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SACRED HEART UNIVERSITY

President's Welcome

April 2, 2011

Warm greetings to every participant.

Welcome to all our visiting scholars and friends! It is Sacred Heart University's privilege to welcome the nearly 300 participants in this year's 65th annual Eastern Colleges Science Conference. Just as the sciences you explore have changed and developed over the years, so too has the University undergone enormous changes in the 12 years since we last hosted this impressive forum. Make yourselves at home on our campus and enjoy your stay to the fullest.

The young scientists presenting here today embody, with their faculty and mentors, a great hope for our future. You have it in your power to shape a world that is healthier, happier and more giving: one that works for peace and plenty. We wish you great success in your endeavors.

Sincerely,

John J. Petillo, Ph.D.
Interim President of Sacred Heart University

SACRED HEART UNIVERSITY

ECSC Organizing Committee Welcome

On behalf of Sacred Heart University, the College of Arts and Sciences, and the 2011 Conference Organizing Committee, we would like to welcome you to the 65th annual Eastern Colleges Science Conference. It is a sincere pleasure to host this conference on our campus in Fairfield, Connecticut. As of this printing we have 291 registrants representing 21 undergraduate colleges and universities. Eleven students have submitted manuscripts for judging and there are a total of 39 platform presentations and 102 poster presentations.

We would like to specifically thank the Offices of the President and Provost for financially supporting the printing of our ECSC program. We would also like to thank Dean Seamus Carey, College of Arts and Sciences, for financially supporting the ECSC poster sessions. Sacred Heart University's Student Government graciously provided the funding for our Keynote Speaker, Ira Flatow. Finally, we would like to thank Campus Operations for providing the workforce to make this conference possible.

The Biology Department is happy to host this event in conjunction with the Departments of Chemistry, Mathematics, and Psychology. Students from the Biology and Chemistry Clubs have volunteered their time to make this event a success.

We are excited to have Ira Flatow, NPR Science Friday, as our keynote speaker this year. A short biography is provided in the following pages. We would like to thank Ira Flatow and the American Program Bureau for agreeing to participate. We look forward to his talk.

We wish you a fun and informative Conference,

Dr. Suzanne Deschenes
Associate Professor of Biology

Dr. Mark Beekey
Assistant Professor of Biology

2011 Eastern Colleges Science Conference Organizing Committee

Co-Chairs

Dr. Suzanne Deschenes, Department of Biology

Dr. Mark Beekey, Department of Biology

Committee Members

Clare Ryan, Biology Club President

Dr. Linda Farber, Department of Chemistry

Dr. Mindy Miserendino, Department of Psychology

Dr. Jason Molitierno, Department of Mathematics

Dr. Ryan Mullen, Department of Mathematics

Dr. Marlina Slamet, Department of Physics

Special thanks to:

Dr. John Petillo, Interim President

Dr. Thomas Forget, Provost & Vice President for Academic Affairs

Dr. Seamus Carey, Dean of the College of Arts and Sciences

Dr. Kirk Bartholomew, Chair, Department of Biology

Larry Wielk, Dean of Students

Denise Tiberio, Associate Dean of Students

Cole Kowalski, Senior Programmer and Analyst, Information Technology

Cynthia Conte, Supervisor, Campus Operations

Lisa Gallagher, Director of Catering, Chartwells

Sacred Heart University Student Government

Eastern Colleges Science Conference History

The Eastern Colleges Science Conference is an association of primarily undergraduate colleges and universities along the northeastern corridor of the United States. The main function of the organization is to stimulate interest in undergraduate research in the natural, behavioral, social, and engineering sciences and other related fields. The annual Conference provides a lively forum for the presentation of undergraduate research.

Since 1947, the ECSC has provided a forum for undergraduates to present their empirical research using the general format of a professional meeting. Students may give platform (oral) presentations, poster presentations, and/or full-length papers. A student who submits a full-length paper must also present either a platform talk or a poster. A major benefit of this conference is the opportunity not only to present one's research in a scientific setting but also to learn as much as possible from others.

Year	Conference Host Institution	Location
1947	Vassar College	Poughkeepsie, NY
1948	Union College	Schenectady, NY
1949	Adelphi College	Garden City, NJ
1950	Bernard College	New York, NY
1951	Yale University	New Haven, CT
1952	Pennsylvania College for Women	Pittsburgh, PA
1953	New York State College for Teachers	Albany, NY
1954	Brooklyn College	Brooklyn, NY
1955	Seton Hall University	South Orange, NJ
1956	Temple University	Philadelphia, PA
1957	Georgetown University	Washington, DC
1958	Wilkes College	Wilkes-Barre, PA
1959	Suffolk University	Boston, MA

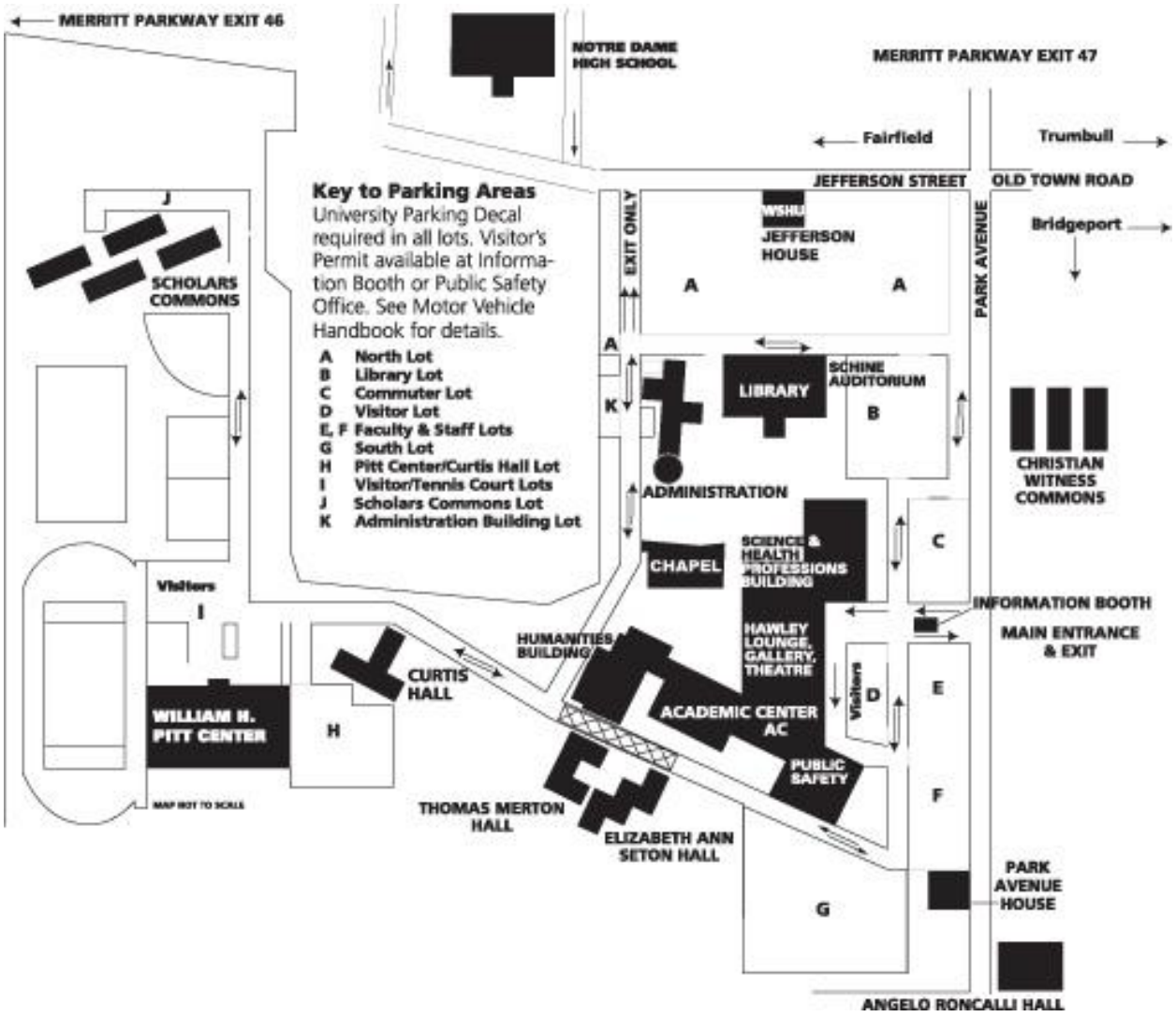
Year	Conference Host Institution	Location
1960	Hunter College	New York, NY
1961	SUNY College of Forestry	Syracuse, NY
1962	North Carolina State College	Raleigh, NC
1963	Boston University	Chestnut Hill, MA
1964	Jersey City State College	Jersey City, NJ
1965	Danbury State College	Danbury, CT
1966	DC Teachers College	Washington, DC
1967	Fordham University	New York, NY
1968	Yale University	New Haven, CT
1969	Yale University	New Haven, CT
1970	Wilkes College	Wilkes-Barre, PA
1971	Rosary Hill College	Buffalo, NY
1972	US Military Academy	West Point, NY
1973	Pennsylvania State University	University Park, PA
1974	Worcester Polytechnic Institute	Worcester, MA
1975	Widener College	Chester, PA
1976	Rhode Island College	Providence, RI
1977	Fairleigh Dickinson University	Rutherford, NJ
1978	Union College	Schenectady, NY
1979	Wilson College	Chambersburg, PA
1980	SUNY at Cortland	Cortland, NY
1981	Jersey City State College	Jersey City, NJ
1982	Lycoming College	Williamsport, PA
1983	Wilkes College	Wilkes-Barre, PA
1984	Providence College	Providence, RI
1985	SUNY at Fredonia	Fredonia, NY
1986	Duquesne University	Pittsburgh, PA
1987	Lycoming College	Williamsport, PA
1988	Ithaca College	Ithaca, NY
1989	US Military Academy	West Point, NY
1990	Manhattan College	New York, NY
1991	SUNY at Fredonia	Fredonia, NY
1992	US Naval Academy	Annapolis, MD
1993	Central Connecticut State University	New Britain, CT
1994	Duquesne University	Pittsburgh, PA
1995	Ithaca College	Ithaca, NY
1996	Lycoming College	Williamsport, PA

Year	Conference Host Institution	Location
1997	Central Connecticut State University	New Britain, CT
1998	Niagara University	Niagara University, NY
1999	Sacred Heart University	Fairfield, CT
2000	Wagner College	Staten Island, NY
2001	Wilkes College	Wilkes-Barre, PA
2002	Niagara University	Niagara University, NY
2003	Ithaca College	Ithaca, NY
2004	Manhattan College	New York, NY
2005	Central Connecticut State University	New Britain, CT
2006	Saint Joseph's University	Philadelphia, PA
2007	College of Mount Saint Vincent	Riverdale, NY
2008	Niagara University	Niagara University, NY
2009	Wagner College	Staten Island, NY
2010	Pace University	Pleasantville, NY
2011	Sacred Heart University	Fairfield, CT

2011 ECSC Conference Schedule

Time	Event	Location
7:30-8:30 am	Check-in	Edgerton Theatre Lobby
7:30-8:30 am	Continental Breakfast	Mahogany Room
	Set up for poster session I (Odd numbered posters)	University Commons
8:30-8:45 am	Conference Welcome	Edgerton Theatre
9:00-10:30 am	Poster Session I (*Odd numbered posters*)	University Commons
10:30-11:00	*Set up for Poster Session II (Even numbered posters)*	University Commons
11:00-11:45 am	Keynote Speaker – Ira Flatow	Edgerton Theatre
12:00-1:00 pm	Lunch	Mahogany Room
1:00-2:30pm	Poster Session II (*Even numbered posters*)	University Commons
2:30-3:00pm	*Coffee Break*	University Commons
3:00-4:30pm	Platform Sessions	Science Wing – Academic Building
4:30-5:30pm	Travel to Trumbull Marriott	
5:30-8:30	Banquet and Awards Ceremony	Trumbull Marriott

Campus Map


MERRITT PARKWAY EXIT 46
NOTRE DAME HIGH SCHOOL
MERRITT PARKWAY EXIT 47
Fairfield
Trumbull
JEFFERSON STREET
OLD TOWN ROAD
Bridgeport
PARK AVENUE
EXIT ONLY
WSHU
JEFFERSON HOUSE
SCHOLARS COMMONS
Key to Parking Areas
University Parking Decal required in all lots. Visitor's Permit available at Information Booth or Public Safety Office. See Motor Vehicle Handbook for details.
A North Lot
B Library Lot
C Commuter Lot
D Visitor Lot
E, F Faculty & Staff Lots
G South Lot
H Pitt Center/Curtis Hall Lot
I Visitor/Tennis Court Lots
J Scholars Commons Lot
K Administration Building Lot
LIBRARY
SCHINE AUDITORIUM
CHRISTIAN WITNESS COMMONS
ADMINISTRATION
CHAPEL
SCIENCE & HEALTH PROFESSIONS BUILDING
INFORMATION BOOTH
MAIN ENTRANCE & EXIT
Visitors
HUMANITIES BUILDING
HAWLEY LOUNGE, GALLERY, THEATRE
CURTIS HALL
WILLIAM H. PITT CENTER
ACADEMIC CENTER AC
PUBLIC SAFETY
THOMAS MERTON HALL
ELIZABETH ANN SETON HALL
PARK AVENUE HOUSE
ANGELO RONCALLI HALL
MAP NOT TO SCALE

Keynote Address Speaker

Veteran National Public Radio (NPR) science correspondent and award-winning TV journalist Ira Flatow is the host of Talk Of The Nation: Science Friday®. He anchors the show each Friday, bringing radio and internet listeners world wide a lively, informative discussion on science, technology, health, space and the environment. Ira is also founder and president of TalkingScience, a non-profit company dedicated to creating radio, TV and Internet projects that make science "user friendly." Flatow's interest in things scientific began in boyhood — he almost burned down his mother's bathroom trying to recreate a biology class experiment. "I was the proverbial kid who spent hours in the basement experimenting with electronic gizmos, and then entering them in high school science fairs," Flatow says. Mixing his passion for science with a tendency toward being "a bit of a ham," Flatow describes his work as the challenge "to make science and technology a topic for discussion around the dinner table."

He has shared that enthusiasm with public radio listeners for more than 35 years. As NPR's science correspondent from 1971 to 1986, Flatow found himself reporting from the Kennedy Space Center, Three Mile Island, Antarctica and the South Pole. In one memorable NPR report, Flatow took former All Things Considered host Susan Stamberg into a closet to crunch Wint-O-Green Lifesavers, proving they spark in the dark.

His most recent book is entitled Present At The Future: From Evolution to Nanotechnology, Candid and Controversial Conversations on Science And Nature. It follows on the heels of They All Laughed … From Light Bulbs to Lasers: The Fascinating Stories Behind the Great Inventions That Have Changed Our Lives.

Flatow is host of the four-part PBS series Big Ideas produced by WNET in New York. His numerous TV credits include six years as host and writer for the Emmy-award-winning Newton's Apple on PBS, science reporter for CBS This Morning, Westinghouse, and cable's CNBC. He wrote, produced and hosted Transistorized!, an hour-long documentary about the history of the transistor, which aired on PBS. He has talked science on many TV talk shows including Merv Griffin, Today, Charlie Rose, and Oprah. He is currently exploring new and better ways of bringing science news to radio, TV and the Internet. On the Internet, Flatow has hosted numerous science related Web Casts for Discovery Online and the American Museum of Natural History in New York. His Science Friday Kids' Connection web pages won the award for one of the top 500 web sites in the country given out by Home PC Magazine. His Podcasts are among the most listened to on the Internet, frequently in the top-ten of all downloads on the iTunes web site.

His recent honors include: National Science Teachers Association Faraday Science Communicator Award (2007), National Science Board Public Service Award (2005), World Economic Forum Media Fellowshipo (2005), Elizabeth Wood Writing (2002), AAAS Journalism award (2000), Brady Washburn Award (2000), the Carl Sagan Award (1999).

Ira is member of the National Association of Science Writers and AFTRA.

His hobbies include scuba diving, gardening (especially orchids), tropical fish and electronic gadgets. He loves the theater. A native of New York, Flatow now lives in Connecticut.

Submitted Manuscripts

The following manuscripts have been submitted for evaluation and consideration for an excellence award. Manuscripts are listed alphabetically by last name.

Each manuscript/paper was evaluated by one judge. The judge evaluating a given manuscript had professional expertise in the discipline covered by the research topic but was not from the same institution as the author. The manuscript was not formally reviewed but instead was evaluated as either "excellent" or "not excellent," based on the professional opinion of the evaluator. The decision of the evaluator is final. All comments, constructive advice passed on the judges will be will be handled through Dr. Donald Stearns after the conference, to maintain anonymity of the evaluators.

Marie J. Alnadi. Effects of Constant Blue Light on Food and Water Intake, Circadian Activity, Melatonin Levels, Adiposity, and Behavior in Rats. John Carroll University. Psychology.

Heidi Benson. The Effects of Orally Administered Adderall on Body Weight, Food Intake, Spatial Learning and Memory, and Activity Level in Long-Evans Rats. John Carroll University. Physiology.

Seth Brittle. Impact of Silver Nanoparticle Exposure on Hudson River Crayfish. Marist College. Environmental Science

Veronica L. Campanella. Microwave-assisted Methylation of Phenols with DMF-DMA. Niagara University. Chemistry

Renae Comulada. Fed With a Silver Spoon: A Deeper Look. Marist College. Environmental Science

Connor Dougherty . Surface Injury Characteristics of Healthy and Dead Saguaro Cacti (*Carnegiea gigantea*) over a 17-year Period. Manhattan College. Botany

Jennifer Ewald. Relationships between Stem and Leaf Characteristics for 20 Species of Broad-leaved Trees. Manhattan College. Botany.

Paolo Grenga. Photolytic Decay of Dibenzylic Sulfites. Niagara University. Chemistry

Patrick Heaphy . Cage Opening and Rearrangement of 1-Iodocubane-4-Carboxaldehyde. Niagara University. Chemistry.

Gabrielle Nunnari . Cognitive and Motor Functioning of the APPPS1 Mouse Model of Alzheimer's Disease. John Carroll University. Molecular Biology.

Kathleen Shea . Relationship between Leaf Pressurization and Sclereids in Leaves of 35 Mangrove Species from Australasia and the Americas. Manhattan College. Botany.

Platform Presentation Schedule (3:00-4:30pm)

Ecology and Environmental Science (Room SC202)

Time	Abstract	Presenter	School	Title
3:00-3:20	1	Andrew Fesler	Manhattan College	Mortality and metal body burden in the estuarine shrimp *Palaemonetes pugio*: nickel exposures at various salinities
3:20-3:40	2	Jo-Marie Kasinak	Sacred Heart University	Conservation Genetics of the American Horseshoe Crab in Long Island Sound
3:40-4:00	3	Zhuo "Tony" Su	Yale University	Modest effects on predictions result from incorporation of highly parameterized nucleotide substitution models into phylogenetic signal and noise analysis
4:00-4:20	4	Allen Clayton	Marist College	Impact of Silver Nanoparticle Exposure on Hudson River Crayfish
4:20-4:40	5	Eric Littmann	Fordham University	Pollen Distribution Across A Major Metropolitan Area

Psychology (Room SC208)

Time	Abstract	Presenter	School	Title
3:00-3:20	6	Kelly Arendac, Jennifer Melhorn	Lycoming College	Can Preschool Children Learn From Frogs? The Effects of Animated Media Presentation on the Understanding of Letters and Letter Sounds
3:20-3:40	7	Christine Gizzi	Mount St. Mary College	The Effect of Injunctive Drinking Norms on College Students' Drinking Attitudes
3:40-4:00	8	Donna DiRocco	Lycoming College	Effect of the Color Red on Test Anxiety
4:00-4:20	9	Kristen Forgotch	Lycoming College	Effects of Temperature on Perceived Saltiness of Foods
4:20-4:40	10	Melody Johnson	Lycoming College	Effects of Women's Scent During Ovulation on Olfactory Stimulation

Biochemistry (Room: SC 232)

Time	Abstract	Presenter	School	Title
3:00-3:20	11	Faiza Sheikh	Pace University	Synthesis of Contraceptive Flims Utilizing Antimicrobial PVA
3:20-3:40	12	Haley McClory	Niagara University	1H NMR-Based Metabolic Profiling of Patients with Risk Factors of Coronary Artery Disease
3:40-4:00	13	Paolo Grenga	Niagara University	Photolytic decay of dibenzylic sulfites
4:00-4:20	14	Stacey Barnaby	Fordham University	The Design and Synthesis of Bone Mimics on Self-Assembled Kinetin Nanoassembies

Botany (Room: SC 203)

Time	Abstract	Presenter	School	Title
3:00-3:20	15	Connor Dougherty	Manhattan College	Surface Injury Characteristics of Healthy and Dead Saguaro Cacti (*Carnegiea gigantea*) over a 17-year period
3:20-3:40	16	Jennifer Ewald	Manhattan College	Relationships Between Stem and Leaf Characteristics for 20 Species of Broad-Leaved Trees
3:40-4:00	17	Kathleen Shea	Manhattan College	Relationship between Leaf Pressurization and Sclereids in Leaves of 35 Mangrove Species from Australasia and the Americas
4:00-4:20	18	Kyle Treman	Manhattan College	A reevaluation of changes in a protected population of saguaro cacti
4:20-4:40	19	Renae Comulada	Marist College	Fed With a Silver Spoon: A Deeper Look

Genetics and Molecular Biology I (Room: SC 200)

Time	Abstract	Presenter	School	Title
3:00-3:20	20	Alexis Salas	Central Connecticut State University	The juvenile alopecia (jal) mutation maps to mouse Chromosome 2
3:20-3:40	21	Elisabeth Adkins	Central Connecticut State University	Does mshi-mediated graft incompatibility result from two linked mutations on mouse Chromosome 10?
3:40-4:00	22	Phelicia VanOverbeke	Manhattan College	Molecular Characterization of the Zebrafish Sense Mutant
4:00-4:20	23	Randal Kudra	Central Connecticut State University	The Role of Cell to Cell Interactions during Parietal Endoderm Orientation and Migration

Chemistry (Room: SC 104)

Time	Abstract	Presenter	School	Title
3:00-3:20	24	Aaron Dowdell	Fordham University	Exploring the effects of shape controlled metal oxide nanomaterials for the development of solar cells
3:20-3:40	25	Nathan Erxleben	United States Naval Academy	Fluorinated Ethylamine Groups as Peptide Bond Mimics: A Computational Investigation of Hydrogen Bonding
3:40-4:00	26	Sin Yung Choy	Pace University	Introducing Antimicrobial Property to Carrageenan
4:00-4:20	27	Alexander Abdurakhmanov	Fordham University	Microwave Assisted Catalysis

Genetics and Molecular Biology II (Room: SC 228)

Time	Abstract	Presenter	School	Title
3:00-3:20	28	James Cebulski	Providence College	Bax Inhibitor-1, Bxi1p, is an ER-localized Protein that Links the Unfolded Protein Response and Programmed Cell Death in *Saccharomyces cerevisiae*
3:20-3:40	29	Blaine Lander	United States Naval Academy	Extracytoplasmic Cellular Stress Responses Induced by Cationic Polyethylenimines
3:40-4:00	30	Neil Patel	Pace University	The Effects of Glutathione and Its Derivatives on the Survival of Mycobacterium bovis-BCG Vegetative and Persistent Organisms
4:00-4:20	31	Yi Cao	Providence College	Filamentous Cells in *Saccharomyces cerevisiae* Are Resistant to Programmed Cell Death

Biology (Room: SC 229)

Time	Abstract	Presenter	School	Title
3:00-3:20	32	Louis Ponessi	Mount St. Mary College	Importance of Protease Inhibitors and the Integrity of Muscle Proteins
3:20-3:40	33	Gigianna Santiago	Mount St. Mary College	The Effect of Listening to Music on the Diving Reflex
3:40-4:00	34	Nathan Johnson	Providence College	Flexion Points and Angles in Flexible Propulsors
4:00-4:20	35	John Castro	Bronx High School of Science	Apical Dieback Symptoms of Red Spruce Trees of the Adirondack Mountains
4:20-4:40	143	Lindsay Mitchell	Pace University	The Effects of Temperature Increase on Sucrose Biosynthesis as a Measure of Photosynthetic Activity in *Arabidopsis thaliana* (Brassicaceae).

