information Technologies:
This demonstration is intended to show examples of innovative technologies utilized in health informatics and surveillance.

Northrop Grumman:
Splunking in the CSOC Environment.
This is a demonstration of the analytical tools used in Cyber Security Operations Centers for data correlation and data mining to gain insights and intelligence about complex cyber attacks.

Lockheed Martin Corporation:
Nanotechnology in Aerospace and Defense. Lockheed Martin Corporation has helped shaped the growth of nanotechnology in the aerospace and defense industry. Check out our booth and see nanotechnology in action!

STEMbassadors:
STEMbassadors is a key element of TJ's outreach to support STEM enrichment in elementary and middle schools and to help high school students give back to their local community.

A: 8:30-9:20

SENIOR RESEARCH PROJECTS

Planetarium

Science Experiments during Interstellar Travel, Sowmya Ranga, Sonia Thakur
This research focuses on potential science experiments that should be conducted during interstellar travel.

Observation and Analysis of Extrasolar Planet Transits, Arvind Gupta
This project focuses on determining physical properties of exoplanets and their orbits by analyzing their transit light curves.

Room 101

Online Adaptive Frequency Hopping, William Moses
Increasing network efficiency through environmental modeling.

Ferromagnetic Fluids, Andrew Coffee, Lucas Kang
Synthesis and analysis of a custom ferromagnetic fluid as a possible propulsion source for small satellites in low earth orbit.

Examining the Relationship Between Perceived Color and Material Structures,
Veronica Lee, Ivy Ren
To further investigate the relationship of structural coloration in nature, we examined similar structures present in CDs and spin-coated surfaces.

Room 102

The Effect of Inhibition of LTM on the Siphon Withdrawal Reflex of Aplysia,
Sahitya Allam, Anthony Carrington
This study seeks to understand the importance of protein kinase M Apl III to classical conditioning through the inhibition of long term memory.

The Neurological Effects of Endocrine Disruptor Chemicals on A. californica,
Christian Doan, Avin Khera, Heun Min
We will be presenting on the observed effects of Endocrine Disruptor Chemicals on the

neural activity of Aplysia californica.

Establishing Baseline Risk-taking Behavior in Procambarus clarkii, Ryan Lee, Andrew Pan
Neuroscience experiment that set the basis for future experimentation on neuroeconomics of crayfish and potential chemical effects on risk assessment.

Room 103

Synthesis of Gold Nanoparticles, Tiffney Kathir, Simran Rohatgi, Isabelle Walton
Applications in Energy Conversion

Chemical Determination of Air Quality in Schools, Daniel Kwun, William Woodruff
Monitoring of particulate matter counts and air quality over the course of the school year was supplemented by testing for specific pollutants.

How's it Glowing? Modeling Antioxidative Capacity with Lightsticks, Angela Tang, Jennifer Yin

Room 113

Synthesis and Evaluation of Chemotherapeutic Hybrid Prodrugs, Arjun Iyer
Discussion of the organic synthesis, chemical kinetics and biological evaluation of two novel nitric oxide releasing PARP inhibitor hybrid prodrugs.

Symmetric Foot Modelling System, Aseem Jain
In order to address the issue for a need of a cheap, versatile leg-prosthetic, a novel prosthetic was designed based on the principle of gait-symmetry.

Engineering a Stem Cell Therapy for Degenerative Eye Diseases, Andrea Li
This project investigates a surface biomarker approach for optimization and purification of stem cell therapies for degenerative eye diseases.

Room 114

Breast Cancer: Death by Broccoli and miRNA? Angela Pham, Lucia Tsian
Can sulforaphane from broccoli and miR-335 synergistically affect cancer through epigenetics? A closer glance at miRNA therapy and amazing genes!

Zapping Cancer! Deepa Issar, Priya Seetharaman
We exposed drug-resistant small cell lung cancer cells to an electric field as an alternative to chemotherapy.

Room 115-Right

Optimizing Simple Moving Average Crossovers In Stock Price, Aditya Chaudhry
My project deals with how to exploit inefficiencies in the stock market by using the method of Simple Moving Average crossovers to maximize profit.

The use of finger tracking to create a virtual typing experience, Adithya Venkatesan
Utilizing the Leap Motion to track the user's fingers, the user's finger taps and gestures are interpreted as typing. I use it to create fluid typing.

Practicing Chess Endgames, Ashley Xue
This is a presentation about a website I made where chess players can practice their chess endgame tactics.

Room 115-Left

Using Touch Stimuli for Induced Synesthesia in the Visually Impaired, Asa Kaplan
The goal of my project is to use input visual information and output touch stimuli to provide environmental information to a visually impaired person.

Reasoning Behind Financial Decisions, Amy Ahhyun Kim
A web application that models concepts of experimental economics; was able to gather information on why people make the financial decisions they do.

Using Scale Free Networks to Find the Best Coaches, Brian Welch
Analyzing connections between NCAA football coaches and their assistants to determine the "hubs" of college football coaching.

Room 116

FIRST Robotics Competition 2014, Dhruv Gaba, Miles Oakley, Amelia Griese, Aaron Zhao, Jessica Shen, Aadil Refai, Benjamin Andre, Ciprian-Andrei Triculescu, Liesl Jaeger, Miraj Patel, Avan Lakmazaheri, Alexander Wood-Thomas, Richard Tucker
The TJ FRC team's senior members presents their research and development of an autonomous and teleoperated robot to compete in the Aerial Assist game.

Room 117

Reduction of G-Forces by Hydraulic Dampening, Alison Yan-Ka Yu
Mineral oil can be used in a hydraulic dampening system to effectively decrease the G-forces experienced by a rocket payload.

Collapsible Basketball Hoop, Bradley Rosenblum
Fully functional basketball hoop, that is light and portable, and can collapse to a size that fits into my car.

The Design and Implementation of a Foldable Bicycle, Clara Pitts, Joshua Won Chung
In today's society, the need for convenient transportation is prevalent. Our bicycle can fold down half its size and be easily stored almost anywhere.

Room 118

Monitoring Structural Health: Real-Time Analysis via Strain Sensor Networks, Rachel Zoll, Rachel Laveson
We designed a system using foil strain gages, analog processing, a ZigBee wireless network, and digital data analysis to monitor architectural health.

Room 119

Installation of Bicycle Wheels on an Automobile, Brian Higgins
Designing and constructing an adapter to mount a bicycle wheel on the hub of a full-size automobile.

EMG-Controlled Hybrid Car, Brian Womeldurf, Joseph Downs
Combining the technology used to detect muscle movements with a radio controlled, fuel-cell powered car.

Creating Drinkable Water Through Alternative Energy, Christopher Prak, Deebas Dhar, Mya Abousy, Varun Kumar
Our project encompasses three different subsystems, including methods of filtration and solar desalination, in order to create drinkable water.

Room 126

In Plane Sight: Mapping Oil Spills with Remote Sensing, Anne Li, Isabel Roscoe
Evaluating a new image classification technique using remote sensing hyperspectral data to determine spread and thickness of an oil spill.

Investigating Hellbender Behavioral Responses to Mucous Secretions from, Jacqueline Szilagyi
This study tested the hypothesis that hellbender skin mucous increases the frequency of hiding behaviors among conspecifics.

Investigating Effects of Zonation on Biology and Geology of Barracuda Bank, Katie Valery
Spending a week at sea in the Caribbean allowed me to analyze deep sea topography and the unusual biology and geology of the area.

Room 127

Measuring the Degree to which pH and Temperature Affect the Swelling Proper, Michelle Shiu, Eric Xie
Nanogels are new materials for the intelligent delivery of drugs. In our study, we analyzed the swelling of a nanogel in varying pH levels.

An Exploration Of Various Methods Of Green Nanoparticle Synthesis, Katherine Au, Daniel Carris, Priya Shankar
This experiment deals with the optimization of nanoparticle (gold, silver, and copper) yield through eco-friendly and conventional methods.

Synthesis of Heat-resistant Polylactide, Sayed Malawi, Yang Yu
This experiment attempts to increase the glass transition temperature of a commercially useful polymer, polylactide.

Room 128

The Effect of 5-Aminoimidazole-4-carboxamide ribonucleotide on HepG2 Cells, James Eagle
This experiment is to see the effect of 5-Aminoimidazole-4-carboxamide ribonucleotide (AICAR) on HepG2 liver cancer cells, specifically on AMPK.

SFA Concentration on Insulin Receptor Sensitivity in 3T3-L1 Adipocytes, Joohwan Kim, Wei Lin
Finding the correlation in obesity and insulin resistance (Type II Diabetes) by measuring glucose uptake of cells cultured in fatty acid media.

Reprogramming Hair Follicle Stem Cells into Cardiomyocytes, Manotri Chaubal
This project aims to determine whether hair follicle stem cells can be engineered into cardiomyocytes, a pathway that has never been explored before.

Room 133

Augmented Reality: Enhancing your Perception of the World, Nathaniel Eubanks
This project uses a webcam as data input and detects faces, then identifies the faces with helpful notes to enhance social interaction.

Agent-Modeling of Artificial Societies, Tyler Shepherd
"Sugarscape" is an agent-modeling system that allows for the creation of artificial societies and can be used to examine behavioural models.

The Quest for Gravity Waves, Vamsi Veeramasu
The project's goal is to find existence of gravity waves, which were predicted by Einstein's theory of relativity.

Room 141

Examining the Relationship Between Type 2 Diabetes and Renal Cell Cancer, Priyanka Nair, Meena Rezazad
Using fruit flies to determine why female patients with type 2 diabetes are at a high risk of developing renal cell cancer later in life.

Butanol Production from Synechocystis Bacteria, Carolyn Ours, Allen Parker
By modifying cyanobacteria we aim to create organisms which are more tolerant to the butanol they produce, allowing us to increase energy yield.

Analyzing the Immune Response of Dendritic Cells to Irradiated Cancer Cells, Kunal Debroy, Naveen Ambati
Cancer immunotherapy is a powerful weapon in the war against cancer. We look at how immunotherapy may be improved with the aid of photoirradiation.

Room 145

RoadBuilder: Interactive Traffic Simulation, Alexander Barghi
A web application designed to bring a user-friendly interface and a complex set of statistics together to simulate road traffic.

An Algorithm for Eye Detection In Images, Akshith Doddi
An algorithm to detect eyes in the image of a human face using concentration and distribution of horizontal edge pixels.

The Speech Recognizing Calculator, Alice Yuen
Using speech recognition, my web application performs standard calculator functions according to what you, the user, tell it.

Room 151

Raspberry Pi: Flying Camera, Andrew Snyder, Matthew Zhou
Using the Raspberry Pi and its wireless capabilities, we are able to remotely access its interface and camera from a computer while its in flight**.**

Every Step You Take, Caitlyn Carpio
Using piezoelectric tile technology to harness and convert the energy of foot strikes into usable electricity.

Human Mind Control of a Cockroach, Mary Forburger
The point of this project is to create a bluetooth connection between a human mind and that of a cockroach, in order to control the cockroach.

Room 217

Overhead Chess Piece Detection, Eric Levonian
Using a single camera, the state of a chessboard is tracked across the course of a game, and the moves recorded into a human-readable transcript.

Song Learning with Cortical Learning Algorithms, Frank Huang, Abi Gopal
Using algorithms that model how the neural cortex functions to "learn" how to identify different song inputs by the genre that they belong to.

Implementation of a Robotic Balancing Platform, Jimmy Wei
Creating a robot that is capable of balancing an object regardless of which direction or orientation the platform is in.

Room 218-219

Implementation of Long Range UAV, Yang Gang
This project focuses on the building of a cheap and efficient UAV that will travel up to near space while being able to transmit live information.

Implementation of Regenerative Braking System in a Solar Powered Vehicle, Meghana Valluri
A system which harnesses the wasted kinetic energy during a break-press in order to increase the efficiency and applicability of a solar car.

The Swaggin' Wagon, Benjamin Carniol, Dylan Muramoto, Timothy Lu, Zhaochun Tan
Our project was to convert and restore a 1972 Jensen-Healey roadster into an all-electric vehicle with solar charging capabilities.

Room 231

3D Printed Fabrics, Caroline Murton, Abigail Rose
Designing textiles using 3D printing and exploring their uses.

Art Deco Homes: A Loud Style on a Quiet Canvas, Alexander Sorensen
This experiment attempts to design a domestic setting in art deco, a style known for its loudness, grandeur, and in-your-face obnoxious beauty.

The effect of 3-D Tumor Shape on Chemotherapy Susceptibility, Siboney Shewit, Mia Gross
Using CAD and Biotech to form models that evaluate chemotherapy and tumor formation as they relate to one another.

DESIGN CHALLENGES

T-1: Balloon Cantilever, Build a balloon structure at the edge of a desk that holds a softball away from the desk as far as possible.

T-2: Rube Goldberg, Create the most complex design that starts with a marble being placed in a slot and ends with a marble in a cup.

T-3: How Long Will You Stay Up? Design and build a boat out of straws and plastic wrap that can hold 30 pennies for at least 10 seconds before sinking.

T-4 : Lego Engineering, Build the longest Lego bridge that can carry the most weight.

PANEL DISCUSSION

Room 223

The Effect of Spatially Controlled Nanohydroxyapatite on Human Mesenchymal Stem Cell Behavior on a 3D Printed Osteochondral Defect, Satvika Kumar
New Therapy for Old Joints, Manufacturing and testing 3D scaffolds to treat and heal the Osteochondral Defect.

Transparent Polycrystalline Spinel by Pressure-Assisted Microwave Sintering, Richard Oh
A research done to investigate the effects of Pressure-Assisted Microwave Sintering (PAMS) on the processing of transparent polycrystalline spinel, important in application for transparent armor.

Detoxicating our Healthcare Facilities, Vooha Putalapattu
An Innovative Approach to Identify the Structure of Clostridium difficile's Toxin B.

Greening Greywater: Testing Filtration Systems to Protect Earthworm Food Supply, Valentina Lohr
The research is on engineering and testing cost-effective filtration systems to allow safe greywater (household water) reuse without damaging the soil microbial community.

