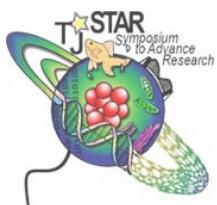




TJ STAR SYMPOSIUM THOMAS JEFFERSON HIGH SCHOOL FOR SCIENCE AND TECHNOLOGY



June 2, 2010
6560 Braddock Road,
Alexandria, Virginia 22312

CONTENTS

tjSTAR SYMPOSIUM TO ADVANCE RESEARCH

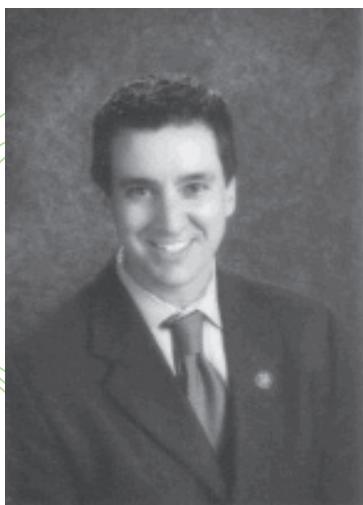
A day to celebrate all things research!

04
05
06
07
08
09
10
14
17
20
23

-Welcome letter from **Dr. Evan Glazer**, Principal
.....Biography of Keynote Speaker, **Chef José Andrés**
.....tjhst **One Question**
.....thanks to our **sponsors**
.....acknowledgements
.....**overview** of tjstar
.....concurrent **sessions**
.....B
.....C
.....D
.....E

thank you to all of our attendees!





introducing tjSTAR

DR. EVAN GLAZER PRINCIPAL

WELCOME to the second

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 freshman 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 sessions, students can attend interactive workshops, listen to expert speakers on panels, participate in design competitions, learn about One Question social responsibility 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!

KEYNOTE SPEAKER CHEF JOSE ANDRES



JOSÉ Andrés, a renowned Spanish chef, is a proponent of molecular gastronomy and food deconstruction. He introduced various avant-garde concepts into the restaurant and mini scene, and has been internationally recognized for the novel contributions. He has been dubbed "Chef of the Year" in 2006 by the Washington D.C. Restaurant Association and the "Best Chef Mid Atlantic" in 2003 by the James Beard Foundation, among a plethora of other titles and awards.

Chef Andrés started his cooking career at the School of Restaurant and Hotels of Barcelona, later extending his studies to the United States, where worked with Rob Wilder to transform Proximo restaurants into his current culinary team, ThinkFoodGroup.

Molecular gastronomy is the study of physical and chemical processes that cooking undertakes. Andrés has used this concept to innovate his culinary works. Some of his dishes include raw fish wrapped in

cotton candy and drinks that incorporate different layers of heat to enhance the flavor of the food. In a feature of 60 Minutes, Andrés proposed to "feed people maximum flavor with minimum quantity of food."

Andrés will teach a course this fall at Harvard University in culinary physics. Through cooking demonstrations such as making mayonnaise, Andrés will illustrate properties like emulsion - a liquid dispersed into another liquid. According to the Washington Post, for Harvard University, "it's a way to convince people that [science] is fun and that there's a lot of stuff we understand from a scientific point of view that chefs exploit," said David Weitz, a professor of physics who will co-teach the course.

As Chairman Emeritus for D.C. Central Kitchen, Andrés helps open opportunities for culinary education to the underprivileged. Andrés has also frequently appeared on TV programs, such as Bravo's "Top Chef" and Food Network's "Iron Chef." He currently resides in Maryland with his family.



TJHSST answers

ONE QUESTION

What if we all asked the same question?
What if we all answered it together?
How could a question change our life at TJ?
How could our answers affect the world beyond our building?

WHAT are the social responsibilities of educated people? The answer didn't come from a thesis paper or an essay- it came from all 1945 faculty and students at TJHSST.

The question, posed by Ian Ladner (class of 2012), was discussed through mock UN conferences, talked about during 8th period tea times, and explored in lectures by special guest speakers. The entire school took part- whether through reading and analyzing TJ's One Book, *Three Cups of Tea*, or participating in the first annual Service Week, established by

the school SGA. Some enrolled in a semester course, where they involved themselves in community projects and class discussions. Others took advantage of the One Question Grant to pursue projects that would benefit the TJ community.

Now, the TJ community is taking One Question even further- continuing the tradition, Raynor Kuang (class of 2013), has come up with the One Question for next year: "How can we maintain our individuality and creativity in an increasingly impersonal and technological world?" As students realized this year, anyone can help answer a question.

THANKS TO OUR SPONSORS

The generosity of our sponsor partners in their strong demonstration of support for tjStar is much more than a simple agreement to fund an event. It is an affirmation of the great expectations of business and 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 many partners in supporting the June 2nd research symposium and for their confidence in our school, its leadership and faculty, and our terrific students.

Battelle

The Business of Innovation

 **VeriSign®**

**LINCOLN
MILITARY
HOUSING**

Every Mission Begins at Home™

LOCKHEED MARTIN



NORTHROP GRUMMAN

ExxonMobil

BAE SYSTEMS

ART & JEWELRY EXCHANGE
OF TYSONS

SAIC
From Science to Solutions


CISCO™

ACKNOWLEDGEMENTS

The hard-working students, staff, parents, business partners and friends of TJ have come across the metropolitan area, and several from across the county, to dialogue, debate and challenge each other to seek scientific solutions to the problems of today. We are a community of learners, each with a responsibility to share our knowledge and experiences in the name of research. Senior Tech Lab Directors, IBET teams, mentors and individual teachers who have worked with students pursuing independent research opportunities outside of the classroom are to be commended for the fine job that they have done with our students. Other staff and community members have generously offered their time to lead workshops, organize panels, invite speakers, sponsor student clubs, and lend a hand to the countless tasks and committees that make a day like this possible. TJ's stars really shine!

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

tjSTAR Student Steering Committee: Serena Saffarini, Liza Miadzvedskaya, Marie French and Katy Williamson

tjSTAR Student Committee Chairs: Dean Shute, James Graham, Richard Garrett, Gireesh Reddy, Jahnnavi Madiraju, Natalie Cauley, Sara Suarez, Jin Kim, Pranava Raparla, Andrew Watson, Katie Lin, Kaylee Yocum, Michael Wattendorf, Stephen Seliskar, Ned Danyliw

tjSTAR webpage creators and curators: Jennifer Lee, Daniel Kang

Yearbook Adviser: Erinn Harris and Yearbook Staff

tjSTAR Faculty Sponsors: Betsy Sandstrom, Koji Otani, Shawn DeRose

FCPS Cluster III Office

TJ Partnership Fund

8th Period Office

TJ PTSA, Administrative Staff and Security Team

TJ One Question Committee

TJ Tech Team: Richard Washer

TJ STAR Overview of Schedule
June 2, 2010

CONCURRENT SESSIONS

A: 8:55-9:35

IBET PRESENTATIONS

Room 120

Salamander Census

This presentation describes the effect of natural and constructed vernal pools on the number of salamander egg masses present. (Cole Rosenberg, Robby Vasta, Michelle Wang, and Sharon Zhao)

The Good, the Bad, and the Green

This presentation evaluates the effects of green and shingled roofs on short term leaching of phosphate and nitrate nutrients in runoff. (Vamsi Budur, Priyal Gandhi, Spencer Gennari, and Colton Sears)

Death by Fertilizer

This presentation shows how aquatic environments are affected by the addition of a fertilizer, and how quickly effects of eutrophication become observable. (Marilyn Arwood, Alex Dalzell, Arlan Jaska, Alan Kulatti)

Room 121

Vitamin C: A Miracle Cure?

This presentation describes the effect of vitamin C concentration on the reproduction rate of *Daphnia magna*. (Arjun Nandra and Jingyi Zhou)

The Caffeine Conundrum

This presentation describes the effect of caffeine on the motor functions of *Gryllus pennsylvanicus*, crickets, and the possible effects on human health. (Bakhtiar Chaudry, Sean Kane, Patrick Maribojoc, and Amanda Nelson)

Don't Let It Leak!

This presentation describes the effect of different kinds of fertilizers on aquatic ecosystems. (Emily Barrett, Curt Kim, Sunny Kim, and Kathy Wu)

Room 123

Melatonin Magnifies Movement

This presentation describes the effect of melatonin on the activity rate of black planaria, *Dugesia dorotocephala*. (Annabelle Chang, Sarah Eltinge, Ga Eun Kim, and Gyeong Min Lee)

Lights, Camera, Salamanders!

This presentation describes our incorporation of a motion activated camera into a salamander gate. (Ilyuba Bolkhovitinov, Kartik Gupta, Namita Kansal, and Chloe Siebach)

Here Comes the Sun

This presentation describes the effect of different wavelengths of ultraviolet radiation on bacterial populations. (Amy Hwang, Charlotte Sheridan, Tom Hay, and Neeraj Ghandi)

Room 125

A Harmful Vitamin: A Limitation on Respiration

This presentation describes the effects of vitamin A on the rate of oxygen consumption in the water flea *Daphnia magna*, a common aquatic crustacean. (Suhas Gondi, Yash Bhatnagar, and Will Stalcup)

Commander Salamander and the Wee-Beasties

This presentation describes the effect of macroinvertebrate biodiversity on the number of salamander egg masses in a vernal pool. (Sam Hoffman, Jihun Kim, Naomi Naik, and Toni Stapleton)

How Many Sides Doe-s A Circle Have?