Business, Mathematics and Engineering (Room: SC 102)

Time	Abstract	Presenter	School	Title
3:00-3:20	36	Dan Shaw	Sacred Heart University	The effects of revenue and black quarterbacks in the NFL
3:20-3:40	37	Robert O'Leary	Providence College	Gutters from Garbage and Storage from Sweat
3:40-4:00	38	Michael Kriner	Providence College	A Pedagogical Model of the Smart Grid
4:00-4:20	39	Anthony Rafetto	Wagner College	A Mathematical Economic Model

Poster Presenters and Titles

Abstract #	Category	Presenter	School	Title
40	Biochemistry	Brian Williams	Fordham University	Self-Assembly Approach to Plant Polyphenol Based Nanostructures as Building Blocks for Device Fabrications
41	Biochemistry	Heidi Benson	John Carroll University	The Effects of Orally Administered Adderall on Body Weight, Food Consumption, Spatial Learning and Memory, and Activity Level in Long-Evans Rats
42	Biochemistry	Alyssa Scagnelli	Mount St. Mary College	A Quantitative Analysis of trans-Resveratrol content in Pinot Noir wines
43	Biochemistry	Matthew Castaldo	Niagara University	Development of a Metabonomic Assay For Breast Cancer Biomarkers in Urine
44	Biochemistry	Steven Lewis	Niagara University	Towards a Metabonomic Assay to Identify Triple Negative Breast Cancer
45	Biochemistry	Alison Quirch	Pace University	Characterization of Deoxyhypusine Synthase from *Cryptosporidium parvum*
46	Biochemistry	Joseph Gehrz	United States Naval Academy	Exploring the Function of Spheroplast Protein y (Spy)
47	Biochemistry	Patrick Wiedorn	United States Naval Academy	Development of Novel Crystallization Precipitants
48	Biology	Antoinette Negron	Central Connecticut State University	Analysis of Aquaporin-2 Protein in Ribbed Mussel Gills
49	Biology	Jessica Dennison	Fordham University	Reactive Oxygen Species Damage to Human Retinal Pigment Epithelial Cells and Protection by Melatonin
50	Biology	Theresa Geraci	Fordham University	Ultraviolet (UV) Light and the Morphological Effects on the Aging Process of Two Human Cell Lines
51	Biology	Leonid Telis	Fordham University	Combination Cytotoxic and Epigenetic Agents in the Treatment of Sarcomas
52	Biology	Colin Smith and Allegra De Vita	Sacred Heart University	Expression and Localization of BETA1- and BETA4- Integrin Subunits in Embryonic Chick Forebrain Neurons
53	Biology	Heather Wolfe	Sacred Heart University	You are what you eat: the fatty acid composition of diet influences the fatty acid composition of fat stores in a migratory songbird, *Sturnis vulgaris*
54	Biology	Aimee Marin	Wagner College	Effects of dioctyl phthalate on the life cycle of *Drosophila melanogaster*
55	Botany	Kristen Gulino	Pace University	The Effects of MAPK Kinases 3/8/10 on Stomatal Development in Arabidopsis

Poster Presenters and Titles (continued)

Abstract #	Category	Presenter	School	Title
56	Ecology	Heather MacIntosh	Central Connecticut State University	Eastern Gray Squirrels Take More Time and Dig More Unused Holes When Caching Red Oak Acorns than Pin Oak Acorns.
57	Ecology	Andrea Ramsdell	Elms College	Floral Fragrance is Unaffected by Belowground Root Herbivory in Cucumber Plants.
58	Ecology	Christopher Esposito	Fordham University	Heavy Metal Pollution in Estuaries: Effects on Limulus polyphemus Embryo Survival, Developmental Rate, and Oxidative Stress Response.
59	Ecology	Katlyn Rice	Niagara University	Chironomid burrowing and the nitrification/denitrification processes at the sediment-water exchange.
60	Ecology	Kyle Polanski	Niagara University	Forest Age and Terrain Interaction with *Plethodon cinereus* along the Niagara Escarpment.
61	Ecology	Brittany Hartman	Sacred Heart University	Urban forest fragments as stopover sites for migratory songbirds; does further deforestation impact avian community structure and health?
62	Ecology	Meagan Lynch and Chris Bond	Sacred Heart University	Project *Limulus* needs you!
63	Environmental Science	Seth Brittle	Marist College	Impact of Silver Nanoparticle Exposure on Hudson River Crayfish.
64	Environmental Science	Jason Koutoudis	Fordham University	Monitoring of Horseshoe Crab Breeding activity.
65	Environmental Science	Manuel Juarez	Mount St. Mary College	Analyzing Heavy Metals in Water, Sediment and Shellfish Samples in the Hudson River.
66	Environmental Science	Gigianna Santiago	Mount St. Mary College	The Use of Plants to Generate Electricity within a Plant Microbial Fuel Cell.
67	Health Sciences	Alison Sardonini	Marist College	Methadone-induced DNA damage in developing chick embryo brain.
68	Health Sciences	Rachel Serafin	Marist College	Entering Our Food Chain: Toxic Effect of Silver Nanoparticle Exposure on Tomato Plant (*Lycopersicon esculentum*).
69	Health Sciences	Stephanie Cabey	Marist College	Silver Nanoparticles Possess the Midas Touch?
70	Marine Science	Michael Burke	United States Coast Guard Academy	Residence Times and Influences on Stratification in the Thames River Estuary.

Poster Presenters and Titles (continued)

Abstract #	Category	Presenter	School	Title
71	Microbiology	Jerod Brammer	Central Connecticut State University	Bacterial Bioremediation of Gasoline Contaminated Soil.
72	Microbiology	Briana Lunman	Central Connecticut State University	Investigation of Host Range of Bacteriophage Specific for *Propionibacterium acnes*, a Bacterial Species Found on Skin.
73	Microbiology	Tran Nguyen	Central Connecticut State University	Characterization of Antibiotic Resistant Isolates of *Propionibacterium acnes* from Skin.
74	Microbiology	Gabriella Brum, Thomas Carbone, Eric Still	Providence College	N-acetylcysteine potentiates doxorubicin-induced ATM and p53 activation in ovarian cancer cells.
75	Microbiology	Matthew Hurton	Providence College	Genome Reduction in Yeast Involves Programmed Cell Death.
76	Microbiology	Rafael Vargas	United States Naval Academy	Variations in the N-terminus of PapE and Its Effects on Cpx Induction.
77	Microbiology	William Rivera	Wagner College	Carriage of bacterial and protozoan pathogens among Common Tern chicks on Pettit Island, Barnegat Bay.
78	Molecular Biology	Kevin Child	Central Connecticut State University	Fine-mapping the wooly mutation (wly) on mouse Chromosome 11.
79	Molecular Biology	John Sirois, Diana Mateo, Vidhi Dave	Central Connecticut State University	Investigating cell cycle exit during differentiation in zebrafish embryos.
80	Molecular Biology	Theodore Szmurlo	Central Connecticut State University	The Role of Cadherin Based Junctions Aid in the Orientation and Migration of Parietal Endoderm Outgrowth.
81	Molecular Biology	Nelson Vila	Central Connecticut State University	Does the juvenile alopecia (jal) mutation in mice result from a defect in the Il2ra gene?
82	Molecular Biology	Jacqueline Brown	Elms College	Survey of the Metagenomic Population of the Horse Gut by DNA Extraction of Stool Samples.
83	Molecular Biology	Erica Matula	Fordham University	Optimization of live cell imaging for the analysis of microtubule dynamics.
84	Molecular Biology	Tatiana Popovitchenko	Fordham University	Genetically Dissimilar Strains of *Caenorhabditis elegans* and their Behavioral Responses to Food Deprivation and Pharmacologic Agents.
85	Molecular Biology	Adriana Hache'	Manhattan College	A Morphological Analysis of the Balloonhead Mutant Zebrafish.

Poster Presenters and Titles (continued)

Abstract #	Category	Presenter	School	Title
86	Molecular Biology	Caitlyn DeCicco	Niagara University	Salamander Microsatellite Loci
87	Molecular Biology	Andrew Siedlecki	Niagara University	Optimization and comparative analysis of multiplex PCR techniques in *Plethodon cinereus*
88	Molecular Biology	Ilyse Nelson	Pace University	Topoisomerase IA exhibits substantial internal flexibility during the closing motion with a DNA substrate
89	Molecular Biology	Nina Patel	Pace University	Conformational changes in topoisomerase IA closing control the DNA binding
90	Molecular Biology	Stephanie Pineda	Pace University	Closing motions of topoisomerase IA alter protein conformation and increase DNA interactions
91	Molecular Biology	Vincent Cascio	Providence College	A Genome-wide Screen for Transcription Factors Involved in Programmed Cell Death in the Yeast, *Candida albicans*
92	Molecular Biology	Ben Lichtenfels	Providence College	A Gain-of-Function Screen for Transcription Factors that Regulate the Response of *Candida Albicans* Yeast Cells to Sulforaphane
93	Molecular Biology	Kristen Merloni	Providence College	The Role of S-adenosyl-L-methionine in the treatment of gastrointestinal disorders by enhancing the viability of the probiotic yeast, *Saccharomyces boulardii*
94	Molecular Biology	Kevin Murphy	Providence College	Investigating the Role of Calcium in BAX-induced Cell Death in the Yeast, *Saccharomyces cerevisiae*
95	Molecular Biology	Monika Kadlof	Sacred Heart University	Optimization of parameters used to characterize epigenetic changes in brain reward regions of rats chronically exposed to methylphenidate
96	Molecular Biology	Samantha Kee	Sacred Heart University	Determining the effects of embryonic exposure to Prozac on the developing nervous system in a zebrafish model
97	Molecular Biology	Joseph C. Lugo	Sacred Heart University	Glycinergic neuron antagonist alters gene expression profiles at neuronal synapses in developing zebrafish embryos and leads to behavioral abnormalities in the larval or adult fish
98	Molecular Biology	Shannon Swift	Sacred Heart University	Sonic Hedgehog's negative autoregulatory properties in salamander limb development
99	Molecular Biology	Elizabeth Cummins	Western New England College	Genomic Analysis of the Hyperthermophilic Archaeon, *Geoglobus acetivorans*

Poster Presenters and Titles (continued)

Abstract #	Category	Presenter	School	Title
100	Molecular Biology	Veneta Qendro	Central Connecticut State University	RNA editing targets in *Drosophila melanogaster*
101	Molecular Biology	Roseanna Valant	Wagner College	Chromosome Aberrations Caused by the Chemotherapeutic Agent Mitoxantrone on In Vitro Human Peripheral Leukocytes
102	Physiology	Ryan Russell	Central Connecticut State University	Astrocytes can sequester and release serotonin
103	Physiology	Caroline Czajkowski	Central Connecticut State University	Fibroblast responses to TGF-beta and Angiotensin II
104	Physiology	Lauren Schmalz	Fordham University	Behavioral Responses to Time-Varying Visual Stimuli in Drosophila
105	Physiology	Gabrielle Nunnari	John Carroll University	Cognitive and motor functioning of the APPPS1 mouse model of Alzheimer's disease
106	Physiology	Cherryle Brown	Medgar Evers College	Pharmacological Study of Dopamine Post-Synaptic Receptors of the Lateral Ciliated Cells of the Gill and Visceral Ganglia of *Crassostrea virginica*
107	Physiology	Shannon Caesar	Medgar Evers College	Parallel Synthesis of Potential Histone Deacetylase Inhibitors to Be Used For PET Imaging of the Brain
108	Physiology	Fiona Dailey	Medgar Evers College	Urinary Steroids Profile In Endometriosis Patients
109	Physiology	Rachelle Desroches	Medgar Evers College	Manganese Impairs the Activity of Mitochondrial Aconitase in Gill of the Bivalve *Crassostrea virginica*
110	Physiology	Latoya Duncanson	Medgar Evers College	The Ability of PAS, Acetylsalicylic Acid and Calcium EDTA to Protect Against Toxic Effects of Manganese on Mitochondrial Respiration and Membrane Potential in Gill of *Crassostrea virginica*
111	Physiology	Kun Huang	Medgar Evers College	Toxic Effects of Metals on Mitochondrial Cytochrome c Oxidase Activity in the Gill of the Bivalve *Crassostrea virginica*
112	Physiology	Michael Nelson	Medgar Evers College	Are the Neurotoxic Effects of Manganese Due to Blockage of Post Synaptic Dopamine Receptors?
113	Physiology	Gabriela Murphy-Goldberg	Mount St. Mary College	Music Has a Positive Effect on Muscle Performance in Humans.
114	Zoology	Alessandra Lyons	Sacred Heart University	Amplitude and attenuation of notes within the lar gibbon (*Hylobates lar*) great call.

Poster Presenters and Titles (continued)

Abstract #	Category	Presenter	School	Title
115	Analytical Chemistry	Daniel Murphy	Niagara University	Evaluation and comparison of organic extracts from the leaves and the flowers of *Salidago Canadensis* (Golden Rod).
116	Analytical Chemistry	Alana DeTone	Mount St. Mary College	Analysis of Nicotine in Hookah Water.
117	Analytical Chemistry	Mary McEwan	Mount St. Mary College	Analysis of Metals in Hookah.
118	Chemical Ecology	Laura Baumgartner	United States Naval Academy	Population genetics of white oak in relation to herbivory.
119	Chemical Ecology	Amanda Lau	United States Naval Academy	The effect of chemical attractants and repellents of red oak foliage on gypsy moth feeding behavior.
120	Chemistry	John Leistner	Niagara University	The synthesis of S-substituted-N,N-dimethyldithiocarbonate as a possible treatment for type II diabetes.
121	Chemistry	Kara Swallow	Sacred Heart University	Exploring Microwave Assisted Oxidation Reaction Organic Synthesis.
122	Inorganic Chemistry	Josephine Mayne	Medgar Evers College	Is Chelation the Mechanism of Action of p-Aminosalicylic Acid (PAS) in the Treatment of Manganism?
123	Organic Chemistry	Eric Stoutenburg	Niagara University	Solid State Thermo-Studies of Substituted Dibenzylic Dialkoxy Disulfides.
124	Organic Chemistry	Patrick Heaphy	Niagara University	Cage opening/rearrangement of cubanes and surfactant synthesis.
125	Organic Chemistry	Lorenzo Crumbie, Ursula Brandl, John Williams	Rhode Island College	Antibiotic and anitfungal graft polymers of cotton and polyvinyl alcohol bound to arylphosphonium salts.
126	Organic Chemistry	Chris Gemski	Rhode Island College	Microwave- assisted Polypeptide Synthesis.
127	Organic Chemistry	Colin Kelly	United States Naval Academy	Microwave Assisted Copper-Catalyzed Halogen Exchange and Hydrodehalogenation of Aryl Halides.
128	Organic Chemistry	Natalie Plana	Fordham University	Mass Spectrometry Analysis for the Synthesis of a Dipeptide Using Ruthenium Pentammine as a C-terminus Protecting Group
129	Organic Chemistry	Veronica Campanella	Niagara University	Microwave assisted methylation of phenols with DMF-DMA

Poster Presenters and Titles (continued)

Abstract #	Category	Presenter	School	Title
130	Organic Chemistry	Christopher Dietz	Niagara University	Vinyl cubane derivatives: Cage opening/rearrangements.
131	Organic Chemistry	Bryce Paolella	Niagara University	Novel dimerization of benzylamine.
132	Organic Chemistry	Maddison Pollina	Niagara University	Monitoring the proton exchange of an acid C-H sulfone in various deuterated solvents.
133	Physical Chemistry	Andre Santa	Mount St. Mary College	Investigating the Oxidation of 2-Butanol Catalyzed by Au and Pd Nanoparticles Using ATR-FTIR.
134	Psychology	Lisa Gallagher	Lycoming College	The Effects of Instrumental Music on Verbal Memory.
135	Sociology	Jaclyn Hendricks	Sacred Heart University	Media Exposure and Body Dissatisfaction.
136	Psychology	Jalina Brown, Linsey Martin	Lycoming College	The Effects of Failure on Ratings of Self and Others.
137	Anthropology	Jennifer Ida	Wagner College	Transmission of Infectious Disease between Human and Non-human Primates.
138	Psychology	Jenna Barnhart	Lycoming College	Automaticity of Semantic Processing Effects on the Ability to Identify Word Component Parts.
139	Chemistry	Kelly Considine	Sacred Heart University	Identification of novel peptide inhibitors of the DR6-NAPP protein-protein interaction using a virtual screening approach..
140	Psychology	Bethany Mastronardi, Katie Baldwin	Lycoming College	The Effect of Adding Pictures to Concrete and Abstract Words.
142	Psychology	Marie Alnadi	John Carroll University	Effects of Constant Blue Light on Food and Water Intake, Circadian Activity, Melatonin Levels, Adiposity, and Behavior in Rats.

Platform Abstracts

1

Andrew Fesler. Mortality and metal body burden in the estuarine shrimp *Palaemonetes pugio*: nickel exposures at various salinities. Biology Department, Manhattan College.

The ability of heavy metals to form complexes with chloride in solution may affect the bioavailability and thus toxicity of these metals. This complexation is particularly important in estuarine systems where salinity including chlorides varies with the tidal cycle. In order to test the effect of varying salinity on nickel toxicity, bioavailability and body burden, acute toxicity tests were performed on the estuarine grass shrimp *Palaemonetes pugio*. Ni toxicity on field collected *Palaemonetes* was assessed in laboratory studies with salinities of 5, 20 and 30. Mortality (96h) of the shrimp was our first response variable. Using probit analysis, the LC_{50} was 58, 50, and 90 mg/L for 5, 20 and 30 respectively; however the differences were not statistically significant and differences among experiment dates were more pronounced than among salinities. Secondly, post exposure, the shrimp soft tissue was removed and separated (tail muscle and visceral tissue) and subjected to body burden analysis to determine $[Ni_{tissue}]$. Desiccated shrimp tissue was digested with concentrated nitric acid. Samples were analyzed via atomic absorption analysis (AA) and inductively coupled plasma atomic emission spectroscopy (ICP). The $[Ni_{tissue}]$ were below the detection limit for AA. However, using ICP to provide greater resolution, the results indicate there was a positive correlation between the $[Ni_{tissue}]$ and mortality ($p=0.03$).

2

Jo-Marie Kasinak. Conservation Genetics of the American Horseshoe Crab in Long Island Sound. Biology Department, Sacred Heart University.

Horseshoe crabs (*Limulus polyphemus*) can be critical members of aquatic ecosystems and have significant value in the whelk and eel fisheries as well as the pharmaceutical industry. This can lead to conditions of overharvesting and population decline. In Connecticut they are considered a species of concern and no-harvest zones were established to conserve the population of horseshoe crabs in Long Island Sound (LIS). This study was developed to determine if this plan was appropriate to conserve the genetic diversity of the LIS population. A microsatellite DNA-based genetic survey of the population was undertaken to determine the overall genetic health and structure of the population. A total of 187 horseshoe crabs, collected from 5 distinct sites spanning the geographic extent of LIS, including two of the no harvest zones, were genotyped for 11 microsatellite DNA regions. Analysis of the genetic data indicates that the LIS horseshoe crab population is in good genetic health, does not exhibit isolated subpopulations, and is genetically homogenous with no signs of inbreeding. The genetic data are in agreement with data from a long-term mark-recapture study in that both indicate that individuals move around the Sound but generally stay within its boundaries. Therefore, the locations of the established no-harvest zones are appropriate to conserve genetic diversity. However, to continue to harvest horseshoe crabs sustainably, a tri-state management strategy is needed to successfully increase the population numbers.

3

Zhuo "Tony" Su. Modest effects on predictions result from incorporation of highly parameterized nucleotide substitution models into phylogenetic signal and noise analysis. Department of Ecology and Evolutionary Biology, Yale University.

A longstanding challenge in phylogenetic experimental design concerns how to quantify the phylogenetic informativeness of characters, the power of different classes of characters to resolve phylogenetic hypotheses during specific historical epochs. Accurate predictions of power to resolve a phylogeny require modeling both phylogenetic signal and noise. Townsend (2007 & 2010) advanced an analytical theory of phylogenetic signal and noise, by assuming a Jukes-Cantor model of molecular evolution and applying estimates of character evolution rates to track site patterns of character states in a phylogenetic quartet. In this paper, we generalize the phylogenetic signal and noise theory beyond the simple JC model to all common Markov models of nucleotide substitution. Phylogenetic signal is modeled as the probability of observing an informative synapomorphic site pattern given estimated rates of character evolution. Using Markov process theory, phylogenetic noise is characterized as the probability of a homoplasious site pattern arising along the lengths of the four subtending branches. By applying the theory to a published Candida data set, we show that parameterization of signal and noise analysis with a particular model of molecular evolution leads to similar predictions of the level of resolution that can be achieved for a node of interest. Thus, analyses using simple models may perform better in the face of model uncertainty and demand less computational resources than do analyses using more complex models of molecular evolution.

4

Allen Clayton, Seth Brittle, Rachel Serafin, Chau Quach, and Dr. Zofia Gagnon. Impact of Silver Nanoparticle Exposure on Hudson River Crayfish. Department of Environmental Science, Marist College.

The use of nanotechnology has become widespread in commercial, industrial, and medical applications. However, the very property that makes nanoparticles desirable, their high level of reactivity, raises concerns that they may also pose risks to the environment and human health. Silver nanoparticles (AgNPs) are proven to be very effective antibacterial agents; nonetheless, the qualities that make them such effective filtering agents could also negatively affect waterways and living organisms. Crayfish (*Orconectes virilis*) were exposed to different AgNP treatments. The following AgNP concentrations were used: 0.0, 0.05, 0.107, 0.16, and 0.214 mg/L. Control treatments of $AgNO_3$ and $NaBH_4$ were established in the same concentrations used for synthesis of the AgNP treatments. Additional control treatments were established using untreated Hudson River water, and cages placed directly in the Hudson River (river control). After 10 days of exposure, the crayfish were harvested and tissue analyzed for silver (Ag) content using graphite furnace atomic absorption spectrometry (GFAAS). DNA damage was analyzed by comet assay. It was hypothesized that silver accumulation in the tissues and DNA damage in the brain would occur in the experimental treatments. In the 0.214 mg/L exposure accumulation was ~0.25 μg of Ag/g of dry liver tissue. There was significant DNA damage in the AgNP treatments where comet tail length ranged from 95 to 130 μm. The results support concern about the possible impact of AgNPs on the environment and human health. Presently, there are no laws regulating the use of nanoparticles. We hope that with our results, steps can be taken to implement regulations on these substances until more research can be done to show their health and environmental effects.

5

Eric Littmann. Pollen Distribution Across A Major Metropolitan Area. Departmental of Natural Sciences, Fordham University.

The distribution of modern airborne pollen at a regional level is scarcely understood, yet the public health consequences are significant. During early to late spring of 2010 we deployed 25 pollen sampling traps throughout the New York City Tri-state Area to establish the geographic pattern of pollen deposition at a regional and neighborhood level. The samplers are a simple, low-cost design modified from the original device described by Henrik Tauber, so they collect airborne pollen and particulates by passive deposition. Samples were processed by acetolysis; the residues slide-mounted and analyzed at 400x magnification. We also compared these pollen spectra to the cumulative results of two active Burkard aerobiology samplers covering the same period. From the Tauber trap samples, we identified more than 30 pollen types dispersed in the region during the period from March to late May. Oak pollen, a known allergen dominated the spectra throughout urban, suburban and rural settings, often comprising more than 60% of the total. The appearance of birch, also allergenic, was more variable but usually low especially in urban settings. Pine was low in urban areas, and *Platanus* (London Plane, Sycamore) was a significant presence throughout New York City yet remained low in rural samples. We noted a broad similarity between Tauber and Burkard results where the devices were located side by side. Furthermore, the Tauber sample deployed in New Rochelle NY had very similar pollen spectrum to the uppermost sediment sample of a pollen core extracted a local swamp

6

Kelly Arendacs, **Jennifer Melhorn** and Dr. Sue A. Kelly. Can Preschool Children Learn From Frogs? The Effects of Animated Media Presentation on the Understanding of Letters and Letter Sounds. Psychology Department, Lycoming College.

Children spend more time watching tv than engaging in virtually any other activity (Comstock & Paik, 1991). Thus understanding the effects of television is of major importance. Research has compared educational media/videotaped instruction versus live instruction, but no studies have examined the effectiveness of live versus animated video instruction. The current study fills this gap. Eight 3-year-old children were pre-tested on their knowledge of letters and letter sounds. Half of the children watched Leap Frog's animated *Letter Factory* video and half listened to a live instructor once a week for 4 weeks. A post-test was given one week later. Growth scores (post- minus pre-test scores) were calculated. There was no difference in any of the measures. The small sample size may have limited the current findings. It is also possible that the type of live instruction employed was inconsistent with what preschool children generally receive. Specifically, the live instructors were energetic and engaging, they utilized a script that was taken directly from the video, and the script was repeated each week. Children may have been more attentive to the live instruction because the method of delivery was novel. It is possible that there is no difference in the effectiveness of live instruction or animated video. This suggests that even though the animated videos are not more effective than live instruction, they are also not *less* effective. Research should be continued with a larger sample size, and with attention paid to the type of live instruction that is provided.

7

Christine Gizzi. The Effect of Injunctive Drinking Norms on College Students' Drinking Attitudes. Department of Social Sciences, Mount St. Mary College.

Past research has shown that when students come to college, they are likely to over perceive the drinking norm (e.g., average students' drinking behavior) and the injunctive drinking norm (e.g., the average students' attitude on drinking). When this occurs there is a positive correlation between permissive attitudes on drinking and drinking behavior. This study investigated whether students over estimated the injunctive norm and whether after being given the injunctive norm permissive attitudes on drinking would decrease. Students answered a questionnaire about their attitudes on alcohol and then made an assumption on the injunctive norm on campus. Participants were then given the statistics from a survey in which first year students answered in the previous year (e.g., the injunctive norm). The same questionnaire was given again to see if participants changed their attitude on drinking. Results indicated that there was an overestimation of the injunctive norm; however, differences in attitude towards alcohol did not change from pre test to post test. Future studies should focus on other ways to reduce over estimation of drinking norms among college students.