PROFESSIONAL SPEAKERS

Auditorium

International Submarine Races and Research in the US Navy, Kurt D. Yankaskas
NIHL Program Officer

Room 129

The Secrets of Life on Mars and the Rest of the Universe, Dr. Harold Geller
Associate Professor, George Mason University

Room 130

Careers in Medical Research, Dr. Robert Conley, Lilly Distinguished Scholar, Eli Lilly and Company

Room 132

Applications of EE to Today's Energy needs, Dr. Jim Howland, Director, MITRE Corporation

Room 135

Engineering Wearable Body Armor, Dr. Lori Wagner, Performance Materials & Technology Division, Honeywell

Room 136

Creating Weather with Computers, Dr. Ananthakrishna Sarma, Senior Scientist, Leidos Inc.

Room 143

Forensic Entomology: Biology of Crime Scene First Responders, Dr. Joseph Keiper Director, Virginia Museum of Natural History

Room 146

Mathematics Careers in Economics and Finance, Dr. Brian Becker, President Precision Economics, LLC

Room 147

Biomedical Research, From Bench to Bedside, Dr. Lauren Moffat, Laboratory Director, MedStar Health Research Institute, Firefighters' Burn and Surgical Research Lab

Room 148

Our Task, Dr. Gerald Barney, Executive Director, Our Task

Room 150

Computer Vision and its Applications for Biometrics, Dr. Peter Venetianer, Manager Digital Signal Corporation

Room 224

Driving Affordable Innovation with Lean Six Sigma, Dr. Hung Le, Lean Six Sigma Master Black Belt, Northrop Grumman

Room 225-227

Medicine: A Career of many opportunities, Dr. Robert Wah, Global Chief Medical Officer, CSC

Room 228-230

Cyber Security: High School and Beyond, Mrs. Diane Miller, Director of InfoSec Operations and Cyber Initiatives, Northrop Grumman

Room 229

SpaceX: New Frontiers from the Final Frontier, Mrs. Stephanie Bednarek, Government Affairs Manager, SpaceX

B: 9:30-10:15

SENIOR RESEARCH PROJECTS

Planetarium

Investigating Pyroclastic Features in the Medusae Fossae Formation, Emma Hastings
Come learn about one of the most enigmatic formations on the Martian surface, its unique features, and how pyroclastic activity could explain them.

Supermassive Black Holes and Star Clusters, Laura Manno
How do Supermassive Black Holes affect star formation? Galaxy formation? Does its influence differ by galaxy type? Come find out.

Inflated Lava Flows South of the Martian Tharsis Montes, Iris Hyon, Tenin Lhanze
Want to learn more about Mars? Come hear about a new field of study: inflated lava flows on the Martian surface.

Observing Lobate Scarps on Mercury's Surface, Anastasia Chobany
Mercury's surface is covered with long, curved cracks called lobate scarps. Come and learn what they could be caused by!

Room 101

On the Stability of Lung Parenchymal Lesions, Archis Bhandarkar, Rohan Banerjee
Our work seeks to explore the currently unknown pathological factors underlying lesion rupture in pneumothorax through biomechanical modeling.

Creating a Quantum Photon Entanglement Device, Giovanni Jimenez, Keon Hyeong Park, Abraham Kang
In this presentation, we will cover the methodology and theory behind the creation of a device which creates quantum entangled photons.

CVD Synthesis of Tungsten(IV) Sulfide Monolayers, William Bradbury, Tim Zhong
Developing a system for the chemical vapor deposition of WS2 monolayers, and characterizing the product with atomic force microscopy.

Room 102

The Effects of Human Reticulon4 on the Regeneration of the Leech Nerve Cord, Meena Nayagam, Tim Ruiter
Our painful process of attempting to determine if a human brain protein decreases the regeneration rate in medicinal leeches.

The Effect of Stimulation of motor neurons on the learning of G. portentosa, Somya Shankar
The purpose of this research project was to examine the phenomenon of learning in Gromphadorhina portentosa, through the use of operant conditioning.

You Are What You Eat: Operant Conditioning in Aplysia Californica, Charith Ratnayake, Sooraj Achar
We are studying the effectiveness of operant conditioning on Aplysia feeding behavior. Electrical stimulation will be used to try to mimic real food.

Room 103

Anthocyanin Dye Effectiveness in Dye-Sensitized Nanocrystalline Solar Cells, Jonathan Lee, Daniel Suzuki
Dye-sensitized solar cells are low-cost but haven't reached the efficiency of standard solar cells. We looked at improving the efficiency of the dye.

Oxidation of Carbon Nanotubes and Comparison with Seaweed in Zinc Sorption, Ji Whae Choi, Irene Hwang
The zinc sorption ability of seaweed biomass and nonoxidized/oxidized multi-walled carbon nanotubes is compared using the Zincon colorimetric method.

Investigating Weak Organic Drug Substances through Inverse Titration, Saehee Jung, Ellen Kim
This project explores the use of the inverse titration method for the determination of the ionization constant and solubility of weak organic bases.

Room 113

The Role of Endosymbiotic Bacteria in the Immune Response of Drosophila, Christine Nguyen
How endosymbionts of the genus Wolbachia or Spiroplasma affect Drosophila immunity and concomitantly survival curves following infection by a pathogen.

The Effect of Sickle Celle Genotypes of Townes and Berkeley Mice on Anxiety, Ji Sung Seo
Effect of sickle cell on anxiety was investigated with two mouse models of sickle cell, the Townes mice and the Berkeley SS mice.

Cellular Roles of the RanBP2 Protein, Kunal Khurana
An analysis of RanBP2's specific molecular roles and possible association with Hutchinson Gilford Progeria Syndrome.

Room 114

Silencing Pancreatic Cancer with Epigenetics, Eric Bo, Ken Qi
We are studying the cancer-causing RAN oncogene. We plan to use methylation, an epginetic technique, to silence the gene and inhibit tumor growth.

The Effect of Delivery Mode on Gut Microbiome Expression, We attempt to find a correlation between Firmicutes, Bacteroidetes, Meret Lund, Navya Thippana, Sara Mohideen Enterobacteriaceae in the infant gut and immunity to fungal infection.

Can Broccoli protect you from Cancer? Deepika Mukhara, Ravali Goda
Come find out if Sulforaphane, which is richest in Broccoli, has anti-cancer benefits.

Room 115-Right

MusicG, Co Thai Nguyen
Program takes a tune (.mp3 format), compares it to a database full of other songs and returns a percentage of "similarity" between the songs.

Keyboard Proximity Spell Checking, Daniel Sainanti
Spell-checking software that is based on proximity of misspelled words on the keyboard.

Fault Analysis in Electrical Networks, Hari Sridhar
The goal of this project is to utilize network algorithms to detect power outages and reroute power in model electricity grids.

Room 115-Left

Open Says-A-Me: The Magic of Personalized Computer Authentication, Everi Osofsky
Learn how to implement a vocal recognition algorithm and see how it can be used to personalize authentication by using a user's voice as a password.

Data Visualization: Using Maps to Graph Census Data, Nikhil Gupta
This project aims to overlay Census data on a map to display correlations between types of data (e.g. income and crime rate).

Electronic Sign In: The Next Wave of Front Desk Software, Nathaniel Williams
Fed up with signing into your library, pool, or rec center on paper or clunky software? Come see the new modern solution to the problem at tjSTAR.

Room 116

FIRST Robotics Competition 2014, Dhruv Gaba, Miles Oakley, Amelia Griese, Aaron Zhao, Jessica Shen, Aadil Refai, Benjamin Andre, Ciprian-Andrei Triculescu, Liesl Jaeger, Miraj Patel, Avan Lakmazaheri, Alexander Wood-Thomas, Richard Tucker
The TJ FRC team's senior members presents their research and development of an autonomous and teleoperated robot to compete in the Aerial Assist game.

Room 117

Extreme Picker Upper, Juliana Said
Grabber sticks have bad grips on smooth materials like glass. I decided to redesign the grabber stick to have a better grip and be automated.

Fabrication of a Cost-Effective Bass Marimba, Kaylyn Buford, Rebecca Duke
We built a large, low-pitched percussion instrument from scratch. Come hear how we did it and hear how it sounds!

Construction of a Double Pendulum for Use in a Classroom, Lauren Mostrom
I built a double pendulum to teach kids about chaos theory and suit various learning styles.

Room 118

The Development of a Hybrid Analog-to-Digital Convertor (ADC), Roy Rinberg
This project combines two existing forms of analog-to-digital conversion to create a hybrid of ""flash"" and ""dual slope"" converters.

An Efficient Method of Accurate Audio Amplification, Jeffrey Horowitz
Using digital switching methods to control a MOSFET half-bridge, audio amplifier efficiency is maximized while high audio quality is maintained.

Room 119

Contrarotating Coaxial Rim Driven Propeller, Daniel Carballo
Alternative propeller design for decreased drag and increased torque and top speed.

Efficient Classroom Wind Turbine, Grace Zeng, Sudharasan Sriram
An Efficient Wind Turbine created using the 3D printer, which may be replicated by future students taking Energy Systems to further their knowledge.

Stop Dragging Me Down, Hye Chang
Improving the safety, yet reducing the drag of the solar car at the same time.

Room 126

Reality Stings: Possible Anthropogenic Origins of Jellyfish Blooms, Rishi Gupta, Jonathan Stewart
Come discover how differing natural and artificial substrates may play a role in the proliferation of jellyfish blooms.

Investigating Water Sanitation: Diatomaceous Earth in Biosand Water Filters, Comfort Sampong, Harleen Bal, Julia Suarez
A gravity-operated, sand-filled water filter? Come learn about Biosand water filters and their impact on global health in developing countries.

Room 127

Simulation of Zinc Oxide (ZnO) Nanorods Functioning as Optical Fibers, Jae Young Chang
Investigation of the optical-fiber-like properties of Zinc Oxide nanorods through Finite-Difference Time Domain (FDTD) simulations.

Analyzing Functionalized Carbon Nanofibers with Inverse Gas Chromatography, James Jeshi Wang
In this project we employ Carbon Nanofibers in Polymer Nanocomposites to increase mechanical reinforcement in order to create new bullet proof armor**.**

Room 133

Auto Photoshop, William Jiliang Xu
Detection and removal of blemishes on face using computer vision.

Chemical Reaction Modeling, Biqiao Yin
Predicting the products of chemical reactions through computer algorithm.

Room 141

Using Chemical Inhibitors to Stop the Monster: Antibiotic Resistant Bacteria, Kevin Luu, Randy Yin
We tested the effectiveness of a combination of chemical inhibitors at inhibiting beta lactamase activity from degrading microbe-killing antibiotics.

Epigenetics: Our Outside-the-Box Approach to Metastatic Inhibition, Prajeeth Koyada, Keshav Rao
Join us as we discuss our attempt at halting the spread of cancer - using one of the cell's most basic inhibitory techniques against itself.

How Cyanobacteria Affects the Hydrocarbon Degradation Rate of Heterotrophs, Pavan Krishnan
This project investigates the oxygen-producing effect of cyanobacteria on the metabolic efficiency of a type of microbe in bioremediating oil plumes.

Room 145

NoteScribbler: Transcribing Audio into Sheet Music, Christine Tsou, Katherine Hao
A program that takes an audio input of a melody and transcribes it into sheet music with rhythm and music notes.

Bridge Play Monitor and Recorder, David Soukup
A program to aid in the recording of bridge play by replacing human operators with automatic recorders (bridge hand recognition).

Nonogram Generator: Android App That Creates Nonograms, David Zhao
Learn about nonograms and the process behind developing an android app that creates them.

Room 151

Mission: Invisibility, Hunter Clark, Nathaniel Kim
We are trying to create an illusion of invisibility from the prospective of an individual using Kinect body tracking software.

A Jumbo Slice of Raspberry Pi, Jacob Rosenblum
Multi-Screen Jumbotron display created using Raspberry Pi technology on multiple computer monitors.

Catching Pi: Smart Video Surveillance, Maria Kim
An economical and high quality security device was created using a Raspberry Pi. This apparatus also includes motion sensors and feature detectors.

Room 217

Multimedia Virtual Tour Viewer, Luke Kuprenas
A program to display ultra-high resolution panoramic images with other viewable media sources to further explore the area.

Quiz Game Practice Suite, Owen Hoffman
This project uses Text-to-Speech to simulate the environment of a quiz game such as Jeopardy, Quiz Bowl, or in this case Certamen.

Imagecheck, Philip Yu
Imagecheck is an online image-editing program that uses various programming languages. This provides an easy way for users to manipulate pictures.

Room 218-219

Electrically Powered Longboard, Kush Kakkad
Presentation of electrically powered longboard.

Investigating Energy Efficiency of a Wind Turbine at Low Wind Speeds, Melody Fan
While wind turbines are the most effective at high wind speeds, this project seeks to design and model an efficient turbine for low wind speeds.

Step Up 5: Light it Up, Madeline Reinse
Our project utilizes piezoelectric elements in the creation of a pressure-activated tile which converts mechanical energy into electrical energy.

Room 231

The Mechanical Energy Catalyst, Carl Fremlin
Energy is never lost. Yet ""Energy Loss"" is a common term because we can't economically recapture thermal energy. My project aims to change that**.**

Optimized Theatre Set Design, Jordan Goodson
We have designed set pieces for a theatre to use that optimize space and utility, with set pieces that can be easily converted into different ones.

Alternative Wind Turbine Designs, Katherine Wen-Jay Tsai
Exploring wind turbine designs that are both functional and aesthetically pleasing.

IBET PROJECT PRESENTATIONS

Room 120

Tasty Worms, Ian Carr, Omisha Jyothi, Nathan Kim, Pranav Ramanan
This presentation describes the effect of microwaved food on the mass of Redworms.