This presentation describes the effect of plot shape on the number of deer pellet groupings. (Crystel Calderon, Alex Dilaura, Imran Khan, and Paul Naanou)

Room 131

Egg Masses: Hanging on a Limb

This presentation describes the effect of branches on spotted salamander egg mass numbers. (Ryan Madani, Nicholas Mattes, and Patrick O'Connor)

Reaching for the Best Roof

This presentation describes the effect of different roofs on the internal house temperature under different conditions. (Hyae-In Seo, Nimish Todi, and Ian Lin)

Planaria Party

This presentation describes the results of adding phosphate to regenerating planaria and the potential implications on the future of advanced medicine. (Noah Bardash, Weldon Burrow, and Evaristo Koyama)

Room 146

The Seed That Never Sleeps

This presentation describes the effect of melatonin on *Brassica rapa* pollen production. (Himika Rahman, William Nuckols, and Daniel Matson)

Curry Conundrum

This presentation describes the effect of turmeric on the heart of ghost shrimp. (Kyle Angelotti, Rucha Bhat, Tarun Kalakoti, and Ben Sando)

Cloudy with a Chance of Clear

This presentation describes the effect of pond depth on the color (cloudy or clear) of *A. maculatum* egg masses. (Kirsten Cardinal, Andrew Draganov, Anu Goel, and Peter Price)

Room 148

Curry: Curing Cognitive Conditions

This presentation describes the effect of the spice turmeric on the spatial learning rate of brown planaria. (Mayank Mahajan, Prajal Bishwakarma, and Kevin Huo)

Escargot on Espresso

This presentation describes the effect of caffeine on the movement rate of Ramshorn snails and the possible correlation to human consumption of caffeine. (Acacia Dai, Christina Lee, Sekar Novika, and Harshini Pyata)

Keeping It Green Clean

This presentation describes the effect of different plants on water quality. (Kayuri Shah, Anna Li, Eric Lin, and Sravan Yeleru)

Room 150

pHreaky pH

This presentation describes the effect of pH level on the number of *A. maculatum* egg masses. (Kyle Alexander, Bobby Ends, and Ashley Hwang)

O Shoot! A Deer

This presentation describes the effect of controlled hunts on the number of white-tailed deer pellet groupings. (Marcus Prater, Emory Ruscus, Sajala Shukla, and Kevin Zeng)

Not So Silent Spring

This project describes the water quality of Donaldson Run in Arlington County, and its effects. (Julia Arthur, Karina Hemmendinger, Nick Hayes, and Nate McLean)

Room 151

Honey, I Forgot My Path: Does Caffeine Affect Memory?

This presentation describes the effect of caffeine on the memory of *Lymnaea stagnalis*. (David Rice, Harry Na, and Max Kanwal)

The Little Groupings of Pellets at the End of the Road

This presentation compares the effect of proximity to roads on the number of deer pellet groupings in a given area. (Ariel Berger, Shohini Ghosh, Virginia Hsu, and Katherine Lee)

Feasible Biodiesel

This presentation describes the effect of different kinds of diesel on engine output. (Akshay Murthy, Chris Piller, Kiffa Conroy, and Arya Dahal)

Trailer 1

Daphnia Soup

This presentation describes the effects of lead poisoning on *Daphnia magna* population growth. (Katharine Earl, Sarah Khatry, Justin Lee, and Cyrus Malekpour)

Would You Like Some Eggs with your Veggies?

This presentation describes the effect of the amount and type of vegetation on the distribution of spotted salamander egg masses. (Tom Beekhuysen, Joshua Chiu, Katie Lang, and Seongmin Lee)

Runaway from Runoff

This presentation describes the correlation between nitrate and phosphate levels in water and soil at Scott's Run in McLean, VA. (Lucy Bullen, Hope Flaxman, Suzy Mueller, and Saniya Suri)

Trailer 2

Learning While Yearning for Sleep

This presentation describes the effect of melatonin on learning rate of brown planaria (*Dugesia tigrina*). (Amy Chen, Tiffany Duong, and Sanjana Verma)

Pluggin' Up the Water

This presentation discusses the effect of dams on water quality. (Lina He, Kate Peng, Derek Wu, and Richard Chong)

Miracle Gro-ing Daphnia

This presentation investigates how adding liquid fertilizer to water affects daphnia's heart rate. (Kevin Au, Naveed Mostaghimi, Robin Sturm, and Saemi Han)

Trailer 3

Two Drops of GA3 for Me

This presentation describes the effect of gibberellic acid on the carbon dioxide consumption of *Brassica rapa*. (Caroline Kerr, Michelle Lee, Stephanie Nguyen, and Megha Vipani)

Please Don't Stop the Sound Waves

This presentation describes the effect of sound wave exposure on the height of *Sagittaria graminea*. (Victoria Hold, Aileen Huang, Shweta Kumar, and Brandon Zhang)

It's All About Location, Location, Location

This presentation investigates the effect of vegetation type on the amount of spotted salamander egg masses found in a vernal pool. (Nikhil Bayya, Margaret Engler, Samantha Hoegle, and Rachel Merriman-Goldring)

Trailer 4

Beat Around the Curve

This presentation describes the effect of potassium sulfate on the number of appendage beatings of *Daphnia pulex*. (Karina Charipova, Hun Sung (Ed) Lee, Romita Mandal, and Ji Soo Song)

Magic Macroinvertebrates: Meters of Marsh Wellness

This presentation describes macroinvertebrate diversity differences between natural and artificial wetlands. (James Bollinger, Robert Dioso, Kalki Seksaria, and Robert Wharton)

It's a Bug's Life

This presentation uses macroinvertebrates as a detection of water quality at local streams. (Andrew Jiang, Stephanie Levin, Eric Tao, and Kevin Xu)

Trailer 5

The Missing Citric Acid Planaria Hysteria

This presentation describes the effect of citric acid concentration on the regeneration time of *Dugesia tigrina* (Yash Maniar, Lauren Huang, and Daniel Edwards)

Do You Like Your Eggs Leafy?

This presentation describes the effect of leaf litter on the number of spotted salamander egg masses. (Kritika Chugh, Raynor Kuang, Rebecca Poch, Christopher Vrabel)

Golf Courses—Why Keeping Them Green Isn't So Green!

This presentation explores the use of fertilizer on golf courses and how it affects the local watershed's phosphate and nitrate levels. (Michaela Brown, Dhruv Bansal, Michael Cooper, and Michael Sheaffer)

Trailer 6

Beat It!

This presentation describes the effect of ammonium nitrate on the heartrate of *Daphnia magna*. (Ashrit Bagali, Jack Brown, Minh Bui, and Rohan Krishnan)

Do Salamanders Cheat?

This presentation compares the pond fidelity of the spotted salamander in constructed and natural vernal pools. (Kevin Cao, Vardaan Gurung, Christine Lucky, and Zach Moser)

Shocking Results From Smarter Planaria

This presentation describes the effect of electricity on the learning rate of *Dugesia tigrina*. (Thomas Board, Andrew Kim, and Arjun Malhotra)

ONE QUESTION PRESENTATIONS

Room 203

Educated People Educating Others (EPEO)

Kristina Horita

Socially-responsible.org

Mason Park

Room 205

School Supplies for Students with Cerebral Palsy in Shanghai

Helena Manguerra

Poverty Awareness and Prevention Month

Katie Mitchell

Human Rights Awareness

Sungmin Sohn

SENIOR RESEARCH PROJECTS

Planetarium

The Search for Irregular Type Ia Supernovae

Andrew B. Kim

Inflated Lava Flows on Mars (Team 1)

Brittany Borman, Nicole Bailey, William Manaker

Room 113

Construction of Bacteriophage Vectors for Gene Therapy of Cancer

Aaron Koenig and Arjang Navab

The Effect of Cyclopamine on the Growth of Osteoblasts

Alexandra Mellis, Sheila Borkar

Room 114

DNA Bar Codes in *Iris atropurpurea*: A Molecular Approach to Taxonomy

Justine Huang; Lisa Nam

The Effect of Cholinesterase Inhibitors on the Heart Rate of *Oryzias latipes*

Juyeon Park and Linda Zhang

Room 126

The Effect of Triptolide Concentration on the Viability and Apoptosis of MCF-7 and MDA-MB-231 Breast Cancer Cells

Madeline Byrd

The Effect of Oxybenzone in Commercial Sunscreens on the Expression of Vitellogenin in *Danio Rerio* Adult Males

Maretta Fan, Katie Mitchell

Room 104

Beam Splitter

Alan Allworth

Harnessing the weather: Alternative Renewable Energy for the Future

Aldo Avanzini

Room 103

Synthesis and Characterization of Biomarker-Harvesting Hydrogel Particles

Anirudh Mohan

The Synthesis of Quantum Dot Enhanced Photoelectrochemical Cells

Pranav Aurora, Adil Dittmer, Eric Westman

Room 127

Development of a Microbial Desalination Cell Enhanced with Riboflavin

Ashwin Raja and Ellen Zhong

Analyzing Recycling Methods for Manganese and Zinc from Alkaline Batteries

Tyler Anderson, Ellie Roeva

Room 110-111

The Analysis, Justification, and Video Presentation of an Informational Cable Television Program