8

Donna DiRocco. Effect of the Color Red on Test Anxiety. Psychology Department, Lycoming College.

It is commonly believed that grading papers and exams with red ink creates anxiety and has a negative effect on academic performance. Researchers testing the effects of color have generally measured anxiety by using questionnaires. The current study utilized a physiological measure, the gavanic skin response (GSR), to measure arousal. Students received previously taken exams that had been graded with red, green, or black ink while GSR measurements were made. Results from the GSR measurements are compared to previous results using more subjective measures.

9

Kristen Forgotch. Effects of Temperature on Perceived Saltiness of Foods. Psychology Department, Lycoming College.

There has been considerable interest recently in promoting healthier food options in public school lunches and the American diet in general. Removing salt from foods has been of particular interest due to the negative effects of sodium on the heart and other organs. Finding a way to make foods taste saltier with less salt would be beneficial. Researchers have devoted considerable attention to the effects of food temperature on perceived sweetness, but considerably less on the effect of temperature on perceived saltiness. Fifty two college students ate pickles at varying temperatures and were asked to rate the saltiness on a scale from 1 to 10. The students were not told that all pickles had the same level of salt. It was hypothesized that foods at a colder temperature would be perceived as saltier. Results supported the hypothesis with a mean rating of 3.6 for the 32° sample and a mean rating of 6.4 for the 110° sample. Findings suggest that warmer foods are perceived as saltier than colder foods.

10

Melody Johnson. Effects of Women's Scent During Ovulation on Olfactory Stimulation. Psychology Department, Lycoming College,

Women's scent during ovulation is known to affect men's testosterone levels and increase sexual attraction. The current study hypothesized that both men and women are affected by other women's scent and predicted that participants would rate shirts previously worn by women during ovulation as more appealing than shirts worn during the Luteal phase of the woman's menstruation cycle. The present study also tested whether contraceptive pills prevented an appealing scent during ovulation. Nine women who were either close to ovulation during their late Follicular phase (day 14) or far from ovulation during their Luteal phase (day 21) wore t-shirts for 24 hours. The shirts were then placed in a classroom and 50 undergraduate men and women smelled the different shirts and rated how appealing they smelled on a five point scale. The ratings for different phases in the menstrual cycle and other demographic characteristics were compared.

11

Faiza Sheikh. Synthesis of Contraceptive Films Utilizing Antimicrobial PVA. Chemistry Department, Pace University.

Due to the growing awareness of medical complications associated with the use of contraceptives, interest in other contraceptive methods has increased. Most of the contraceptive methods in current use cause some inconvenience to users. Moreover, it is often desirable to administer medication in the vagina or other internal areas of body. Thus, under current situation contraceptive film, which is a device adapted for local administration of medication agent in an internal body area, is preferred. Our laboratory is working on the development of a contraceptive film utilizing PVA, which is safe for internal use, glycerol, and a previously prepared antimicrobial compound. Our goal is to synthesize a new contraceptive film; the synthesis and physical properties of our work to date will be described herein.

12

Haley McClory. 1H NMR-Based Metabolic Profiling of Patients with Risk Factors of Coronary Artery Disease. Biochemistry and Physics Department, Niagara University.

The prevalence of coronary artery disease (CAD) in the industrialized world has caused an increase in the technologies used to diagnose and treat this debilitating disease, primarily in the symptomatic population. These techniques, usually invasive and sometimes painFful procedures, have led us to consider metabonomics as a way of diagnosing CAD. This is the study and measurement of the different metabolites in the body and can be related to specific to the cellular processes. Using metabonomic analysis could not only eliminate these procedures but it also has the potential to identify those at increased risk for developing CAD. Blood plasma samples from male and female patients with at least one detectable risk factor of CAD were obtained from Niagara Falls Memorial Medical Center. Samples, classified into high risk and low risk groups, were then analyzed using 1D-NOESY NMR to enable observation of small molecule metabolites. The resulting spectral data was processed using manual and automatic processes of line broadening, phasing and baseline correction with a Chenomx software package (6.0 Professional Edition). This software program not only allows for metabolite identification but also subdivision of the spectral data into specific sized regions (spectral binning). Bins are manageable spectral areas more readily amenable to principal component analysis. Binned data is currently being analyzed using the Umetrics statistical software SIMCA P+ to identify the statistically significant parts of the spectra and determine data correlations.

13

Paolo Grenga. Photolytic decay of dibenzylic sulfites. Chemistry Department, Niagara University.

The photolytic decay of a library of dibenzylic sulfites has been evaluated. Each dibenzylic sulfite was synthesized by reacting two equivalents of para-substituted benzyl alcohol with one equivalent of thionyl chloride and two equivalents of pyridine for 5 hours in dichloromethane. Varying the substituent on para-positions of the benzyl alcohol has produced a library of compounds for analysis. Sulfites were exposed to UV radiation in a Srinivasan–Griffin–Rayonet Photochemical Reactor in various solvents, and their rates of decay monitored by ^{1}H-NMR. The decay for each dibenzylic sulfite was then evaluated with respect to Swain and Lupton's field constant, F. The rate of photolytic decay does indeed vary depending on the identity of the benzyl substituents. Furthermore, it has been observed that the identity of the solvent can affect both the rate of sulfite photolytic decay as well as final product distribution.

14

Stacey Barnaby. The Design and Synthesis of Bone Mimics on Self-Assembled Kinetin Nanoassembies. Chemistry Department, Fordham University.

Kinetin is a plant cytokinin responsible for roles in the plant such as apical dominance, seed germination, and cell division, as well as protecting cells against oxidative damage. Previously, we have reported the ability of kinetin to self-assemble into nanofibers under neutral conditions. In this work, we have explored the ability of kinetin nanofibers to serve as scaffolds for bone tissue engineering. To this end, kinetin nanofibers were coated with collagen, chondroitin sulfate, and fibronectin in order to mimic the extracellular matrix (ECM) as well as the composition of natural bone. In the body, collagen is a main component of connective and fibrous tissue, as well as blood vessels and cartilage, chondroitin sulfate is an integral part of cartilage and the ECM, and fibronectin is a vital part of the ECM for its role in cellular functions such as adhesion, growth, and wound healing. Therefore, by coating these materials on the surface of kinetin nanofibers, we are creating materials that mimic artificial bone. The formation of the nanoconjugates was assessed using electron microscopy, FTIR, and differential scanning calorimetry. We also examined the cytotoxicity and biocompatibility of the nanostructures in the presence of normal rat kidney cells and osteoblasts. These materials may potentially serve as a means to expedite wound healing for tissue regeneration

15

Connor Dougherty. Surface Injury Characteristics of Healthy and Dead Saguaro Cacti (*Carnegiea gigantea*) over a 17-year period. Biology Department, Manhattan College.

Sixteen species of columnar cacti of North and South America that should live 100 to 300 years show identical surface injuries. Recent data show that stem surface injuries to columnar cacti lead to premature morbidity and mortality. This study is an extension of a long-term study trying to understand the rate at which healthy cacti become morbid, and at which cacti die. During the summer of 2010, we reevaluated 1010 saguaro cacti in Tucson Mountain Park, Arizona. During the eight-year period, more than 50% of saguaros that had good health in 2002 had poor health in 2010. Of the healthy cacti, 69% developed surface injuries and 6% died. Injuries increased mostly on south-facing surfaces while fewer injuries occurred on other surfaces. One-fifth of the cacti died by 2010 and 19% of the cacti that died exhibited healthy surfaces in 2002. As predicted, most of the cacti that died by 2010 had many surface injuries in 2002. Sun exposed cacti had more surface injuries than shaded cacti. For example, 50% of healthy cacti were in shady conditions whereas 98% of cacti that died were found in full sunlight. These results clearly demonstrate that saguaro cacti, a cactus species that should live to be 300 years old, show rapid rates of morbidity and mortality. The effects of incident solar radiation are in accordance with global models that show that sunlight on south-facing surfaces should be four times greater than on north-facing surfaces at the latitude of the field site. Thus, these results support our overall hypothesis that UV-B radiation of natural sunlight is causing injuries.

16

Jennifer Ewald. Relationships Between Stem and Leaf Characteristics for 20 Species of Broad-Leaved Trees. Biology Department, Manhattan College.

The intent of this study was to determine if there are relationships between amounts of xylem cells in petioles and in terminal stems at the end of first year growth. Our hypotheses are based upon the premise that primary purpose of xylem cells petioles and stems is to supply water to leaves at stem terminals. For 20 plant species, there was a positive linear relationship between length of petioles and leaf area. All species showed a positive relationship between cross-sectional xylem area of petioles and individual leaf areas. The slopes of these relationships were negatively correlated with leaf area which indicates that lower slope values reflect higher levels of xylem efficiency in petioles. For stems, areas of first-year xylem tissues were determined. Analyses were performed to show a positive relationship between these first-year stem xylem areas and leaf area. Species with larger leaves have greater xylem efficiency of stems. Linear regression showed a positive relationship of stem xylem area of terminal shoots with cumulative leaf area. Overall these data demonstrate that xylem area of petioles and of stems were highly correlated with leaf area.

17

Kathleen Shea. Relationship between Leaf Pressurization and Sclereids in Leaves of 35 Mangrove Species from Australasia and the Americas. Biology Department, Manhattan College.

Mangrove forests are extensive throughout the world (12 to 20 million hectares of mangroves), found in tropical coasts and estuaries. These tree species provide a suitable habitat for many aquatic organisms—specifically fish species. One third of all Australian fish species occur in mangrove forests. Due to their location, mangrove roots are anoxic for many hours per day. There appears to be two methods by which plant roots obtain adequate oxygen. The first method is internal movement of air from leaves to roots, while the second method is the presence of pneumatophores (exposed roots). This study focused on the former method. Plant tissues were obtained from Australia, Vietnam, Panama, and Florida for this study. Data of this study indicate that internal air movement was not through aerenchyma of leaves and petioles. Instead the data from 35 mangrove species showed that all species that moved air internally possessed sclereids in their leaves, while all species that did not move air internally did not possess sclereids. We performed pressurized petiole tests with dilute dye solutions to determine the path of air movement. Where the pressurized air was released, dye solutions occurred in those exact locations in sclereids of leaves and petioles. The results of these tests show that dye was only present in sclereids and was not present in aerenchyma tissues or any other tissues in either petioles or leaves. In addition, sclereids were associated with cork warts (cork warts are structures on leaf surfaces of mangroves that are responsible for air uptake). These results taken together demonstrate that air is taken up by cork warts, becomes pressurized, and moved into sclereids of mangrove species. The very specialized use of sclereids was determined in 22 mangrove species, of 14 different genera, that were found in Australasia and the Americas—very distant locations. These specific morphological adaptations represent convergence in evolution.

18

Kyle Treman. A reevaluation of changes in a protected population of saguaro cacti. Biology Department, Manhatten College.

The presence and extent of surface injuries on the stems of *Carnegiea gigantea* have been described in several publications. Surface injuries on saguaros are of relatively recent concern with few injuries reported prior to 1950. Injury has been referred to as scaling or barking. Sixteen species of columnar cacti of the Americas show identical injuries. The overall purpose of this study was to describe a re-evaluation of 1010 saguaros in 2010. In 2002, percentages of cacti in classes I (healthy), II (declining in health), III (medium health), IV (below medium), V (poor) and VI (dead) were 22.2, 16.0, 5.5, 5.7, 29.1, and 21.4% respectively for the 1010 cacti of the study. A significant percentage of healthy cacti showed stem injuries in 2010 and a large percentage of cacti in Class V died over the period. The above changes in Class I and V cacti is reflected by increases in percentages of Class II cacti (10.8%) and Class VI cacti (17.4%). The next step was to determine changes in 14 individuals (as examples) in Class I. Five cacti showed a decrease in health of more than 30% over the eight-year period. One cactus showed complete scaling and barking on the crests but neither trough had scaling or barking. Data from 1993 to 2002 was compared with data from 2002 to 2010. In general, surfaces from 2002 to 2010 had two to three times greater injury changes compared with 1993-2002. Our extensive data set shows that south-facing surfaces had much higher levels of injuries than east-, north-, and west-facing surfaces. The reasons for these differences will be discussed.

19

Renae Comulada and Dr. Zofia Gagnon. Fed With a Silver Spoon: A Deeper Look. Biology Department, Marist College.

The study of nanoparticles and their effect on biological organisms is still in its early stages. Studies have been done showing a link between silver nanoparticle (AgNP) exposure and their ability to target and treat cancerous cells. Nanoparticles have an antibacterial aspect to them as well and are being used in the preservation and storage of food. The hypothesis was that AgNPs will have toxicological effects on growth and development of tomato seedlings. The media in which the plants were grown contained Sigma's Murashige and Skoog Basal Salt with Minimal Organics (MSMO). The experimental design consisted of varying concentrations of silver nitrate ($AgNO_3$), sodium borohydride (NaBH4), AgNPs, and a control. The range of treatment concentrations were as follows: $NaBH_4$ - 10, 20, 40 mL, $AgNO_3$ - 5, 10, 20, and 40 mL, and the AgNPs - 5, 10, 20, and 40 mL. The observed effect of AgNPs on the growth of tomato plants was an overall decrease in growth with the exception of the $AgNO_3$ treatments. The accumulation of silver (Ag) in the plant tissue was analyzed through atomic absorption spectrometry. The results demonstrated that the AgNPs in the plant tissue were proportional to the exposure, and the accumulation of Ag ranged from 0.0µg/g of dry weight to 214.5 µg/g of dry weight. Maximum accumulation was shown at the 40 mL AgNP concentration. The results of this experiment raise concerns that AgNPs could enter biological organisms through the food chain and have a potentially adverse effect on human health.

20

Alexis Salas, Francisco Ramirez, Elisabeth Adkins, Jose Horak, and Nelson Vila. The juvenile alopecia (jal) mutation maps to mouse Chromosome 2. Biology Department, Central Connecticut State University.

Mice homozygous for the recessive juvenile alopecia (*jal*) mutation display patches of hair loss, and may offer a model for alopecia areata in humans. Another group has reported that *jal* is located on mouse Chromosome (Chr) 13, but they did not define a particular chromosomal interval. With the long-term goal of finding the genetic basis of the *jal* mutation, we decided to map *jal* to higher genetic resolution. To do this, we crossed C57BL/6 mice, homozygous for the wild type "+"allele, with C3H/He-*jal/jal* mutant mice. F1 females were then bred with mutant males to produce a backcross (N2) generation. The phenotype of each N2 mouse was recorded, and a tail tip biopsy was taken for DNA isolation. Each mouse's DNA was analyzed by PCR to determine its inheritance of dimorphic (C57BL/6-derived or C3H/He-derived) microsatellite "markers" that are located on Chr 13. Surprisingly, *jal* alleles were seen to independently assort from all of the markers typed on Chr 13, suggesting that *jal* must actually be located on a different autosome. We next typed our set of N2 DNAs for PCR-scorable markers from all over the mouse genome, seeking one that was inherited in a pattern similar to the *jal* locus. This analysis revealed linkage between *jal* and marker *D2Mit1*. We are currently producing a new backcross panel (involving strains C3H/He-*jal/jal* and A/J) that promises to provide a richer supply of dimorphic markers on Chr 2. Analysis of this panel should allow us to further restrict *jal*'s location, and to identify co-localizing candidate genes (see abstract by Vila *et al*.).

21

Elisabeth Adkins. Does mshi-mediated graft incompatibility result from two linked mutations on mouse Chromosome 10? Department of Biomolecular Sciences, Central Connecticut State University.

The mouse male sterility and histoincompatibility mutation (*mshi)* arose on a fully-inbred BALB/c background. Homozygotes display an antigen-loss transplantation barrier, and males are sterile. Our lab recently found a 13 kb deletion that spans a portion of the *Mtap7* gene in *mshi* mutants, and showed that this defect is responsible for the male-sterility phenotype. However, homozygous loss of *Mtap7* alone (in mice heterozygous for *mshi* and an *Mtap7* "knock-out" mutation) does not generate graft incompatibility. We therefore reasoned that *mshi* must include a second, tightly-linked genetic defect in addition to the *Mtap7* deletion. According to this model, mice would have to inherit two copies of both the mutated "second site" and a defective *Mtap7* gene in order to display histoincompatibility. To identify this putative second component of the *mshi* mutation, we have crossed *mshi*/*Mtap*$^{k.o.}$ females with *mshi/*+ males. Their offspring are *mshi/mshi*, *mshi/+*, *Mtap7*$^{k.o.}$/*mshi* or *Mtap7*$^{k.o.}$/+. We can readily distinguish these genotypes by DNA typing. BALB/c tail-skin graft challenges performed on most *Mtap7*$^{k.o}$/*mshi* mice are expected to be accepted. However, rare *Mtap7*$^{k.o.}$/*mshi* mice that inherit a recombinant chromosome from their mother, such that *Mtap7*$^{k.o.}$ and the putative second site are now located in *cis*, are expected to reject their skin grafts. Analysis of regional, PCR-scorable markers in those recombinant, graft-rejecting mice should allow us to determine the location of *mshi*'s proposed second genetic defect with respect to *Mtap7*.

22

Phelicia VanOverbeke. Molecular Characterization of the Zebrafish Sense Mutant. Biology Department, Manhattan College.

Progressive neurodegeneration is a trait associated with many human syndromes such as Parkinson's, Huntington's and Alzheimer's diseases. In an attempt to better understand the cellular mechanisms underlying these human neurodegenerative diseases, a model must be identified. Numerous studies have demonstrated significant similarities between the genes regulating human and zebrafish neurodegeneration providing an excellent model system for the study of neurodegeneration. To further utilize the zebrafish model system, I have characterized the ENU induced point mutation, *Sense (sen-/-)*, as having aberrant cell death which is localized to the optic tectum, the anterior retina, and the primary motor neurons beginning at 24 hours past fertilization. TUNEL assays confirmed the aberrant apoptosis was resulting in the *sen-/-* phenotype. *In situ* hybridizations of marker genes confirmed that cell differentiation was not effected in *sen-/-* embryos, and analysis of neuronal structure failed to identify any deficiencies in *sen-/-* embryos. This data suggests that the neurodegeneration in *sen-/-* embryos is due to abnormal regulation of apoptosis pathways. To characterize the genetic nature of the mutation, SSLP markers were used to map the mutation to a 3 cM region linkage group 6. Currently several candidate genes are being screened to identify the gene affected by the mutation.

23

Randal Kudra. The Role of Cell to Cell Interactions during Parietal Endoderm Orientation and Migration. Biology Department, Central Connecticut State University.

Parietal endoderm outgrowth from F9-derived embryoid bodies has been well established as a model system for the in vitro study of early embryonic yolk sac development. Migration of parietal endoderm outgrowth begins as an epithelial-like sheet and migrates in an oriented and directed fashion away from the embryoid body. Our research has shown that the cell to cell binding in the parietal endoderm sheet is a dynamic process, with bonds forming and releasing. Data from our laboratory has shown that this migration requires classical cadherin-mediated adhesions, known as adherens junctions. Disruptions in cadherin proteins accomplished by function-blocking antibody techniques, reveal a loss of orientation in parietal endoderm cells and randomized, rather than directed, migration. Research by others suggests that cadherins are able to act as mechanotransducers. Force produced between migrating cells may cause internal cell changes to aid in cell migration. Previous research suggests that adherens junction formation is regulated by the nectin, afadin, and par3 signaling adhesion complex. Our research focuses on examining the role of the nectin, afadin, par3 complex in modulating the formation of cadherin-based junctions and how these junctions ultimately result in the oriented and directed migration of parietal endoderm, by using immunocytochemistry and siRNA knockdown approaches. We hypothesize that the role of these adhesions proteins in parietal endoderm migration is to provide positional cues that allow for both oriented and directed migration.

24

Aaron Dowdell, Stephen H. Frayne, and Ipsita A. Banerjee. Exploring the effects of shape controlled metal oxide nanomaterials for the development of solar cells. Chemistry Department, Fordham University.

In recent times, attention has been focused on the development of hybrid approaches for the preparation of photoactive nanomaterials with potential applications in photovoltaic devices. Although there have been several reports indicating the applications nanocrystalline TiO2 - dye sensitized photovoltaic cells, few studies have focused on TiO_2 hybrids. Further, the effect of photosensitization based on varying shapes of the nanomaterials is yet to be explored in detail. In this work, we have utilized a template free approach for the formation of TiO_2 nanotubes and examined their potential as solar cell materials when embedded with a range of phthalocyanine dyes or quantum dots. The results obtained were compared with TiO_2 powder as well. In some cases we have prepared GeO_2-TiO_2 hybrids and examined their efficiency for the development of dye-sensitized solar cells. Our results indicate that the efficiency of such a photovoltaic cells depends on the types of the nanomaterials used, the type of dye and the concentration used as well as the shapes of the nanomaterials. The rationale for this study is to develop nanomaterials with higher voltage and current outputs. By examining various dyes, different types of counter electrodes, as well as varying shapes of nanomaterials, these results may help develop efficient solar cell nanomaterials.

25

Nathan Erxleben and Joseph J. Urban. Fluorinated Ethylamine Groups as Peptide Bond Mimics: A Computational Investigation of Hydrogen Bonding. Chemistry Department, United States Naval Academy.

The trifluoroethylamine group has received much attention as a potential replacement for the peptide bond in the generation of peptidomimetic compounds. In this study, ab initio molecular orbital theory calculations have been performed on analogs of N-methylacetamide generated by replacement of the amide bond by either a trifluoroethylamine or fluoroethylamine group. Calculations employing a supramolecular approach have been performed on hydrated complexes where a water molecule has been associated with the trifluoroethylamine and fluoroethylamine moieties to investigate the ability of these groups to engage in hydrogen bonding. It is generally accepted that organic fluorine is a poor hydrogen bond acceptor. However, in the presence of the nearby amine group, the possibility of a hyperconjugative interaction exists that could potentially enhance the hydrogen bond accepting ability of the fluorine. The impact of the fluoro or trifluoromethyl group on proton donating and accepting at nitrogen is also investigated. Several input geometries of hydrated complexes have been considered for each compound under study. For the complexes found, optimized geometry and binding energy results will be presented and comparisons to analogs where the hyperconjugative interaction is absent will be made.

26

Sin Yung Choy. Introducing Antimicrobial Property to Carrageenan. Chemistry Department, Pace University.

Carrageenan is sulfated polysaccharide that commonly used as a thickening agent in food and many other industries. Previous researches had shown that carrageenan itself is an extremely potent infection inhibitor for a broad range of sexually transmitted HPVs; therefore, effort has made to integrate antimicrobial property onto carrageenan. We have modified carrageenan by incorporating a quaternary ammonium substituent at one of the free hydroxyl groups (Figure 1). The protocol used and chemistry basis for the modifications made will be discussed. The antimicrobial activity and physical properties of the products will be presented and analyzed. Further, the significance of the results will be highlighted.

27

Alexander Abdurakhmanov. Microwave Assisted Catalysis. Chemistry Department, Fordham University.

The heterogeneous gas phase catalytic oxidation of 3-methylpyridine was investigated over a vanadium-titanium oxide catalyst using microwave heating. A continuous-flow microwave reaction system with a tubular packed-bed quartz reactor and IR temperature sensor were used. For comparison, the reaction in a tubular reactor under conventional heating was performed as well. It was shown that only 40W of microwave energy is enough to heat the catalyst to the reaction temperature of 250-300 degrees Celsius, while a much higher amount of conventional energy is required to heat the catalyst to the same temperatures. The reaction products (nicotinic acid, 3-pyridinecarbaldehyde, 3-cyanopyridine) were identical to those of conventional heating sources. The reaction kinetics have been observed comparing the two energy sources as well. There is a strong dependance on oxygen by conventional heating methods which limits the niacin producing reaction. However, in microwave assisted catalysis, there is a much smaller dependance on oxygen; raising the capacity of the reaction. This decreased dependance is attributed to a more efficient temperature distribution with the use of microwave energy and results in higher oxygen mobility in the catalyst lattice, which provides the oxygen for the reaction products. The results indicate a significant gain in energy efficiency using microwave heating for the heterogeneous catalytic oxidation of 3-methylpyridine.

28

James Cebulski. Yeast Bax Inhibitor-1, Bxi1p, is an ER-localized Protein that Links the Unfolded Protein Response and Programmed Cell Death in *Saccharomyces cerevisiae*. Biology Department, Providence College.

Bax inhibitor-1 (BI-1) is an anti-apoptotic gene whose expression is upregulated in a wide range of human cancers. Studies in both mammalian and plant cells suggest that the BI-1 protein resides in the endoplasmic reticulum and is involved in the unfolded protein response (UPR) that is triggered by ER stress. It is thought to act via a mechanism involving altered calcium dynamics. In this paper, we provide evidence that the *Saccharomyces cerevisiae* protein encoded by the open reading frame, YNL305C, is a *bona fide* homolog for BI-1. First, we confirm that yeast cells from two different strain backgrounds lacking YNL305C, which we have renamed *BXI1*, are more sensitive to heat-shock induced cell death than wildtype controls. They are also more susceptible to ethanol induced and glucose induced programmed cell death. Significantly, we show that Bxi1p-GFP colocalizes with the ER localized protein Sec63p-RFP. We have also discovered that *Dbxi1* cells are not only more sensitive to drugs that induce ER stress, but also have a decreased unfolded protein response as measured with a UPRE-lacZ reporter. Finally, we have discovered that deleting *BXI1* diminishes the calcium signaling response in response to the accumulation of unfolded proteins in the ER as measured by a calcineurin-dependent CDRE-lacZ reporter. *In toto,* our data suggests that the Bxi1p, like its eukaryotic homologs, is an ER-localized protein that links the unfolded protein response and programmed cell death in yeast.