Investigations of the Relationship Between Macroinvertebrates and Spotted Salamanders, Anshu Sharma, Thomas Mecherikunnel, and Diana Zavela
We wanted to observe, by comparing trends in macroinvertebrate populations with trends in spotted salamander populations in Mason Neck State Park, whether or not the size of the salamander population corresponded over time with the size of the macroinvertebrate population.

A "Frack"tured Heart, Hannah Collins, David Lim, Kathleen Kim, and Colin Murphy
This experiment tested the effect of chemicals used in hydraulic fracturing on the heart rate of Daphnia magna.

Room 123

Aerogelous of Us? Rachel Alexander, Jason Zou, Thinh Tu, and Vivian Hu
This presentation tested the aerogel technology to clean up a simulated oil spill.

The Effect of Precipitation on the Salamander Migration Rates. Omer Hatim, Jihyeong Lee, Woohyeong Cho, and Thejus Poruthikode Unnivelan
This presentation demonstrated that our IV is precipitation and our DV is the breeding migration rate.

An Investigation of Fairy Shrimp: The Effect of Acidity on the Hatching Time of Fairy Shrimp Eggs, Neil Parikh, Alexander Nguyen, and Adam Wilkie
This presentation determined that as acidity decreased, the hatching time of fairy shrimp eggs decreased significantly.

Room 125

Team NotPink Plants, Richard Chung, Aarushi Gulati, Vikash Kumar, Adam Turflinger
This presentation describes the effect of hydrogen peroxide on dissolved oxygen rates.

The Effect of Water Depth on Macroinvertebrate Abundance and Biodiversity: Apoorva Thumma, Shraddha Pradeep, Saloni Bhargava, and Neha Khandelwal
The Effect of Water Depth on Macroinvertebrate Abundance and Biodiversity:
This presentation studied the relationship between varying water levels and macroinvertebrate abundance and biodiversity in the Highpoint 2 vernal pool.

The Effect of Albuterol on Red Harvester Ants: Colin Buckley, Hugh Quinn, and Bharat Venkat
This presentation investigated the effects of differing levels of albuterol sulfate on the growth of red harvester ants.

Room 130

Lettuce EnLighten You: Jami Park, Jodie Beaumont, Rachel Martinka, and Suhas Sastry
This presentation investigated the effect of various wavelengths of light on the growth of lettuce plants.

T**he Effect of Acidity on the Egg Mass Counts of Spotted Salamanders In Northern Virginia Over Time:** Andrea Michael, D'Michael Thompson, and Oktay Ahverdiyev
This presentation tested the pH levels of a vernal pool and its relationship to egg mass counts of spotted salamanders, taking into account the measurements of previous years.

The Effect of Albuterol Sulfate on Pogonomyrmex barbatus: Arthur Wu, Jason Liu, Prithvi Narayana, and Dylan Cathapermal
This presentation describes an investigation of the effects of an asthma medication on ants.

Room 131

PestiSide Effects: Deepshika Dhanasekar, Pranab Krishnan, Aakash Shukla, and John Serger
This presentation tested the effect of synthetic and organic pesticides on the oxygen producing capabilities of Elodea densa.

DOLO (Daphnia Only Live Once): Gloria Chen, Victor Galov, Hamsa Mani, Tarun Singh
This presentation describes the effect of aspririn on the movement rate of Daphnia.

The Effect of the Wavelength of Light on the Dispersion Rate of a Slime Mold: Aadith Vittala, Rahul Kindi, and Jnanadeep Dandu
A Study on P. polycephalum: This presentation demonstrated that the wavelength of light did not significantly affect the rate of dispersion of the slime mold.

Room 136

The Effect of Road Proximity on Deer Pellet Group Counts: Tarikasri Chittajalu, Vishal Bhasin, Ahnaf Khan, Dylan Seng
This presentation hypothesizes that as the proximity to road increases, the deer pellet count decreases.

Defying gravity: Harish Chandrasekaren, Quinn Dawkin, Varun Iyengar, Sam Liu
This presentation describes the effects of gravity on tardigrades.

An Investigation of Arabidopsis: Janet Malzahn, Ryan Burns, and Yash Jain
The Effect of Duration of Nicotine Exposure on Rate of Plant Growth: This presentation determined that the duration of nicotine exposure has no significant effect on the growth rate of Arabidopsis thaliana.

Room 146

Squashing the Competition: Claire Fuller, Fatimna Gunter-Rahman, Kevin Kuo, and Kody Stremick
This presentation measured the effect of various salts on the growth of Cucurbita pepo (squash).

An Allergy Analogy: Srivanth Dhulipala, Kristin Myers, Albert Pan, Gautam Ramanathan
This presentation describes the effect of Benadryl on the Ghost Shrimp.

The Effect of Vitamins on Planarian Regeneration Rates: Isuru Attanagoda, Prashanth Kallat, and Milana Wolff
The presentation tested was the effect of various vitamins upon the regeneration of planaria.

Room 147

The Effect of Previous Winters' Snowfall on Deer Population Change: Daniel Lee, Katie Tam, Sahithya Vishwanath
This presentation hypothesize that if the previous winters' snowfall increases, then the deer population size will decrease.

The Effect of Temperature on the Breeding Migration Patterns of Ambystoma maculatum: Sarah Crossen, Kate Eisert, Jana El-Sayed, and Roshni Yaradi
This presentation studied the effects that varying environmental temperatures have on the breeding migration patterns of the Spotted Salamander species, also known as Ambystoma maculatum.

Investigating the Most Common Pain Killer in the World: A Study of Tylenol on the Movement of C.elegans: Aaron Gu, Joseph Chen, Josh Rutzick, and Adarsh Kulkarni
This presentation examined the effect of different levels of Tylenol concentration on the rate of movement of C. elegans.

Room 148

Ramped Up Wrigglers: Daniel Chen, Jack Boyle, Cecelia Brower, and James Quek
This presentation measured the effect of various nitrate concentration of the mass of worms.

The Effect of Natural and Constructed Vernal Pools on Ambystoma maculatum Egg Mass Counts: Cedric Bernard, Harry Han, Lawrence Wang, and Varun Talwar
This presentation tested if constructed vernal pools are more or less effective for survival of ambystoma maculatum egg masses.

Wheying the Options: Susanna Bradbury, Brendan Capozzi, Clare Connally, James Houghton
This presentation describes the effect of whey vs. soy on the growth rate of redworms.

Room 150

Dizzy Daphnia: William Baxley, Juliana Gruver, Lada Semicheva, and Jason Stranne
This presentation measured the effect of turbulence on the heart rate of Dapnia magna.

The Effect of Acid Precipitation on Spotted Salamander Egg Mass Counts: Anjali Kikkisetti, Abhishek Mishra, Helen Tran, and Leo Wang
This presentation concluded that our IV is the acid precipitation and our DV is the egg mass count.

Plantioxidants: Eric Liu, Rhea Sahai, Carolyn Wang
This presentation describes the effect of various antioxidants on planarian regeneration time.

DESIGN CHALLENGES

T-1: Balloon Cantilever, Build a balloon structure at the edge of a desk that holds a softball away from the desk as far as possible.

T-2: How Long Will You Stay Up? Design and build a boat out of straws and plastic wrap that can hold 30 pennies for at least 10 seconds before sinking.

T-3: Rube Goldberg, Create the most complex design that starts with a marble being placed in a slot and ends with a marble in a cup

T-4: Lego Engineering, Build the longest Lego bridge that can carry the most weight.

PANEL DISCUSSION

Room 143

Making an Impact! STEM Careers in Engineering and Research at Exxon
Tshikuna Muanankese, Kelly Li, Meredith Gustafsson, Madhav Acharya, Diego Pena

PROFESSIONAL SPEAKERS

Auditorium

Bluetooth, a QR code, and a Smartphone Walk Into the SATs... MicroStrategy, MicroStrategy is revolutionizing how you authenticate your identity. Through cutting edge mobile technologies like Bluetooth, NFC, and beacons, you can walk through doors, access secure sites, and find your friends using only your smartphone. Our solution keeps your identity secure while enabling more convenience in your critical, everyday activities. Our presentation will cover a demo of our technology with an application of how you can use it to access some sweet snacks.

Room 128

Inventing Yourself--a ride to the top guided by a rocket scientist-attorney, Dr. Toby Hain, Patent Attorney, National Institute of Standards and Technology

Room 129

The Secrets of Life on Mars and the Rest of the Universe, Dr. Harold Geller, Associate Professor, George Mason University

Room 132

Aging? Who cares? Dr. Felipe Sierra, Director, Division of Aging Biology
National Institute on Aging, National Institutes of Health

Room 135

Engineering Wearable Body Armor, Dr. Lori Wagner, Performance Materials & Technology Division, Honeywell

Room 220

Computer Vision and its Applications for Biometrics, Dr. Peter Venetianer, Manager Digital Signal Corporation

Room 225-227

Forensic DNA Analysis and Genetic Identity Testing, Dr. Brian Young, Technology Initiatives Leader, Battelle Memorial Institute

Room 228-230

Medicine: A Career of many opportunities, Dr. Robert Wah, Global Chief Medical Officer, CSC

Room 229

Geo Futures: Persistence and Discovering Patterns of Life, Mr. Douglas McGovern Director, InnoVision, National Geospatial-Intelligence Agency

C: 10:25-11:10

SENIOR RESEARCH PROJECTS

Planetarium

Can You Saltate with All the Colors of the Wind? Sienna Lotenberg, Virginia Wordsworth
Have some sand-hoppin' fun! Come hear about Martian ripples and wind as we talk about our analysis of aeolian ripples on Mars.

Estimating the Age of Stellar Clusters in M31, Madison Phillips, Hannah Pho
Phillips and Pho present PHAT phun! With Python, Excel, and the Panchromatic Hubble Treasury, we studied star clusters in the Andromeda Galaxy.

An Exploration of Titan, John Wood
In my presentation, I will explain my research into Titan's methane cycle, a little understood feature unique to our solar system.

Asteroid Hazards in Urban Areas, Andrew Corzo
This presentation models the catastrophic damage that occurs when as asteroid collides with the Earth's populated areas.

Room 101

Modeling 2-D Bubbles, Romain Debroux, Nathan Quyang
We model 2-D bubbles with the Voronoi Implicit Interface Method (VIIM) and discuss applications.

Relating Quantum Probabilities to Relative Volumes, Alexander Atanasov
The probability between two quantum states is related to the relative area they trace on projective Hilbert space/space of density operators.

The Quantum Eraser, Hassan El Tinay, Abi Gopa
An expansion of William Young's famous double-slit experiment. Now with 20% more quantum.

Room 102

Thought into Action: Linking Brain Signals to a Motorized Wheelchair, Seong Jun Jang
Step into the world of ""mind control"" and learn how simple thoughts such as ""move left"" and ""move right"" are harvested for external control of devices.

Human-Cockroach Interfacing, Jonathan Towne
If u-rhythms are processed to identify directional thoughts, then a cockroach can be controlled by such thoughts through thought acquisition.

It's Easy, Just Think About It, Kenneth Hau, William Ashe
We created a dynamic calibration algorithm to improve the accuracy of the EEG wheelchair with the hope of significantly decreasing the learning curve.

Room 103

Maximizing the Effectiveness of Permeable Reactive Barriers for Groundwater, Ashwin Basana, Tony Xiao
Our project deals with the use of zero valent iron and sand mixtures to remediate contaminated groundwater, which is simulated with a dye solution.

Ring-Opening Polymerization of Lactide for the Synthesis of Polylactic Acid, Laura Duke, Monica Grover
We compared different metal catalysts on the ring-opening polymerization of lactide to form PLA, and observed how melting point and IR spectra differ.

Analysis of Gallic Acid Antioxidants, Alex Li, Wendy Sun
This project analyzed methyl, ethyl, propyl, and butyl gallate to determine the effect of various substituent groups on antioxidant capacity.

Room 113

Thioester-containing proteins and Drosophila immune response to pathogens, Likhitha Kolla
The goal of this research is to understand the function of the TEP genes in Drosophilia against nematode parasites and their bacteria.

Dysferlin Associated Proteins & Limb Girdle Muscular Dystrophy 2B, Kekha Narayana
Dysferlin associated proteins may present a way to facilitate muscle membrane repair in limb girdle muscular dystrophy 2B patients.

Regional Characterization of Microglia Morphology and Function, Miyabi Saito
The purpose of this experiment was to characterize differences in microglia morphology and functionality of non-diseased microglia in different brain.

Room 114

The Effect of Ritonavir on EBV-Induced Canine B-Cell Lymphomas, Olivia Sullivan, Jessica Choi
Could a drug used to treat AIDS in humans also help puppies with cancer? Find out what this experiment that combines three hot-topic issues suggests!

ArsM Gene, Manganese and Iron's Effect on Arsenic Adsorption by P. Putida, Roshini Bhasin, Varun Jain
We attempt to genetically engineer a bacterial strain, P. putida, with the ArsM gene to enhance arsenic removal from simulated Bangladeshi water.

The Effect of Methylation of kDNA in Crithidia fasciculate, Vashali Jain
Determining whether methylating the mitochondrial DNA of the parasite, C. fasciculate will discourage host/parasite interactions.

Room 115-Right

Musicians on Call App, John Aulabaugh
I made an application to assist a volunteer organization with musical hospital visits and collect data to find the optimal time for artists to visit.

Java to C++ Code Translation, James Day
I will be describing an application for translating Java source code to C++. This dramatically improves any program's execution time and memory usage.

GlobalVNC: An In-Browser VNC Client, James Forcier
GlobalVNC aims to provide a simpler and more lightweight in-browser VNC client, for accessing VNC servers from anywhere.

Room 115-Left

Monte Carlo Tree Search Heuristics in Computer Go, Rayan Jian
The goal of this project is to develop heuristics to improve the playing strength of Go AIs using Monte Carlo Tree Search.

Mapping Surface Currents to Model the Path of Algae Colonies, Rena Lui
My project is a computer model that uses surface currents to accurately predict the course of macroalgae colonies through various bodies of water.