Ben Swanson

The Production and Analysis of Online Media in a Digital Age

Jennifer Schulz, Erica Bond

Room 115 (R)

Hallway Traffic Simulation

Benjin Dubishar

Smallpox Bioterrorist Scenario Modeling in Python

Joe Fetsch

Simulating the Spread of a Virus in a Modern Environment

Tyler Haines

Room 115 (C)

Simulating Traffic Congestion on Route 1

James O'Hara

Jefferson Integrated Media Initiative (JIMI)

Luke Bean, Andrew Imm

Cartesian vs. Polar in Predator-Prey Systems

Neelesh Shrivastava

Room 119

Design and Implementation of an Electric Golf Cart with Supplemental Power from Mounted Photovoltaic Cells

Alex Shmorhun

Capability of a Wind Turbine to Power a Small Home

Alice Lee

Determining the Viability of Wind Energy Technology in Train Tunnels

Amith Ananthram

Room 118

Electromechanical Relays

Judy Kim

Rectilinear Audio: Directional Sound from Ultrasound

Roman Averbukh; Lance Guthrie

Room 102

Role of Serotonin in the Sea Slugâ€™s Gill-Withdrawal

Reflex

Jasteena Gill, Alison Kosmacki, Mica Moore, Laura Quintela

Neural-Directed Wheelchair

John Anderson, Chris Heo, John Kim, Jonathan Sredl, Lydia Wang

Room 124

The effect of salinity on the feeding rates of the Aurelia aurita

Anne Marie Creighton and Annie Silverman
The Identification of Fish Species through DNA Barcoding
Ariel Deutsch, Hannah Lan, Priya Patel

The effects of salinity on polyp production in the jellyfish A. aurita

Madeleine Lemann

Room 101

Design and Simulation of Circuits for Computation Based Upon a Model of Spiking Neurons

Aviv Cukierman

Optimizing the Grid: A Study of Distributed Generation

Greyson Lewis

Electrostatic Charge Reduction Using Coatings on Metallic Rotors

Nader Al-Naji

Room 213

A Mathematical Model of Phyllotaxis

Daniel Li

Mapping Heart Sounds

Franklin Zhou

TSH and FT4 Reference Intervals

Luke Cheng

Room 117

The Production and Analysis of Online Media in a Digital Age

Erica Bond, Jennifer Schulz

Design of a Twenty-two Degrees of Freedom Robotic Manipulator Modeled After a Human Arm

Karl Sofinowski, Anna Lan

Room 116

Design and Implementation of an Autonomous Navigation System and User Interface for the TJ TourBot

David Ensey, Joel Heck, Jeremy Vercillo

Design, control, and implementation of a coordinated swarm of robots for a search and rescue mission

Jeff Pontell

Design and Implementation of a Local Fine-Precision Position and Guidance System

Jimmy Clark

SPEAKERS

Room 143

Wayne Plourde, CSC
Cloud Computing

Room 147

Dr. Harold Geller, George Mason Univ.
In Search of Exoplanets

Room 228-230

Peggy Maxon, Department of Homeland Security
Cybersecurity

Lecture Hall

Honorable Zachary J. Lemnios, Department of Defense
Defense Research & Engineering for Department of Defense

Room 232A and 232B (Sessions A,B,C)

Scott C. Kennedy, SAIC
Demo: Cyber Patriot

Room 145 (Sessions A-E)

Chheang Yang, Lockheed Martin
Demo: Prime Time Design

Room 243 (Sessions A-E)

TJ Math Team
Mystery Puzzle

Gym (Sessions A-E)

Gina Junio, Argon ST
Display: Recruiting Information

Holly Herro and Kristi Wright Davenport, Disappearing Ink
Demo: Ink Research Project

Dr. Gary Harris, Howard University
Demo: NanoExpress

Blake Ross, Lockheed Martin
Demo: 5th Gear

Kelvin Franklin, Northrup Grumman
Demo: Second Life

Paul Mitchell the School, Tyson's Corner
Demo: Hair for Oil

Alexander McGlothlin, Devan Samant, Jake Hermle, TJ CubeSat (Energy System)
Demo: How to Make a Satellite

Room 141 (Sessions A & C)

Brian Eckenrode, FBI
Forensic Challenges for Research

Room 207-208

Patti Curtis, Arundhati Jayarao, Steve Obenhaus
Lobbying is NOT a Dirty Word

Rooms 209-210 (Sessions A & C)

Kate Sheppard, Mother Jones Magazine
Politics of Global Warming

Rooms 218-219 (Sessions A & C)
Dr. Don Lewis Millard, National Science Foundation
From Guitars to iPods to Robots

Rooms 225-227 (Sessions A, C, & E)
Dr. Ananthakrishna Sarma, SAIC
Weather Forecasting and High Performance Computing

Room 217 (Sessions A & E)
Natalia Lerner, University of Virginia
Engineering: From High School to the Real World

B: 9:45-11:05

SENIOR RESEARCH PROJECTS

Planetarium
Direct Observation of Extrasolar Planets Using X-Band Radio Emissions
Hailey Arnold, Julia Hed, Sydney Schrider
Radio Observations of Jovian and Solar Activity Using a Single Dipole Antenna
Kamna Kathuria
Inflated Lava Flows on Mars (Team 2)
Kelsey Dressing, Kyle Ruempler, William Manaker

Looking for Gravity Lenses in the CMB
Nathan Harmon
Solar Activity and Radio Transmission in Earth's Ionosphere
Reed K. Martinko

Room 113
The effect of pyrethrin application on the nitrogen-fixing activity of Rhizobacteria populations in root nodules of *Medicago sativa*
Alicia Goertel
Proteolytic Susceptibility of D,L-peptides
Alicia Li and Minh Nguyen
Proximity Ligation Assay for Prolactin Receptor Interaction
Alyssa Mendoza
The role of SpoT in *Helicobacter pylori* pathogenesis
Amy Shiyi Yang
Expression and Purification of Recombinant Human Prolidase
Andrew Lending

Room 114
The Effect of UV Radiation on *Arabidopsis thaliana*
Kathryn Martinez, Danett Song
Enhanced Bioremediation of Gasoline-Contaminated Sites by Biostimulation with Oxygen Releasing Materials
Keturah James, Lauren Laffosse

The Effect of the Mothers Against Decapentaplegic Homolog 3 (SMAD3) Protein on Duchenne Muscular Dystrophy (MDX)
Kurtis Carlock, Ivy Choi

The Identification of Cancer Stem Cells in Human Glioma Cell Lines
Linda Chiang and Jinri Hong
The Effect of Cryptobiosis on *Hypsibius dujardini* Learning and Memory
Victor Hsu, Kevin Nguyen

Room 126
Modeling of the protein ENV found on the surface of HIV virions
Matt Lycas and Nicholas Nguyen
The effect of chimeric protein subunit expression on the development of synaptic plasticity and maturation of cognitive function in transgenic mice
Mohima Sanyal
Establishing a Common Genetic Link among Neurofibromatosis Type 1 and Juvenile Myelomonocytic Leukemia
Nikhil Prakash and Jayson Marwaha
Optimization of HIV-1 Membrane Protein Structures Generated by Cryo-electron Tomography
Patrick Gould, Byong Han Kim

Room 104
Design of an Outdoor Photovoltaic Workstation
Amanda Lew
Design of a Bakery
Amy Ruskin
Design of a Concert Hall with an Emphasis on Architectural Acoustics
Andrew Hendricks
3D Sports Boat Design
Arda Menzilcioglu
Design of a Sustainable Apartment Building with a Focus on Urban Agriculture
Caroline Odom

Room 106
Energy Efficient Boat
Sean Cheng
Soccer Stadium
Seung Hwan lee
Design of Energy Efficient And Energy Saving Ice Skating Rink
Soo Han
Design of a Hyperbolic Cable-Stayed Bridge
SungJae Park

Room 103
Rosemary Extract on the Inhibition of Lipid Oxidation
Asha Menon, Biqi Zhang
Powerpoint
Dan Wang, Jerry Liu
Using Chemical Spectroscopic Analysis to Develop an Ultraviolet/Infrared Heat Mirror
James (Mic) Byrne and Cara Newlon

Determination of Iron Concentrations in Soap Using UV/Vis Spectroscopy

Julie Hansen

Using Chemical Spectroscopic Analysis to Develop an Ultraviolet/Infrared Heat Mirror

Mic Byrne and Cara Newlon

IR Spectroscopy of Elastomers Under Tensile Strain

Xinyi Zhang

Room 127

Rate Law Determination: Dye Reaction with Hypochlorite Bleach

Amelia Friedman

Heavy Metal Biosorption By Algae

Claire Cowden

Permeable Reactive Barrier Reductant Metal Properties™ Efficiency in Remediating Groundwater

Jungeun Choi, Xu Yu Zeng

Analysis of Fibers using FT-IR and Raman Spectroscopy

Sherry Dai, Xiaonan Hu

Accessing Acidic Corrosion of Zero Valent Iron

Won Jun Kuk, Ewan Kay

Rooms 110-111

Instructional Digital Media: The Socratic Seminar

Catherine King

Design and Construction of a Highend Audiovisual Workstation

Danny Kim

Video Editing 101

Kelsey Johnson, Kathryn Zagobelny, Kathryn Zurowski

It's Not Easy Being Green

Simone Dallaire, Charlotte Hopkinson, Tori Stringfellow

Room 115 (R)

Tagging and Translating Latin Sentences

Andrew Runge

Learning to Classify Documents

Edwin Zhang

Multiple Objective ACO

Hong Zhou

Optimization of Business Location

Mendel Chen

Developing a Rigid-Body Educational Physics Engine

Neal Milstein

Exploring the use of Fuzzy Constraint Satisfaction Problems to evaluate the Happiness of Society.