29

Blaine Lander, Shirley Lin, and Daniel Isaac. Extracytoplasmic Cellular Stress Responses Induced by Cationic Polyethylenimines. Chemistry Department, United States Naval Academy.

An emerging class of antimicrobial polymers and small molecules hold great promise for use in settings where sterility is of cardinal importance however, the basis for their biocidal action is very poorly understood. Gram negative bacteria have at least three discrete extracytoplasmic stress responses (Cpx, σ^E and Bae) that serve to sense largely non-overlapping perturbations such as those likely to be caused by antimicrobial compounds. We examined stress response induction in the Gram-negative bacterium *Escherichia coli* as a means of attempting to better understand the mechanisms by which antimicrobial compounds exert their effect on bacterial cells. Exposure to antimicrobial cationic alkylated polyethyleinimine (PEI+750) in solution reveals specific induction of the Cpx stress response of E. coli at ~ 2.0-2.5 fold over appropriately matched controls at 320μg/mL without significant induction of the σ^E or Bae stress responses. Exposure to the known membrane pore-forming molecule vanillin, in solution, reveals selective, significant, and concentration dependent induction of the σ^E stress response at ~ 6-fold over appropriately matched controls at 640μg/mL, without significant induction of the Cpx or Bae stress responses. The stress response induction of these compounds was also compared to a high molecular weight, non-antimicrobial compound, polyethylene oxide (PEO). Stress response induction of these molecules suggests that, while both PEI+750 and vanillin are both antimicrobial compounds, they act to disrupt the bacterial membrane by different mechanisms.

30

Neil Patel. The Effects of Glutathione and Its Derivatives on the Survival of Mycobacterium bovis-BCG Vegetative and Persistent Organisms. Biology Department, Pace University.

The causative agent of tuberculosis, *Mycobacterium tuberculosis,* is responsible for nearly 2 million deaths each year. Approximately 10 million new cases of the disease arise each year and currently, the organism latently infects an estimated 1/3 of the world's population. Many unknown characteristics of tuberculosis have made it difficult for researchers to gain a full understanding of the organism and its underlying pathogenic mechanism during latent infection. It is believed that the latent mycobacteria enter a non-replicative persistent state. The cells of the human immune response produce many molecules that attempt to control the latent organism. Glutathione and its alternative oxidative forms are examples of such molecules. Our data demonstrates that upon exposure to glutathione and its derivatives, the growth of vegetative BCG is inhibited. Persistent BCG, on the other hand, are not affected by the presence of glutathione and its derivatives. Through various drug trials and the creation of mutant strains, the intermolecular interaction of glutathione and its derivative will provide a better understanding of tuberculosis survival during latent infection.

31

Yi Cao and Nicanor Austriaco. Filamentous Cells in *Saccharomyces cerevisiae* Are Resistant to Programmed Cell Death. Biology Department, Providence College.

Apoptosis is a type of programmed cell death that often occurs when cells are exposed to stressful conditions. The budding yeast, *Saccharomyces cerevisiae*, undergoes apoptosis when cultured in particular environmental stimuli including acetic acid, hydrogen peroxide, and ethanol. Just as the human body consists of severalcell types, from muscle cells to liver cells, the yeast *S. cerevisiae* also occurs in several cell types including the haploid a and α cells, the diploid a/α cells, and the pseudohyphal invasive cells. We are using a wild type strain from the Σ 1278b strain background that is capable of undergoing the dimorphic shift to determine if different yeast cell types respond to ethanol-induced apoptosis in similar or different ways. Our data suggests that filamentation, in both haploid and diploid cells, increases a cell's resistance to programmed cell death in 22% ethanol media. However, our experiments suggest that this resistance cannot be completely attributed to differences in cell type because mutants lacking genes necessary for filamentation, such as RAS2, STE12, and TEC1, still exhibit a resistance to apoptosis similar to that found in wildtype pseudohyphal cells. Experiments to identify the genetic pathways involved in this filamentation-associated resistance to programmed cell death are in progress.

32

Louis Ponessi. The Importance of Protease Inhibitors and the Integrity of Muscle Proteins. Biology Department, Mount St. Mary College.

Incorporation of protease inhibitor cocktail in tissue lysate extracts is thought to be protective. The purpose of our study is to determine whether this cocktail protects the protein content of rat *Latissimus dorsi* muscle lysate. In addition, we sought to determine whether the cocktail protects the protein of muscle lysates after incubation with exogenous trypsin. Using polyacrylamide gel electrophoresis (PAGE) to determine the integrity of the muscle protein bands, muscle lysates with Tris-HCl buffer, detergents, and chelators(U3) and muscle lysates containing in addition, the protease inhibitor cocktail (U4) displayed more protein bands than those suspended de-ionized water (U1) or Tris-HCl buffer (U2), suggesting that detergents and chelators extracted more protein from the tissue lysates. Repetitive freeze-thaw cycles do reduce the number of protein bands and the protein content of muscle extracts, but the effect is less in U3 and U4 than with U1 and U2. Since the number of protein bands in U3 muscle lysates did not differ from U4 muscle lysates, it appears that protease inhibitors are not critical for preserving muscle proteins in the first three or four weeks of storage at -80°C. When exogenous protease (trypsin) was incubated with U3 and U4 lysates for an hour (37°C), protease inhibitors were more protective of proteins in the range of ≥33 kD.

33

Gigianna Santiago, Christine Gizzi, and Dr. Carl Hoegler. The Effect of Listening to Music on the Diving Reflex. Biology Department, Mount St. Mary College.

The diving reflex is a conserved reflex, shared among many vertebrates. Its adaptive value in marine mammals is based on restricting oxygen supply to limited organs. Previous studies have shown that variables mediated by sensory and brain function can modify the reflex. In this study we investigate whether different music styles can influence this reflex. Human (male and female) subjects (n=22) underwent four trials during which time the face was immersed in water (70°F). During each 30 second- randomly sequenced immersion trial, subjects listened to one of the following: "soft music," "hard music" and text reading with silence as the control. In control immersion, significant bradycardia occurred during the first 15 seconds and continued significantly through a second 15-second time period before rebounding to pre-immersion levels. Trials involving "soft music" and reading revealed similar patterns to the control. Though the trial with "hard music" also displayed significant bradycardia during the first 15 seconds, the heart rate did not decrease further, leveling off during the second 15-second period before rebounding afterward to pre-immersion levels. Recreational swimmers exhibited a similar pattern of bradycardia to competitive swimmers. Thus, listening to "hard music" attenuates the bradycardia, regardless of swimming experience. However, this response may be conditioned by gender differences as well as one's subjective impression of the music.

34

Nathan Johnson. Flexion Points and Angles in Flexible Propulsors. Biology Department, Providence College.

Propulsors vary widely among taxa, and are morphologically unique to the environment in which the species exists. However, many different propulsors have the common design of flexing at some point close to the tip, creating a flexible margin. This flexible margin aids in locomotion of organisms through fluids. leading to more efficient movement than stiff propulsors. Our goal is to determine if there is a pattern of similar flexion points or flexion angle across multiple species in different fluid environments. The flexion point is determined as the location along the propulsor at which the angle changes. The flexion angle is the angle with respect to the plane of the propulsor which is created from the flexing. Using still images, we have determined that the flexion ratio (the distance from the body to the flexion point over the total length of the propulsor) is typically between .85 and .65, which certain outliers. The flexion angle, however, is much more distributed, typically between 175 degrees and 140 degrees. We are now in the process of determining the flexion angle's of multiple species (both in air and in water) using video, exporting still images at different points in its locomotion and measuring the angles. So far, many of the angles throughout motion follow the same pattern. However, more data must be collected before a conclusion can be drawn across taxa. This study will give us more insight into how to mimic the efficient movement of organisms through fluid, and could have many engineering and biomechanical implications.

35

John Castro. Apical Dieback Symptoms of Red Spruce Trees of the Adirondack Mountains. Biology Department, Bronx High School of Science.

Apical dieback is the predominant injury to terminal stems of red spruce (*Picea rubens*). Apical dieback is the death of first-year stems as they undergo their first winter at high elevation sites of the Adirondack Mountains. The purpose of this study was to determine the amounts of apical dieback on stems of trees of the High Peaks region of the Adirondack Mountains. 201 trees were sampled at four elevations on each of three mountains in August 2010. Eight azimuth directions of branches were observed on each tree. Three years of branches were observed. The mean survival rate for the 1424 branches of 2008 was 88%. For 2008 stems, the lowest elevation had the highest survival rate and azimuth directions of 270 to 0^o had the highest survival rates. The mean survival rate for the 3880 branches of 2009 was 91%. For 2009 stems, central terminal stems had higher survival rates and the lower elevations had the highest survival rates. Cascade mountain had higher survival rates that the other two peaks. The mean survival rate for the 8297 branches of 2010 was 72%. For 2010 stems, central terminal stems had higher survival rates. For 2010 stems, the medium levels had the highest survival rates and the azimuth direction of 0^o had the highest survival rate. Considering all years of branches, the most important conclusions were: (1) youngest branches had the highest mortality, (2) central stems had higher survival rates than lateral stems, and (3) there were not consistent effects of azimuth, elevation, and mountain site. The consistent 70% mortality rate among mountains, azimuth directions, elevation for the youngest stems indicates that this species remains in a stressful, vulnerable condition in the Adirondack mountains.

36

Dan Shaw. The effects of revenue and black quarterbacks in the NFL. Economics Department, Sacred Heart University.

This paper discusses the effect black quarterbacks and revenue generation have on the valuation of NFL organizations from 2006 to 2009 and whether or not there is a racially driven subconscious within the NFL.

37

Robert O'Leary, Thomas Quinn, Gutters from Garbage and Storage from Sweat. Engineering Department, Providence College.

The purpose of this research project is to design a low cost sustainable water harvesting system to help meet the water needs of families in rural communities in the developing world. The starting point for this project is an innovative idea to use discarded water bottles and wire from old coat hangers for gutters and on-site constructed cement barrels for storage. Work on this project began in fall 2010 with a research project under the direction of Dr. Stephen Mecca and it is expected to continue through the spring semester to a final integrated system documented to allow fabrication by a villager in Ghana. The potential benefits include stored water for families to supplement their daily needs. This allows for less work for women who have responsibility for carrying water from (often polluted) sources to their homes. Girls will be able to stay in school as a result of fewer household responsibilities. Potential business opportunities for local Ghanaians are another benefit even though the anticipated system should be able to be fabricated by a village family. The gutter subsystem is just one of the subsystems involved in the water harvesting project. Other subsystems that are being studied and tested include the downspout system and the first water filtration/diversion system. Successful completion of this project may allow implementation as early as summer 2011 in Pokuase Village, Ghana.

38

Michael Kriner. A Pedagogical Model of the Smart Grid. Engineering Department, Providence College.

Over the past few years, there has been much talk about the "smart grid", an expensive innovation that is often not understood. The basis of the grid is the optimization of supply assets to fully meet demand requirements. The importance of the smart grid's abilities cannot be underestimated in a world where we are quickly running out of "traditional" supply resources. This project documents the creation of a pedagogical model of the smart grid to demonstrate the potential value of the grid. The stochastic model is composed of four dependent parts: weather, supply, demand, and smart grid. In order to demonstrate the potential benefits of the smart grid, a hypothetical country with four different regions has been created based on four US states (Rhode Island, Washington, Nevada, and Florida). The goal of the model is to enable users to understand the major advantages of the smart grid system and to build scenarios to observe the impact of changing basic elements of the system.

39

Anthony Rafetto. A Mathematical Economic Model. Mathematics Department, Wagner College.

A mathematical economic model based on the laws of Newtonian physics will be presented. The economies of several nations, including the U.S. and China, are evaluated using this model.

Poster Abstracts

40

Brian Williams, Stacey Barnbaby, Nazmul Sarker, and Ipsita Banerjee. Self-Assembly Approach to Plant Polyphenol Based Nanostructures as Building Blocks for Device Fabrications. Chemistry Department, Fordham University.

In this work, the formation of nano and microstructures of pyrogallol, a derivative of the plant polyphenol gallic acid was examined using the self-assembly approach. It was observed that the self-assembly process was dependent upon both the concentration as well as the solvent in which the nanostructures were grown. In particular, under aqueous conditions at low pH, high yields of nanofibrils were observed. We also examined the growth in the presence of organic solvents in order to study the growth effect due to hydrophobic-hydrophilic interactions. The growth was examined through various spectroscopic methods, as well as AFM and electron microscopy. Traditionally pyrogallol[4]arene derivatives have been synthesized and utilized for encapsulation of fluorescent molecules. However the encapsulation efficiency of pyrogallol nanostructures as well as their fluorescence properties have not been measured directly. Thus we also studied the luminescent properties of the nanostructures by confocal microscopy as well as fluorescence spectroscopy. Because pyrogallol has been known to coordinate with metal ions, in some cases, the nanofibers were also coated with quantum dots such as ZnS to enhance the luminescent properties. Further, the size control of the quantum dots grown on the nanofibers was also examined. This method can be potentially used to produce nanostructures with controlled semiconducting properties by a simple and economical method, and may enable the resulting nanostructures to be applicable as smart building blocks in nanometer-scaled devices and chemical sensors.

41

Heidi Benson. The Effects of Orally Administered Adderall on Body Weight, Food Consumption, Spatial Learning and Memory, and Activity Level in Long-Evans Rats. Chemistry Department, John Carroll University.

Adderall is widely reported to increase mood, alertness, concentration, and overall cognitive performance while decreasing fatigue and appetite in humans. The state dependent learning theory states that material learned while on a drug affecting the central nervous system may not be remembered once the drug wears off. This study examined whether or not Adderall has an effect on learning and if material learned during drug administration would be remembered after drug use was terminated. The effect the drug has on body weight, food intake, activity level, behavior, and body composition was also examined. Male Long-Evans rats were administered therapeutic doses of Adderall for three weeks and their body weight, food intake, activity levels, and behavioral patterns were monitored daily. Learning and memory were examined through the use of a Morris Water Maze. Througrhout the period of Adderall administration, the experimental rats learned the maze faster, gained less weight, consumed less food, and showed higher activity levels in comparison with control rats. There were no signs of state dependent learning after the experimental rats were taken off the drug.

42

Alyssa Scagnelli, Suparna Bhalla, and Lynn Maelia. A Quantitative Analysis of *trans*-Resveratrol content in Pinot Noir wines. Chemistry Department, Mount St. Mary College.

Recent research has begun to focus on specific phytochemicals that seem to have therapeutic benefits towards certain types of health-related issues. The active ingredient in red wine, *trans*-Resveratrol, has been linked to enhanced cardiovascular health as well as tumor cell suppression. The anticancer property of resveratrol has been supported by its ability to inhibit proliferation of a wide variety of human tumor cells *in vitro*. Varying concentrations of *trans*-Resveratrol has been tested on cell lines in order to see if any change in proliferation would occur, however, it is not known if the concentrations found in red wine would be able to produce these therapeutic effects. In this study, Pinot Noir wines from different regions were tested for regional differences in *trans*-Resveratrol content in the wines and to observe if there was a correlation between the quality of the wine and concentrations of *trans*-Resveratrol. The results from Californian wines show differences in *trans*-Resveratrol content but there is no clear correlation with the quality of wine and the *trans*-Resveratrol content. We are in the process of comparing our results with Pinot Noir wines from New York state and testing the anti-proliferative capacity of *trans*-Resveratrol on the human cervical epithelial cell line HeLa.

43

Matthew Castaldo and Michael Donahue. Development of a Metabonomic Assay For Breast Cancer Biomarkers in Urine. Biochemistry and Physics Department, Niagara University.

Research shows that cancer cells have a different metabolism than normal cells and some metabolic processes can be associated with specific tumors (e.g. choline metabolites and breast tumors). Therefore Metabonomic analysis might be able to identify biomarkers specifically associated with the cancer cells. The working hypothesis for metabonomic biomarker development is that metabolites and metabolite levels reflect the state of the organism and that changes in metabolites over time can be used as a predictor of disease state. Therefore differential disease states can be identified using statistical analysis in combination with various experimental spectroscopy techniques. In the present study urine samples will be analyzed to define breast cancer biomarkers using 1H NMR spectroscopy and statistical analysis. Current research is involved in establishing methods to perform metabolomic analysis of an in vitro model representing the spectrum of breast cancer types and stages in breast cancer developments. The MDA-MB-231 cells are a model of aggressively growing breast cancer cells, and therefore of advanced stages of the disease. This cell line is being used to develop the protocols for metabolite and lipid extractions as well as NMR spectral acquisition. 1H NMR spectra have been obtained for a representative sample of the cell lines. Optimal data processing parameters using Chenomx software and statistical analysis will be determined using the resulting spectra.

44

Steven Lewis and Kevin Cutler. Towards a Metabonomic Assay to Identify Triple Negative Breast Cancer. Biochemistry and Physics Department, Niagara University.

Triple-negative breast cancer (TNBC) is a breast cancer subtype that has the unique property of lacking the three major receptors used to characterize the majority of breast tumors: those of estrogen (ER), progesterone (PR), and herceptin (HER2). ER, PR and HER2 are used to target cancer cells for treatment and approximately 85% of breast tumors present at least one of these markers. Consequently, TNBC has the highest mortality rate of all breast cancers. Recently, treatments that target Poly(ADP-ribose)polymerase-1 (PARP-1), a DNA replication and repair enzyme involved in apoptosis inhibition, has shown success in destroying TNBC cells. As such, a computational analysis of the PARP-1 enzyme is being performed to determine potential inhibitor molecules for future studies on TNBC. This study begins a comprehensive approach to analysis of therapies for triple negative disease. The overall scheme includes computational chemistry as well as metabonomic analysis of cells and urine samples to develop unique TNBC markers. Computational studies include quantum mechanical calculations to determine a pharmacophore model for small molecule inhibition correlated with published inhibition data. Modeling of drug moieties in the active site of PARP-1 are being carried out to ensure best fit. Cell studies of TNBC lines have been carried out and NMR analyses of these cells are being used to identify unique target metabolites. Correlation of computational models with targeted profiling using Chenomx will be used to predict best the therapy models to treat triple negative disease.

45

Alison Quirch, Mary Morada, Bhavna Chawla, Rentala Madhubala, and Nigel Yarlett. Characterization of Deoxyhypusine Synthase from Cryptosporidium parvum. Chemistry Department, Pace University.

Deoxyhypusine synthase (DHS) serves as the enzyme responsible for catalyzing the first post-translational modification step in the synthesis of the residue hypusine. Hypusine (N-(4-amino-2-hydroxybutyl) lysine), a unique amino acid, is synthesized only in the protein, eukaryotic initiation factor 5A (eIF-5A). During modification an addition of an aminobutyl moiety is transferred onto a lysine unit on the initiation factor precursor protein yielding the intermediate eIF-5A-deoxyhypusine which is later hydrolyzed. This process is necessary for optimal cell progression of cell growth. DHS presence and activity are present in several parasitic eukaryotic cells including in *P. vivax* and *L. donovani*. In the present study, characterization of the deoxyhypusine pathway in *Cryptosporidium parvum* was determined by the identification, cloning, and expression of eIF-5A and DHS. Using crude extracts, deoxyhypusine formation was confirmed by detection of radiolabeled eIF-5A. *C. parvum* DHS was assayed using eIF-5A from several sources including human, *Leishmania*, and yeast, and demonstrated highest activity with *L. donovani* eIF-5A. Furthermore, the investigation of the novel polyamine pathway could reveal potential chemotherapeutic targets.

46

Joseph Gehrz, Jamie Schlessman, and Daniel Isaac. Exploring the Function of Spheroplast Protein y (Spy), Chemistry Department, United States Naval Academy.

The cell envelope of *Escherichia coli* is comprised of two cell membranes as well as the intermembrane space they enclose, known as the periplasm. Three signaling systems – Cpx, σ^E, and Bae – have been identified that monitor the cell envelope of E. coli via activation of a signaling cascade that leads to up-regulation of various stress-combative factors. Such factors fall into two general categories. Proteases operate by hydrolyzing the peptide bonds that link amino acids together. Chaperones bind to unfolded and partially folded polypeptide chains to prevent the improper association of exposed hydrophobic segments that could lead to non-native folding as well as polypeptide aggregation and precipitation. Here, we study spheroplast protein y (Spy), a fairly uncharacterized periplasmic protein that is dually regulated by the Cpx and Bae systems. We have successfully expressed and purified Spy and SurA, an established periplasmic chaperone. With an abundance of these proteins available, we are seeking to determine whether or not Spy can also act as a chaperone using fluorimetry. Using a citrate synthase-based protein aggregation inhibition assay, preliminary work indicates that Spy might act as a chaperone protein. We are conducting fluorimetry experiments to test and confirm apparent chaperone activity of Spy at a variety of concentrations and temperatures.

47

Patrick Wiedorn. Development of Novel Crystallization Precipitants. Chemistry Department, United States Naval Academy.

This study identified novel crystallization conditions for the model proteins hen egg-white lysozyme and a hyperstabilized variant of Staphylococcal nuclease (SNase) using the small molecule crystallizing precipitants 1,6-hexanediol (HEZ) and 2,3-butanediol (BTD). Growing a relatively large, single crystal of a protein is often the most time-consuming part of an x-ray structure determination, which is contingent upon obtaining a crystal. The discovery of novel and effective crystallizing precipitants would be beneficial in making this process easier. A commonly used precipitant in crystallographic studies of proteins is 2-methyl-2,4-pentanediol (MPD). This study explored a range of possible small-molecule crystallization precipitants, including 1,3-propanediol, 1,6-hexanediol, 2,3-butanediol, and 1,1,1-tris(hydroxymethyl)ethane. These precipitants were chosen for their structural similarities to MPD. By attempting to crystallize both lysozyme and SNase in the presence of each of these precipitants, the effectiveness of each precipitant was evaluated. Crystals of lysozyme have been obtained in MPD, and in the novel precipitant HEZ. Crystals of SNase have been obtained in MPD, in the novel precipitant HEZ, and in the novel precipitant BTD. Both hanging and sitting drop methods for inducing crystallization have been employed. Candidate crystals of both lysozyme and SNase have been flash-cooled in liquid nitrogen and have been screened for diffraction quality. Structure determination will be completed using data from high-quality crystals.

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Antoinette Negron and M. A. Kapper. Analysis of Aquaporin-2 Protein in Ribbed Mussel Gills. Biology Department, Central Connecticut State University.

Our lab is testing the hypothesis that during adaptation to changing salinity in the ribbed mussel *Geukensia demissa* cell membrane water permeability is modulated by removing aquaporin water channel proteins from the cell membranes. Slot blots, followed by Western blots were performed to establish that aquaporin-2 is present within mussel gill cells and that the antibody cross-reacts with the molluscan protein. The primary antibody used in the slot and Western blots was an Anti-Aquaporin 2 (Anti-AQP2) raised against rat aquaporin-2, with a secondary antibody conjugated to horseradish peroxidase, (Goat Anti-Rabbit) used for colorimetric visualization (Bio-Rad Opti-4CN) of the aquaporin. Western blots from homogenates of mussel gills adapted to a constant $15^{o}/oo$ salinity show a protein band at approximately 29-32 kD, the molecular weight of aquaporin-2. Positive controls using rat kidney show a similar band. We are currently developing an immunoprecipitation procedure for isolating aquaporins, with an eye towards specifically labeling aquaporins on the cell surface and distinguishing these from aquaporins being stored in cytosolic vesicles.

49

Jessica Dennison. Reactive Oxygen Species Damage to Human Retinal Pigment Epithelial Cells and Protection by Melatonin. Biology Department, Fordham University.

Human retinal pigment epithelial cells (hRPE) play an important role in the maintenance of photoreceptors and visual function. The oxidative damage to the hRPE, which is caused by the reactive oxygen species, is believed to be a contributing factor to the cause of age-related macular degeneration (AMD). This study tested the protective effects of melatonin against oxidative stress caused by hydrogen peroxide. Using human retinal pigment epithelial cells, in culture media DMEM, we tested different concentrations of melatonin (10^{-10}-10^{-4} μM) on its protective effects against the oxidative stress caused by the addition of H_2O_2 (0.6 mM). The cell viability was detected by the 3-(4, 5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) assay. The results of the MTT viability testing showed that the protective effects of the melatonin were dose dependent to a certain concentration. The study shows that melatonin can protect human RPE cells from H_2O_2 damage in vitro. Further research is required to test melatonin as a treatment of AMD.

50

Theresa Geraci, Justyna Bednarz, and Deborah Luckett. Ultraviolet (UV) Light and the Morphological Effects on the Aging Process of Two Human Cell Lines. Biology Department, Fordham University.