Engineering Xylanase: A Novel Approach for Building Better Biofuels, Robert Young
Discover a new method for protein engineering. This research was begun at GMU and explores the use of mutated xylanase for producing cheaper biofuels.

Room 116

"Look, No Hands! HERMES: The Self-Localizing Autonomous Navigator: Navigating TJHSST with an Alternative to GPS Technology through HERMES, Anand Kapadia, Alexander Xu, Joshua Goldstein
The Heuristic Expeditionary Range-finding Motion-analyzing Electronic System.

Quadcopter from Scratch, Daven Kim, Dong Kweon, Joshua Fang
Using only the 3D printer and laser cutter to create the chassis for a remote controlled quadcopter.

Cooking Without Fire: The World's First 3D-Printed Automated Solar Grill, Nikhil Bhattasali
Cook using solar energy with this sun-tracking solar grill capable of reaching upwards of 350 degrees. TJ's biggest 3D-printing project to date.

VISOR (Visual Intelligence System; Optical Reconnaissance, Chris Kim, Mason Chee
Head-up display designed to enhance user awareness.

Room 117

How to entertain your dog with no hands, Mansour Ali
In the Prototyping Tech Lab, I made an automated dog ball launcher that continuously plays fetch with my dog.

A Stretch in the Right Direction, Megan Ganley
Erb's Palsy is a condition that tightens the nerves in the arm and causes the limb to be weak and bent. This device aims to fix that**.**

Diwheel: Beat That, Rachel Iwicki, Turner Arndt, Ellen Mule
The design and implementation of an electric vehicle consisting of two five foot diameter steel wheels and a self-righting roll cage.

Room 118

Advanced Audioelectronic Tuner: Applied Fourier Analysis, Brian Clark
Design of a system to translate musical waveforms from the time to the frequency domain then process the signals to yield useful intonation data.

Achieving Active Noise Cancellation, Dominic Fritz
Using advanced adaptive digital filtering techniques, active noise cancellation was achieved in a pair of headphones.

Room 119

Creation of a Data Acquisition System for Electric Scooters, Julian Nguyen
The planning and construction of a data acquisition system, which collects readings of voltage, current, and speed for an electric scooter.

Solar Powered and Thermoelectric Wireless Computer Mice, Jae Yun, Doo Won Kang
Solar Powered and Thermoelectric Wireless Computer Mice.

Berry Tasty Energy, Vivian Le
The dye sensitized solar cell (DSSC),a cheaper alternative to the conventional silicon based solar cell.

Room 126

The Sea-cret to Sea-ing: Neovascularization within the eye contributes to blindness in ocular diseases, Candace Park
Zebrafish can be used to test the efficacy of the pro-drug, SF1126, on inhibiting angiogenesis, which may provide a potential treatment for eye disease.

Gut Plastic? The Effect of Microplastic Pollution on Oysters, Lily Gu
Do oysters, a keystone species in Chesapeake Bay, ingest microplastics, a recent threat to marine ecosystems?

PB & Upside-Down J, Kameron Wong
Investigating the effects of iron concentrate on mucus protein concentrations in Cassiopea xamachana, more commonly known as Upside-Down jellyfish.

Room 127

Do oysters, a keystone species in Chesapeake Bay, ingest microplastics, a recent threat to marine ecosystems? Are local streams in more trouble than we think?
Kinsey Moser, Maria Kanevesky
This parasite has the power to change insect sex ratios and alter ecosystems.

Database Creation From MSC Trawl Data, Sarah Brooks
Ever wondered what lives in the waters off Wallops? Using trawl data from the Marine Science Consortium to create a database accessible by millions.

Follow the Light, Jane Werntz
Microscopic plankton light up ocean waters with beautiful, blue light. Can this luminous display also indicate water pollution?

Room 141

Nanotechnology: Tiny Steps Against Breast Cancer, Rishabh Mazmudar, Saad Guliwala
The project focused on conjugating gold nanoparticles with a certain antibody, and using these to selectively target and treat breast cancer cells.

Effect of Folic Acid Supplementation on Gluconeogenesis in HepG2, Robert Wang, Vaidehi Patel
Can supplementing liver cancer cells with folic acid impact the rate of gluconeogenesis (release of glucose)? Discover new cancer perspectives.

The Right Recipe: Finding a Ratio of Surface Proteins to Combat Cancer, Sparsh Gupta
This project seeks to find the best ratio of MICA and MICB (two surface proteins) to induce the greatest cytotoxic response in T cells.

Room 145

iMusician: Organizing Music and Practice Sessions for Music Students, Elise Favia
iMusician is an iPhone application that allows users to add music, create practice sessions, and organize with the use of an SQLite database.

Automated Book Requesting, Elizabeth Huang
A program to track a list of unpublished books the user wants to read, and then automatically request them from the library as they become available.

Modeling Hand motions using Ultrasound Imaging of muscle activity, Jayanth Devananthan
A program to analyze ultrasound files for new prosthetic development, and testing the program's ability to emulate hand motion.

Room 151

A No-Fumble SMART Board Pen, Benjamin Lister
An explanation on the mechanics of a wireless SMART Board Pen, its uses, and the learning process of creating it.

Optimizing the iPhone's Speaker, David Chae
Solving for the ideal way an iPhone's speaker can be maximized though the use of resonance tubes and makeshift speakers.

Glove-Powered Interfaces, Henry Tessier
Exploring the uses of a flex-sensor glove as an alternative method to control PC and Xbox interfaces.

Room 217

WISE Image Stacking, Sidharth Verma
Image stacking of data of NASA's WISE telescope to assist in the search for asteroids and other celestial objects.

Complex World Generation and Game Exportation, Ashwinb Gananpathiraju
Generation of a 3D world via a customizable configuration file, along with exportation to various video game save formats.

Room 218-219

It's Basically a Motorcycle, Erikca Rashka, Madeline Naide
We created an electric bicycle with batteries and hydrogen fuel cells.

Improving Wireless Charger Technology through Induction, Ramanan Ramesh
My project is essentially creating a small circuit that uses induction coils and PC board to transmit power from an outlet to my smartphone device.

Design and Implementation of an Off-grid, Self-regulating Greenhouse System, Alyssa Bruce
A greenhouse engineered to run solely on renewable energy and resources that is fully automated, and has no grid tie.

Room 231

Dimensional Tolerances in 3D Printing, Linda Marie Lay
How do you print accurate parts using a notoriously inaccurate prototyping method? Join us for a potential solution.

Technology Is Fashion: 3D-Printed Garments and Fabric Mimicking Mesh, Simran Singh
A new era of art, of fashion is about to emerge; an era of the transformation of "technology meets fashion" into "technology is fashion"?

In Plane Sight: Mapping Oil Spills with Remote Sensing, You Na An
Evaluating a new image classification technique using remote sensing hyperspectral data to determine spread and thickness of an oil spill.

IBET PROJECT PRESENTATIONS

Room 120

The Effect of Air Temperature on Spotted Salamander Egg Mass Count: Jacob Ajit, Matthew Szilagyi, Steven Li, and Brendan Divney
We wanted to see how varying air temperatures in different years affected the number of salamander egg mass counts that year.

The Effect of Water Proximity on Annual Deer Pellet Counts: Melody Chiang, Mohh Gupta, Sarah Hoback, David Sun
We hypothesized that as the proximity to water increased, the number of deer pellets would increase.

Rhiz-of the Bacteria: Emily Zou, Klara Vertes, and Josh So
This experiment tested the effects of nitrogen supplements on plant growth.

Room 123

Investigating Regeneration: The Effects of Hydrochlic Acid on Hydra viridssma: Mrinal Save, Anusha Balani, Aditi Sundararaman , and Isha Ghodgaonkar
This presentation describes the effect of hydrochloric acid on the regeneration rate of Hydra viridissma.

Filtrating Foliage: Ahad Rizvi, Elise Conforti, Adam Kim, and Navya Kalale
This presentation measured the effect of root structures on the ability to filter runoff.

The Effect of Pool Origin on Egg Mass Counts of Ambystoma Maculatum: Warren Chen, Zachary Hayden, Reilly McLaren, and Caulton Wilson
This presentation explored whether the number of spotted salamander egg masses is different in natural and artificial vernal pools.

Room 125

The Effect of Water Proximity on the Number of White-tailed Deer Pellet Groupings: Shiraz Chokshi, Amee Kapadia, Eldon Luk, Shweta Mohanty
This presentation demonstrates that closer proximity of deer to water sources significantly increases the rate of pellet-grouping deposition.

A radiant story: Sam Case, Christina Oh, Sarah Sturken, Margaret Zhao
This presentation describes the effects of radiation on planaria.

The Effect of Dissolved Oxygen on the Concentration of Amybstoma maculatum Egg Masses: Neeraj Prasad, Cece Chu, Alyssa Lee, and Alex Bochenek
This presentation determined whether a correlation exists between DO levels and concentration of egg masses.

Room 130

The Effect of Summer Precipitation Amounts on Winter Populations of White-tailed Deer: Katherine Ahn, Dan Qi, Joyce Tian
This presentation determined that the amount of summer precipitation significantly increased the relative population growth in the pre-hunt winter months.

Algae Soup: Nipun Mallipeddi, Ishaan Gandhi, Chase Brown, and Leela Ramineni
This presentation measured the effect of pectinase on algae growth in eutrophic conditions.

The Effect of Vegetation on the Vertical Spacing of Ambystoma maculatum eggs: Zara Batalvi, Alex Prosak, Raef Khan, and Nikita Semichev
This presentation studied the correlation between in-pool vegetation distribution and the vertical spacing of salamander eggs, a great factor in their larval survival.

Room 131

Analyzing Anhydrobiosis: Response of the Richtersius coronifer Reproductive Rate: Jennifer Baily, Meron Girma, and Sharon Liu
This presentation describes the effect of anhydrobiosis duration on Richtersius coronifer reproductive rate.

Oh' Kill 'Em: Michael Chang, Audrey Huang, David Liu, and Emma Zhang
This presentation tested the effect of using different wavelengths of light on destroying pond water bacteria.

The Effect of Road Proximity on Deer Pellet Group Counts: Nash Hemrajani, Devarsh Modh, Tishani Patel, Raquel Sequeira
This presentation hypothesized that as the proximity of a plot to a road increased, the number of deer pellets would decrease.

Room 136

Fighting dirty waters: Madhu Balasekaran, Sravani Buddhavarapu, Advait Kulkarni, Aaria Malhotra
This project describes the effect of turbidity on the survival rate of daphnia.

The Green Shield: Vikram Pratha, Samuel Kebadu, and Nayana Suvarna
This experiment measured the effect of different styles of green roof on the internal temperature of a house.

The Effect of Hunting Zone Proximity on the Number of Deer Pellets Collected: Richa Gupta, Jake Karton, Rachel Lee, Haoyuan Sun
This presentation discovered that as the proximity to the hunting zone decreases, the number of deer pellets decreases.

Room 146

The Effect of Constructed or Natural Pools on Macroinvertebrate Populations: Jonathan Ko, Manish Kondapolu, and Peter Zhao
This presentation considered whether constructed or natural pools benefit the growth of macroinvertebrates.

CO2, Gotta Catch 'Em All: Hana Cho, Sydney Dayyani, Prathik Naidu, and Avinash Tummala
This presentation tested the effect of an algae biofilter on carbon dioxide sequestration.

Caffeine boost: Emma Bachmann, Rashel Bajaj, Sveta Jagannathan, Yadeen Rashid
This presentation describes the effects of caffeine on planaria regeneration.

Room 147

The Effect of Tree Density on Deer Pellet Counts: Arun Bhattasali, Tamara Drpic, Won Lee, Gaby McDonald
This presentation hypothesize that as the tree density increases, the deer pellet count increases.

An investigation of Drosophila Reproduction: The Effect of Caffeine: Sarah Dickson, Ashima Banga, and Meghna Sil, Jade Kim
This presentation discusses the major findings of a study to determine the finding effect of caffeine on the reproduction rate of D. melanogaster.

The Effect of Macroinvertebrate Population on Egg Density of Ambystoma maculatum in Vernal Pools: William Furlong, Arnav Gupta, Kiersten Paul, and Anahita Sharma
This presentation measured the correlation between macroinvertebrate population and salamander egg density.

Room 148

The Effect of Oophila amblystomatis Presence on the Egg Masses of Ambystoma maculatum and Dissolved Oxygen Concentration: Chappy Asel, Akshay Balaji, Shomik Ghose, and Shruti Ray
This presentation explores the relationship between algae presence and oxygen concentration in vernal pools.

At Last I See the Light: Stephanie Do, Hayun Chong, William Xu, Scott Kilmer
This presentation measured the effect of different wavelengths of light on the growth rate of Elodea densa.

The Influence of Pond Vegetation on Macroinvertebrate and Salamander Populations: Daniel Mao, Alex Sun, Jerius Samra, and Caitlyn Ling
This presentation studied the Effect of Vegetation on Macroinvertebrates.

Room 150

The Effect of the Potential of Hydrogen in Freshwater Bodies on Deer Population Density over an Extended Period of Time: Nikhil Chintada, Daniel Choi, Abhishek Mogili, Sydney Zheng
This presentation discovered that as the level of pH decreases, the deer population density near freshwater sources will also decrease.

Showing Bacteria the Bright Side: Allen lang, Griffith Heller, and Timmy Tran
This presentation describes the effect of different wavelengths of electromagnetic radiation on fecal coliform growth.

The Effect of pH on Cloudy to Clear Egg Mass Ratios: Amit Gupta, Kanu Gaba, Sung Joon Park, and Nicholas Yoon
This presentation studied the effect of pH on egg color polymorphism frequencies in spotted salamander populations.

DESIGN CHALLENGES

T-1: Balloon Cantilever, Build a balloon structure at the edge of a desk that holds a softball away from the desk as far as possible.

T-2: Rube Goldberg, Create the most complex design that starts with a marble being placed in a slot and ends with a marble in a cup

T-3: How Long Will You Stay Up? Design and build a boat out of straws and plastic wrap that can hold 30 pennies for at least 10 seconds before sinking.