Peter Ballen

Statistical Machine Translation (Spanish to English)

Raghav Bashyal

Word Play Generation

Vivaek Shivakumar

Complex Dynamic Cretaceous Ecosystem Simulation

William Yu

Room 115 (C)

Design of an AI optimized by a genetic algorithm.

Bharat Ponnaluri

The Implementation of a Glove-Based User Interface

Chris Carey

Applications of Artificial Intelligence and Machine Learning in Othello

Jack Chen

Automated Detection of Human Emotion

Jennifer Lee

Creating an Electronic Medical Records [EMR] System

Jeremy Chaikind

Neural Network Typing Authentication

Luke Knepper

Coverage Efficiency in an Autonomous Lawnmower

Mo Lu

Implementing Genetic Algorithms in a Financial Application

Nihaar Sinha

Machine Learning of the College Admissions Process

Sam Rush

40 Y/O Single M Looking for Fun

Sam Zhang

Room 119

Quantitative Assessment of Photovoltaic Intermittency: Comparing the Performance of a Geographically Dispersed Solar Array to a Centralized System

Arman Carter

Modification and Testing of a Conventional Combustion Engine to Run on Liquid Petroleum Gas

Ashley Miller

Design and Implementation of an Electronic Power Steering System for a Solar Car

Brian Weinstein

The Production of Bio-Fuel from Potatoes

Connor Cotton

Remotely Operated Vehicle

Dylan Drake, Franklin Zheng, Surbhi Gupta

Room 118

Development of an Energy Storage System Using Ultracapacitors

Daniel Higgins

Acoustic Beamforming Using a Linear Array of Microphones

Gloria Lee, Matthew Palko, Andrea Yun,

Horse Lameness Diagnosis with Accelerometers

Lee Kussmann, Dave Warrington, Lawrence Diao

Room 102

RhoGEF Trio regulates dendritic arborization via differential modulation of the actin cytoskeleton

Dennis Wang

Investigation of Serotonin's Role in Simple Learning with respect to the Withdrawal Response in Aplysia Californica

Emily Maier, Celeste Chong

Effects of Serotonin on the Response Latency Period of the Gill-Siphon Reflex in Aplysia californica

Joyce Chung and Jeanette Du

Remote Control of Behavior by Photoactivation of Channels in Zebrafish

Neelima Panth

Electrophysiology of the Medicinal Leech

Parker Johnson and Jennifer Park

A Concatenate Expression System for Refining the Expression Patterns of Existing Gal4 Enhancer-trap Lines in the Drosophila Visual System

Stephanie

Room 124

The Effect of Ethanol on Sonic Hedgehog Expression and Muscle Defects in Zebrafish Embryos

Arvin Ahmadi and Rachel Wu

An Evaluation of Water Quality in Areas of Variable Land Use Using Three Biotic Indicators

Candice Kremer and Megan Sagurton

The Effect of pH Changes on the Bioluminescence of the Dinoflagellate Pyrocystis lunula

Carolyn McKenna

A Study of Environmental Effects on Various Types of Coral

Carter Lockwood

The Effect of Water Quality and Coculture of Echinoderms and Red Abalone (Haliotis rufescens) on Abalone Growth

Christina Choi and Annie Laib

Room 101

Simulating Gradient Index Fibers

Amedee d'Aboville

Computer Generated Holography and Holographic Data Storage

Constance Mi

Exploring a New Approach to Calculating Temperatures from Spectra

Daniel Ranard

Photograph Correction through Computer Aided Optical Transformations

Haoyuan Liu

Improving the Functionality of a Laser Microphone

Mason Park

Room 213

Heating Effect of Gold Nanoparticles Using Radiowaves
Christina Doughty

Improving Tunneling with Insulating Thin Films

Grace Wang

Synthesis and Optimization of Silicon Nanowires

Jenny Yung

using gyromagnetic gold nanostars to measure viscosity

Tim Rauen

Room 117

Purifying your Water Quality Problems Away

Avnish Samraat Goel

Growing Plants With LEDs and Mirrors

Rachael Vogel

Research and Prototyping of Functional Training Equipment for TJ Athletics

Alex burch, Kyle Gutkowski, Max Kieff

The Design and Construction of a Solar Powered Model Boat

Amelia Gonzalez

Design of a Prototype Football Launcher

Jackie Sullivan, Alan Nguyen, Collin Hennegan

Room 116

Design and Implementation of an Autonomous Reconnaissance Robot Incorporating Video Relaying Capabilities

Anurag Shyamala, Kyle Applegate, Hung Nguyen

Design, Programming, and Testing of an Autonomous Airborne Search-and-Rescue Platform

David Mazzocco

Measuring Seismic Activity Using an Ultrasonic Sensor and GPS Receiver

Rebecca Friedman, Nora Lam

Automation and Propulsion used in Soccer Training

Sam Hoehn

A comparison of different robotic visual techniques for sight reading

Shane Sugianto

Automated Field Liner

Timur Aleshin, Kwame Ampeh, Ian Rappaport, Quantum Wei

SPEAKERS

Room 108

Catherine Didion, National Academy of Sciences

Issues Women Face in Science, Especially in Engineering.

Room 141

Nishan Dulgerian, FBI

Demo: Counterterrorism and Forensic Science/Research

Room 147

Ty Znati, Michael Branicky, Helen Gill, NSF

Panel: Cyber Physical Systems

Rooms 204-205

John Nowick, SAIC

Keeping Our Country Safe: How CIA Trains Its Analysts with Games and Multimedia

Room 203

Dr. Jack Pevenstein; Clara Asmail, National Institute of Standards and Technology

Inovation and Invention in Today's World

Rooms 218-219

Fred Darlington, Raytheon

International Border Control and Non-Proliferation of WMD

Lecture Hall

James Kohlhaas, Lockheed Martin

Energy for the Future

Room 217 (Sessions B & D)

Lisa Chong, Thornton Tomasetti

Structural Engineering: Bridge Building

Rooms 225-227 (Sessions B & D)

Brian Klock, Fitzpatrick, Cella, Harper, and Scinto

Protecting Intellectual Property

IBET PRESENTATIONS

Room 120

Tone-deaf Planaria

This presentation describes the effect of sound frequency on the reproduction of *Dugesia tigrina*. (Greg Anderson, Gabrielle Chen, Catherine Hong, and Sam Yoo.)

Salamanders Terrorized by pH Levels!

This presentation describes the effect of pH at the top and bottom of a vernal pool on the mortality rates of spotted salamanders. (Justin Hwang, Will Lewitus, Brittany Peck, and Kaley Thornton)

From Green to Clean

This presentation describes the effect of various natural resources that can be used as a filter on the water quality. (Sung Jin Kim, Seung Young Park, Alexander Boyd, and Sangwon Kim)

Room 121

Breathe Easy: No Cap on Caffeine

This presentation describes the effect of caffeine on the respiration rate of brown planaria (*Dugesia tigrina*). (Zacharia Hosseinpour, Jacob Doran, and Vivek Gorijala)

Acidity Morbidity

This presentation describes the effect of varying pH levels on the heart rate of *Daphnia magna* and the potential harms of acidification on aquatic ecosystems. (Isabella Liu, Jungwook Choo, Brian Shi, and Mei Pang)

Photosynthesize THIS!

This presentation describes the effect of the amount of growth medium on algae's production of hydrogen gas for use as an alternative, clean energy source. (Andy Loh, Bobby Fontana, Christopher Tam, and Daniel Fritzson)

Room 123

C the Stress Suppressor?

This presentation describes the effect of vitamin C on the oxygen uptake of fruit flies. (Sarah Graham, Tram-Anh Nguyen, Jacqueline Lee, and Pritty Dwivedy)

Oh Where, Oh Where, Have the Salamander Eggs Gone?