This project investigates the senescence in two human cell lines, IMR-90 (lung fibroblast) and CCD-1070Sk (skin fibroblast). One of the many things that we are investigating is the effect of ultraviolet light on the aging process using *in vitro* cell lines. Cells from both cell lines were exposed to Ultraviolet (UV) light at various exposure times. Based on the amount of exposure and growth of the cells, we noticed that there appears to be a morphological change in the cells that were exposed to ultraviolet light. We will continue to investigate if the morphological change continues throughout the aging process of these two cell lines.

51

Leonid Telis. Combination Cytotoxic and Epigenetic Agents in the Treatment of Sarcomas. Biology Department, Fordham University.

The potential therapeutic effect of standard cytotoxic chemotherapeutic drugs in combination with histone deacetylase inhibitors (HDACIs) and DNA-methyl transferase inhibitor (DNA-MIs) agents was explored by treating a series of 11 sarcoma cell lines with two different HDACIs in combination with the DNA-MI decitabine in the presence and absence of doxorubicin (a standard cytotoxic agent for sarcomas). Combination doxorubicin/HDACI/DNA-MI therapy showed advantages in specific sarcoma cell lines when compared to cells treated with doxorubicin alone. Combination therapy advantages showed primarily with the use of HDACI SAHA. In addition, to examine the effect of HDACIs and DNA-MIs without standard cytotoxic chemotherapy on sarcomas, we treated a large sarcoma cell line panel with five different HDACIs in the absence and presence of the decitabine. We observed that the IC50 of each HDACI was consistent for all cell lines while decitabine as a single agent showed no growth inhibition at standard doses. Combination HDACI/DNA-MI therapy showed a preferential synergism for specific sarcoma cell lines. We conclude that some epigenetic modifying agents show a therapeutic advantage when used together on various sarcoma cell lines as well as when used along with doxorubicin.

52

Allegra DeVita, **Colin Smith**, David Choy, John Pierce and Mark Jareb. Expression and Localization of BETA1- and BETA4- Integrin Subunits in Embryonic Chick Forebrain Neurons. Biology Department, Sacred Heart University.

When embryonic chick forebrain neurons are grown *in vitro* on a laminin substrate, their axons grow faster and longer as compared to axons of neurons grown on a polylysine substrate. These data suggest that a laminin receptor is localized in the axons of chick forebrain neurons mediating the axon-growth promoting properties of laminin. A number of heterodimers from the integrin family of proteins have previously been identified as laminin receptors, including ones which contain β1 or β4. We examined the distribution of β1 and β4 integrin, as well as a β4 integrin construct in which the cytoplasmic tail has been deleted, in cultured forebrain neurons from embryonic chick. When a β4 integrin-GFP construct is expressed in the neurons, fluorescence from GFP is localized to axons. A β4 integrin construct in which the cytoplasmic tail has been deleted appears to exhibit a similar pattern of expression suggesting that its axonal localization is dependent on other portions of the subunit. In contrast, preliminary data suggests β1 integrin is expressed solely in the cell body and dendrites. We further tested the role of β1 and β4 integrin in laminin-induced increases in axonal growth using function blocking antibodies. These data appear to be consistent with the hypothesis that heterodimers containing β4 act as the axonal laminin receptor in embryonic chick forebrain neurons.

53

Abbie Britton and **Heather Wolfe**. You are what you eat: the fatty acid composition of diet influences the fatty acid composition of fat stores in a migratory songbird, *Sturnis vulgaris.* Biology Department, Sacred Heart University.

Fatty acid composition of fat stores affects exercise performance in a variety of vertebrates although no such studies focus on birds. Nonetheless, recent studies have shown that birds can distinguish between diets containing different fatty acids and have a preference for diets containing certain fatty acids. Since birds can choose the fatty acids in their diets and the fatty acid composition of fat stores (i.e. depot fat) may influence their exercise performance, it is important to understand how diet influences the fatty acid composition of depot fat. We tested the hypothesis that the fatty acid composition of the diet influences the fatty acid composition of depot fat in birds. Eighty European starlings (*Sturnis vulgaris*) were fed one of four semi-synthetic diets each differing only in fatty acid composition for a period of two months. Samples of depot fat were taken from the furcular region of each bird and the fatty acid composition of tissue was analyzed using a modified version of Folch et al. (1957) and gas chromatography. We found that the fatty acid composition of the diet significantly influenced the fatty acid composition of depot fat in all four groups of starlings. This finding has important ecological implications because if birds can influence the composition of their fat stores by choosing diets with certain fatty acids, then they may be able to influence their energy expenditure during long migrations.

54

Aimee Marin. Effects of dioctyl phthalate on the life cycle of *Drosophila melanogaster.* Biology Department, Wagner College.

The effects of the endocrine disrupting chemical dioctyl phthalate (DOP) on the life cycle of *Drosophila melanogaster* were studied by exposing organisms to 0.1 ppm, 1 ppm, and 10 ppm DOP. The effect of DOP exposure on: (1) the number of surviving adults and on pupae formation after 10 days of exposure, and (2) the number of adults emerging from the pupal case were determined. 10 ppm dioctyl phthalate were found to lower the survival rate of adults, reduce the number of pupae formed and decrease the number of flies that emerged.

55

Kristen Gulino. The Effects of MAPK Kinases 3/8/10 on Stomatal Development in Arabidopsis. Biology Department, Pace University.

Stomatal development in plant cells is important to plant survival as stomata regulates essential gas exchange between plants and their surroundings. Mitogen-activated protein kinase (MAPK) signaling networks are also important to plant development because they regulate numerous biological processes. These biological processes include cell division, initiation of developmental pathways, and stress responses. In *Arabidopsis thaliana* signaling networks that contain MAPK kinases MKK4/5/7/9 function in abiotic and biotic stress responses and regulate embryonic and stomatal development. Stomatal development in *Arabidopsis thaliana* follows a series of cell divisions and cell state transitions with each transition being controlled by specific aspects of these MAPK kinase signaling networks. MAPK kinases such as MKK 4/5/7/9 all control stomatal development and thus appear to perform the same functions in early stomatal development. However, there is specificity amongst these kinases as only MKK7/9 control later stages of guard cell production. It has been suggested that multiple MAPK kinases control stomatal development to allow for the fine-tuning of the developmental pathways in response to broad external stimuli. Since additional MAPK kinases (MKK 3/8/10) appear to be involved in stress responses, we have utilized a previously described cell type specific activation system to examine the roles of these kinases in stomatal development. These results suggest a potential novel, positive role of MAPK signaling in stomatal development.

56

Heather MacIntosh, **Karli Walczewski, Joseph Cantone, Kristin Longenecker, Kerry Lusebrink**, Sarah Neff, Thomas Allison, Adrian Dutkiewicz, Dennis Poole and Sylvia Halkin. Eastern Gray Squirrels Take More Time and Dig More Unused Holes When Caching Red Oak Acorns than Pin Oak Acorns. Biology Department, Central Connecticut State University.

We hand-tossed an alternating series of single red oak and pin oak acorns to squirrels, and found that caching behavior varied for the two kinds of acorns. The four squirrels that we tested took longer to cache the larger and more calorically rich red oak acorns, and dug more unused holes in the course of caching them. This behavior may make it more difficult for potential thieves to determine where the more valuable red oak acorns are actually buried. An alternative hypothesis is that it takes a squirrel more time and holes dug to find a suitable location to cache larger acorns.

57

Andrea Ramsdell and Nina Theis. Floral Fragrance is Unaffected by Belowground Root Herbivory in Cucumber Plants. Biology Department, Elms College.

Belowground damage can significantly affect plants above ground. Root herbivory by cucumber beetle larvae has been shown to increase pollinator attraction but decrease both the size and number of cucumber fruits. Fragrance data was collected from the flowers of root damaged plants that had previously been exposed to four different levels of cucumber beetle eggs. Samples were obtained using dynamic head space collection and analyzed using gas chromatography-mass spectrometry in order to determine whether fragrance volatiles might also be affected by root herbivores. When leaves are damaged the concentration of defense related floral volatiles increases. We tested whether the same effect could be seen when roots were damaged. Instead, we found that root herbivory has no significant effect on floral volatile emissions in cucumber plants. These results contribute to our understanding of below ground root herbivory, an underexplored aspect of ecology.

58

Christopher Esposito and Mia Malin. Heavy Metal Pollution in Estuaries: Effects on *Limulus polyphemus* Embryo Survival, Developmental Rate, and Oxidative Stress Response. Biology Department, Fordham University.

Horseshoe crabs are regarded as living fossils, surviving for over 400 million years with relatively constant morphology. During its early developmental stages, horseshoe crabs are subjected to many environmental stressors, including heavy metals pollutants such as Cu and Cd. The literature suggests that these metals generate reactive oxygen species causing lipid peroxidation and protein carbonylation. To cope with oxidative stress, organisms utilize the enzyme superoxide dismutase (SOD). In this study, we exposed stage 20 embryos of the American horseshoe crab, *Limulus polyphemus*, to concentrations of Cu ($CuSO_4$) and Cd ($CdCl_2$) from 0.01 to 100 mg/L at four different time intervals ranging from 4 h to 24 h. Levels of oxidative damage to proteins and lipids were measured using assay kits (Cayman Chemical). SOD levels were detected by immunodetection on Western blots. Increasing duration of metal exposure led to a general delay in developmental rate, but increased mortality was only noted at the highest concentration of Cu, 100 mg/L. Preliminary observations suggest that embryos exposed to both metals showed oxidative stress damage, as evidenced by a general increase in protein carbonylation and lipid peroxidation relative to unstressed controls. In general, levels of SOD were higher in metal treatments compared to controls, although there was no clear correlation between SOD levels and the concentration of Cu or Cd. Overall, increases in the levels of SOD appears to be one mechanism by which *L. polyphemus* embryos can survive oxidative stress caused by metal pollution.

59

Katlyn Rice. Chironomid burrowing and the nitrification/denitrification processes at the sediment-water exchange. Biology Department, Niagara University.

We have shown macrobenthic larvae have a large effect on the sediment-water exchange, particularly Sediment Oxygen-Demand which contributes to hypoxia. The U-shaped burrows of these organisms increase the surface area of the sediment-water boundary in lakes and streams and may cause an increase in bacterial growth. We hypothesized that the associated increase in surface area will alter the bacterial nitrification/denitrification processes at the sediment-water interface in the hypolimnetic layers of Lake Erie. A series of microcosms were constructed with sieved sediment and chironomids were allowed to acclimate and burrow for one week. Sediment nitrogen chemistry was assessed by using microelectrodes (NH4+, NO3-, NO2-, and O2) bacterial abundance (ssu rRNA), nitrification (AmoA), and denitrification (nosZ) were optimized and the extracted cores will later be analyzed through quantitative PCR. Our results demonstrate an increase in nitrate diffusion at the burrows. Later field work will measure microbial communities associated with macrobenthic burrows and the natural cores will be compared to laboratory results.

60

Kyle Polanski. Forest Age and Terrain Interaction with *Plethodon cinereus* along the Niagara Escarpment. Biology Department, Niagara Univesity.

The local environment found along the Niagara River in Niagara Falls, New York provides a unique habitat and an accessible area to study the Red Back Salamander, *Plethodon cinereus.* The study's objective was to identify an interaction between immature and mature forest along with percent slope of the landscape to the size of the *Plethodon cinereus* population. During the study, six environmental conditions were observed at two study sites, Devils Hole State Park and Artpark. The six environmental conditions included, Immature Forest- with a Steep slope, Mid slope, No slope and Mature Forest- Steep slope, Mid slope, No slope. Three trails for each condition were recorded, resulting in eighteen total sample sites along the Niagara Escarpment. We examined the various sample sites by lifting cover objects such as rocks or leaves to capture the Red Back Salamander for a total of 25 minutes, were upon salamander count and size were recorded. Due to the known nature and diet of the Red Back Salamander, it was hypothesized that the greatest catches of the Red Back Salamander would occur in Mature Forests with no slope. Due to seasonal change from fall to winter, a total of six sites were sampled at Devils Hole with an average percent slope of 43.42% while four sites were sampled at Artpark with an average percent slope of 29.19%. A total abundance of 244 Red Back Salamanders were captured at Devil's Hole while a total of 70 Red Back Salamander were captured at Artpark. Forest Age and Terrain will have to be considered when purposing future restoration efforts of the Red Back Salamander, *Plethodon cinereus*.

61

Brittany Hartman and James Roberts. Urban forest fragments as stopover sites for migratory songbirds; does further deforestation impact avian community structure and health? Biology Department, Sacred Heart University.

Migratory and resident songbirds utilize New England forest habitats in numerous ways. Migrants utilize forests as "stopover sites" to rest and refuel, while residents utilize forests for breeding, shelter, and survival. It is well known that forest fragmentation significantly impacts avian community structure. Previous research suggests that as a forest fragment decreases in size, the number of migrant species utilizing the fragment as a stopover site will also decrease. It has also been suggested that smaller forest fragments do not allow adequate nutrition for migrating birds, resulting in lower fat scores of migrants in smaller fragments. Veterans' Memorial Park (VMP) in Bridgeport, Connecticut is one such forest fragment that has been monitored over the past several years as to the composition of bird species using the forest. Preliminary analysis of data collected in this forest fragment before and after further fragmentation leads us to believe that the percentage of migrant species has decreased following deforestation, while the percentage of resident species has increased. Our data also suggests that the percentage of bird species that tend to utilize forest interiors has decreased following deforestation of VMP, while the percentage of bird species that tend to utilize forest edges has increased. Our preliminary findings suggest that increased deforestation of the VMP fragment has led to less migrant species utilizing the area as a stopover site and more species which prefer edge habitat.

62

Clare Ryan**, Meagan Lynch**, and **Chris Bond**. Project *Limulus* Needs You! Department of Biology, Sacred Heart University.

Successful conservation activities necessarily include the citizens who benefit economically from the species of concern. Project *Limulus*, a community based research program that relies on citizen scientists, was established to help us conduct spawning surveys and tag horseshoe crabs on beaches throughout Long Island Sound, bordered by New York, Connecticut and Rhode Island. We recruit volunteers by presenting a multitude of outreach programs across the tri-state area that outline the importance of horseshoe crabs in the ecosystem and promote science literacy by having the volunteers collect data for horseshoe crab conservation locally. Once a group of volunteers (conservation organizations, independent citizens (naturalists), and dedicated teachers of K-12 school groups) is recruited, we train them and establish local group leaders who are responsible for tagging and data collection on their beach. We target various media organizations (i.e., TV, radio, newspapers, magazines) to inform the general public about the importance of reporting tagged horseshoe crabs found on beaches. To date, our volunteers have tagged over 30,000 crabs across 200 miles of shoreline, recaptured more than 2500 individuals, and conducted over 900 spawning surveys. This synergistic partnership between researchers and citizens allows us to investigate regional horseshoe crab population dynamics by collecting data over a broad area. Ultimately, Project *Limulus* may be used as a model for collecting needed data required for guiding and improving the conservation of Asian horseshoe crab species by starting localized, volunteer citizen science programs and establishing several central data collection centers at different Universities.

63

Seth Brittle, Allen Clayton, Rachel Serafin, and Chau Quach. Impact of Silver Nanoparticle Exposure on Hudson River Crayfish. Department of Natural Sciences, Marist College.

The use of nanotechnology has become widespread in commercial, industrial, and medical applications. However, the very property that makes nanoparticles desirable, their high level of reactivity, raises concerns that they may also pose risks to the environment and human health. Silver nanoparticles (AgNPs) are proven to be very effective antibacterial agents; nonetheless, the qualities that make them such effective filtering agents could also negatively affect waterways and living organisms. Crayfish (*Orconectes virilis*) were exposed to different AgNP treatments. The following AgNP concentrations were used: 0.0, 0.05, 0.107, 0.16, and 0.214 mg/L. Control treatments of $AgNO_3$ and $NaBH_4$ were established in the same concentrations used for synthesis of the AgNP treatments. Additional control treatments were established using untreated Hudson River water, and cages placed directly in the Hudson River (river control). After 10 days of exposure, the crayfish were harvested and tissue analyzed for silver (Ag) content using graphite furnace atomic absorption spectrometry (GFAAS). DNA damage was analyzed by comet assay. It was hypothesized that silver accumulation in the tissues and DNA damage in the brain would occur in the experimental treatments. In the 0.214 mg/L exposure accumulation was ~0.25 µg of Ag/g of dry liver tissue. There was significant DNA damage in the AgNP treatments where comet tail length ranged from 95 to 130 µm. The results support concern about the possible impact of AgNPs on the environment and human health. Presently, there are no laws regulating the use of nanoparticles. We hope that with our results, steps can be taken to implement regulations on these substances until more research can be done to show their health and environmental effects.

64

Jason Koutoudis. Monitoring of Horseshoe Crab Breeding activity. Department of Environmental Science, Fordham University.

This study explores the spawning activity of the American Horseshoe crab, *Limulus polyphemus* at the intertidal zone of Plum Beach, Brooklyn N.Y. The intention is to estimate the significance of New York's protected estuaries in the vicinity of Jamaica Bay with regards to Horseshoe crabs reproductive capacity, density of eggs at different sediment types and interactions occurring at intertidal ecosystems between horseshoe crab eggs and migratory shorebirds. An average of all the samples suggests that over 50,000 eggs were deposited per square meter in the aerobic, moderately sorted sands of Plum Beach in 2010. This number combines data from two different sediment types and is presumably incomplete, as the samples were collected during late spawning period, after the threshold of trilobite larvae that escaped the egg cluster unrecorded. The breeding period of *Limulus* occurs from May to July, while a larva develops to the trilobite stage in four weeks. Spawning occurs in sync to the migration of numerous foraging shorebirds that depart the South for breeding grounds in Canada and obtain essential energy from eggs. Horseshoe crabs have evidently existed since the Paleozoic Era, and date back 400Ma in the fossil record. The coast of North America has long provided estuaries for Horseshoe crabs to breed, however, these estuaries have been remarkably undermined during the last few hundred years by the infrastructure that supports the coastal megacities and overrides wetlands. The damage is almost irretrievable but ecological restoration is the prime concern.

65

Manuel Juarez. Analyzing Heavy Metals in Water, Sediment and Shellfish Samples in the Hudson River. Department of Natural Science, Mount St. Mary College.

Heavy metal contamination of freshwater aquatic systems has been a major health concern for several decades. This research focuses on the analysis of lead, chromium and cadmium concentrations in the Hudson River. Atomic Absorption Spectroscopy was used to determine concentrations within the ppm range. No lead was detectable at the ppm level. Further research will be done using tissue samples of Blue Crabs and water analysis will be repeated using ICP (Inductively Coupled Plasma) spectroscopy and Cylic Voltammetry.

66

Gigianna Santiago. The Use of Plants to Generate Electricity within a Plant Microbial Fuel Cell. Department of Natural Science, Mount St. Mary College.

Recently research in alternative energy has accelerated in the scientific community. While fossil fuels dominate as sources of our nation's energy use, they are also sources of environmental pollution and are believed to be the major cause today of climate change. In addition fossil fuels are nonrenewable and are in danger of being depleted. The ramifications of a world with decreasing or non existing fossil fuels are serious in a world which has no other source of energy. Some research has been focused on using microbes to produce hydrogen for hydrogen fuel cells. Little work in this country has been done to use plants to generate electricity in fuel cells. We have built a fuel cell which will accommodate plants that have the potential to generate electricity. Present and future work now focuses on a reasonable plant candidate which will generate electricity and the optimization of conditions for the maximum electricity generation

67

Alison Sardonini, Dr. Zofia Gagnon, Dr. Sherry Dingman, and Maria Otte M.Sc. Methadone-induced DNA damage in developing chick embryo brain. Department of Health Sciences, Marist College.

Methadone hydrochloride, a synthetic opioid, is used to treat opioid-addicted patients, including pregnant women. Methadone doses administered to pregnant women typically range from 40 to 160 mg per day. In this pilot study, methadone was administered in three duration conditions at two treatment levels. In each condition, eggs were injected with either a low or a high dose, comparable to human dosages, of methadone in a vehicle of PBS. Brain tissues were harvested and processed for DNA damage analysis using single-cell gel electrophoresis method assay (alkaline comet assay). Using Image-Pro® Plus software, the degree of DNA fragmentation was quantified using fluorescence microscopy, and 50 randomly selected nuclei per sample were analyzed. DNA damage did not suffer significantly by high or low dose for exposure on incubation days 12 to 15 (last trimester). DNA damage, determined by comet tail length (TL), did not differ significantly by dose for exposure on incubation days 12 to 15. The mean TL from N = 41 cells in the 40 mg/kg condition was 73.9 (SD = 8.9) and mean TL for N = 33 cells in the 160 mg/kg exposure condition 70.8 (SD = 15.4), t = 1.25, p = 2.22. There was a significant difference for duration of exposure at the higher dose with the mean TL for 140 mg/kg on days 8 to 15 at 61.2, SD = 9.5, t = -2.94, p = .005. It is perhaps noteworthy that the variance between exposure and dose conditions was significant. We plan to follow up this pilot study by investigating the fate of DNA for neurons and glia cells.

68

Rachel Serafin and Chau Quach. Nanoparticles Entering Our Food Chain: Toxic Effect of Silver Nanoparticle Exposure on Tomato Plant (*Lycopersicon esculentum*). Department of Health Sciences, Marist College.

Silver Nanoparticles (AgNP) have become prevalent in commercial, industrial, and medical fields. They are utilized as an antimicrobial agent and can be found in our toothpaste, makeup, burn treatments, and possibly water filtration. Elements are known to become more reactive at their nano-size and although silver (Ag) has a low toxicity, this could change when on a nanoscale. The common tomato plant (*Lycopersicon esculentum*) was exposed to synthesized AgNP and the parent components, silver nitrate ($AgNO_3$) and sodium borohydride ($NaBH_4$) in a hydroponic system. The four week old seedlings received a onetime dose of the following concentrations of AgNP: 5, 25, 50, 75, and 100 ppm in Hoagland growth media. Relative concentrations were used for seedlings exposed to $AgNO_3$ and $NaBH_4$. After two weeks, the samples were harvested for analysis. Ag content was established using atomic absorption spectrometry in graphite furnace mode (GFAAS). Tomato plants exposed to silver AgNP demonstrated reduced growth and development. Ag concentration in plant tissue ranged from 0.8 to 0.37 μ/g dry wt. and expressed a nonconventional dose response curve. The threshold level found at 75 ppm where the growth of the tomato plants was noticeably impaired. Threshold level also showed the highest Ag accumulation at 0.37 μ/g of weight. Our future studies will focus on DNA damage in plants and the accumulation of Ag in the fruits of developed plants. No regulation has been established to control these particles; the goal of this research is to fuel further testing and bring attention to potential harm.

69

Stephanie Cabey and Zofia Gagnon. Do Silver Nanoparticles Possess the Midas Touch? School of Science, Marist College.

Treasured for its antibacterial properties, silver has been utilized for centuries in a variety of ways. More recently, it has been manipulated into the form of silver nanoparticles, the size of a mere one thousandth of a micrometer. In turn, this increases the surface area, chemical reactivity, biological activity, catalytic behavior and bioavailability. Currently, there are more than 260 nanosilver products on the American market within a range of categories. In 2009, the federal government allotted $1.5 billion to the U.S. National Nanotechnology Initiative to fund research and product development, but with practically no guidance on how to spend the money, it has been principally used for product development sans research. In 2007, the EPA devised a voluntary program in which manufacturers of nanomaterials were asked to submit basic materials data, yet, without incentives or deadlines, there resulted in only twenty-nine submissions. As far as the FDA's supervision goes, companies are allowed to place nano-products on the market without any pre-market assessment, testing, data or approval. Research needs to be done on the environmental effects and potential harm on human health in order to prevent another crisis mimicking that of PCBs in the 1970's which is, to this day, in the attempts of being alleviated. In this study, crayfish (*Orconectes virilis*) were exposed to different AgNP treatments as well as control treatments of the parental components: silver nitrate ($AgNO_3$) and sodium borohydride ($NaBH_4$). For 14 days, crayfish were fed to check for food and fear responses, disintegration/disappearance of claws and fatalities. The changes in these various responses to different experimental treatments suggested that there were toxic responses to exposure and possible brain damage.

70

Michael Burke and William Bell. Residence Times and Influences on Stratification in the Thames River Estuary. Marine Science Department, United States Coast Guard Academy.

The Thames River Estuary is classified as a salt wedge to partially mixed estuary. It stretches south to north between New London and Norwich, CT in the southeaster portion of the state. Temperature and salinity data were collected using a YSI 6820 unit to examine the effects of weather and tides on the system between April 2010 and December 2010. Results showed a highly stratified river in the spring and fall, with a partially mixed river in the winter and the summer. The tidal stage will have an effect of the salinity values and sampling due to the salt wedge mobility within the river. The residence time in this area was estimated utilizing the fraction of freshwater method. The estimated residence time is based on four values: the salinity obtained in our saltiest value within the most southerly (mouth of the river) station, the sum of the freshwater flow from the three major tributaries contributing to the Thames (Yantic, Shetucket, and Quinebaug), the volume of the river through bathymetric methods and GIS data, and salinity profiles binned by depth. The mean of each station was applied to calculate the residence time on each date. The residence time during the study period varied between 1 and 10 days due to the variability in the river input. The Thames River input will be affected by the precipitation values and weather patterns in the area. These residence times can assist in the calculation for how long a substance will remain in the Thames River Estuary.