T-4: Lego Engineering, Build the longest Lego bridge that can carry the most weight.

T-5: Domino Demolition, Build a path of dominoes that takes the longest time to collapse.

PANEL DISCUSSION

Room 133

Endeavorist.org: How YOU can democratize science, Dr. Steve Lewis, Co-founder Endeavorist LLC and Mr. Tom Matthews, CEO, Endeavorist LLC

Room 135

Lift Off to TJ CubeSAT! Carlos Niederstrasser, Master Systems Engineer, Orbital Adam Kemp, Director, EnergySystems Lab, TJHSST, Nicholas Allegro, Systems Engineer Intern, Orbital (TJ alum), Brett Offutt, student University of Virginia (TJ alum), Rohan Punnoose, TJHSST
Joint presentation with Orbital Sciences, TJ students (past and current) and faculty to review the TJ CubeSat satellite program.

Room 225-227

Intel Panel, Archis Bhandarkar, Tina W. Ju, Lucas Kang, Kunal Khurana, William Moses
Hosted by Intel Science Talent Search semi-finalists, this panel will discuss students' experiences with these programs and include a brief project introduction, the application process, Q&A, and recommendations and tips for interested applicants. Projects include: On the Unique Roles of Neurocomputational States in Neocortical Circuits; Discovery and Engineering of Exceptionally Potent Biological Inhibitors of Infections; Investigation of Rule 73 as a Case Study of Class 4 Long-Distance Cellular Automata; Investigating the Cellular Roles of the RanBP2 Protein; Online Adaptive Frequency Hopping

PROFESSIONAL SPEAKERS

Auditorium

Smithsonian Institution's 3D Digitization Project, Matt Hoffman, Education Specialist, Smithsonian Institution, Adam Metallo, 3D Digitization Officer, Smithsonian Institution
This fall the Smithsonian launched a charter collection of 3D digitized objects and scientific missions (3d.si.edu). It's now possible to analyze every angle of these objects, take true-to-life measurements, manipulate material properties, analyze cross-sections, and in some cases download and reproduce the objects in three dimensions. Join Smithsonian staff to learn about the technologies that made this possible, stories from the field, and future plans and challenges.

Room 128

Inventing Yourself--a ride to the top guided by a rocket scientist-attorney, Dr. Toby Hain, Patent Attorney, National Institute of Standards and Technology

Room 129

TJ Alumni at Micro strategy, Tammy Le (Class of 1992), Thuy Le (Class of 1993), Jeff Taylor (Class of 2001)
From college acceptance to professional careers: Discussion of lessons and experiences since graduating from TJ.

Room 132

Five States of Matter, Dr. Larry Bennett
Research Professor, George Mason University

Room 143

Spectrum, Spectrum Everywhere, But why is my tablet so slow? Mr. John Wong, Federal Communications Commission Chief, Engineering Division, Media Bureau

Room 220

CODIS- Forensic DNA, Dr. James Girard
Professor, Chemistry Dept., American University

Room 223

Hematopoietic Stem Cell and Blood Cancer, Dr. Dan Qi, Attending Physician, Inova Fairfax Hospital

Room 228-230

Overview of Electronic Health Records for Clinical Research, Mr. Randy Estes
Research Informatics Manager, MedStar Health Research Institute

Room 229

Emerging Environmental Science Careers in the Gulf of Mexico Region, Dr. Kim Waddell, Senior Program Officer, National Academy of Sciences

D: 11:20-12:05

SENIOR RESEARCH PROJECTS

Planetarium

Pyroclasm in the Mare Tyrrhenum Quadrangle, Catherine Shi, Alice Zhang
Learn about pyroclasm, one of the leading theories on how the geology of Mars formed. Volcanism in the southern hemisphere of Mars? How SCANDALOUS.

A Study of Nuclear/Extended Star Formation and Black Hole Accretion, Bridget Andersen
The purpose of this study was to establish a correlation between nuclear and extended star formation and black hole accretion in Seyfert II galaxies.

Measuring the Physical Properties of Comet C/2012 S1 (ISON) and its Evoluti, Tommy Lunn, Karen Xia
Do you want to learn about the origins of our universe? Come and learn more about the comet of the century, Comet ISON!

Inflated Lava Flows to the East of Mars' Tharsis Region, Connor Phillips
Interested in learning more about the Red Planet? Want to learn more about volcanoes? If so, come and learn about both during this presentation!

Room 101

Optimization of the Radon Transform in Tomographic Image Reconstruction, Rahul Majumdar
The radon transform is a crucial mathematical tool utilized in medical technology; through its optimization the project increases efficiency.

Orbital Tethers, Sreenath Are
An investigation into the non-Keplerian behavior of the orbits of tethered objects.

ACHIEVING PHOTON ENTANGLEMENT, Anudeep Mangu, Joey Valery, Andreas Butler
We'll show YOU entanglement. Dellving into the microverse of quantum oddity.

Room 102

The Effect of Folic Acid and Methotrexate on Leech Nerve Cord Regeneration, Kyle Alexander, Robert Kelly
Electrophysiology techniques were used to determine nerve cord regeneration in Hirudo medicinalis after damage and exposure to MTX and FA solutions.

Clash of the Colors, Andrew Burns, Harshita Nangunuri
Our experiment looks at whether color affects the dominance patterns and aggression in Procambarus clarkii through the use of mazes and paired fights.

The Effect of APOE-Genotypes on Dimerization and the Expression of AD, Robert Kelly
We established assays to detect APOE dimers in human plasma with APOE-3/3 and APOE-3/4 genotypes to look for a relationship b/w AD and dimerization.

Room 103

GC/MS, TLC, and DPPH Analyses of Essential Oils Extracted from Spices, Victoria Kim
Essential oils, derived from spices by hexane extraction, were analyzed with GC/MS, TLC, and a DPPH assay analysis for their compounds and properties.

Karats from Carrots: Green Synthesis of Gold Nanoparticles using D. Carota, Anwar Omeish, John Wilkes
This project experiments into the efficacy of D. carota as a reducing agent for tetrachloroauric acid in the synthesis of gold nanoparticles.

Using Quinine Quenching to Measure Chloride Concentration in School Water, David Liu
Applied previous research on quinine fluorescence to a novel, practical purpose: accurately analyzing school drinking water.

Room 113

Analysis of Genetic Variants in the APOE, BDNF, and CNTF Genes in ALS, Nithin Bala
An experiment to see if genetic variants in the APOE, BDNF, and CNTF genes affect the likelihood of having Amyotrophic Lateral Sclerosis.

Desensitization of nAChRs is responsible for nicotine-mediated weight loss, Peyton Randolph, Sara Quettawala
Investigating the mechanism by which nicotine induces negative energy balance and consequently weight-loss.

Localization of Apoptosis-Inducing Granzyme B in Septic Platelets, Ramandeep Mrwah
Acute sepsis-induced platelets express the protease Granzyme B. We aimed to localize the storage of Granzyme B to alpha-granules in septic platelets.

Room 114

Alcohol + Worms = Longer Life? Victoria Li, MiJue Kwon
Does ethanol affect the expression of DAF-16 protein and HSF-1 gene? Does it make worms live longer, and do mutant worms benefit more than the rest?

The Expression of miRNA-128 During Differentiation of Rat Neural Stem Cells, Yana Kaplun, John Panagides
These students combined their interests in neurobiology and biotech, using rtPCR to track miRNA 128 concentration levels as rat stem cell differentiated.

The Effect of Caffeine on the Glucose Metabolism of Sacharomyces cerevisiae, Adam Reiss
Caffeine, the most popular drug in the world, affects those with diabetes due to their altered glucose metabolisms. This model predicts its effects.

Room 115-Right

Solving Physical Puzzle Using Computer Vision, Jesse Judish
My project was taking the physical puzzle ""Thinkfun Tilt"" and having a computer be able to output a list of moves that successfully solves the puzzle.

Cyncher Search: A Platform for Social Data Classification, Muthuraman Chidambaram
A search engine for generating social approval ratings for brands, topics, etc.

HereReminders, Matthew Jiang
To increase flexibility and accuracy of scheduling applications, this android program considers both GPS location and time in event notifications.

Room 115-Left

Video Compression with a Tailored Optical Response, Steven Bunting
Explores combining video compression with video super-resolution for applications on Unmanned Aerial Systems. Extension of summer research at a FFRDC.

Analysis and Computation of Handwritten Mathematical Expressions, Tushar Govil
Expands the versatility of handwriting analysis by developing an application to recognize characters in mathematical expressions and compute them.

Development of an Automated Facial Detection System, Akhil Gangu
Introducing a new and simple way of detecting faces in static images through means of skin detection.

Room 116

Implementation of artificial movement through infrared motion tracking, Kirishnaprasad Jayaraj
The purpose of project is to create a robotic arm that will be able to mimic a user's movement by reading motion from an infrared tracker. (LEAP)

CAVE (Creation of Architectural Virtual Environments), Patrick Wang, Jose Acuna
A project involving the recreation of physical space into virtual space that can be later explored through virtual reality.

Design and implementation of a vision based tracking system in an automated, Tess Muss, Ye Seo
Our project is to create a device that would take a live action stream of a game autonomously to aid in sports photography and videography.

Room 117

ACL Rehab: Reconstructed, Taylor Yohe
Design and implementation of a personal rehabilitation device for exercises after orthopedic knee operations.

Underwater ROV Design and Implementation, Venkata Kankala, Vincent Liu
Exploring the deep blue sea through the design and implementation of an underwater remote controlled vehicle (ROV).

Never Rebound Again, Andrew Fountain, Nikhil Garg, Elizabeth Woods, Kia Eskandarian
Come learn about the most advanced basketball return system of all time! It follows you on the court and puts the ball right where you want it to be.

Room 118

Representing Real-time analog signals on a digital OLED display, Stephanie Ngoc-Lan Hoang
By using digitizing and sequencing techniques, an analog signal is converted into a compatible digital format for the display.

A Near-Field Magnetic Induction System for Radio Frequency Identification, Quinnlan Sweeney
A Radio Frequency Identification(RFID) system was built using near-field magnetic induction methods to shape a platform for future research.

Room 119

Implementation of Solar Array to Solar Car, Wesley Poon
My job was to electrically implement the solar array to the solar car to either charge or assist the car battery in the car.

Regenerative Braking, Aditya Goodala
Exploring the effectiveness and reliability of a flywheel based, regenerative braking system in an electric car.

Fast Food Fuel, Alexander Monahan, Daniel Noh
Our project used vegetable oil from a variety of restaurants to fuel the engine of a car.

Room 126

Dangerous Dinos Cause Harmful Algal Blooms, Sunny Song, Syeun Ko
Studying the relationship between nitrate levels and protein output of a dinoflagellate species which causes harmful algal blooms and poisoning.

Lobsters as Lab Rats, Megan Man
Isn't Noise Pollution a Bit Shellfish? Determining the effect of acoustics on one of America's most important crustaceans.

The glue that costs billions: Barnacles, Caroline Shoaibi, Tara Gupta
""You and me baby are stuck like glue-"" but how strongly? We investigated whether nitrates affect the strength of barnacle adhesion.

Room 141

Disabling of the toxA gene of Pseudomonas aeruginosa, Sara Shan
The disabling of the virulent toxA gene of P. aeruginosa, a bacterium that infects the lungs of cystic fibrosis patients, and its health implications.

The Effect of Inflammation on Aging of Drosophila melanogaster, Victor Shen, Ye Seo
Three different strains of E. coli were tested to trigger inflammation in D. melanogaster and cause the expression of ""domeless"" to accelerate aging.

How plant color is affected: Light Intensity and Anthocyanin biosynthesis, Felix Chen
Being able to regulate the anthocyanin pathway will allow us to see how light intensity can affect plants.

Room 145

Microsimulation of Traffic on Interstate-66, Jason Huang
A project on how cars interact on a straight road while dealing with heavy concentration of congestion. This applet is controllable by a user.

Sentiment Analysis of Book Reviews, Jocelyn Huang
A program able to determine the sentiment (positive, negative, or in between) of book reviews.

Search Spec Unification, Michael Kramer
Search specification has remained virtually unchanged since 1995. This project investigates unifying and extending the different search paradigms.

Room 217

Computational Neuroscience: Modulations in Fast Object Recognition, Jay Herbert
Decreased attention, increased performance? Exploring neural mechanisms behind vision during multitasking and the relationship to conscious awareness.

Image Processing in a Hadoop Distributed Computing Cluster, Larry Hensley
A look into using the leading Big Data solution, Hadoop distributed computing, to process images in record time.

The Effect of Removing Links in a Graph on its Spectral Radius, Kyu Kim
The goal for this research is to analyze the effects of removing links in a network on the epidemic threshold.

Room 218-219

Construction of a line following RC Car, Zartosht Ahlers
I constructed and assembled an RC Car controlled by an on board Servo with the ability to follow a white line at the speed of a 4:30 mile.

Effects of Thermal Insulation on Temperature Stability, Helen Chen
How long can insulation help maintain a certain temperature in a room? This project investigates the effectiveness of insulation on heating efficiency.

The Road to Better, Safer Batteries is Paved With Zinc, Matthew Wattendorf
New zinc ""sponge"" technology has allowed us to surpass many of the short-comings of Li-ion batteries, allowing for safer and smaller products.

IBET PROJECT PRESENTATIONS

Room 120

The Effect of the Proximity to Water on the Number of Deer Pellet Groups. Matthew Heninger, Jillian Khoo, Vishal Tandale, Andrew Zhang
This presentation explains that as the proximity to water increases, the number of deer pellet groups will increase.

The Effect of Phosphate Concentration on the Number of Ambystoma maculatum Egg Masses. Isabelle Gallagher, Keerthi Puvvada, Alvand Moini, and Thomas Lai
This presentation examines the effect of phosphate concentration on Ambystoma maculatum (Spotted Salamander) egg masses at different vernal pools.