This presentation describes the effect of the depth of the vernal pool on the number of spotted salamander egg masses. (Jisu Park, Vrinda Shukla, and Angela Tuo)

Building a Quality Future

This presentation describes the effect of the construction in Tysons Corner on the overall water quality of nearby streams. (Molly Hemenway, Emmelyn Luu, Shreyan Patel, and Jake Shankman)

Room 125

Squeaky Sounds Send Speedy Snail Mail

This presentation describes the effect of sound frequency on the motor skills of Periwinkle snails (*L. littorea*). (Morgan Cheatham, Ghazal Rashidi, Avinash Ramesh, and Ethan Voytko)

Nitrate Nemesis

This presentation describes the effect of ammonium nitrate on the growth of Ramshorn snails, and the possible effects on other marine life. (Nancy Ding, Andrew Freix, Dennis Lysenko, and Ceci Vollbrecht)

Itty Bitty Critters

This experiment compares the biodiversity of macroinvertebrate populations in constructed vs. natural vernal pools in southern Fairfax County. (Alec Brenner, Deanna Buttarro, Patrick Dinh, and Jiyoung Kang)

Room 131

Growing Masses in Acid Worlds

This presentation describes the effect of acidity on the growth rate of a hard shelled clam (*M. mercenaria*). (Clara Guo, Panya Vij, and Jennifer Wang)

Sleeping Snails

This presentation describes the effect of melatonin on the movement of land snails and the possible effects on human health. (Mairead Bartlett, Cody Silverman, and Ellen Song)

I'll Take My Eggs Acidic

This presentation describes the effect of pH on the number of spotted salamander egg masses. (Mig Gebril, Rashad Laher, Sebastian Lerner, and Josh Stein)

Room 146

A Myth Enlightened

This experiment describes the effect of ultraviolet radiation (UV) on the reproduction of photosynthetic green hydra (*C. viridisima*). (Keshav Mantha, Uj Heiertz, and Sangbum Lee)

The Curious Case of the Stationary Snails

This presentation describes the effect of electromagnetic radiation on snail movement. (Collin Berman, Min Cheol (Michael Kim), and Ben Roodberg)

iBox

This presentation describes our improvements on the preexisting salamander counting device. (Zachary Ho, Justin Kim, Alan Wei, and Thomas Zanger)

Room 148

Outstanding Oranges Do Nothing for Regeneration

The presentation describes the effect of vitamin C concentration on planaria regeneration rate. (Jane Berkowitz, Molly Chheathe, Sandy Le, and Adelaide Song)

Is It Clean? Let's Ask the Bugs!

This presentation describes the use of macroinvertebrates as an indicator of water quality. (Christine Galloway, Parker Won, Takeshi Mochida, and Allison Chou)

Saving the Planet; One Roof at a Time

This presentation describes the effect of plant variation on runoff water quality. (Jenny Peng, Matt Conley, Parshwa Shah, Navya Kandukuri)

Room 150

Take a Gander at a Salamander? Eggs-actly!

This experiment observed the change in ratio between clear and opaque colored spotted salamander eggs over time. (Emily Bartlett, Kira Guth, Hninn Lwin, and Malaika Murphy-Sierra)

Uncovering the Forest Cover Story

This presentation describes the effect of forest cover on the presence of white-tailed deer. (Ben Hsu, Rishi Khanna, Salim Najjar, and Eddie Zhao)

Killer Cell Phones

This presentation describes the effect of electromagnetic radiation on the life span of Daphnia magna. (Reese Frerichs, Niara Lezama, Quark Wei, and Yihemba Yikona)

Room 151

A Sweet Deal

This experiment describes the effect of sucralose, an artificial sweetener, on planaria regeneration rate. (Daniel Ni, Nipun Singh, Paul Bentz, and Andrey Napalkov)

C the Difference?

This presentation describes the effect of vitamin C on the growth rate of brine shrimp. (Emily Aldrich, Saloni Chaswal, Alec Grieser, and George Wang)

Nitrogen, The Bio-Bomb

This presentation describes the effect of nitrogen on the heartrate of daphnia. (Ryan Pillai, Samuel Dallstream, and Vicky Moon)

Trailer 1

Hot or Cold: What's the Trigger?

This presentation describes the effect of soil temperature on the migration of the Spotted Salamander and the potential impact on the amphibian population. (Sid Anche, Andrew Eu, and Anand Prasanna)

Oh Deer! More Road Kill?

This presentation details the distribution of white-tailed deer in relation to roads in the Mason Neck refuge. (Tahmina Achekzai, Pierce Eggan, and Luke Waddell)

Clean and Green

This presentation describes the effect of plants incorporated into a green roof on overall water quality. (Anna Pelletti, Richard Young, Alex Mohrman, Victor Shen)

Trailer 2

Drunk as an Irishman

This study describes the effect of ethanol on the balance of an ant. (Mookie Goodson, Darren Bolduc, and Austin Ralls)

Ditch Your Classes Lets Find Some Egg Masses

This presentation describes the effect of the position of egg masses in vernal pools on the number of egg masses. (Karen Clark, Amanda Infeld, Rena Mazur, and Rashi Sahai)

Raise the Green Roof

This presentation describes the effect of roofing material on home temperatures. It also explores the potential reduction on heating and cooling costs to reduce the amount of energy consumed per household. (Taylor Culman, Neil Jassal, Diana Li, and Keenan Temin)

Trailer 3

Getting Groovy with UV

This experiment describes the effect of UVB light on the reproduction rate of red worms (*Eisenia foetida*). (Dan Kim, Tony Reiter, and Bobby Huddleston)

Deep-Dwelling Salamanders

This presentation describes the effect of water depth on spotted salamander egg mass concentration. (Shiva Ambardar, Scott Gibson, David Shin, Billy Swift)

Why Did You Put Your "Business" Here? Location, Location, Location

This presentation describes the effect of forests and meadows on the presence of white-tailed deer population. (Amy Ahn, Jeffrey Fang, and Schyler Pa)

Trailer 4

Regeneration: an Enzyme Balancing Act

This experiment describes the effect of sulfuric acid on the regeneration rate of planaria (*Dugesia tigrinia*). (Emily Kelly, Carolyn Carrithers, and Aayushi Agarwall)

The Fec-ocious Hunt

This presentation describes the effect of coniferous vs. deciduous forest types on the presence of white-tailed deer pellet groupings. (Niraja Bohidar, Geoffrey Greenwalt, Alexander Kim, and Ian McConnell)

The Fast and the Furious

This presentation tests how the velocity of the flow of water affects water quality. (Andrew Tao, Jenna Pollock, Amanda Hicks, James Jang)

Trailer 5

Deer Densitree

This presentation describes the effect of tree density on the number of deer pellet groupings. (Natalie Cheng, Katie Ho, and Michelle Wang)

Bad Water Bugs Me!

This project focuses on the effect of pollution on the biodiversity of benthic macroinvertebrates, as well as how water quality plays a key role in determining the health of a body of freshwater. (Julia Anderson, Carrie Sun, Matthew Swanhorst, and Daniel Anderson)

Polluted Waters

This presentation describes the effect of water current on the average turbidity of a stream. (Bohe Hosking, Kun Liu, Carlisle Wishard, Daniel Min)

Trailer 6

They Pooped in Vain, Those Deer in the Rain, Too Bad Their Pellets Won't Remain This presentation describes the effect of precipitation on the presence of white-tailed deer pellet groupings. (Anthony Uitz, Nathan Kodama, Sameer Srivastava, and William Lucht)

The Difference Between a Monastery and an Airport: Water Quality

This project describes the factors contributing to specific elements vital to aquatic life and the potential effect on the local environment. (David Chu, Soojin Jeong, and Hans He)

The Hazard of the Hazards

This presentation describes the effects of golf course runoff on water quality. (Christine Freund, Christopher Mercado, Shahida Mizan, and Thuc Tran)

ONE QUESTION PRESENTATIONS

Room 203

Environmental Resource Club (Melissa Reardon, Nicole Boyd)

Green Education

Photography for Families

Hunter Merrill

Lighting the Future with Technology!

Karishma Popli

Room 205

Los Ninos en la Republica Dominicana

Burke Deutsch, Victor Weiss, TJ Ayuda

Africa Goes Solar

Kathleen Atkatch

Composting Trash to Save the Earth

Nand Kishore, William Lucht, Neeraj Ghandi

SENIOR RESEARCH PROJECTS

Planetarium

Detection of Extrasolar Planets Using C Band Radio Emissions

Joseph Scholle, Matt Lamb, Amer Ahmed

Geological Wonder: Dunes on Polar Caps of Mars

Kyung Min Chae

The Analysis of the Differences in FR I and FR II Radio Galaxies with Confirmed Jets

Ranjani Sarma

Room 113

The Effect of siRNA on Silencing the VCP/p97 Protein in Cystic Fibrosis Cells

Andy Mai; Grace Merkin

Quantification of Paraoxonase Activity In Animal Serum

Anh Dao

New Models for Learning and Memory in Juveniles

Jonathan Hsu

Room 114

The effect of the histone deacetylase inhibitor trichostatin-A on dystrophin deficiency in cardiac muscle cells of male zebrafish (*Danio rerio*)

Frederick Ghandchi, Vandana Kumar

Extent of Hybridization of Wild Tundra and Trumpeter Swans

Hannah Clark

Room 126

Study of Pharmacophore of Multidrug Resistance-linked ABC Drug Transporters

Salini Hota

Characterization of Human Embryonic Stem Cell (hESC)-derived Neuronal Cell Types

Sherie Zhou

Room 104

Designing an Environmentally Friendly Fencing Academy

Chantal Montrose

Design of a Green College Residence Hall

Cheng Xu

Room 106

Design of a Synagogue

Sarah Notis

Design of a Piano

Sarah Stalcup

Room 103

Analyzing the Effect of Gelation Temperature on the Pore Size of Sol-Gel Matrices Using Visual Spectroscopy

Dahan Choi

Analysis of Biodiesels Produced from Different Oils Using Heterogeneous Catalysts