71

Jerod Brammer, Scott Hunyadi, Taino Pacheco, Sean Batchelder, Jeremy Yetishefsky, and Michael Davis. Bacterial Bioremediation of Gasoline Contaminated Soil. Biology Department, Central Connecticut State University.

Many soil sites are contaminated with various hydrocarbons that render those sites unsafe for human use. Gasoline contamination, especially at or near filling stations, is generally ameliorated by removal and disposal elsewhere of the contaminated soil. This approach has clear disadvantages, and alternate protocols are being sought. We are attempting to develop an on-site decontamination procedure based on the ability of select bacteria to catabolize gasoline, converting it into non-harmful (or less harmful) byproducts. Gasoline is a complex mixture of hundreds of organic compounds, with varying degrees of toxicity. Rather than focus on chemical analyses to demonstrate the elimination of specific hydrocarbons, we use a biological assay for soil decontamination based on germination and sprout growth of seeds (*Brassica rapa*). We have isolated several candidate bacteria from contaminated sites; preliminary identification (based on biochemical tests) suggests they are *Pseudomonas* spp. We have characterized some of their growth properties in the lab, and have begun to determine their abilities, alone and in combination, to render gasoline contaminated soil safe for plant growth.

72

Briana Lunman and Michael Davis. Investigation of Host Range of Bacteriophage Specific for *Propionibacterium acnes*, a Bacterial Species Found on Skin. Biology Department, Central Connecticut State University.

Though the skin disease acne has a complex etiology, *Propionibacterium acnes* is the bacterial species involved in serious acne lesions. Some acne therapies are directed at controlling the growth of these bacteria. We are developing a novel acne treatment based on the use of *P. acnes*-specific bacteriophage and their ability to kill target bacteria the normal bacteriophage lytic reproductive cycle. The bacteria and the bacteriophage are present in normal skin Microbiota, and we have isolated both bacteria and bacteriophage from the skin of several individuals. We are investigating the *P acnes* subtype host range of bacteriophage, specifically testing the hypothesis that there will be a correlation between the ability of an individual's bacteriophage to kill (grow lytically on) bacterial isolates from that same individual. Multiple *P. acnes* isolates have been collected from four individuals, and crude (mixed) bacteriophage preparations have been collected from the same four. The results, though incomplete, suggest that a correlation does exist, and that in the case of *P. acnes*, bacteriophage present on an individual's skin may influence the distribution of an individual's bacterial subtypes.

73

Tran Nguyen, Greg Jaszczur and Michael Davis. Characterization of Antibiotic Resistant Isolates of *Propionibacterium acnes* from Skin. Biology Department, Central Connecticut State University.

Acne in various forms is a skin disease with high prevalence and a complex etiology. Some of the more serious lesions are the direct result of opportunistic bacterial infection by *Propionibacterium acnes*, a species found normally on skin. There are several effective acne treatments directed at these bacteria. One method is long term antibiotic therapy; commonly used drugs include tetracycline, erythromycin, minocycline, and clindamycin. As could be predicted, the effectiveness of such treatments are increasingly compromised by the evolution of antibiotic resistance.

Our lab is developing an alternative acne treatment based on the use of *P. acnes* specific bacteriophage to limit the numbers of the pathogen on skin and in acne lesions. We have amassed a large collection of *P acnes* isolates (about 450 strains from over 50 subjects) for studies of bacteriophage-host interactions. We are characterizing this collection in several ways, including assessing the degree to which strains in the collection show resistance to antibiotics used to treat acne. Broth-dilution tests are used to determining the MIC (minimum inhibitory concentration) for tetracycline and erythromycin. Preliminary results suggest that our bacterial collection shows a lower incidence of significant antibiotic resistance than that reported by other investigators. We will study other relevant phenotypes of the antibiotic resistant isolates, including their susceptibility to killing by bacteriophage

74

Gabriella Brum, Thomas Carbone, Eric Still, Vendita Correia, Yuan Liu, Fang Ji, Fuquan Lin, Wen Di, and Yinsheng Wan. N-acetylcysteine potentiates doxorubicin-induced ATM and p53 activation in ovarian cancer cells. Biology Department, Providence College.

Doxorubicin has been used clinically to treat various types of cancer, and yet the mode of actions of doxorubicin remains to be fully unraveled and the cell signaling pathways to be uncovered. In this study, we investigated the effect of doxorubicin on cultured ovarian cancer cells (CaOV3). MTT assay data showed that doxorubicin inhibits cell proliferation in a time and dose dependent manner. Phagokinetic cell motility assay data indicated that doxorubicin inhibits both basal level and EGF-induced cell migration in CaOV3 cells. Confocal microscopic data revealed that doxorubicin induces reorganization of cytoskeletal proteins including actin, tubulin and vimentin. Western blot analysis showed that doxorubicin induces phosphorylation of p53 at ser 15 and 20, acetylation of p53, and ATM activation. Doxorubicin also induces phosphorylation of histone H2AX at ser 139. Interestingly, Doxorubicin inhibits mTOR activity, measured by phosphorylation of S6 ribosomal protein. Contrary to the previous report on other cells, pretreatment of CaOV3 cells with antioxidant *N*-acetylcysteine or NAC but not PDTC potentiates doxorubicin-induced phosphorylation of p53. Collectively, we conclude that doxorubicin induces ATM/p53 activation leading to reorganization of cytoskeletal networks, inhibition of mTOR activity, and inhibition of cell proliferation and migration. Our data also suggest that removal of oxidants may enhance the efficacy of doxorubicin in vivo.

75

Matthew Hurton and Emily Roblee. Genome Reduction in Yeast Involves Programmed Cell Death. Biology Department, Providence College.

Genetic reduction is of great significance in many biology pathways, including for example the production of gametes. A tetraploid strain of *Candida albicans,* when grown on a diploid specific pre-sporulation media, undergoes random chromosome loss, becoming diploid or close to diploid in DNA content and undergoing significant cell death as part of the completion of aparasexual cycle. To measure this cell death cells were grown on pre-sporulation media. Viability measurements were made with a methylene blue stain, with tetraploid cells on average showing 23% survival by day two compared to 89% for diploid cells. To determine the mechanism of death, assays were done to measure ROS levels and caspase activity. Cells were stained with DHR 123 and then viewed under a confocal fluorescence microscope, with on average 52% of tetrapoid cells showing fluorescence while only 2% fluorescence was seen in the diploid. A FLICA assay for caspase activity was also done, with tetraploids showing around 53% fluorescence while in diploids only 2% fluorescence was observed. These results indicate high levels of ROS and caspase activity in the tetraploid, suggestive of programmed cell death via apoptosis. Further research is being done presently with diploid strains of both *Candida Albicans* and *S. cerevisiae* to show a more universal mechanism of genome-reduction-related apoptotic cell death, and similar assays in cells with gene knockouts of AIF1, an apoptosis-related gene in Saccharomyces, are being done to further confirm this relationship.

76

Rafael Vargas and Daniel Isaac. Variations in the N-terminus of PapE and Its Effects on Cpx Induction. Biology Department, United States Naval Academy.

In Gram-negative bacteria such as Escherichia coli, the ability to sense and respond to different environmental stresses is crucial to survival. The Cpx stress response is responsible for sensing various types of bacterial envelope perturbations including the presence of specific misfolded protein substrates. Misfolded PapE, a protein subunit of the bacterial pilus of uropathogenic strains of E. coli, is one of the few such substrates that has been demonstrated to activate the Cpx response. Such activation has been shown to be absolutely dependent on the N-terminal 12 amino acids in its primary sequence. Here, we describe the use of site-directed mutagenesis to create finer N-terminal deleted PapE mutants to further dissect the structural elements critical for Cpx induction. A functional analysis of mutants generated to date will be presented.

77

William Rivera, Corey Gaylets, Roy Mosher, Brian Palestis, and Adam Houlihan. Carriage of bacterial and protozoan pathogens among Common Tern chicks on Pettit Island, Barnegat Bay, NJ. Biology Department, Wagner College.

Little is known about the intestinal microflora of migratory seabirds. If these avian species harbor gastrointestinal pathogens, they may disseminate them along migratory flyways. To assess this possibility, Common Tern (*Sterna hirundo*) chicks on Pettit Island in Barnegat Bay, NJ were evaluated for carriage of bacterial and protozoan pathogens and nematodes. Oropharyngeal and cloacal swabs were taken for culture-based detection of bacterial gastrointestinal pathogens during the June/July 2009 and June/July 2010 nesting seasons. Bulk fecal samples were also taken during the 2010 nesting season to determine nematode and *Cryptosporidium* oocyst loads. Of 125 birds samples in 2009, none carried *Salmonella* and only 1 carried *Campylobacter*. In 2010, 1 of the 54 birds sampled carried *Salmonella* and none of them had *Campylobacter* in their intestines. Microscopic examination of fecal smears obtained in 2010 revealed that 39 of 54 Common Tern chicks had *Cryptosporidium* oocysts in their intestines and 10 of 54 carried adult and larval nematodes. Preliminary data indicate that Common Tern chicks in Barnegat Bay have low intestinal carriage of bacterial pathogens but relatively high carriage of protozoan parasites and nematodes.

78

Kevin Child, Legairre Radden, and Michelle Kayser. Fine-mapping the wooly mutation (wly) on mouse Chromosome 11. Biology Department, Central Connecticut State University.

The recessive hair variant named wooly (*wly*) has previously been mapped to mouse Chromosome 11. The purpose of this investigation is to determine more precisely where this mutation is located, with the long-term goal of determining (at the sequence level) the molecular basis of the defect. To reach this goal, we have screened a large backcross (N2) family of mice for crossovers between microsatellite markers *D11Mit87* and *D11Mit339*, the interval where *wly* is known to reside. The recombinant mice identified were typed using additional microsatellite and single nucleotide polymorphisms (SNPs), which are located throughout this region. A crossover that falls between *wly* and a particular DNA marker rules out as possible "candidates" all those genes that lie distal to that marker. Currently, we have located *wly* between two SNPs that are only 0.8 Mb apart, a span that includes only 3 genes that are known to be expressed in skin. Currently, we are amplifying and purifying individual exons from one of these candidates, *Slc5a10* [for solute carrier family 5 (sodium/glucose cotransporter), member 10] from both mutant and normal mice for primer-extension DNA sequencing. This effort will either reveal the basis of the *wly* defect or else, if no defect can be found, eliminate *Slc5a10* coding regions from our search.

79

John Sirois, Diana Mateo, and **Vidhi Dave**. Investigating cell cycle exit during differentiation in zebrafish embryos. Biology Department, Central Connecticut State University.

Embryos generate extensive cellular diversity through cell division and differentiation. Throughout development cells make decisions whether to continue dividing or to stop dividing and start performing a specific task. By balancing these two processes the embryo can generate the tissues needed during development while leaving a pool of progenitor cells. We suggest that the same signaling pathways that promote differentiation can also prompt cells to exit the cell cycle. Hedgehog (Hh) is a signaling molecule that instructs mesodermal cells in zebrafish to become slow muscle. Without Hh signaling no embryonic slow muscles are formed. We investigated cell division in slow muscle precursors to determine if cell division patterns are also altered. Slow muscle precursors normally express the cell cycle inhibitor Cdkn1c as they exit the cell cycle. However, we found that when Hh signaling is inhibited slow muscle precursors specifically fail to express *cdkn1c*. This failure suggests that the two processes of cell cycle exit and differentiation into slow muscle are coordinated. Such coordination through signaling molecule may be common mechanism used in development. In parallel we are investigating the role of retinoic acid (RA) signaling on the cell cycle. RA promotes differentiation of neurons in the zebrafish spinal cord. These precursors also express the cell cycle inhibitor *cdk1nc*, but do not require Hh signaling for this expression. We are currently investigating whether RA is necessary and sufficient for expression of *cdkn1c* in spinal neurons.

80

Theodore Szmurlo and Randal Kudra. The Role of Cadherin Based Junctions Aid in the Orientation and Migration of Parietal Endoderm Outgrowth. Biology Department, Central Connecticut State University.

Early embryonic yolk sac development of parietal endoderm (PE) outgrowth from F9-derieved embryoid bodies has been well established as a model system for *in vitro* study. Parietal endoderm migration begins as an epithelial-like sheet, migrating away from the embryoid body in an orientated and directed manner. Data collected in our laboratory has shown that parietal endoderm migration requires classical cadherin-mediated cell-cell adhesions, known as adherens junctions (AJ), which utilize proteins like E-cadherin. These cadherin-mediated adhesions are often thought of as being static structures that are established to stabilize the migrating cells. Our research has shown, through time-lapse photography of migrating parietal endoderm, that these cell-cell adhesions are transient structures that form and then break during the migratory process. This suggests that these cadherin based adhesions have a more dynamic role, by assembling and then later disassembling, as the parietal endoderm migrates away from the embryoid body. Disruption of cadherin proteins, through function-blocking antibody techniques, reveals a loss of orientation and more randomized, rather than directed, migration of the parietal endoderm. Research by others has suggested the ability of cadherins to play a role in mechanotransduction. As cells migrate in the parietal endoderm, forces between them may cause internal changes to aid in the migration process. We hypothesizes that the mechanosensing role of cadherins aids in the migration and orientation of parietal endoderm cells.

81

Nelson Vila, Alexis Salas, and Francisco Ramirez. Does the juvenile alopecia (jal) mutation in mice result from a defect in the Il2ra gene? Biology Department, Central Connecticut State University.

We have recently mapped the recessive juvenile alopecia (*jal*) mutation to the tip of mouse Chromosome 2 (see abstract by Salas *et al.*). This genomic region also includes the *Il2ra* gene (for interleukin 2 receptor, alpha chain), which in humans has been shown to be associated with the development of alopecia areata, an autoimmune disease that leads to disfiguring hair loss, and most often has a polygenic basis. To determine if juvenile alopecia in mice might result from a single-gene defect in *Il2ra*, we have imported mice that carry a recessive loss-of-function, "knock-out" mutation in *Il2ra*. Crossing $Il2ra^{k.o.}$ carrier females with *jal/jal* males will produce mutant offspring that possess no normal copy of *Il2ra*, if *jal* is a mutation in this gene. Alternatively, if *jal* is a defect in a gene other than *Il2ra*, then all offspring will be normal, since the father will always transmit $Il2ra^{+}$, and the mother will always transmit jal^{+}. DNA from all mice in this study will be tested by PCR to verify their *Il2ra* genotype, to ensure that $Il2ra^{k.o.}$ has been transmitted to the expected 50% of these "complementation" cross progeny.

82

Jacqueline Brown. Survey of the Metagenomic Population of the Horse Gut by DNA Extraction of Stool Samples. Biology Department, Elms College.

An organism is defined by cells that can be identified as self (genetically belonging to the organism) and those that can be identified as non-self (mostly microbial). This microbial population is the group of organisms that we seek to study in this project. Metagenomics is the study of culture-independent organisms identified by genomic analysis of a population of microorganisms that exist in a specified environment, in this case, the horse's gut. In this project we will identify the metagenomics of the horse's gut by extracting DNA from stool samples. The samples will be processed to extract and purify any bacterial, viral, parasitic, or horse DNA. Once the DNA is extracted the bacterial populations will be determined using PCR. The PCR will amplify the polymorphic segments of the bacterial 16S ribosomal RNA gene. The resulting amplified DNA products will produce distinct profiles reflecting the bacterial strains and species in the sample. The results from the analysis of multiple horses will provide a consensus of the organisms present and will constitute the metagenomic population of the horse's gut. Metagenomics is a field of study that has the potential to reveal novel sources of bacterial borne products with possible pharmaceutical applications and to expand our knowledge of microbe diversity. This project seeks to determine the normal metagenomic population of the horse gut for healthy functioning. This data might provide a basis for comparison for future studies regarding the affect of parasites and antihelminthics (antiparasite drugs) on the metagenomic population.

83

Erica Matula. Optimization of live cell imaging for the analysis of microtubule dynamics. Biology Department, Fordham University.

The cytoskeleton provides all eukaryotic cells with five major functions. These functions are: establishing cell shape, movement, chromosome separation in cell division, mechanical strength, and intracellular transport of organelles. One of the most essential components of the cytoskeleton are microtubules which are composed of tubulin and are stabilized by microtubule-associated proteins (MAPS). The goal of the Alonso lab is to study the neuronal MAP called tau and its implications in Alzheimer's disease. The current project set out to optimize live cell imaging of microtubules. The three cell lines used were Chinese hamster ovary fibroblasts (CHO) cells, human immortalized cell line (HeLa cells) and stably transfected LLCPK cells expressing GFP fused to EB1, a microtubule cap protein. Three microtubule cap proteins were in the transient transfection systems, EB1, EB3, and Clip170, all linked to different fluorophors. Cap protein localization was then observed using confocal laser scanning imaging. The objective was to determine which system is best to perform subsequent live cell imaging. CHO and HeLa cells were then transfected with various cap proteins, cultured for 24 hours and stained via immunocytochemistry for tubulin. LLCPK cells were transfected with tubulin and not immunostained. Preliminary experiments showed that in the transient system, CAP proteins did not behave as expected and the stable cell line gave inconsistent results. Thus both systems, transient and stable, have obstacles that need to be overcome. Further work will be needed to optimize this sytem.

84

Tatiana Popovitchenko. Genetically Dissimilar Strains of *Caenorhabditis elegans* and their Behavioral Responses to Food Deprivation and Pharmacologic Agents. Biology Department, Fordham University.

The minute nematode worm *Caenorhabditis elegans* shares a number of neurotransmitter systems with vertebrates, such as the serotonin system. In humans, considerable evidence links depression with low levels of serotonin activity, and drugs such as fluoxetine (Prozac), which increase serotonin activity, play an important role in the treatment of depression. A function of serotonin in *C. elegans* is to cause hungry worms to reduce locomotion when they encounter bacterial food. We investigated the roles of serotonin and dopamine in modulating locomotor behavior in *C. elegans,* including the effects of fluoxetine, and three genetic mutations. We used two measures of locomotory activity: immobilization in liquid media, and rate of body bending on agar. Genetic strains included a wild type (N2), one with a defective serotonin receptor, and one with a defective serotonin reuptake transporter. Fluoxetine increases the action of serotonin by disabling the reuptake transporter. For the body bends study, we compared the strains under conditions of well-fed versus food-deprived, and in the presence or absence of food. Food deprivation was not significant (P=0.387). Presence or absence of food were (P=0.000 for both). Immobilization response was tested in the presence of buffer, serotonin, dopamine, and fluoxetine. Initial tests showed inconsistent results for the fluoxetine responses. A less concentrated fluoxetine at 0.75 mg/ml did not have a significant effect. In addition, responses to dopamine had varying effects among all three genetic strains.

85

Adriana Hache'. A Morphological Analysis of the Balloonhead Mutant Zebrafish. Biology Department, Manhattan College.

The zebrafish is an excellent and well-known model organism used to investigate embryonic vertebrate development. In this study I identify and characterize a novel zebrafish mutant allele *balloonhead*. The *balloonhead* allele is lethal, however prior to death the affected ebryos are characterized by a dorsally curved trunk and edema of the pericardium and the head, first visible 48 hours post fertilization. Furthermore the adult carriers of the allele are characterized by dotted pigmentation and reduced fertility. The female carriers typically lay only 1-2 clutches and then are unable to lay, whereas wild-type siblings are able to lay a clutch every week. Histological analysis of proposed heterzygous carriers suggests abnormal ovary morphology. Literature searches suggest a possible role of neural crest cells in the phenotype. Neural crest cells are known to have effects on pigmentation, cardiac development and a new study implicates their potential role in the development of the somatic ovary. We are currently working to test the hypothesis that neural crest cells are affected by the *balloonhead* mutation.

86

Caitlyn DeCicco. Salamander Microsatellite Loci. Biology Department, Niagara University.

Tracking microsatellite loci is useful in ecological conservation efforts to help understand population dynamics, genetic difference due to isolation, and the impact of human activities on the species. The cost of DNA sequencing is steadily decreasing, and comparing cost effectiveness of microsatellite techniques is becoming increasingly important. In this methods study to perform a comparison of these two techniques, ten red-backed salamander tails (*Plethodon cinereus*) were extracted from two sites in Devil's Hole State Park in Niagara Falls, NY. The techniques of DNA extraction, Polymerase Chain Reaction and gel electrophoresis were performed on the ten salamander tails. After PCR, the samples were sent out and sequenced. These two methods were compared and cost effectiveness was assessed.

87

Andrew Siedlecki. Optimization and comparative analysis of multiplex PCR techniques in *Plethodon cinereus*. Biology Department, Niagara University.

The red backed salamander (*Plethodon cinereus*) is an ideal indicator of ecosystem health due to the relative ease of sampling and quick response to disturbance. Multiplex-Polymerase Chain Reaction (MPCR) of *Plethodon* genomic microsatellites offers an alternative to single primer pair PCR through the amplification of several loci of distinct but variant length, and has proven to be a both cost effective and efficient means to the quantification of genetic diversity within and between *Plethodon* populations. Primer pairs were optimized into three amplifications within one set of MPCR conditions and compared to the respective single primer pair PCR. These conditions include a varied optimal primer:primer ratio, $MgCl_2$ and dNTP concentration, and polymerase quantity. In subsequent endeavors, this multiplex methodology will be applied to assessment of population diversity in the Niagara River gorge as well as to compare physical and genetic mark-recapture techniques.

88

Ilyse Nelson and Daniel Strahs. Topoisomerase IA exhibits substantial internal flexibility during the closing motion with a DNA substrate. Biology Department, Pace University.

DNA topoisomerase I regulates supercoiling in prokaryotes by means of a cleavage and religation of DNA coupled with conformational changes to eliminate underwinding. Part of the enzymes catalytic cycle requires a motion that brings together the two partial active sites located in separate domains to form a functional active site. Molecular dynamics simulations have captured the spontaneous closing motion of topoisomerase IA in complex with a single DNA strand. During this closing motion, the DNA substrate bridges the gap and the interactions between the DNA and the enzyme exert force leading to both DNA and enzyme twisting. Although the structure is twisted, the amount of twist is variable during the simulation. Increasing twist between domains 1+4 and domains 2+3 leads to partial release of the DNA substrate from domain 1; this is due to interactions forming between the DNA and domain 3+4. The increased twist produces structural changes in the arch, indicating the high flexibility of this simple beta-strand structure. These structural changes highlight the conformational variability observed in this enzyme, suggesting the possibility of a variety of conformational states occupied during the closing motion.

89

Nina Patel and Daniel Strahs. Conformational changes in topoisomerase IA closing control the DNA binding. Biology Department, Pace University.

DNA topoisomerase I is an enzyme which stabilizes DNA structure by the reversal of supercoiling or decatenating through DNA cleavage and subsequent religation of only one DNA strand. The cleavage/religation cycle catalyzed by topoisomerase IA requires the formation of a functional active site by a closing motion that brings together the two partial active sites located in separate domains. Molecular dynamics simulations have captured the spontaneous closing motion of topoisomerase IA in complex with a single DNA strand. Analysis of this closing motion may assist in controlling the cleavage and ligation of bacterial DNA. As domain 3 and domain 1 close, the DNA substrate bridges the gap between the domains. This leads to increased twist in domains 2 and 3 as the DNA "pushes back". Overall, increasing interactions with DNA lead to various structural changes. Many changes happen around the DNA binding site in domain I, involving an increased helical clamp on the DNA and changes near the active site. These motions in the domains may be involved in post-cleavage interactions between the enzyme and the nucleic acid substrate.

90

Stephanie Pineda and Daniel Strahs. Closing motions of topoisomerase IA alter protein conformation and increase DNA interactions. Biology Department, Pace University.

DNA topoisomerase I is an enzyme which cleaves and subsequently religates DNA to regulate supercoiling and decatenating. Enzyme activation requires a closing motion that brings together the two partial active sites located in separate domains to form a functional active site. Molecular dynamics simulations have captured the spontaneous closing motion of topoisomerase IA in complex with a single DNA strand. During this closing motion, the DNA substrate bridges the gap and the interactions between the DNA and the enzyme exert force leading to both DNA and enzyme twisting. In the twisted structure, the DNA substrate bridges the gap between the domains. Motions between the DNA substrate and the enzyme lead to increased interactions with domain 4 that may control the closing motion. These interactions are accompanied by conformational changes at the top of the arch. Increased interactions between domain I and the DNA outside the active site may illustrate a path for binding of longer DNA strand substrates.

91

Vincent Cascio. A Genome-wide Screen for Transcription Factors Involved in Programmed Cell Death in the Yeast, *Candida albicans*. Biology Department, Providence College.

Apoptosis, or programmed cell death, is a controlled form of cell suicide that often occurs when cells are exposed to stressful conditions. Candida albicans is a dimorphic human fungal pathogen that proliferates in either a yeast blastospore form or a filamentous hyphal form. We are performing a genetic screen for Candida genes that regulate apoptosis, using a library of 450 individual yeast strains, each of which has a different transcription factor that can be overexpressed with tetracycline. We have identified a number of genes, which when overexpressed, lead to the generation of reactive oxidative species, the activation of caspases, and to cell death. The screen has revealed a substantial number of genes associated with filamentation and histone modification, which may encode critical regulators of programmed cell death in yeast and other eukaryotes.