Biochar… Agriculture's Next Star? Sam Libberton, Jamie Do, Rohan Suri, and Jonathan Buchinsky
This presentation measured the effect of soil remediation using biochar on runoff water quality.

Room 123

Analyzing E.coli: The Effect of Centrifugal Forces on E.coli Reproduction: Arun Singh, Vibhav Badrish, and Ankush Joshi
This presentation demonstrated that as the centrifugal forces increased, the number of E.coli colonies decreased. The results indicated an enzyme was optimal at a certain centrifugal force.

The Effect of Water Depth on the Egg Mass Count of Ambystoma maculatum: Natasha Shukla, Jessica Wang, Rupali Dhumne, and Hiranya Kamdar
This presentation describes the relationship between water depth and the number of spotted salamander egg masses.

Bamboozled: The Invasion of the Dirt Snatchers: Alvin Shi, Ryan Helmlinger, and Nila Selvaraj
This presentation describes the effect of various fast-growing plants on the growth rate of Phyllostachys aurea.

Room 125

Investigating Memory Transfer: Cannibalism in Planaria: Ruchi Maniar, Pranavi Nara, Nikita Sawant, and Sneha Suresh
This presentation describes the effect of type of food on reaction times.

The Effect of Vegetation on the Oviposition of Ambystoma maculatum: Gregory Bastian, Colin Chung, Ilwoo Kim, and Kirubel Aklilu
This presentation conducted a study at Mason Neck Wildlife Refuge testing which plants A. maculatum attaches its egg masses.

Acid worms? Ari Anugu, Kevin Jo, Maya Omais, Molly Smullen
This presentation describes the effect of pH on the rate of regeneration of planaria.

Room 130

Caffeine and Stridulation: A Study of Acheta domesticus: Sofia Kruszka, Audrey Park, and Elizabeth Hu
This presentation describes the effect of caffeine on the average pitch of the chirp of the house cricket.

The Effect of Temperature on the Migration of Ambystoma maculatum: Immalla Chen, Anusha Holavanahali, Sunny Truslow, and Bilol Tulamirza
This presentation studied the effect of temperature on the migration of Ambystoma maculatum to and from breeding ponds.

Tree's a Crowd: Jasper Barnett, Arjun Guidroz, Juhyung Park, and Clara Fontaine
This presentation utilized satellite imagery to observe the density of coniferous trees at varying latitudes.

Room 131

Investigating Stem Cell Activity: A Study on the Effects of Growth Colony Stimulating Factor on Planaria Regeneration Rate: Chris Liu, Laura Chu, Ryan Bolton, and Joseph Park
This presentation describes the effect of growth colony stimulating factor on planaria regeneration rate.

Fluorescent waters: Kana Griffin, Sojung Kim, Eric Wang, Andrew Yoder
This presentation describes the effects of phosphates on dynoflagellates.

Mass Effect: Savana Hadjipantelli, Hannah Kim, Landon Chu, and Kaleb Marioghae
This presentation measured the effect of NPK fertilizer on the change in mass of worms.

Room 136

An Analysis: The Investigation of the Effect of Ethanol on D. magna Heart Rate: Suzie Bae, Carly Klebine, and Jessica Wang
This presentation demonstrated that as ethanol concentrations increased, D. magna heart rate significantly decreased.

Hot waters make it stressful: Jonathan Cao, Hriday Rangaraju, Christine Wang
This project describes the effect of temperature on Daphnia**.**

The Effect of Forest Type on Deer Pellet Counts: Jacob Adolphe, Deepak Gupta, Joanne Lee, Summer Powers
This presentation hypothesized that if forest types are compared, the number of deer pellet counts in coniferous forests will be greater than the number of pellet counts in deciduous forests.

Room 146

Investigating Temperature and regeneration: a study of planaria: Nikolas Damalas, Chris Cao, and Chris Jin
This presentation demonstrated that as temperature approached room temperature, regeneration increased.

The Effect of Hurricane Isabel on Deer Population: Jabili Angina, Joya Bhattacharyya, Tim Cho, Devon Wood-Thomas
This presentation hypothesize that the period after the hurricane will have reduced deer population.

Paving the Way to a Clean Future: Shrikant Mishra, Daniel Haseler, Victoria Li, and Tatiana Bennett
This presentation measured the effect of proximity to roadways on nitrate and phosphate levels in water.

Room 147

A Study on the Effect of Light Intensity on Regeneration Rate of Planaria: Sai Samayamanthula, Josh Cummings, and Emma Glass
This presentation found that light intensity did not significantly increase the regeneration rate of planaria.

The Effect of Humidity on Salamander Migration: Stephanie Chen, Emma Cuddy, Nikhil Daga, and Isabel Gomez
This presentation studied how the migration of Ambystoma maculatum is affected by humidity.

The Effect of Distance from Water on White Tailed Deer Distribution in Northern Virginia: Radhika Agrawal, Victoria Bevard, Josal Patel, Giancarlo Valdetaro
This presentation hypothesize that as the distance from water decreases, the deer distribution increases.

Room 148

Coco Makes a Seed Go Loco: Cody Miller, Divya Shan, Hayden Dux, and Shreya Medepalli
This presentation measured the effect of zeatin, a growth hormone, on the shoot growth of radish seeds.

The Effect of Vernal Pool Depth on Dispersion of Ambystoma maculatum egg masses: Brian Bae, Seung-ho Bae, Ashwin Srinivasan, and Ashvin Venkatesan
This presentation studied the effect of vernal pool depth on the dispersion of Ambystoma maculatum egg masses at Mason Neck State Park.

The Shocking Potential of Algae: Caelan Barranta, Jacob Fondriest, Bryan Lee, and Rebecca Mays
This presentation explored how algae can be used as an electrical power source in microbial fuel cells.

Room 150

The Effect of Road Proximity Over Time on the Distribution of White-Tailed Deer as Determined by Deer Pellet Distribution: Violet Felt, Kevin Jiao, Molly Schindler, Nikhil Shirolkar
This presentation discovered that there is a statistically significant increase in the number of deer pellets in plots near the road over time.

Affects of a pool origin on its macroinvertebrate population: Ravi Kodali, James Ma, and Robert Velasco
This presentation studied the effects of pool origin on macroinvertebrate population.

It's Always Greener on the Other Wavelength! Numan Khan, Nick Lee, and Jessie Shen
This presentation explores the use of different wavelengths emitted on plants on the amount of carbon dioxide absorbed.

DESIGN CHALLENGES

T-1: Balloon Cantilever, Build a balloon structure at the edge of a desk that holds a softball away from the desk as far as possible.

T-2: Rube Goldberg, Create the most complex design that starts with a marble being placed in a slot and ends with a marble in a cup

T-3: How Long Will You Stay Up? Design and build a boat out of straws and plastic wrap that can hold 30 pennies for at least 10 seconds before sinking.

T-4: Lego Engineering, Build the longest Lego bridge that can carry the most weight.

T-5: Domino Demolition, Build a path of dominoes that takes the longest time to collapse.

PANEL DISCUSSION

Auditorium

So You Want to Open Up the Final Frontier,
Carlos Niederstrasser, Master Systems Engineer, Orbital Sciences, Stephanie Bednarek, Government Affairs Manager, SpaceX, David Johnson, VP/General Manager, Honeywell Technology Solutions, Inc.

Room 127

One Question Panel, Tara Abrishami, Anusha Saga, Mimi Nguyen, Tina Joseph, Jessica Wu, Archis Bhandarkar, Sahitya Allam, Thuy-Vi Nguyen, and William Woodruff
Learn more about One Question projects Mythvestigations and iGEM Team

Room 151

Science in the Service of Diplomacy, U.S. Department of State, Dr. Kyler Turner and Ms. Grace Park

PROFESSIONAL SPEAKERS

Room 128

Air Traffic Management (ATM) Modernization, Mr. Donald Kauffman, Senior Technical Manager, Honeywell Aerospace, Mr. Michael Olive, Honeywell Aerospace

Room 129

The Northeast Maglev, Mr. Robert Kiernan, Senior Director, The Northeast Maglev

Room 132

Wildlife Conservation in the Anthropocene: New World, New Approaches, Dr. Steven Osofsky, Executive Director, Wildlife Health Wildlife Conservation Society

Room 133

Steal This Show, Mr. Brendan Murray, Senior Counsel for Technology Federal Communications Commission

Room 135

Cybersecurity Threats and Opportunities in the Age of Hyperconnectivity, Mr. Glenn Brunette, Senior Director, Cybersecurity, Oracle Public Sector

Room 143

Spectrum, Spectrum Everywhere, But why is my tablet so slow? Mr. John Wong, Federal Communications Commission Chief, Engineering Division, Media Bureau

Room 216

Smithsonian Institution's 3D Digitization Project, Matt Hoffman, Education Specialist, Smithsonian Institution, Adam Metallo, 3D Digitization Officer, Smithsonian Institution

Room 223

Hematopoietic Stem Cell and Blood Cancer, Dr. Dan Qi, Attending Physician, Inova Fairfax Hospital

Room 224

Creating an Entrepreneurial Life, Mr. Luke Chung, President, FMS, Inc.

Room 226

Physical Therapy: an overview of clinical and research opportunities, Mr. Eric Anson, Physical Therapist, Graduate Research/Teaching Assistant, Cognitive Motor Neuroscience Lab, University of Maryland

Room 225-227

Our Task, Dr. Gerald Barney, Executive Director, Our Task

Room 228-230

Overview of Electronic Health Records for Clinical Research, Mr. Randy Estes Research Informatics Manager, MedStar Health Research Institute

Room 229

Biomedical Research, From Bench to Bedside, Dr. Lauren Moffat, Laboratory Director, MedStar Health Research Institute, Firefighters' Burn and Surgical Research Lab

E: 12:50-1:35

SENIOR RESEARCH PROJECTS

Planetarium

A Comparison of TrES-3b Light Curves to Determine Exoplanet Characteristics, Shayna Hume, Emma Puranen

An exploration into exoplanets, through comparing light curves generated from 115 images taken of TrES-3b's transit at Kitt Peak National Observatory.

Using Multi-Spacecraft Observations to Determine AKR Emission Structure, James Sullivan

Auroral Kilometric Radiation (AKR) is geophysical plasma radiation that occurs along with the aurora and has an impact throughout the solar system.

Room 101

An Optogenetic Approach for Seizure Therapy, Parag Shukla

Optogenetics, a cutting-edge neuroscience research technique, utilizes light-sensitive neuronal proteins to control activity of epileptic seizures.

A Shocking Reflex, Michelle Chen, Allison Cindy Ko

We investigated the effect of Serotonin, a chemical implicated in movement, on the sensitization of the Gill-Siphon Reflex in Aplysia californica.

Memory in the Mindless, Srikanth Chelluri

Is memory structural or dynamic? We look at the necessity for metabolism in memory maintenance in tardigrades, or water bears.

Room 102

Typing with Brains: Future of Brain-Computer Interface, Anirudh Surumpudi, Surya Gourneni

Through your EEG waves, you can control the world around you without you ever moving a muscle. We show you how to control a computer through typing.

The Truth About Lie Detectors: Using EEG to Develop a P300-Based Lie Detect, Priyanka Raju, Tarun Prabhala

Criminals are now learning ways to beat the traditional polygraph lie test. Our new ""fool proof"" method of lie detection uses EEG as an alternative.

Diminished antioxidant defense compromises neurite outgrowth, CheyAnne Rivera

Decreased antioxidant defense in mitochondria via TxnRd2 pathway may play a major role in abnormal cortical connectivity and dendrite outgrowth.

Room 103

Silver Nanoparticle-Enhanced Chemiluminescence and Square Wave Voltammetry, Tushar Maharishi, Emily Schneider

After encountering difficulties with voltammetry, we transitioned our project to analyze luminol chemiluminescence boosted by silver nanoparticles.

Investigating pH Dependency Of Biosorption Of Metal Ions By Blue-Green Alga, Miranda Callahan, Maria Psarakis

Exploring the potential pollutant remediating applications of the amphoteric biosorption process with colorful solutions and tasty green algae.

Remediation of Fracking Water using Permeable Reactive Barriers, Anthony Skaff, Andrew Zhang

Using permeable reactive barriers to remediate ""fracking"" water contaminated during the hydraulic fracturing process.

Room 113

Effects of Ascorbic Acid on a Sickle Cell Disease Animal Model, Ravikant Pattapagala

The project investigates the pro-oxidant state present in Sickle Cell and the response of several blood parameters to treatment with ascorbic acid.

Association of Single Nucleotide Polymorphisms with EHS and Measures of V02, Rahul Ramraj

This project seeks to identify genetic markers, specifically single nucleotide polymorphisms, associated with EHS characteristics and measures of V02.

Mystery Gene: ANO5 and its Role in Limb Girdle Muscular Dystrophy, Soumya Mishra
This project was focused on understanding the role of the Anoctamin 5 (ANO5) gene in human skeletal muscle cells and the correlation of ANO5 to LGMD.

Room 114

Hoarse "Heave-y" Horses, Jennifer Du, Sanjana Epari
Come learn about asthma like symptoms in horses, called heaves and how a particular gene plays a role in the disease.

Isolating and Exploring C. elegans Stem Cells, Jonathan Lin
C. elegans stem cells can be isolated from their eggs. Once obtained, the cells provide a great model for studying stem cell biology.

SOS: The Effect of RecA Inhibitors on Resistance to Quinolones in E. Coli, Lucy Chu, Grace Chuang
Our study examines whether inhibiting the SOS response pathway in E. coli will cause loss of resistance to four antibiotics.

Room 115-Right

Lynk – A Microblogging Service for iOS, Samuel Ober
How your favorite sites like Twitter and Tumblr handle millions of users at a time and how Lynk keeps you secure during your online experience.

Offline Handwriting Recognition, Victoria Xia
Neural Networks for Character Recognition: This project explores the use of neural networks in converting scanned images of handwritten characters into editable text.