Lam Bui, Kristina Brant

Statistical Analysis of Geochemical Concentration and Industrial Pollution in Sediments of Bohai Bay Area

Sharon Yin

Room 127

Optimization of silver-based substrates for low-power Raman surface enhancement

Jimmy Wu, Brian Rud

The Production of Biodiesel from Microalgae

Megan Falls, Anna Mazur

Comparing biodegradability of lubricants of different compositions

Minsik Jun

Rooms 110-111

The Effect of Varying Visual Stimulus on Memory of Personal Narratives

Cassie Black and Adrea Jackson

Applications of Music Technology

Kennan Murphy-Sierra, Danny Kim

Room 115 (C)

Tracking in Persistent Surveillance

Adam Mounts

The Statistical Analysis of Gut Microbiota In *Mus Musculus*

Fecal Matter

Alex Tran

Applications of Fourier Analysis in Image Recovery

Kang Guo

Enhancing the Enlargement of Images

Tara Naughton

Room 115 (R)

Application of Computer Vision in Security

Kyle Ferris

Applications of Neural Networks

Patrick Stalcup

Image Deblurring Techniques

Vincent DeVito

Room 119

Study of Materials and Body Shape for a Solar Car

Emily Warner

The Design and Implementation of a Kite Wind Generator

Eric Tsai

Generating Electric Power from Running Water

George Li

Room 118

High Altitude Solar Power: A Step Towards Space Based Solar Power

Andrew Han

Comparing Dissonant and Consonant Distortion in a Hybrid Headphone Amplifier

Miller Ke

Room 102

Dopamine and the Social Histories of Crayfish

Christine Lee, Ayaka Sugiura

Anti-aging molecule human Senescence Marker Protein 30 hydrolyzes organophosphate nerve agents used in chemical warfare

Kushal Seetharam

Effects of social experience on behavioral and neural sensitivity to alcohol in juvenile crayfish (*Procambarus clarkii*)

Tejas Aralere

Room 124

Using otolith microchemistry to assess menhaden populations in the Chesapeake Bay

Christina Moore and Nicole Boyd

How do Dissolved Oxygen Levels Affect Settling of Epifauna in the Rhode River of the Chesapeake Bay?

Emily Yu

A Study of E. coli and Optical Brightener in Fairfax County Streams

Maliha Khan and Masooma Raza

Room 116

Generic Peripheral Control in Unmanned Underwater Vehicles Using the MSP430 Microcontroller

Chris Joyce

Design and Implementation of an Object Sensing Multiplexed LED Wall with Webcam

Jackie Chen and Nicole Yu

Line Art Machine

Mariet Kurtz

SPEAKERS

Room 108

Kirk A. Janowiak, Department of Energy

Study Opportunities and Employment in STEM Fields; The Future is Now!

Room 143

Glenn Higgins, Northrup Grumman

Regional Climate Modeling and Adaptation

Room 147

Siva Prakash Yarlagadda, CSC

Virtual Collaboration

Room 220

Melissa Schoeplein, TJHSST Faculty

Science Policy Program Overview

Rooms 214-215

John P. Wong, Media Bureau, FCC

The FCC Broadband Plan

Rooms 207-208

Patti Curtis, Steve Obenhaus

Lobbying is NOT a Dirty Word

Lecture Hall

Harry Wingo, Google

Google and Future

Rooms 214-215 (Sessions C & E)

Sasha Denisin; Dr. Lloyd Whitman, UC Berkely; NIST

Panel: Can I really get paid to be a scientist? How do I sign up?

D: 12:40-2:00

SENIOR RESEARCH PROJECTS

Planetarium

Luminous Blue Variables: Predicted vs. Observed Mass-Loss Rates

Danley Hsu

Comparison and Analysis of Martian Gullies

Hannah Turner

Analysis of Solar Activity

Nora Riesenber, Nora Gayer

Investigating Light Curves from the Kepler Mission

Robby Culhane

Plotting Ultraviolet Light Curves for Gamma Ray Burst 060218

Willie Nicklas

Room 113

Ibuprofen in the Fight for Memories

Anika Raja & Vishaka Ravishankar

Treating Diabetes with Stem Cells: The Implementation of Functional Pancreatic Endoderm Derived from Human Spermatogonial Stem Cells In Vivo.

Anirudh Saraswathula

The effect of different concentrations of styrene in a carbon source on the amount of polyhydroxyalkanoate accumulated by *P. putida* CA-3

Colleen Knight and Nora Vivanco

An Investigation of Nanocryosurgery--An effective option for tumor treatment Colvin Wang and Dorothy Ho

Bioremediation of PAH and Lead Contaminated Soil with Two Microbes

Courtney Prothero, Marie French

Room 114

The Effect of Small Ubiquitin-related Modifiers on Ribosome

Biogenesis

Hanwen Xu

Molecular-Genetic Basis of NSAID Toxicity

Hun Baek

Vitamin D and Diabetic Drosophila: The Effect of Vitamin D on the Glucose Levels in Homozygote Df[dilp1-5] Drosophila melanogaster

Hunni Ji

Embedding of Magnetic Nanoparticles in Polycaprolactone Nanofiber Scaffolds to Facilitate Bone Healing and Regeneration

Jacob Kannarkat

Characterization of Gastrointestinal (GI) Effects of Opioids

James Janopaul-Naylor

Room 126

The Effect of Coal Pre-treatment on Biogas Production with MicGas Coal Biotechnology

Shravya Kovela

The Effect of Mitochondrial Topoisomerase I Activity on Cellular Respiration

Swetha Pasala

Application of hydrogel nanoparticles for early Lyme disease diagnosis

Temple Douglas

Lactone Hydrolysis by Catalytic Bioscavengers Paraoxonase, Prolidase and SMP-30

Tristan Jones

Cryo-Electron Tomography of Trimeric Env Spikes on HIV

Udaysankar Chockanathan, Siddhant Bhatia

Room 104

Design of an Ergonomic Office Exercise

Claire Cundiff

TJ Redesign and Sustainable Technology

Colleen Kerins

Design of a Clinical Bicycle

Dain Cheon, Mina Oh

Environmental Pyramid

Danny Lehnert

Design of a Sustainable Museum and Studio Building

Elizabeth Chun

Room 106

Recreational Center for Homeless People

Lauren Kim, Elizabeth Chu

Designing a Pitching Machine that Imitates Human Pitches

Meghan Mutchler

Visualizing Herod's Temple in Jerusalem

Noa Ovadia

Wind Powered Land Yacht

Ryan Frate and Aditya Krishnamurthi

Design and Implementation of a Solar Panel Array

Sam Brinton

Room 103

New Modular Synthesis of \pm -Hydroxy- \pm -Phenyl Lactams

Jean He

The Analysis of Triazines and their Degradation Products

Spencer Clark, Alexandre Streicher

Printing Endothelial Cells to Mimic the Vascular Structure of Living Tissue

Chris Kilgore

Room 127

Analysis of Fatty Acid Composition of Blood Plasma in Patients with Metabolic Syndrome

Brian Yu

Clinical Conditions Associated with Plasma Levels of EBV Antibodies and sCD Markers

Jason Ya

The Creation of a Novel, Dye-Sensitized Solar Cell

Julie Hsia and Helena Manguerra

Analysis of Simulated Permeable Reactive Barriers under Varying Conditions

Sy Rashid, Mary Kim

Rooms 110-111

What's the News?

Alex Dona

Authentication by Typing Patterns

Luke Knepper

The Effect of Visual Cues on Short Term Memory

Lyndsey Wheeler, Tori Zupan

Room 115 (C)

Bridging the Gap: Storytelling Alice as a Precursor to Python

Amanda Gilbert

The RSA Encryption Algorithm

Betty Huang

Incremental Computation of Simplicial Homology of Triangulated Surfaces

Brian Hamrick

Multicast DNS

Dan Johnson

An Implementation of Least Significant Bit Steganography and its Steganalysis

Deniz Oran

The Design and Implementation of a Functional Programming Language

Jason Koenig

Scratching the Surface: Elementary Programming

Nick Grippin

Room 115(R)

Simulating Fluid Motion in a Shallow Context in 3 Dimensions

Jacob Dominy

Graphics/Physics Demonstration Joseph Hallahan

Viability of Browser Based Distributed Computing

Sigurdur (Siggi) Simonarson

Parallel Path Tracer

Stuart Maier

Computational Fluid Dynamics Using the Lattice Boltzmann Method

Thomas Georgiou

Room 119

Flywheels and regenerative braking

Joey Jachowski

Introduction of Hydrogen Gas into Wankel Engine to Increase Efficiency

Liam Carter-Condon

Design and Construction of a Hydroelectric Bridge

Matt Callahan

Design and Implementation of a Hands-Free Biodiesel Processor

Megan Tetlow

The Design and Testing of a Photovoltaic Circuit for use in a Solar Car

Nathan Levine

Room 102

Human single-chain antibodies affect the misfolding of Î±-synuclein in Parkinsonâ€™s disease

Andrew Mittereder

Social Status Determination in Procambarus Clarkii: Ketanserin on Dominant Behavior and Habituation