92

Ben Lichtenfels, Lea Noonan, and Nicanor Austraico OP. A Gain-of-Function Screen for Transcription Factors that Regulate the Response of *Candida Albicans* Yeast Cells to Sulforaphane. Biology Department, Providence College.

Sulforaphane(SFN) is a isothiocynate found in cruciferous vegetables, particularly broccoli. Studies in human and house cancer cell line have shown that SFN has anticancer properties, and is currently thought to function by inducing programmed cell death (PCD) or triggering cell cycle arrest. However, the mechanisms behind these properties are still poorly understood. In order to identify genes that may be involved in the PCD response to SFN we have begun an screen of the common budding yeast *Candida albicans,* searching for gain of function (GOF). We are using the Tet-inducible Candida Albicans transcription factor library, a collection of 343 individual yeast, each of which has been modified to over-express a certain gene in the presence of G418. Our work thus far has primarily focused on optimizing the parameters of the screen in order to visualize a GOF phenotype by the naked eye. The first step in developing this screen involved identifying positive and negative controls, as well as optimizing experimental drug conditions, concentrations as well as transcription factor concentration and cell concentration. We tested out developed experimental procedure on a plate from the library containing both negative and positive controls, and confirmed functional reporting. The candidates that are being collected retain growth in SFN and G418, which express the genes for GOF. The screen is currently ongoing.

93

Kristen Merloni. The Role of S-adenosyl-L-methionine in the treatment of gastrointestinal disorders by enhancing the viability of the probiotic yeast, *Saccharomyces boulardii.* Biology Department, Providence College.

Saccharomyces boulardii yeast is a probiotic agent prescribed to prevent and treat gastrointestinal disorders and acute enteritis. To be effective as a probiotic, *S.boulardii* must maintain viability within the acidic environment of the gastrointestinal system. It has been shown that *S.boulardii* survival is greater in a simulated gastric environment as compared to *Saccharomyces cerevisiae* yeast strains. The aim of this study was to explore the effects of *S. boulardii* viability when treated with S-adenosyl-L-methionine (AdoMet), a commercially available dietary supplement. Together, *S.boulardii* and AdoMet and *S. boulardii* may act as a more effective treatment for gastrointestinal disorders than *S. boulardii* alone.

94

Kevin Murphy. Investigating the Role of Calcium in BAX-induced Cell Death in the Yeast, *Saccharomyces cerevisiae*. Biology Department, Providence College.

BAX is a proapoptotic member of the Bcl-2 family of proteins. Upon activation, Bax binds to the outer mitochondrial membrane, which ultimately induces programmed cell death in mammalian cells. Naturally, the budding yeast, *Saccharomyces cerevisiae*, does not contain BAX. However, when mammalian BAX is over-expressed in yeast, it induces programmed cell death. We are investigating the role of calcium in BAX-induced cell death by overexpressing human BAX in a series of yeast mutants defective for calcium regulation. We have discovered that several of these mutants including strains lacking *CCH1*, *CRZ1*, *PMC1*, *PMR1*, and *VCX1*, are relatively sensitive to BAX-induced toxicity. [Our laboratory is supported by the following grants: NIGMS R15 GM094712, NSF MRI-R2 0959354, and NIH Grant 2 P20 RR016457 to the Rhode Island INBRE Program].

95

Monika Kadlof, Heather M. Wolfe, Alyssa R. Woronik, and Suzanne M. Deschenes. Optimization of parameters used to characterize epigenetic changes in brain reward regions of rats chronically exposed to methylphenidate. Biology Department, Sacred Heart University.

Gaining a better understanding of the relationship between the environment and epigenetic regulation of drug addiction-associated genes will lead to better treatments for human addictions. The addictive drugs cocaine and methylphenidate (aka, Ritalin) affect the same brain reward regions and are similar in terms of gene expression and their influence on behavior. Unlike cocaine, however, the epigenetic regulation of methylphenidate has not been studied as extensively. The ultimate goal of this experiment is to characterize histone modifications in genes expressed in brain reward regions of Sprague-Dawley rats after chronic exposure to methylphenidate. As a first step in achieving this goal, we have been optimizing the following parameters: 1) sonication intensity prior to chromatin immunoprecipitation (ChIP); 2) amplification by real-time PCR primers specific for several addiction-related genes for use in ChIP or mRNA analyses; and 3) RNA purification and reverse transcription for real-time PCR analysis. The results of our optimization efforts will be presented. In the future, this experiment's findings will hopefully be correlated to behavioral changes observed in the rats following the same treatment.

96

Samantha Kee, Shannon Figuoera, and Nicole M. Roy, PhD. Determining the effects of embryonic exposure to Prozac on the developing nervous system in a zebrafish model. Biology Department, Sacred Heart University.

Prozac a widely prescribed drug of the selective serotonin reuptake inhibitor class, is used to treat a number of disorders, including depression, panic attacks, obsessive compulsive disorder, and some eating disorders. Its widespread use raises concerns regarding the potentially harmful developmental effects of embryonic exposure to the drug. A zebrafish model was utilized to study the effects of Prozac on the developing nervous system, specifically focusing on synaptic remodeling events. Experimental embryos were exposed to Prozac for 48, 72, and 96 hours and compared to controls of the same age. While no morphological differences between experimental and control embryos were observed, reverse transcriptase polymerase chain reaction analysis indicated that at the molecular level, exposure to Prozac may induce changes in the expression of genes involved in synaptic transmission, including those for serotonin and dopamine transporters. The effects of Prozac were further examined by observing changes in the development and migration of hindbrain branchiomotor neurons in transgenic fish. Using the zebrafish model, we demonstrate that embryonic exposure to Prozac may alter gene expression, which results in synaptic, but not morphological, changes.

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Brianna Arpie, **Joseph Lugo**, Dan Cerutti, and Nicole M. Roy, PhD. Glycinergic neuron antagonist alters gene expression profiles at neuronal synapses in developing zebrafish embryos and leads to behavioral abnormalities in the larval or adult fish. Biology Department, Sacred Heart University.

The developing fetal brain requires a strict choreographed sequence of cellular events that may be disturbed by early exposure to chemical compounds. Zebrafish (*Danio rerio*) are an important vertebrate model organism to study embryonic brain development due to their rapid, transparent and *ex utero* neural maturation. Using our zebrafish model system, we sought to study the effects of potential neurotoxicants that cause disruptions in the developing nervous system. Our goal is to demonstrate gene expression changes at neuronal synapses in response to chemical challenge and link those changes to behavioral abnormalities in the larval and adult fish. To that end, we utilized an antagonist to the glycinergic neurotransmitter system, strychnine. To examine changes in gene expression at various stages of early neural development, we utilized a PCR aproach to study up or downregulation of genes. We focus on genes found on the presynaptic glycinergic, glutamatergic and GABAergic nerve terminals, mainly transporters and neurotransmitter processing enzymes as well as postsynaptic receptors. We find several genes are downregulated, upregulated or do not change in response to antagonist treatment during early neural development phases. We also demonstrate changes in larval and adult behavior including hyper-responsivness to a looming stimulus and longer habituation times to non-threatening stimuli. Taken together, early neural synaptic gene changes and synaptic remodeling events may lead to behavioral and learning deficiencies in response to chemical challenges

98

Shannon Swift, Amanda Gryzb, Brittany Hartman, Ashley Engel, and Dr. Geffrey Stopper. Sonic Hedgehog's negative autoregulatory properties in salamander limb development. Biology Department, Sacred Heart University.

Sonic hedgehog (Shh) is a diffusible morphogen that is expressed in the posterior of tetrapod limbs and patterns the anterior-posterior axis of the limb. Shh is thought to interact in a positive feedback loop with Fibroblast Growth Factors expressed at the distal tip of the limb. Shh also has negative autoregulatory properties, which cause its expression to increase when its signaling is blocked. Previous studies in the salamander *Ambystoma mexicanum* have shown that a 10-day exposure to cyclopamine, which allows Shh expression but blocks its signaling, results in a loss of nearly all Shh patterning function from the onset of exposure, thus yielding limbs with reduced numbers of digits. We investigate whether a shorter 2-day exposure to cyclopamine causes a collapse of the positive feedback loop, resulting in limbs morphologically similar to those that underwent 10-day exposures to cyclopamine, or whether the autoregulatory properties of Shh allow it to recover, resulting in limbs similar in morphology to untreated limbs. Many of our experimental limbs with 2-day cyclopamine exposures show the same morphologies as untreated limbs, while only a few show slight abnormalities consistent with reduced Shh function. This supports that Shh has strong negative autoregulatory properties that allow its signaling to recover from, and possibly even compensate for, short periods of interruption, with little to no morphological effect

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Elizabeth Cummins, Ryan Dubay, Kory Grahl, Brian Vaidulas, and Dawn Holmes. Genomic Analysis of the Hyperthermophilic Archaeon, *Geoglobus acetivorans.* Biology Department, Western New England College.

Geoglobus acetivorans is a hyperthermophilic archaeon that was isolated from the deepest of the known hydrothermal fields in the Mid-Atlantic Ridge at a depth of 4100 m. *G. acetivorans* is able to grow anaerobically by coupling the complete oxidation of a variety of fatty acids with insoluble Fe(III) reduction. To date, very little information regarding the physiology of this organism is available and its genome has not yet been sequenced. Therefore, several different molecular approaches were used to obtain genomic sequence data from *G. acetivorans*. Degenerate primers targeting genes from the citric acid cycle were designed using genome sequences from 2 phylogenetically related archaea, *Ferroglobus placidus* and *Archaeoglobus fulgidus*, and these primers were used for the polymerase chain reaction (PCR). Genomic libraries were also constructed with the pUC19 vector, and the restriction enzymes, *EcoRI*, *HindIII*, *BamHI* and *PstI*. In order to understand the mechanisms involved in Fe(III) reduction by this organism, SDS protein gels were done to detect the presence of c-type cytochromes. This study is significant because it should help shed light into the physiology of microorganisms capable of Fe(III) reduction and organic matter oxidation in deep hydrothermal environments.

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Alyssa Naoumides, Krista Perrella, **Veneta Qendro**, and Barry Hoopengardner. RNA editing targets *in Drosophila melanogaster*. Department of Biomolecular Sciences, Central Connecticut State University.

Adenosine-to-Inosine (A-to-I) RNA editing is a process that post-transcriptionally modifies RNA substrates. Adenosine deaminases that act on RNA (ADAR) enzymes specifically convert adenosine residues to inosine; these inosines are then interpreted as guanosines by the cell during translation. Therefore, the editing of a messenger RNA sequence can result in a transcript with an altered nucleotide sequence distinct from the original version encoded by the gene. Several research projects in our lab focus on the regulation of editing with age, expression of the Drosophila ADAR, and the prediction of new editing targets in fruit flies

101

Roseanna Valant. Chromosome Aberrations Caused by the Chemotherapeutic Agent Mitoxantrone on In Vitro Human Peripheral Leukocytes. Biology Department, Wagner College.

Chemotherapeutic drugs target dividing cells in the body and since cancer cells are transformed with no control over their cell cycle, more of the cancer cells are affected by these treatments. These chemo drugs however, do have an effect on normal dividing cells and have been known to lead to secondary cancers in some cases. The purpose of this study is to assess the chromosomal damage caused by Mitoxantrone, an antineoplastic, antitumor drug that is used in the treatment of various types of cancer. Using peripheral leukocytes, sets of *in vitro* cultures (normal and drug treated) were prepared from two different healthy human subjects. The cultures were harvested after 68-72 hours of incubation using conventional procedures. Slides were made using a flame drying technique, stained with a Giemsa stain and viewed under oil immersion using an Olympus light microscope. Structural and numerical aberrations as well as changes in mitotic indices were noted from all samples and digitally photographed. Statistical evaluation of our results gives us an indication of the magnitude of damage caused by this drug. Slides with drug treated cells had a much lower mitotic index and cell density present compared to the control slides. Preliminary data from this project coupled with data from previous studies suggests that the drug Mitoxantrone does cause both structural and numerical aberrations on human chromosomes from peripheral leukocyte cultures.

102

Ryan Russell, Ling Lei, and Cheryl Watson. Astrocytes can sequester and release serotonin. Biology Department, Central Connecticut State University.

It has been established that astrocytes can transport serotonin (5-HT), into the cell from the extracellular space. We have previously shown, using immunofluorescent techniques, that 5-HT is taken up and stored in vesicles expressing vesicular monoamine transporters (VMAT). We have confirmed that astrocytes express VMAT using Western blot. We now seek to discover if these vesicles can release 5-HT in response to a stimulus. In neurons, intracellular calcium triggers the release of stored neurotransmitters into the extracellular environment. To test this mechanism in astrocytes, astrocyte cultures, loaded with 5-HT, are treated with ATP, which has been shown to increase intracellular calcium (Centemeri et al. 1997). Exocytosis of 5-HT was determined using an EIA assay on the cells and surrounding media. We demonstrate that ATP treatment will cause release of 5-HT from astrocytes. Astrocyte ability to release 5-HT is a novel and important contribution to glial biology.

103

Caroline Czajkowski, Olga Levkina, Rochelle Rennie, Nichole Kycia, Danielle Berera, Lauren Giroux, and Michelle Thomas. Fibroblast responses to TGF-beta and Angiotensin II. Biology Department, Central Connecticut State University.

Hormones have the power to transform cardiac fibroblasts, changing their function or their contractility. Angiotensin II (Ang II) is thought to increase the production of Cx 43, a gap junctional protein. TGF-Beta and Ang II aid in the transformation of fibroblasts into myofibroblasts, increasing expression of muscle actin. An increased expression of alpha-actin in culture, would suggest that this transformation was occurring. Evidence suggests that statins, normally prescribed to reduce cholesterol formation, inhibit this transformation. Dose dependent experiments were done using high and low concentrations of TGF-Beta or Ang II either with or without treatment with statins. Immunoprecipitations will be done on these specimens to see if TGF-Beta or Ang II increased alpha-actin expression and if the statins inhibited this expression. We will also test for an increase in Cx-43 following Ang II treatment.

104

Lauren Schmalz. Behavioral Responses to Time-Varying Visual Stimuli in Drosophila. Biology Department, Fordham University.

While the visual system for *Drosophila* has been studied, not many experiments have focused on the behavioral responses to time-varying visual stimuli. Insects in general, and *Drosophila* in particular, have been found to have a substantially higher time-resolution in vision than humans. Our experiment seeks to determine the effects of high frequency LED light patterns on free flying *Drosophila melanogaster*. Wild type, Canton-S flies were placed in a testing apparatus with two separate landing platforms. Each platform held a Petri dish containing an agar solution and a single LED light. Before testing, flies were food deprived for 20 hours. The first phase of testing was a three hour training period, in which one platform had a sugar-agar Petri dish and a flickering LED light, with the flicker pattern computer controlled. A second platform had a sugar (control) Petri dish and a continuous LED light, or one flickering with a different pattern. After the training period, both Petri dishes were replaced with an agar (control) Petri dish, while the respective LED patterns were continued. This testing phase lasted for three hours. During both phases a camera monitored the flies' platform preference, taking one picture every minute. At the completion of the trail, pictures were reviewed and the number of flies that landed on each platform was tallied. Ability of flies to distinguish the LED patterns, differing with respect to timing, will be determined.

105

Gabrielle Nunnari. Cognitive and motor functioning of the APPPS1 mouse model of Alzheimer's disease. Biology Department, John Carroll University.

Alzheimer's disease (AD) is one of the most common forms of dementia in aging adults characterized by many symptoms such as memory loss, fatigue, and loss of appetite. To study this complex disease, several mouse models have been developed. These mice show the neurological and behavioral characteristics of humans with AD. One of the most common mouse models is the amyloid precursor protein presinilin 1 (APPPS1) mouse which is a transgenic mouse introduced to amyloid precursor protein and presenilin 1 as an embryo. This model is controversial as to whether or not it truly represents AD, but one way to draw comparisons is to employ commonly used behavioral tests. Motor and cognitive tests were employed in order to draw conclusions about a group of APPPS1 mice, using Black 6 mice as a control. The three behavioral tests used were open field, rotorod, and fear conditioning. The APPPS1 mice had significantly more beam breaks in the open field test signifying they may be more active in comparison to the Black 6 mice. The results for the rotorod test showed that the Black 6 mice were able to stay balanced on the rod significantly longer signifying a possible coordination deficit in the APPPS1 mice. The fear conditioning test was a cognitive test which yielded significant results for the Black 6 mice who displayed more freezing behavior indicating their ability to remember a stimulus after two delay periods, while the APPPS1 mice displayed memory deficits in the task. In addition, neuronal tissue was examined in both groups to ascertain differences in the cortex, hippocampus, and amygdala. This analysis showed that there were several amyoid-beta plaques in all three brains regions for a representative brain of an APPPS1 mouse and no plaques observed in a representative brain of a Black 6 mouse. Results suggest that the APPPS1 mouse may serve as a good model for some charac

106

Cherryle Brown and Damilola Adebesin. Pharmacological Study of Dopamine Post-Synaptic Receptors of the Lateral Ciliated Cells of the Gill and Visceral Ganglia of *Crassostrea virginica.* Biology Department, Medgar Evers College.

Lateral cilia of the gill of *Crassostrea virginica* are controlled by a reciprocal dopaminergic- serotonergic innervation which originates from the cerebral and visceral ganglia. Dopamine is the neurotransmitter slowing down beating and serotonin accelerates beating. Dopamine receptors are classified as D1-like and D2-like, with respective subtypes. D1-like receptors are coupled to G protein $G_{\alpha s}$ and activates adenylate cyclase. D2-like receptors are coupled to the G protein $G_{\alpha i}$, and directly inhibits the formation of cAMP by inhibiting the enzyme adenylate cyclase. Previous work of our lab showed the dopamine receptors in the lateral cells D2 type. To learn more we continued the study by investigating the receptors in the visceral ganglia. The agonists, A68930, propylpiperdine, piribedil, BHT920, 2-bromo-ergocryptine , SKF89626; and the antagonist, supiride, droperidol, metoclopramide, ergonovine and chlorprothixene were tested to determine their efficacy in altering the beating rates of the lateral cilia. Analysis of the data for the agonists and antagonists indicates that the dopamine receptors present in the gill and visceral ganglia are of the D2 type. The study also shows that this preparation is a good model for pharmacological studies of dopamine function as well as the pharmacology of drugs affecting biogenic amines in nervous systems.

107

Shannon Caesar and Alicia Reid. Parallel Synthesis of Potential Histone Deacetylase Inhibitors to Be Used For PET Imaging of the Brain. Biology Department, Medgar Evers College.

The behavior of a person's genes doesn't depend just on the genes' DNA sequence, but includes the epigenetic factors affected also. Changes in these epigenetic factors can play a critical role in disease. Histones are proteins that aid in the organization of DNA in to chromosomes. Histone deacetylase (HDAC) removes acetyl groups from histone tails, causing the histones to wrap more tightly around the DNA with an accompanying reduction in gene expression. Several classes of histone deacetylase inhibitors (HDIs), including benzamides, have been pursued as treatments for cancer as well as psychiatric and neurological disorders. Since little is known about the concentration and distribution of HDAC in the human brain, we set out to synthesize HDIs that could be radiolabelled for imaging HDAC in the brain using Positron Emission Tomography. To date no agent is available for imaging HDAC in the brain. A parrallel synthesis procedure was developed that gives access to more than 100 potential benzamide ligands was developed. Using this synthetic approach nine benzamide ligands have been synthesized thus far. Two ^{11}C radiolabeled benzamide derivatives have been prepared, both of which have shown moderate brain uptake and HDAC affinity.

108

Fiona Dailey, Ozgul Muneyyirci-Delale, and Vijaya Nacharaju. Urinary Steroids Profile In Endometriosis Patients. Biology Department, Medgar Evers College.

Endometriosis is a debilitating gynecological medical condition in women. This occurs when endometrial cells appear and flourish in areas outside the uterine cavity, often times on the ovaries. These endometrial cells outside of the uterus are also influenced by hormonal changes and respond similarly as do those cells found inside the uterus. Along with Endometriosis, women experience severe pelvic pains, dysmenorrheal (painful menses), dyspareunia (painful intercourse) and even infertility. This disease does not have a cure; however, patients can be treated in order to alleviate the pain. While the exact cause of Endometriosis remains unknown, research shows that it is a hormone dependent condition. Specifically in this study, we focused on urinary androgens and glucocorticoids. We concentrated on cortisol a stress hormone before and after treatment. Steroid extraction and hydrolysis was used as a technique before injecting the derivatives in the gas chromatography/mass spectrometry. These peaks were identified and analyzed. The THE (tetrahydrocortisone) levels were higher after 24 week treatment, indicating increased conversion of the stress hormone cortisol to the inactive cortisone.

109

Rachelle Desroches, Alfred Hutchinson, and Hai Huang. Manganese Impairs the Activity of Mitochondrial Aconitase in Gill of the Bivalve *Crassostrea virginica*. Biology Department, Medgar Evers College.

Manganese is an essential trace metal but excessive exposure leads to manganese accumulations and toxicity. Excess manganese is neurotoxic and causes Manganism, a Parkinsons-like disorder. The mechanism of manganese neurotoxicity is unknown. It is hypothesized excess manganese causes mitochondrial dysfunction. Manganese accumulates in mitochondria and can raise levels of reactive oxygen species or participate in catalyzing unwanted redox reactions. We showed manganese accumulates in tissues of *Crassostrea virginica* and disrupt the dopaminergic system controlling lateral cilia in gill. We also showed it impairs gill mitochondrial respiration. We examined effects of manganese on the Kreb Cycle enzyme aconitase. Mitochondrial suspensions were exposed to manganese, repelleted, resuspended, then sonicated to free aconitase from the mitochondrial matrix. Aconitase activity was determined spectrophotometrically. The reactions were monitored by measuring the increase in absorbance at 340 nm associated with the formation of NADPH. Results show short-term exposure to manganese (1-50 mM) caused up to a 90% loss in aconitase activity. The results corroborate our previous findings that manganese disrupts mitochondrial respiration in oyster gill and further demonstrates a mechanism by which manganese can disrupt.

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Latoya Duncanson and Claudette Saddler. The Ability of PAS, Acetylsalicylic Acid and Calcium EDTA to Protect Against Toxic Effects of Manganese on Mitochondrial Respiration and Membrane Potential in Gill of *Crassostrea virginica*. Biology Department, Medgar Evers College.

Manganese (Mn) is an essential metal that at excessive levels in brain causes Manganism, which is similar to Parkinsons disease. The mechanism of action is not completely understood but may be due to mitochondrial damage and resulting dysfunction of the brain's dopaminergic system. We studied effects of Mn on gill mitochondrial respiration and membrane potential using Yellowspring oxygen probes, a Spectramax Fluorescence Plate Reader and the cationic dye TMRM (Tetramethylrhodamine, methyl ester, perchlorate). Mn caused dose dependent decreases in O_2 consumption that was blocked by pretreating with calcium disodium EDTA (caEDTA), p-aminosalicylic acid (PAS) or acetylsalicylic acid (ASA). Each partially reversed toxic effects of Mn when added to Mn treated mitochondria. Mn decreased mitochondrial membrane potentials and was partially blocked by PAS, but not caEDTA. Time lapse photography revealed the fluorescence of specimens treated with Mn dimmed over a 10 minute period indicating a loss of mitochondrial membrane potential. Pretreatment with PAS or ASA prevented the dimming. The study demonstrates Mn reduces O_2 consumption and disrupts the mitochondrial membrane potential. PAS and ASA protected against both toxic effects and may be better therapeutic agents than caEDTA in the treatment of Manganism.

111

Kun Huang and Zakiyya Nicholas. The Toxic Effects of Metals on Mitochondrial Cytochrome c Oxidase Activity in the Gill of the Bivalve *Crassostrea virginica*. Biology Department, Medgar Evers College.

Many metals are believed to exert their toxic effects by raising cellular levels of reactive oxygen species (ROS). We showed metals accumulate in gill and other tissues of C*rassostrea virginica*, and some, particularly copper and manganese, impair mitochondrial respiration. In this study we treated gill mitochondria with copper, manganese, lead or cadmium to determine effects on cytochrome c oxidase (COX). COX is the principle terminal oxidase of high affinity O_2 in aerobic respiration. Agents that inhibit the function of respiratory complexes not only disrupt energy homeostasis but also increase production of ROS. Gill mitochondria were prepared from *C. virginica* and exposed to Cu, Mn, Pb or Cd, re-pelleted then resuspended in fresh media. COX activity was determined spectrophotometrically. Compared to controls results indicate mitochondrial COX activity decreased in response to Cu, Pb and Cd, but remained unaffected by Mn. Mitochondrial COX was most affected by Cu. We also showed the loss of COX activity due to copper treatments could be prevented if mitochondria were pre-incubated with glutathione suggesting the toxic effects of Cu on COX is due to increased oxidative stress. Studying the effects of metals on cellular processes will provide insight into the mechanisms that underlie metal toxicities.

112

Michael Nelson, Trevon Adams and Danilo Beaubrun. Are the Neurotoxic Effects of Manganese Due to Blockage of Post Synaptic Dopamine Receptors? Biology Department, Medgar Evers College.