Collection Optimization through Genetic Algorithms, Akshay Mishra
This project uses genetic algorithms to optimize the can collection algorithm of a virtual robot with vision/memory limitations in a 10x10 grid.

Room 115-Left

Pupil Mapping and Side Scrolling, Arno Chang
Created a software to track eye movements and move the screen accordingly, which can be useful for handicaps or for convenience.

Improving the Reliability of Independent Component Analysis, Daniel Abraham
Independent Component Analysis is a commonly used method in analyzing functional MRIs. My project addressed the inherent problems with this process.

Facilitating Effective Single-Human Multiple-Robot Command and Control, Kabir Brar
The purpose of this project was to develop a SHMR C&C computer interface based on the cognitive model of human operator overload developed at NRL.

Room 116

Aerial Tracking Camera, Arjun Balaji, Andrew Holsten, Edward Chung
Explore the world through the eyes of a bird yet, through the eyes of a human. Witness the spectacle that is the quadcopter.

High-mobility Robotics through 3D-Printing, Cyrus Tabrizi
Developing a terrain-adapting robotic platform that uses a novel 3D-printed drivetrain to achieve better performance than conventional configurations.

Design and Implementation of a Treaded Stair Climber, Erik Haukenes
Presentation will cover the design process behind creating a treaded stair climbing vehicle.

Use of a low friction air bearing as a means to reduce friction for travel, Victor Wang
This presentation will explore the use of a air bearing as a means to reduce friction/ increase efficiency for travel compared to the systems of today.

Room 117

The Design and Implementation of an Electromagnetic Ski Pole, Alexander LeFloch
In order to more safely attach a ski pole to a skier's hand, an electromagnetic tethering system was created to prevent hand and wrist injuries.

Come Here If YOU CAN'T RIDE A BIKE, Brian Pangilinan
The implementation of a unique training wheel which incorporates a shock absorber to not only balance the rider, but also make the ride smoother.

The Design and Implementation of a Gantry System, Jamie Kim
A double gantry system can solve a core problem many researchers encounter when extricating data from tanks: contamination.

Room 118

"Stick to Sheet: Creating sheet music with drumstick-mounted accelerometers, Caleb Goertel
Utilizes MEMS accelerometers to capture the motion of a drumstick and digitally processes that data to generate sheet music based on notes played.

Designing an Inertial Tracking System for Use in Virtual Reality, James Simon
Designing an Inertial Tracking System for Use in Virtual Reality

Room 119

Testing the Efficiency of Magnetic Propulsion, Christopher Haseler
Analyzing the power consumption and efficiency of magnetic propulsion methods through coils.

Solar Plane, Florencia Son, Homer Baker, Roshan Sajjad, Stephanie Bao
The presentation of an airplane that is partially powered by solar energy, and the research involved with creating this airplane through powerpoint.

Testing the Blended-Wing-Body Design, Nicholas Jones
Comparing the Blended-Wing-Body (BWB) aircraft design to standard models with regards to speed, maneuverability, and other aspects.

Room 126

Fighting Nature with Nature: Anti-fouling Properties of Algal Extracts, Emily Zhou
Examining a more eco-friendly way of combating biofouling by applying macroalgal extracts to cultures of the freshwater diatom, Navicula pelliculosa.

Synthesis of Gold Nanoparticles using Sargassum wightii and Sodium Citrate, Hana Chan
An evaluation of whether the marine macroalgae Sargassum wightii is a viable reducing agent in the formation of gold nanoparticles.

Ocean Acidification: The Other CO2 Problem, Christopher Chen, Valery Nguyen
Can phytoplankton and satellite data be used to indicate a fundamental change in seawater chemistry?

Room 141

As Simple as Acid and Base? Manipulating Gastric Cancer Proliferation, Niharika Dar
My Senior Research project aims to measure the effect of changes in the pH level of stomach acid on the proliferation rate of gastric cancer cells.

The Identification of Biomarkers for Metastasis in Neuroblastoma, Albert Andrews, Maran Ilanchezhiian
Come for an intellectual presentation and discussion on how we helped discover biomarkers for metastasis in neuroblastoma.

Detergent or Not? Aarthi Prakash

This presentation studied the effects of detergent components on migrative ability of breast cancer.

Room 145

Finding Minimal Energy Use Paths Through Gravitational Fields, Martha Ann Shields
This project uses simulated annealing to approach an optimal energy path through a gravitational field using a weighted graph.

Movie Trend Analysis and Box Office Prediction Model, Alex Aulabaugh
A data mining/analysis project to find out exactly what makes movies successful and predict the success of future movies.

Optimization of Traffic In Hallways, Andy Sin

Room 217

Improving the data capacity of QR Codes, Chandan Singh
This project aimed to add the data storage capacity of QR codes by adding multiple colors and by changing their shape.

Mapping United States Geological Survey Data on an Android Platform, Vishal Talasani
This project analyzes data from the United States Geological Survey. It primarily deals with caching and processing large amounts of information.

IBET PROJECT PRESENTATIONS

Room 120

We're Growing Grass. Sanji Bhavsar, Daniel Kweon, and Jashan Matharoo
This presentation measured the effect of simulated acid rain on grass height.

The Effect of Average Pool Depth on Macroinvertebrate Count. Grey Golla, Charles Zhao, Wonseok Song, and Christopher Niu
This presentation studied how average pool depth affected macroinvertebrate abundance in vernal pools at Elizabeth Hartwell Mason Neck National Wildlife Refuge.

The Effect of Tree Density on Deer Pellet Groupings. Siddhartha Edara, Sahana Epari, Chris McGowan, Andrew Wang
This presentation described that areas with higher tree density will contain higher counts of deer pellet groupings

Room 123

Psychedelic Shrimp on Acid: Dana Scheetz, Jenny Kim, Dakota Do, and Sean Tran
This experiment tested the effect of pH on shrimp behavior and survival rate.

The Effect of Algae Symbiosis on the Mass of Spotted Salamander (Ambystoma maculatum) Eggs: Aditya Jayanti, Shivam Kollur, Nam Tran Nguyen, and Sneha Ravi
This presentation studied the presence of algae and its effects on the mass of spotted salamander (Ambystoma maculatum) eggs at Mason Neck State Park.

Noisy daphnia: Tess Alexander, Maya Khanna, Bayliss Wagner, Gerald Wu
This presentation describes the effect of sound on daphnia.

Room 125

The Effect of Tree Density on Deer Pellet Counts: Vivian Dong, Jack Schefer, Alex Wang, Luke Young
This presentation found that the presence of more trees per hectare increases the amount of deer pellet groupings found.

The Effects of Road Presence on Ambystoma maculatum Egg Mass Count: Michelle Cao, Harshitha Ravichandran, Saivardhan Mada, and Seorin Jeong
This presentation studied the Ambystoma maculatum egg mass counts in pools at High point II and Woodmarsh to determine whether the presence of a road has any harmful effects on the salamanders.

Salty worms: Devan Kowdley, Rishab Sriramoju, Swati Srivastava
This presentation describes the effect of salinity on planaria.

Room 130

Season That Thing! Patticha Vitsupakorn, Brian Yu, Joseph Chong, and Elise Holford
This presentation tested the effect of salinity on ghost shrimp behavior and mortality.

The Effect of Vernal Pool Water Acidity on the Egg Mass Count of Ambystoma maculatum: Ankith Rao, Edward Tyles, Jenny Ran Zhang, and Sarah Zhou
This presentation studied the effect of water pH on the egg mass count of spotted salamanders.

The Effect of Water Proximity on the Number of Pellet Groupings of Odocoileus Virginuanus. Joseph Berger IV, Andrew Kim, Rayana Matin, Vikram Shivakumar
This presentation noted that the frequency of deer pellet groupings increases significantly as the distance from water decreases.

Room 131

Water the Effects? Selina Cheng, Anoop Kalra, and Alex Fried
This presentation tested the effects of adding nutrient fixing plants to hydroponically grown tomatoes.

Investigating Centrifugal Force and the Regeneration Rate of Planaria: Nicole Carrillo, Sishaar Rao, Matt Jennings, and Danny Guo
This presentation describes the effect of increased centrifugal force on the regeneration rate on planaria.

Roofs Greener, Cities Cleaner: Akanksha Alok, John Feng, Kristen Halper, and Nikash Sethi
This project explored the capabilities of different plant species to regulate internal temperatures of houses.

Room 136

Foods and bugs: Ashutosh Aryal, Arad Jain, Vanessa Na, Clare Stevens
This project describes the effect of on the metabolic rate of crayfish.

The Effect of Vegetation on Egg Masses of Spotted Salamanders: Aaryan Balu, Timothy Chan, and Rudra Dasgupta
This presentation examined the relationship between amounts of vegetation and the number of salamander egg masses in a vernal pool.

The Effect of Temperature on Monthly Deer Population: Prabhav Bhaumik, Brittney Fogg, Soonyong Park
We hypothesize that as the average monthly temperature decreases, the deer population will decrease.

Room 146

PHuN Chemicals: Ragavi Murali, Andrew Ahnn, Jiying Qi, and Jayant Subramanian
This presentation measured the effect of wastewater chemicals on the dissolved oxygen production of Elodea densa.

The Effect of Air Temperature on the Breeding Migration of the Spotted Salamander Ambystoma Maculatum: Shruti Anant, Jonathan Burkle, Amritha Justin, and Subul Malik
This presentation studied the effect of air temperature at Mason Neck Wildlife Refuge on

the migration of A. maculatum (the spotted salamander) into the vernal pool.

Planarians overexposed: Caroline Cox, Jenna Greenwalt, Bailey Knight, Caroline Nguyen
This presentation describes the effect of UV light on planarians.

Room 147

The Effect of Ground Saturation on the Migratory Responses of Spotted Salamanders: Alana Hull, Eleni Georgiou, Alexandra Soccio-Mallon, and Steven Rehard
This presentation investigated the correlation between ground saturation and the migratory patterns of spotted salamanders.

Lettuce Explain: L.P. Pham, Danny Wu, and Nora Thompson
This experiment measured the effect of carbon dioxide supplementation on lettuce plant growth.

The Effect of Varying Levels of Nitrate on the Quantity and Mass of the Egg Masses of Ambystoma maculatum: Suhoon Oh and Jack Stone
This presentation studied the effect of varying levels of nitrate on the quantity and mass of the egg masses of Ambystoma maculatum.

Room 148

Survival of the Fittest: Aquatic Plants in Water Pollution: Evan Lien, Abigail Shoemaker, Seungweon Park, and Tiffany Sun
This presentation tested the ability of various species of aquatic plants to improve water quality.

The Effect of Submerged Branches on the Oviposition of Ambystoma maculatum: Jelena Liu, Sharon Kim, Sarah Koo, and Yashna Verma
This presentation studied the amount of egg masses of Ambystoma maculatum attached to submerged branches found in Mason Neck State Park.

The Effect of Varying Aluminum Concentration of Egg Mass Count of the Spotted Salamander, Ambystoma maculatum: Saurav Velleleth, Bryce Onozuka, Ria Sonawane, and Mina Nowroozi
This presentation investigated the correlation between aluminum concentration in water samples and spotted salamander egg mass counts per square meter pool area.

Room 150

It's Grown On Me: Sweta Prabakaran, Varun Patel, Stephanie Zablocki, and Asha Cheruvu
This presentation measured the effect of environmental temperature on the rate of regeneration of planaria and the potential implications it could have for the future of stem cell research and the treatment of degenerative diseases.

The Effects of Deicing Salts on the Demography of Vernal Pool Breeding Amphibians: Matthew Gross, Jacob Nash, and Chad Constatine
This presentation studied the conductivity in roadside pools versus those near forest pools.

Water bears under the influence: Nakul Dar, Kevin Geng, Rehan Madhugiri, Brandon Wang
This presentation describes the effect of alcohol on tardigrades.

DESIGN CHALLENGES

T-1: Balloon Cantilever, Build a balloon structure at the edge of a desk that holds a softball away from the desk as far as possible.

T-2: Rube Goldberg, Create the most complex design that starts with a marble being placed in a slot and ends with a marble in a cup

T-3: How Long Will You Stay Up? Design and build a boat out of straws and plastic wrap that can hold 30 pennies for at least 10 seconds before sinking.

T-4: Lego Engineering, Build the longest Lego bridge that can carry the most weight.

T-5: Domino Demolition, Build a path of dominoes that takes the longest time to collapse.

T-6: Dat's Dots: Build the tallest tower out of pieces of gum drops that can stand on its own for 30 seconds.

T-7: Jenga Challenge: Build the highest tower with the Jenga blocks.

T-8: Egg Drop: Design a safety mechanism to protect an egg from breaking when it is dropped from a certain height.

PANEL DISCUSSION

Room 127

One Question Panel, Kyle Alexander, Sid Sivakumar, Seong Jang, Ryan Morris, Aliana Gungor, Joe Broom
Learn more about One Question projects Neuroinspire, Mural Club and Full STEAM Ahead

Room 135

Words of Wisdom from TJ Alumni, Courtney Dressing, Rachel Dillensnyder, Dr. Kevin Gormley and Brendan Murray

PROFESSIONAL SPEAKERS

Auditorium

Presentation by The Honorable LaDoris G. Harris, Director of the Office of Economic Impact and Diversity, U.S. Department of Energy

Room 128

Endeavorist.org: How YOU can democratize science, Dr. Steve Lewis, Co-founder Endeavorist LLC

Room 129

Wildlife Conservation UAV Challenge, Dr. Aliyah Pandolfi, Founder/CEO, Kashmir World Foundation

Room 132

Nicola Tesla, Dr. Dragon Momcilovic, Veterinary Medial Officer, FDA

Room 133

Seas the Opportunity! Lisa Wu, Director, TJHSST Oceanography Lab, Katie Valery, Senior TJHSST

Room 143

Saving the World's Languages from Extinction, Dr. Terence Langendoen, Expert, National Science Foundation, Vanessa Lazar, Science Assistant, National Science Foundation

Room 151

Archaeological Conservation: Using Science to Preserve History, Ms. Katherine Ridgway, Conservator, Virginia Department of Historic Resources

Room 220

NASA Spinoffs, OPTIMUS PRIME and You! Mr. Darryl Mitchell, Senior Technology Manager, NASA Goddard Space Flight Center

Room 223

How to Engineer a Net Zero Building, Mr. Raj Setty, President PE/CxA, Mr. Matt Pastore, Director of Engineering Sciences, Setty and Associates International

Room 224

The Intersection of Healthcare and Computer Science, Dr. Odysseas Pentakalos Chief Technology Officer, SYSNET, International, Inc.