Daria Nesterovich, Hope Smith, Mi-Song Kim

Insecticidal Activity of Clove Oil in the Madagascar Hissing Cockroach

Elliott Eggan, Dennis Wang

Developing a Working Electrophysiology Model for Hirudo medicinalis

Jae Sim, Bryan Cheong

Effect of Valproic Acid on Activated BV-2 Microglial Cells

Raquel Tripp

Room 124

The Effect of Light Intensity on Camouflage Range in the Lined Seahorse, Hippocampus erectus

Eric Dale and Corinne Mayer

The Effect of Sexual Stimulants on Carcinus Maenas

Joey Bouchard, Bruk Dinberu

The Effect of Gizzard Shad (Dorosoma cepedianum) on nitrate, phosphate, and chlorophyll-a

Juliana Thatcher

A Comparison of Toxicity Levels in Farmed and Wild White Shrimp Using Bioluminescent Dinoflagellates

Kathryn Moore, Lan-Vy Ngo

An Analysis of Three Biotic Indicators of Water Quality in Areas of Variable Land Use

Katy Williamson and Rachel Lienesch

Autonomous Underwater Vehicle (AUV) with Sonar and GPS Capabilities

Emma Ferris

Room 213

The First Quantitative Projection of Extreme Precipitation: The Making of a Multi-Model Ensemble

Akshar Wunnava

Animated Computer Generated Holography

Connie Xie

The Effect of Filtering and Strobe Angle on Backscattering in Underwater Photography

Emily Schultz

Developing a hydrogen bonding scale for vapor identification.

Julie Ta

Design of a color vision simulator

Renjie You

Room 101

The Effect of Capacitance Varying Diodes on Metamaterial Resonance Frequency

Anshul Goyal

the effect of fractal geometry on a 10 GHz antenna

Joshua Smith

Magnetorheological Fluids for Tunable Sonic Crystals

Kimee Moore

Design and Testing of a Metamaterial Antenna

Sam Surette

Room 117

Elliptical Trainer Generator: The Adaptation of and Development of an Exercise Machine to Generate Electricity

Katherine Ackerman

Design and Construction of a Personal Harvesting Machine for Developing Countries

Kyle Gaarder

Utilization of Pressure Sensors to Steer and Power an Electric Transportation Vehicle

Erin Haas

Basic Utility Vehicle

Logan Buckley, Sheridan Leong, ly Pham, Dan Schlicht

Outdoor Infrared-Triggered Camera System and Datalogger

Sam Speers

Room 116

R/C Lawnmower

Andrew Palmer, Jeff Hobson, Mo Lu, Matt Chan, Victor Yu

Automated Pool Skimmer

Emily Evans

A.D.A.M.: Autonomous Dancing Arcade Machine

Jerold Council

Remote Activated Beverage Launcher

Joe Latta

A Biomimetic-Inspired Surveillance Robot

Shayela Hassan

Design and Creation of a Ski Waxing Robot

Steven Howard, Christopher McPherson

SPEAKERS

Room 108

Dr. Robert Musil; Matthew Davis Former CEO, Physicians for Social Responsibility; EPA

Panel: Science is half of how you change the world. Come learn about the other half.

Room 147

Mark Leary, Paul Seay, Diane Miller, Northrup Grumman

Panel: Cyber Technology

Rooms 209-210

Akshar Wunnava, Ani Mohnan, Julie Ta, Emily Warner, Julie Ta, Kamna Kathuria, TJHSST

Panel: Science Policy

Rooms 214-215

Bob Kirchner, Koeunyi Bae, Dave Malloy, Rathna Davuluri, Phil Lenart, Rick Lenz; Lockheed Martin and ExxonMobil

Panel: Alternative Energy

Rooms 228-230

Telos Corporation

Panel: Cybersecurity

Lecture Hall

Daniel Ruben Odio-Paez, PointAbout, Inc.

How the iPhone Will Change Your Life: The Impending Mobile Revolution

AP CHEMISTRY PRESENTATIONS

Room 133

Cellulosics

Meghan Anand, Hal Libby, Phillip Song, Robin Lashof-Reyas

Frankincense

Rebecca Kolkmeyer, Sapir Nachum, Denise Taylor, Taylor Enders

Frankincense

Lisa Yang, Divya Madhusudhan, Eugenie Quam, Alvina Jiao

Cellulosics

Darwin Li, Aravind Ponukumati, Marc Wechsler, Alex Yang

EcoPaints

Jeein Seo, Trami Pham, Julia Truelove, Colvin Wang

Frankincense

Aakansha Nangarlia, Christine Shen

CIGS Manufacturing

Sanjeet Das, Wes Kurowski, Peter Hansen, Jastena Gill

E: 2:10-2:50

IBET PRESENTATIONS

Room 120

Two Daphnia Walk Into a Coffee Shop...

This presentation describes the effect of caffeine on the heart rate of Daphnia magna. (Michael Chao, Peter Foley, Claudia Lovegrove, and Alana Whitman)

A Forest Full of Feces

This presentation describes the effect of the number of trees per plot on the number of deer pellet groups per plot. (Genevieve Gural, Marisa Kataoka, and Hanna Tso)

Room 121

Coffee Corn

This presentation describes the effect of caffeine on the root length and height of dwarf corn. (Nick Kim, Samyu Jothishankar, Thomas Lee, and Garrett Therkorn)

From Waste to Power

This presentation describes the effect of turbidity on the voltage produced in microbial fuel cells and the potential impact on future wastewater facilities. (Nand Kishore, Catherine Witherspoon, Seungyeon Ju, and Men-Cheol Jeong)

Green Roofs: Much Like a Dirty Sponge

This presentation describes the effects of the composition of growing medium on the quality and quantity of a green roof's drainage. (Jay Sebastian, Nick Haliday, Ann Gao, and Zola Bridges)

Room 123

Fatal Feces

This presentation describes the effect of a controlled hunt on the population of deer. (Christina Shincovich, Hillary Liu, Jasmine Denizard, and Kristina Hu)

"Foliage" Fertilizer Filter

This experiment explores using Vegetative Filter Strips to help filter out fertilizer in runoff. (Rebecca Applin, Jake Clatterbuck, Andy Jiang, and Pedram Pejman)

Room 125

Chirping Sirens: Sound Inbound

This presentation describes the effect of varying sound intensities on the distance between crickets and the sound source. (Sarthak Sahu, Sean McElrath, Steven Kool, and Gordon Hart)

The Ordure of Things

This presentation describes the effect of water proximity on the number of deer pellet groups per sample plot. (Michael Choi, Nick Johnson, Brian Kim, and Alex Li.)

Room 131

Gotta Irradiate Them All!

This presentation describes the effect of ultraviolet radiation-b on the growth of Escherichia coli. (Hassan Almas, Jenny Chen, Prabhu Tewari, and Christine Xu)

That's Not An Acorn That You Stepped On ...

This presentation describes the effect of land use and location of deer feces groupings. (William Borchert, Shomiron Ghose, Changen Pan, and Gireesh Subramaniam)

Room 146

Why Did the Deer Cross the Road?

This presentation describes whether the distance from a road has an effect on the presence of white-tailed deer. (Tyger Burney, Ryan Feng, David Heo, and Andrew Kim)

Theobromine: A Need for Speed

This presentation describes the effect of theobromine on the contraction time of the aquatic invertebrate Hydra littoralis. (David Guo, Seungho Lee, Justin Sim, and Jessica Wang)

Room 148

Sounds Crabby

This presentation describes the effect of sound on the rate of movement of hermit crabs. (Sohail Farhangi, Benjamin Hatanpaa, Brandon Pang, and Thrisha Potluri)

Keep Your Hydra Close and Your Algae Closer

This presentation describes the effect of nutrient pollution on

hydra and the potential imbalance caused to an ecosystem.
(David Gao, WooJu Kim, Angelica Klosky, and Annie Park)

Room 150

I Know, Deer

This presentation describes the effects of habitat type on the white-tailed deer population. (Dina Ajalli, Annie Burch, Krista McGuigan, and Julia Ruth)

Death by Nitrate

This presentation describes the effects of fertilizer type and nitrate concentration on eutrophication and environmental deterioration. (Laura Brouckman, Lizzy Miranda, Anna Hwang, and Liam Bui)

Diligent Dinos

This presentation describes simple organisms, dinoflagellates, and up to which nitrate concentration they are physically capable of maintaining water quality. (Austin Fleming, Leonard Kosta, Avanti Shirke, and Jiwon Yang)

Room 151

Power Shot of Panaria

This presentation describes the effects of caffeine on planaria growth. (Venkat Manne, Joe Nissen, Daniel Wang, and Keven Zhang)

I Wish I Had a Few Bucks for My Doe-Nation

This presentation describes the effect of deciduous vs. coniferous trees on the number of pellet groups found in the plot. (Paul Pottanat, Chris Hughes, and Sean Waterton)

Trailer 1

Fawning Over Edges

This presentation describes the effect of ecotone on white-tailed deer population. (Divya Bhaskara, Laura Chamberlain, Rachel Dyment, and Betsy Goodwin)

Too Cold for Comfort, Too Hot to Handle

This presentation describes the effect of temperature changes on daphnia reproduction rates to gauge the effect of thermal pollution on the life processes of aquatic organisms. (Bryan Havens, Michael Liu, Mallika Patkar, and An Ton)

Trailer 2

Nap Time for Baby Tears

This presentation describes the effect of melatonin on the photoperiodism of Soleirolia soleirolii. (Joseph Angelio, Kleo Greenwood, and Michael Nguyen)

Are You Digging It?