Room 229

Mitigating automation complacency with non-invasive brain stimulation, Mr. Brian Kidwell, Doctoral Student, Psychology Department, George Mason University

F: 1:45-2:30

SENIOR RESEARCH PROJECTS

Room 101

RBM39's Role in the Stress Response and Cellular Proliferation, Sara Eve Felsen
Brain tissues exposed to alcohol express more RBM39 than non-exposed tissues. See how this change in expression could alter cellular processes.

Dysfunctions of Mitochondria in Schizophrenia, Sindhura Kolachana
This study aimed to understand the role of mitochondria in schizophrenia in order to identify pathways that could be implicated in this disorder.

Defining Cortical Column Organization Abnormalities in TSC1 +/- Mouse Model, Snigdha Srivastava, Yoojin Kook
This study aims to define abnormalities in the columnar distribution of neurons in the cerebral cortex of mice models for Tuberous Sclerosis Complex.

Room 102

Attentional Resources on Theory of Complacency, Joseph Kannarkat
Using tDCS, we tested the theory that individuals become complacent due to the cognitively taxing effect an activity has on a person.

A Study of Meta-Strategy and Mixed Strategy Equilibria in Game Ecologies, Jason Jun Kim
An Experimental Study of Individual Meta-Strategy and Mixed Strategy Equilibria In Multiple Game Ecologies.

Communication Development of Autism Spectrum Disorder, Nihita Manem
Autism Spectrum Disorder causes impaired social skills. A primary step to creating a behavioral model is to understand when social interactions start.

Room 103

Removal of Copper Ions Using Oxidized Multiwalled Carbon Nanotubes, Julie Kim, Andrew Yang
Water contamination by metal ions is a growing environmental concern. Recently, oxidized multiwalled carbon nanotubes have been used to remove metals.

Synthesis & Analysis of Antioxidant Activity & Structure of Propyl Gallate, Jung Huh, Lilly Nowlakha
A study on the antioxidant power and structural properties(and the relationship between these two characteristics)of the food additive propyl gallate.

Green Synthesis of Coumarin Derivatives with the Pechmann Condensation, Emma Gee, Nita Takanti
Coumarins have a wide variety of applications, from cosmetics to pharmaceuticals. The Pechmann condensation was tested as a way to synthesize them.

Room 113

Discovery & Engineering of Potent Biological Inhibitors of MERS-CoV & H7N9, Tina Ju
Presents the first antibodies against these emerging viruses and a new class of antibody-based therapeutic against all type I fusion protein viruses.

Synchronizing GLUT4 and TfR Trafficking Using the RUSH System,
Wendy Wu
The objective was to create TfR and GLUT4 RUSH constructs and observe their sorting in HeLa cells and adipocytes at the trans-golgi network (TGN).

Effects of CASZ1 Knockout on the Embryonic Heart Development of Mice, Yu Chen Wang
In order to address the issue for a need of a cheap, versatile leg-prosthetic, a novel prosthetic was designed based on the principle of gait-symmetry.

Room 114

With the Daphnia I drugged and I'm like, forget you - oo oo ooo, Melissa Le, Priya Raju
Every 67 seconds, someone in the United States is diagnosed with Alzheimer's Disease. Come learn about the battle between Ibuprofen, Daphnia and Nd4.

RNA-Mediated Silencing of CDK5 in Parkinson's Disease in SH-SY5Y Cells, Neha Agrawal, Nadege Aoki
We aim to determine if siRNA is a viable method of inhibiting the expression of the Cdk5 gene which has been linked to symptoms of Parkinson's disease.

3D Printed blood vessels and their resistance to blood pressure, Nidhi Gandhi
What's one thing that is needed in the world of artificial organs? Artificial blood vessels. How can they be made in a student lab? 3D Printing.

Room 115-Right

A Voice Based Desktop Manager, Jonathan Colen
An application that uses voice input from users and executes the commands on screen, while over time adapting to the user's voice and speaking style.

Passive Non-Invasive Breathing and Heart Monitor, Mira Holford
My project creating a device that uses a noninvasive, remote sensing technique continuously to monitor breathing and heart activity.

Modeling Large Data Sets with 3D Audio, Nathan Dass
In this research project, 3D audio was used to enable the user to almost naturally turn to the parts of the galaxy that the user is interested in.

Room 115-Left

An Agent-Based Model for the Outbreak, Spread, and Containment of TB, Parth Chopra
This project explores the use of a dynamic computing technique to investigate TB epidemiology dynamics and containment strategies within a population.

Video Feed from Compact Source to a Smartphone, Ankit Goyal
In this presentation, I demonstrate how to capture and send a video feed from a compact source to an Android-based smartphone.

Individual Meta- & Mixed Strategy Equilibria In Multiple Game Ecologies, Navya Kambalapally

We used SECOND LIFE and LSL Scripting to program appropriate stochastic game environments in order to collect data from human subjects with fMRIs.

Room 117

Fanwing Aircraft Demonstrator, Luke Barbano
A radical approach to employing the fullest potential of an airfoil's surface by using a large crossflow fan in place of conventional lift mechanisms.

The Design And Creation Of A Radially Expanding Table, Tabitha Timm
The purpose of this project was to create affordable space-saving furniture similar to the Fletcher Capstan table, but at 1/500th of the price.

Flywheel Bicycle, Adam Sulucz, Raeford Penny
A bicycle with a flywheel that stores kinetic energy.

Room 118

FPGA Implementation of Real-time Stereo Vision, Daniel Stiffler
A fully-configurable and real-time platform for stereo vision (depth perception) processing using cameras and a field-programmable gate array (FPGA).

A Novel Beamforming Approach to Stereo Sound, Samuel Rohrer
Development of a new method for creating a true audio image for a tablet device using DSP and beamforming implemented in both simulation and hardware.

Room 119

Design and analysis of a coaxial wind turbine system, Richard Mirsky-Ashby
An analysis of the advantages of a coaxial wind turbine vs. a conventional turbine.

TJ3Sat: A CubeSat Experimental Satellite, Rohan Punnoose
TJ3Sat is a joint project between TJHSST and industry partners to design and build a CubeSat satellite as a tool for educational outreach.

Electric Go-Kart Conversion, Thomas Stone, Connor Hennessy-Niland, Nebeyu Daniel
A presentation on our electric go-kart conversion, as well as engineering challenges/ environmental benefits of a global shift to electric vehicles.

Room 126

Using Biomimetic Inspiration to Create a Whaley Efficient Glider, Krista Opashi-Ong, Caitlin Kim, Gloria Cho
Humpback whale flippers provided inspiration for biomimetic wing design for an autonomous under water glider.

Marsh Madness: Nutrient Flux in Dyke Marsh, Adam Friedman, Kiwoong Kim, Michael Qu, Benjamin Stoyen, Jennie Yun
Come explore the nutrient dynamics of Dyke Marsh on the Potomac in relation to sedimentation in order to determine the health of the marsh.

Room 141

The Effect of 3-D Tumor Model Shape on Susceptibility to Chemotherapy, Aparajita Sur, Nisha Swarup
Discover how 3-D engineered tissues differ from conventional 2-D cell cultures in reaction to a chemotherapy drug.

Urine for a Treat: Development of a Urinary Antigen Test for Celiac Disease, Christine Mayuga
The goal of this study was to develop a new diagnostic test for celiac disease that is more reliable because of nanoparticle and western blotting.

The Effect of Stages of Type II Diabetes on Level of Betatrophin Expression, Christin Park, Wendy Guo
Can the recently discovered betatrophin hormone lead to a cure for type 2 diabetes? Find out its mRNA expression levels in 3T3-L1 adipocytes!

Room 145

Flower Recognition, Alexandra Zytek
A project using image recognition techniques to provide a user with the most likely species of an input flower image.

Simulated Quantum Computing, Cameron Ewell
The basics of quantum computing: its mathematical foundations, its applications, and simulating it via a special programming language.

Mashup Hub – Music Crowdsourcing, Daniel Fontenot
A website created to serve as a link hub and archive for songs of the Mashup Genre.

IBET PROJECT PRESENTATIONS

Room 123

The Effect of Time, Temperature, and Precipitation on Spotted Salamander Migration: Benjamin Lyons, Akhil Madhugiri, Chris Jiang, and Ruyan Zhang
This presentation explored the correlation of environmental factors to spotted salamander migration.

Impacts of Road Deicing Salt on the Population Size of Vernal Pool-Breeding Amphibians: Minh-Quan Nguyen, Stephen Campbell, Rishabh Venketesh, and Samuel Damashek
This presentation measured the count of spotted salamander egg masses at various distances from the road to determine if road deicing salt has a significant impact on embryo development.

Pass the Salt (and Daphnia): Sania Ali, Roma Chitko, Rahul Batra, and Justin Lee
This experiment measured the effect of road de-icing salt on the heart rate of Daphnia magna.

Room 130

Grow Under the Glow: Nathaniel Choe, Pallavi Bhave, Raman Khanna, and David Hansen
This presentation investigated the difference in nitrate uptake and growth of plants grown under different lights.

The Effect of Road Proximity on Spotted Salamander Egg Mass Count: Brittany Csik, Gabriela Gresenz, Ramya Ravi, and Jennifer Steele
This presentation compares the egg mass counts in roadside versus woodland vernal pools.

Sound and Movement: A Study of Crawfish: Eric Malani, Ajith Sumesh, Nickash Sivakumar
This presentation describes the effect of sound intensity on the distance that crawfish move.

DESIGN CHALLENGES

T-1: Balloon Cantilever

T-2: Rube Goldberg

T-3: How Long Will You Stay Up?

T-4: Lego Engineering

T-5: Domino Demolition

T-6: Dat's Dots

T-7: Jenga Challenge

T-8: Egg Drop

T-9: Balloon Cantilever

T-10: Rube Goldberg

T-11: How Long Will You Stay Up?

T-12: Lego Engineering

T-13: Domino Demolition

T-14: Dat's Dots

T-15: Jenga Challenge

T-16: Egg Drop

T-17: Balloon Cantilever

T-18: Domino Demolition

PANEL DISCUSSION

Room 146

Women in STEM Panel, hosted by Northrop Grumman Information Systems, Ms. Mimi Chen, Systems Engineering Associate, Ms. Kathy Moon, IT Program Director, Ms. Heather Newlin, Director of Programs, Ms. Amanda Rogers, Software Engineer, Mrs. Nirmala Sundararaman, Software Engineer

Room 225–227

Siemens Competition Regional Finalists, Jessica Wu, Wilson Zhou, Jeffrey Liu, Tim Cha
Hosted by Siemens Competition regional finalists, this panel will discuss students' experiences with this program and include a brief project introduction, the application process, Q&A, and recommendations and tips for interested applicants. Projects include "Surface Chemistry Tuning of Molecule Adsorption on Two-Dimensional Materials" and "Rapid and Simple Chemiluminescent Biosensor for Early Diagnosis of Cancer."

PROFESSIONAL SPEAKERS

Room 128

Wildlife Conservation UAV Challenge, Dr. Aliyah Pandolfi, Founder/CEO, Kashmir World Foundation

Room 129

One Question Panel, Simran Rohatgi, Mason Chee, Katie Cox, Ryan Morris
Learn more about One Question project TEDxTJHSST: Drive

Room 132

Strange New Worlds: In Search of New Life & New Civilizations, Ms. Courtney Dressing Graduate Student, Harvard-Smithsonian Center for Astrophysics

Room 135

Air Traffic Management (ATM) Modernization, Mr. Donald Kauffman, Senior Technical Manager, Honeywell Aerospace, Mr. Michael Olive, Honeywell Aerospace

Room 136

Experiences in Health IT, Mrs. Rachel Dillensnyder, Technical Lead and Software Engineer, The MITRE Corporation

Room 143

Saving the World's Languages from Extinction, Terence Langendoen, Expert, National Science Foundation, Vanessa Lazar, Science Assistant, National Science Foundation

Room 147

Physical Therapy: an overview of clinical and research opportunities, Mr. Eric Anson Physical Therapist, Graduate Research/Teaching Assistant, Cognitive Motor Neuroscience Lab, University of Maryland

Room 148

Visualizing Data for Better Decisions, Dr. Kevin Gormley, Lead Engineer, The Mitre Corporation

Room 150

Steal This Show, Mr. Brendan Murray, Senior Counsel for Technology, Federal Communications Commission

Room 151

Archaeological Conservation: Using Science to Preserve History, Ms. Katherine Ridgway, Conservator, Virginia Department of Historic Resources

Room 220

Invention and Innovation, Dr. Jack Pevenstein, Technology Transfer Advisor, National Institute of Standards and Technology

Room 223

How to Engineer a Net Zero Building, Mr. Raj Setty, President, PE/CxA,
Mr. Matt Pastore, Director of Engineering Sciences, Setty and Associates International

Room 224

The Intersection of Healthcare and Computer Science, Dr. Odysseas Pentakalos Chief Technology Officer, SYSNET, International, Inc.

Room 226

Northrop Grumman: A National Leader in Health Information Technology, Dr. Sam Shekar, Chief Medical Officer, Northrop Grumman

Room 228–230

Creating an Entrepreneurial Life, Mr. Luke Chung, President, FMS, Inc.

Room 229

Mitigating automation complacency with non-invasive brain stimulation, Mr. Brian Kidwell, Doctoral Student, Psychology Department, George Mason University

TJHSST Floor Plan