This project investigates the effect of different worms on soil quality. (Garrett Shapiro, Alan Barte, Tricia Tran and Mary Kim Weidman)

Trailer 3

Sailing the Wine-Dark Microwaves

This presentation describes the effects of microwave radiation on the regeneration rate of *Dugesia tigrina*. (Giovani Basurto, Abby Biow, Zophie Quan, and Lauren Revere)

Frankly, My Deer, I Don't Give a Bang

This presentation describes the effectiveness of controlled deer hunts on the white-tailed deer population over time. (Bruce Bland, Jason Lee, and Jennifer Walter)

Trailer 4

Mellow Melatonin

This presentation describes the effect of melatonin on the phytoremediative capabilities of *Elodia canadensis*.

(Michelle Chang, Lucia Lee, Nalini Singh, and Arisa Smith)

Wat-er Deer Doing Here?

This presentation describes the effect of water proximity on the presence of white-tailed deer. (Michael Chan, Gene Gonzalez, Devin Rajan, and Howard Small)

Trailer 5

Daphnia Magnets

This presentation describes the effect of magnetism on the heart rate of *Daphnia magna*. (Lohitha Kethu, Ritwik Anand, and Daniel Chun)

The Tree Muskedeers: All for Feces and Feces for All!

This presentation describes the effect of tree density on the presence white-tailed deer. (Katie Hsia, Alexia Kim, Amy Malladi, and Nadia Rentia)

Trailer 6

Step by Step: An Excremental Investigation

This presentation describes the effect of deciduous and coniferous community structure on the presence of white-tailed deer fecal pellet groupings. (Varun Kripnandan, Amneet Singh Mann, Ki Woong Nam, and Sid Sivakumar)

Human Interaction Causes Community Reaction?

This presentation describes the effect of humans and their activities on the water quality of lakes. (Andriy Katkov, Sarah Liu, and Katrina McTigue)

ONE QUESTION PRESENTATIONS

Room 203

Bridging Worlds: Creating Contact and Bringing Supplies to Underfunded Schools

Amer Ahmed

Movement for "Socially Responsible Investing"

TJ Investment Club (George Bocchetti, Sundeep Kutumbaka, Shreyas Mahapatra, Philip Song, Aileen Wang)

Room 204

Exploring the Properties of Different Materials for Use in Infrared Heat Mirrors

James Byrne

Environmental Action Month

Kristina Brant

SAT Outreach

Patrick Gould, Anna Nikolova

Fight the Hunger

Bianca Kim

Chemistry Education Outreach

Chemistry Society (Sang Min Han, William Choi, Jimmy Wu, Dahan Choi, Alex Streicher, Won Jun Kuk, Hunni Ji, Minsik Jun)

Project Handkerchief

Manna Fujiu

SENIOR RESEARCH PROJECTS

Room 113

Muscular Dystrophy Carriers: Expression in a Mosaic Patchwork

Dayoung Ko

3D analysis of influenza H1N1 virus neutralization via electron microscopy

Deanna Zhu

Room 114

Radical Scavenging Activities Antioxidant Capabilities of Grape Polyphenols

Janet Shin

A carboxylated lysine is involved in modulating the enzymatic activity of N-acetyl-ornithine transcarbamylase

Jeremy Ho

Room 126

Differential Expression of cathepsins and their related endogenous cathepsin inhibitors after experimental spinal cord injury in the mouse

Victoria Kedzie & Mandy Rohrer

Hydrolysis of Organophosphates by Catalytic Bioscavengers

Won Seok Choi

The Development and Optimization of a Quantitative Real-time PCR Assay for Rickettsia Raoultii

Anisha Apte

Room 104

Custom-designed Competitive Swimming Goggles

Jennifer Mercado

Designing the Ideal Movie Theater

John Welch

Room 106

Design of a Suicide Deterrent for the Royal Gorge Bridge in Cañon City, Colorado

Keryl Brown

Design of a Marching French Horn

Lauren Houck

Rooms 110-111

Crowd Composition in Adobe After Effects

Paul Anderson

A Study of Natural, Studio, and Augmented Lighting

Sally Wade, Kevin Place, Nick Perez

Room 115 (R)

Music Genre Analysis

Alex Stabile

Input and Sharing of Infectious Disease Data at the Grassroots Level

Anna Stapleton

Digital Music converted to Sheet Music

Hugh Smith

Developing a Versatile Software Synthesizer

Victor Shepardson

Room 115 (C)

Functional Connectivity of the Thalamus

Morgan Pixa

Expressive Behavior for MDS Robots

Neha Rathi

Room 119

Developing A Spring Based Regenerative Braking System

Nolan Bader

Design and implementation of an electric storage system using an oxygen-evolving catalyst in electrolysis

Sarah Watson

Human Power Plants

Seth Kolker

Room 116

Vacuum Expansion Analysis of Conventional Disposable Glove Materials

Stephanie Snoich

The Design and Construction of a Parabolic Solar Concentrator to Generate Electricity and Potable Water

William Troppé

Design and Implementation of a Modular Operator Console

Zach Michaelov

Room 102

The Effect of Octopamine and Dopamine on the Ventral Nerve Response of *Gromphadorhina portentosa*

Paul Oh, Christine Shen

pVISIA, an Optimized Vector for Surface Display of Immunogens

Vish Sridharan

Room 124

Relative Percentage of Non-Calving Females in the North Atlantic Right Whale (*Eubalaena glacialis*) Population by Habitat Preference

Kelly Schumann

A Comparative Study of the Growth Rates of Freshwater and Marine Striped Bass Using Analysis of Otolith Annuli and Back-Calculation of Fish Length

Kyu Rhee Kang

Planetarium

Population Survey of Benthic Ostracods in the Rhode River Area

Margaret Tarmann

The Effect of a Storm on Benthic Algae in Various Geomorphic Units in a Restored

Melissa Reardon

The effect of antennule ablation on the exploration behavior of the crayfish *Procambarus clarkii*

Samantha Payne, Adriana Phillips

Room 127

Investigating a Mathematical Correlation between Bioluminescence and Biomass in Pyrocystis lunula

Sydney Huppert, Anna Nikolova

A comparative study of winter algal blooms in the western and eastern shores of the Chesapeake Bay

Takahiro Nakamura

Room 101

Crumpled Sheets as an Analogy to Thermodynamics

Allison Koenecke

The First Electronic Structure Calculations and Determination of Related Properties for Radium

Aryan Iden Khojandi

Room 213

Measurement of Vibration Frequency using Reflected Laser Beam

Chris Zeng

The Effect of Harmonic Content on the Recognition of Harmonic Intervals

Kimberly Hann

SPEAKERS

Room 141

Douglas Austin, CSC

Cyber Attacks: How a Rootkit works

Room 143

Richard Scalzo, Yale University

Astronomy from your Living Room: The Internet and the New Synoptic Sky Surveys

Room 147

Carl Landwehr, Jeannette Wing, Donna Dodson, NSF; NIST

Panel: Cyber Security

Rooms 207-208

Julie Strategos, Julie Peterson, Sharon Watts, Kathy Trentacoste, Lockheed Martin

Panel: Women in Engineering

Rooms 209-210

Sarah Alexander, Maria Demaree, Barbara Newman, Dalila Wortman, Lockheed Martin

Panel: Women in Engineering

Rooms 214-215

Dr. Michael Kassner, University of Southern California

World of Mechanical Engineering

Lecture Hall

Walt Havenstein, SAIC - CEO

The Importance of Science and Technology in Sustaining American Competitiveness

DESIGN CHALLENGES

Candy Elevator

Create and execute a confectionery delivery system to raise candies from the floor to your mouth.

Folder Tower

Construct a folder tower out of five manila folders to hold the most bricks as high as possible before collapsing.

Clay Boat

Build a boat out of clay that will hold as many pennies as possible before sinking.

Aluminum Foil Boat

Build a boat out of an allotted sheet of aluminum foil that will hold as many pennies as possible before sinking.

Paper 'Scraper

Be the fastest to build an index card skyscraper ten stories tall.

Hang Over

Balance 7 coat hangers off each other perfectly such that no coat hanger rests in the corner of another.

Domino Demolition

Design and arrange 250 dominoes within a 36 by 36 inch box so that knocking one domino over at a designated position knocks them down in the fastest/slowest amount of time.

Balloon Bridge

Using supplied materials, create a balloon bridge. Complete innovation is accepted and appreciated! Bridge must be contiguous and can only consist of balloons.

Spoon Frog

Create a mini culinary catapult with one spoon to launch another into a cup.

Straw Tower

Design and make the tallest straw tower using the given materials and sturdy enough to hold one tennis ball for 10 seconds.



It creates understanding, where once there were walls. It connects a kid to a scientist to a CEO to save a glacier.

It brings ideas together.

Passions together.

And people together.

It's the human network effect.

The effect that is changing the world.

When technology meets humanity on the human network, the way we work changes.

The way we live changes.

Everything changes.

that's the
human network effect

Please visit Cisco at the Thomas Jefferson Science & Technology Symposium

NOTES