Manganese (Mn), a neurotoxin causing Manganism a Parkinsons-like disease, disrupts dopaminergic neurotransmission. Lack of effective treatment for Manganism is a major obstacle in its management. p-Aminosalicylic acid (PAS) is reported a possible treatment. Lateral cilia of gill of *Crassostrea virginica* are controlled by serotonergic-dopaminergic innervations from the ganglia. We showed Mn blocks cilio-inhibitory effects of dopamine (DA) and this is prevented by PAS. We studied if Mn exerts its effects by blocking DA post-synaptic receptor binding and if PAS prevents Mn from doing this. We observed membrane potentials of lateral ciliated cells with fluorescent dye while measuring cilia beating. Applying DA or 20 Hz electrical stimulation after exciting cilia repolarized the cell membrane and decreased beating. Mn prevented this. PAS prevented the actions of Mn. Adding ATP increased cilia beating without changing membrane potential. Applying MDL-12,330A, an adenylcyclase inhibitor, after Mn decreased cilia beating without affecting membrane potentials. The study shows correlation between membrane potential of lateral ciliated cells and cilia beating. It helps elucidate the neurotoxic mechanism of action of Mn, showing the site of action is after the post-synaptic dopamine receptors. This information is helpful to understand causes and potential treatments of Manganism

113

Gabriela Murphy-Goldberg. Music Has a Positive Effect on Muscle Performance in Humans. Biology Department, Mount St. Mary College.

No one can argue that music plays an important role in the life of humans. Ever since I read that music was banned from the New York Marathon due to its potential effect on the runners' performance, I was interested in the effects of music on muscle performance, In order to test this hypothesis, I measured handgrip muscle endurance by determining the time before the onset of fatigue in subjects who were maintaining a certain level of strength. The handgrip muscle strength of five females and five males was measured using a hand dynamometer. Performance was measured under control conditions (no music) and while the subject was listening to a song by Lady Gaga. The results indicted that both genders exhibited a longer time of muscle endurance before fatigue when listening to this music compared to when no music was played. Thus, the conclusion of the study is that this genre of music does enhance muscle performance by reducing the onset of fatigue during a handgrip exercise.

114

Alessandra Lyons, Chelsea Benwa, Ashley Cassano, and Daniel Lench. Amplitude and attenuation of notes within the lar gibbon (*Hylobates lar*) great call. Biology Department, Sacred Heart University.

The Lar gibbon or white handed gibbon (Hylobates lar) is a monogamous, territorial Southeast Asian species of ape that produces complex songs. Bonded pairs sing in duets, which include the female great call. These vocalizations are known for their loudness, transmitting ≥ 1km through dense forest vegetation. A number of field studies have investigated the repertoire, context and timing of this species' songs, but not the relative amplitudes or transmission characteristics of different song notes. A number of great call sequences were recorded from two pairs of captive gibbons and the attenuation of different note types was quantified by recording their playback from 10-100m through a woodland habitat. The relationship between spectral characteristics of notes and their attenuation was quantified. In addition, comparisons were made between the amplitudes of different note types emitted by a sender, and their subsequent rates of attenuation. Results suggest that in order to maximize the long distance transmission of an entire song sequence, the sender only needs to increase the amplitude of select notes within the song.

115

Daniel Murphy. Evaluation and comparison of organic extracts from the leaves and the flowers of *Salidago Canadensis* (Golden Rod). Chemistry Department, Niagara University.

Natural product extraction has yielded many beneficial compounds. Taxol, which is extracted from the bark of the Pacific Yew tree and is used as a treatment of breast cancer. Salicylic acid is another form of natural extract that comes from a willow tree. In our study of natural extracts, a combination of the leaves and the flowers of *Salidago Canadensis* were used and extracted by the means of hexanes, ethyl acetate, dichloromethane, ethanol and water. Very few studies has been done on this plant, however through Chinese culture this plant has been used as a tea in order for the treatment of kidney stones but no one has been able to ascertain whether there a particular compound that is beneficial for removal of stones.

116

Alana DeTone. Analysis of Nicotine in Hookah Water. Chemistry Department, Mount St. Mary College.

A hookah, also known as a waterpipe, or arghile, is used to smoke tobacco that is flavored with fruit and glycerin(muassel). This method involves a smoke aerosol that is created by hot air from hot charcoals passing over the tobacco and vaporizing the volatile components. The smoke is drawn into a water bowl before passing into the smoker's lungs. Nicotine is present in the smoke and is known to be carcinogenic and highly addictive. This study analyzes the nicotine concentration in the filter water of the hookah after smoking different types of lemon flavored muassel. The filtering water retained more nicotine than the literature value of 5% as measured by a gas chromatograph with a TCD detector. Addition of lemon juice to the filtering water (reaching a pH of 3) did not show any significant change in the amount of nicotine retained by the filter water.

117

Mary McEwan. Analysis of Metals in Hookah. Chemistry Department. Mount St. Mary College.

Smoking tobacco flavored with fruit and moistened with glycerine (ma'sal) through a water pipe, also known as a hookah, shisha or narghile, has become a popular fad among college-aged students. This method of smoking tobacco uses indirect heat from charcoals to vaporize the volatile components of the flavored tobacco. The smoke of this process is then drawn through a bowl of water before entering the smoker's lungs. Heavy metals are known contaminants in tobacco products and are carcinogenic, especially in concert with other compounds present in tobacco and tobacco smoke. This study analyzes metal concentrations of several types of ma'sal, along with the concentrations of metals transferred to the filtering bowl and smoke of the hookah during smoking sessions. The ma'sal and filtering water did not show significant concentrations of lead or aluminum using AA or fluorescence spectroscopy. The smoke condensate was analyzed for twenty two different elements by ICP-MS. High concentrations of barium, zinc, aluminum and lead were found in the smoke.

118

Laura Baumgartner. Population genetics of white oak in relation to herbivory. Chemistry Department, United States Naval Academy.

This research aims to study white oak (*Quercus alba*) populations to determine if plant defenses vary predictably with latitude and to determine connections among populations, ultimately to understand the species' ability to adapt under various scenarios of climate change. By extracting *Q. alba* DNA and searching for specific sequences with polymerase chain reaction (PCR), the degree of relatedness among populations can be determined. Amplification will only occur in PCR if the test DNA contains sequences complementary to the primers chosen by the researcher. To allow the population genetics data to be acquired, several technical problems required resolution. This research aimed to establish a reliable positive control for PCR and to refine extraction methods to provide amplifiable white oak DNA. Genomic oak DNA was extracted using a modification of the Qiagen DNEasy Mini-kit and visualized on an electrophoresis gel, but not successfully amplified. Oak DNA added to positive control clover DNA disrupted amplification, leading to the conclusion that a soluble substance exists in extracted oak DNA that prevents amplification. Several treatments were used to remove the substance and oak DNA no longer prevents amplification. Positive control procedures reliably amplify clover DNA using the rbcL-α primer, useful for amplification of most green plants. Use of other primers continues to be explored. Current work seeks to enhance reliability of the positive control with various primers and to extract amplifiable oak DNA.

119

Amanda Lau. The effect of chemical attractants and repellents of red oak foliage on gypsy moth feeding behavior. Chemistry Department, United States Naval Academy.

To better understand the interactive roles of tannins and nucleopolyhedrosis viruses in producing the recognizable, repeatable population cycles of gypsy moth populations, this research aims to identify and quantify the tannins of northern red oak, *Quercus rubra*, and attempts to associate these compounds with changes in gypsy moth, *Lymantria dispar*, behavior. The procedure for tannin separation commenced with extraction of red oak foliage with 70% acetone, followed by separation with column chromatography and analysis by high performance liquid chromatography. Though some degree of success in separation was achieved, further separation must be attempted to achieve the purity necessary for structural elucidation. Additionally, larval feeding studies performed using the fractions obtained from reverse phased column chromatography indicated strong attraction to the middle fractions, suggesting the existence of an attracting compound or compounds of intermediate polarity. On the other hand, earlier and later fractions suggested the existence of both non-polar and very polar repellents.

120

John Leistner. The synthesis of S-substituted-N,N-dimethyldithiocarbonate as a possible treatment for type II diabetes. Chemistry Department, Niagara University.

Diabetes is a disease that affects 25 million Americans. Approximately 90-95% of these cases are type II diabetes. It has been found that this disease is directly linked to an over activity of protein tyrosine phosphatase 1B (PTP1B), which dephosphorylates the multiple tyrosine residues within the insulin receptor (IR) protein. This dephosphorylation prevents insulin from binding to the receptor site, thus ultimately increasing the blood glucose levels. Current treatments for this disease focus on decreasing of the glucose concentration in the blood, but do not directly address the underlying problem. Through previous research within our lab, it has been concluded that *S*-substituted-*N*,*N*-dimethyldithiocarbonate molecules may inhibit the PTP1B enzyme, further controlling diabetes. Thus far, we have synthesized a few such compounds, some of which have been sent down to CSIRO in Australia to attempt a co-crystallization with the PTP1B enzyme. All new compounds will be evaluated an inhibitors of the PTP1B in-house.

121

Kara Swallow and Linda Farber, Ph.D.,. Exploring Microwave Assisted Oxidation Reaction Organic Synthesis. Department of Chemistry, Sacred Heart University.

Microwave Chemistry is known to decrease reaction time and potentially increase yield. This research wil explore the oxidation of benzhyrol to benzophenone. The use of different solvents and of a mild oxidizing agent, chromium trioxide resin is explored.

122

Josephine Mayne, Jose Rios, and Jean-Rony Hilaire. Is Chelation the Mechanism of Action of p-Aminosalicylic Acid (PAS) in the Treatment of Manga. Chemistry Department, Medgar Evers College.

Manganese is a naturally occurring element, essential for living organisms, but potentially toxic in high concentrations. Certain occupations including mining, welding and steel manufacturing can expose workers to high manganese levels, leading to Manganism, a Parkinsons-like disorder. The mechanism of toxicity is not fully understood and effective treatments are still being developed. A number of studies indicate the metal chelator EDTA is effective in alleviating symptoms of Manganism. Recently p-aminosalicylic acid is being used in treatment of Manganism. However, the mechanism of action is unclear and it is debated whether the effects of PAS are due to anti-inflammatory or metal chelation properties. In this study we used a spectrophotometric assay to determine the manganese chelating properties of PAS. A 1.78 mM of manganese ion (Mn^{+2}) solution was exposed to varying concentrations of PAS. Free Mn^{+2} was then converted to permanganate ion (MnO_4^-). Levels of MnO_4^- were then measured spectrophotometrically and compared to controls. Our results indicate that PAS is an effective chelator of Mn^{+2} ions. Increasing concentrations of PAS reduced levels of free Mn^{+2} in solution. These results help to clarify the mechanism of action of PAS in alleviating the symptoms of Manganism.

123

Eric Stoutenburg. Solid State Thermo-Studies of Substituted Dibenzylic Dialkoxy Disulfides. Chemistry Department, Niagara University.

Dialkoxy disulfide derivatives have been shown to undergo thermolytic decay. The rate of degradation of para-substituted benzylic dialkoxy disulfide molecules seems to differ according to the substitutions they possess. The decomposition of these molecules has been shown to follow Swain and Lutpon's constant. We took a more in depth look at why these molecules behave the way they do under thermolytic conditions. We investigated the thermo-stability of these molecules in the presence of electron withdrawing and electron donating groups. They were synthesized and subjected to heat using the TGA and DSC.

124

Patrick Heaphy. Cage opening/rearrangement of cubanes and surfactant synthesis. Biology Department, Niagara University.

Cubane is a highly strained unsaturated tetrahedral molecule that was first synthesized in 1964 by Philip E. Eaton. Since cubane's discovery, it has been researched in pharmaceuticals, explosives, and polymers. It was ascertained that octanitrocubane is the most powerful non-nuclear explosive. However, dipivaloylcubane is an antiviral compound; specifically against HIV. Due to its range of uses, we have explored the thermo-stability of a number of cubane derivatives which have revealed the propensity to undergo cage opening/rearrangement. In addition, we have begun to explore cubane as a drug delivery vehicle by work towards developing a novel surfactant

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Lorenzo Crumbie, Ursula Brandl, and **John Williams**. Antibiotic and anitfungal graft polymers of cotton and polyvinyl alcohol bound to arylphosphonium salts. Chemistry Department, Rhode Island College.

Aryl phosphonium salts (APS) have anti-microbial and anti-fungal properties. We have grafted a-(triphenylphosphonium)toluic acid to polymers with free hydroxyls by esterification reactions. Cotton cellulose and polyvinyl alcohol have been esterified using microwave irradiation as well as traditional bench-top thermal reactions. Reaction times were dramatically reduced and greater yields were obtained with the microwave-driven reactions. Polyvinyl alcohol-APS esterification in both microwave and bench top reactions was done using $SnCl_2 \cdot 2H_2O$ as a catalyst with the free acid and by conversion of the acid to the acyl chloride before reaction with the polymers. IR analysis of cotton-APS and polyvinyl alcohol-APS both show ester peaks and reduction of OH peak intensity. Dehydration of the polyvinyl alcohol's remaining hydroxyls has been observed in some preparations upon prolonged heating in DMSO. Glass transition temperatures for PVA-APS synthesized bench-top and by microwave indicate, like the IR's, that the compounds are identical. APS-modified cotton and PVA both show anti-bacterial activity against some gram-positive organisms in modified Kirby-Bauer type screening. They also appear to be antifungal to ambient opportunistic fungi.

126

Chris Gemski, Valeria Canar, and John Williams. Microwave- assisted Polypeptide Synthesis. Chemistry Department, Rhode Island College.

Solid state polypeptide synthesis on styrofoam beads has been done manually at room temperature on a wrist shaker and using microwave irradiation to accelerate the synthesis. We are using a Biotage Initiator® microwave reactor to develop an efficient manual synthesis of a cyclic peptidomimetic small molecule that is effective in a mouse model of a trauma-induced neurodegenerative disorder linked to glutamate toxicity. The synthesis sequence begins with swelling the styrofoam (polystyrene?) resin to which is bonded the first Fmoc-protected amino acid in the sequence in DMF. The amino acid on the bead is deprotected and an activated, Fmoc-protected, amino acid is added to make a dipeptide. The sequence: swell, deprotect, couple, deprotect, couple, continues to the final step; cleavage of the polypeptide from the beads. Each step is done under microwave irradiation at 70-80 C with mixing by a magnetic stirrer. The time ratios for room:microwave in minutes are: swelling; 30:2, deprotecting; 10:2, coupling; 90:3, cleavage; 120:2. Efficiency increases with size of the polypeptide. The time decreased from 400' to 9'.

127

Colin Kelly. Microwave Assisted Copper-Catalyzed Halogen Exchange and Hydrodehalogenation of Aryl Halides. Chemistry Department, United States Naval Academy.

An effective method for the hydrodehalogenation of aryl bromides and chlorides was developed using microwave-assisted concurrent tandem catalysis (CTC). In the presence of 5 mol % CuI, 10 mol % *N*,*N*′-dimethlycyclohexane-1,2-diamine, and NaI, halogen exchange of aryl bromides to aryl iodides was accomplished after 0.5-2 hours at 100-150 degrees Celsius with yields of 84-97%. Halogen exchange of aryl chlorides to aryl iodides was accomplished after 0.5-2 hours at 200 degrees Celsius with yields of 5-45%. For the process of hydrodehalogenation, halogen exchange was coupled to a second catalytic reaction that contained a hydrogen source in the presence of 10-20 mol % CuI to produce arenes from aryl bromides and chlorides with yields of 26-87%. A similar CTC methodology to convert aryl chlorides to aryl nitriles is currently in development.

128

Natalie Plana and Rouba Abdel-Malak. Mass Spectrometry Analysis for the Synthesis of a Dipeptide Using Ruthenium Pentammine as a C-terminus Protecting Group. Chemistry Department, Fordham University.

Solution phase peptide synthesis was used to prepare a dipeptide of the type Pro_2-apy$Ru^{III}(NH_3)_5$ using pentammine ruthenium(III) as C-terminus protecting group. The first boc protected proline unit was coupled to 4-aminopyridine which was then anchored on the metal center by substitution of the pyridine nitrogen of 4-aminopyridine on pentammine ruthenium (II) aqua. The reaction product was quenched with dimethyl sulfoxide and oxidized to the ruthenium (III) using hydrogen peroxide. The product was then purified using ion exchange chromatography under acidic conditions to avoid any decomposition of the $Ru^{III}(NH_3)_5$ metal center in neutral aqueous media. The absorption spectrum of the product showed an absorption band around 415 nm characteristic of a ligand to metal charge transfer for apy$Ru^{III}(NH_3)_5$. All products at different stages of the synthesis were characterized by mass spectrometry. The solution phase peptide synthesis described in this work presents many advantages over solid phase peptide synthesis including mainly larger scale product synthesis and the fact that the ruthenium pentammine unit acts as a tracer for the peptide in purification techniques due to its distinctive golden yellow color as opposed to colorless solutions obtained in solid phase peptide synthesis. In addition, for the purposes of our work, the peptide chain is assembled directly on the metal center of interest which acts as a protecting group.

129

Veronica Campanella. Microwave assisted methylation of phenols with DMF-DMA. Chemistry Department, Niagara University.

The methylation of phenols is commonly performed in order to preserve the alcohol group(s) from interfering with subsequent reactions. This protection can be done in numerous manners, one of which is the use of *N*,*N*-dimethylformamide dimethylacetal (DMF-DMA). This however typically requires lengthy reflux (i.e. 24hrs). This project examines the use of microwave to accelerate the rate of reaction. This new process methylates in thirty minutes to one hour using a laboratory microwave and is affected by the presence of electron donating and withdrawing substituents attached to the ring. A library of protected methylated phenols were obtained and purified with moderate to good yields via this microwave assisted protocol.

130

Christopher Dietz. Vinyl cubane derivatives: Cage opening/rearrangements. Chemistry Department, Niagara University.

Based on previous studies of cubane, and its ultimate successful incorporation into polymers, it was found that vinylcubane has a tendency to undergo cage opening/rearrangement. It was in this finding that a cubyl styrene derivative is proposed in order to deter the cage opening of the cubane and thus perform polymerization from a vinylcubane-based monomer. The goal of this research is to perform a novel synthesis of this cubyl styrene derivative and attempt polymerization of the molecule in order to study the cage opening/rearrangement due to the initial a radical formation.

131

Bryce Paolella. Novel dimerization of benzylamine. Chemistry Department, Niagara University.

The dimerization of primary amines to form secondary amines has yet to be reported. We have developed a novel process by which benzylamine reacts with sulfur monochloride to initial form the dibenzylamino disulfide, which subsequently fragments and dimerizes to form *N*-benzylidenebenzylamine. Reacting the imine with $NaBH_4$ yields the dibenzylamine final product. In addition, we have begun to react the imine with various carbanions to make unsymmetrical disubstituted amines.

132

Maddison Pollina. Monitoring the proton exchange of an acid C-H sulfone in various deuterated solvents. Chemistry Department, Niagara University.

The exchangeability of acidic protons with deuterium atoms is a well know phenomena. This is typically associated with alcohol, amines, and carboxylic acids. However, depending if a lowered pKa exists, it is possible to exchange a C-H to C-D. With our system, we examined the exchangeability of methylene protons which are alpha to both a benzenesulfone and carboxylic acid. The rate of exchange was examined in different solvents, and we have also examines how substituents on the benzenesulfone can alter the rate of exchange.

133

Andre Santa. Investigating the Oxidation of 2-Butanol Catalyzed by Au and Pd Nanoparticles Using ATR-FTIR. Chemistry Department, Mount St. Mary College.

Alcohol oxidations under mild conditions using polyvinylpyrrolidone (PVP)-stabilized Au and Pd nanoparticle catalysts in aqueous solutions have been investigated using Attenuated Total Reflectance Spectroscopy in conjunction with Fourier Transform Infrared Spectroscopy (ATR-FTIR). These particles have been previously found to have different catalytic activities and selectivity depending on the type of nanoparticles and alcohol used in the reaction. Although the actual mechanism for alcohol oxidation is not known, different mechanisms have been proposed for the different metal nanoparticles. The ATR-FTIR technique allows the observation of structural changes over time, which provides additional information to further elucidate the mechanism for each type of nanoparticle. Based on our initial findings, we are proposing the first step in the mechanism for alcohol oxidation using either Au or Pd PVP-stabilized nanoparticles is the formation of a butoxide indeterminate. The preliminary studies of these nanoparticles also exhibit a faster rate of product formation for the Pd nanoparticles compared to the Au particles. However, additional studies have shown an interaction between the PVP capping material which disrupts the capping on the nanoparticle surface and interferes with the product spectra. Further studies are needed to elucidate the other mechanistic steps and to characterize the role of the PVP during the reaction

134

Lisa Gallagher. The Effects of Instrumental Music on Verbal Memory. Psychology Department, Lycoming College.

Researchers have reported that approximately 68 percent of students listen to the radio while they study, and many believe that this actually distracts students and hinders their studying abilities (Freeburne & Fleisher, 1952). However, studies by Morgan, Hovey, Obata, among others, actually found that music facilitates studying (Freeburne & Fleisher, 1952). This study addresses if two different genres of instrumental music, classical and rock, have different effects on participants' ability to recall a word list. Participants were asked to memorize a list of 16 words, presented with an immediate recall test and then a second recall test after a ten minute break. Participants were exposed to either instrumental classical music or instrumental rock music or to white noise durign memorization and recall tests. We hypothesized that rock music would impair participants' performance on the recall tests more than classical music. Our results supported our hypothesis; participants exposed to rock music recalled significantly less words than participants in the control group ($t(10) = 3.124$, $p = .011$), which suggests that certain genres of instrumental music can disrupt the encoding process. For students, these results suggest that studying while listening to certain genres of music may have detrimental effects on their ability to recall the information.

135

Jaclyn Hendricks. Media Exposure and Body Dissatisfaction. Sociology Department, Sacred Heart University.

This particular study tested the research question whether female undergraduate students with significant exposure to the mass media were more likely to have feelings of body dissatisfaction than those students with less exposure to the media. Over the years, numerous scholars and experimental studies have measured the impact of the media on self-esteem, particularly females, and how it affected the way that they perceived themselves both physically and mentally. As found within this study, of the 116 undergraduate female participants, those greatly exposed to the media desired to change their body shape, as opposed to those who were not as exposed to the media.

136

Jalina Brown and Linsey Martin. The Effects of Failure on Ratings of Self and Others. Psychology Department, Lycoming College.

Although numerous studies have investigated how individuals feel about themselves after failure, there is little research examining how individuals feel after other people experience failure. The current study explores how participants view another person’s failure, after the participants have experienced failure themselves. Thirty-two students from a small liberal arts school were separated into two groups, one group completed a possible task and the other completed an impossible task. Participants then rated themselves on their perceptions of how well they believed they performed on the test and how well their performance represented their capabilities. Following this, participants were given a short scenario and rated another person’s failure. As expected, those who experienced failure rated themselves worse than those who did not experience failure. However, results showed that participants did not apply their negative feelings about themselves towards others. The experience of failure may be so personal that its negative effects do not generalize to perceptions of others. The current findings are in opposition to what we know about defensive attributions.

137

Jennifer Ida. Transmission of Infectious Disease between Human and Non-human Primates. Department of Anthropology, Wagner College.

Cross-species transmission of disease between non-human primates and humans has increasingly become of great concern; however we still lack essential background data on the process. It is hypothesized that close phylogenetic relationships, overlapping territories, anthropogenic disturbance, and frequent contact with humans will increase the likelihood of transmission. This hypothesis is tested through an analysis of the literature. Specific cases of transmission were examined and the key factors of transmission were identified. Factors were then compared across cases. The research demonstrates that the degree of relatedness between humans and non-human primate species, as well as the extent of niche overlap and shared territory, often resulting from human encroachment on primate habitats, are salient factors in explaining frequency of transmission and predicting which species are most affected. The examined species will include gorillas, chimpanzees, baboons, and macaques. In addition, this research highlights possible routes of exposure, including fecal/oral and aerosol/inhalation transmission. The results then suggest directions for future research, including an examination of ways to mitigate risk.

138

Jenna Barnhart. Automaticity of Semantic Processing Effects on the Ability to Identify Word Component Parts. Psychology Department, Lycoming College.

The experimenter was interested in whether individuals process words as entire words or as component parts. Forty college students were randomly assigned to a group that viewed a list of 30 false words or a group that viewed a list of 30 real words. Each word had an embedded word within it, with 10 in each list appearing at the beginning, 10 at the middle, and 10 at the end of the whole words. Previous research on automaticity of semantic processing led to the hypothesis that in this type of embedded word task, participants would more rapidly identify embedded words within false words than within real words. The results supported the hypothesis that people process words to the level of meaning and that this interfered with the ability to identify component parts.

139

Kelly Considine. Identification of novel peptide inhibitors of the DR6-NAPP protein-protein interaction using a virtual screening approach. Department of Chemistry, Sacred Heart University.

Nikolaev and co-workers recently described a new apoptotic pathway that underlies neuronal development and axonal pruning. According to their model, the pathway, believed to be hijacked in Alzheimer's disease (AD), is engaged by binding between death receptor six (DR6) and an N-terminal fragment of amyloid precursor protein (NAPP) in response to nerve growth factor (NGF) withdrawal. In a previous study, a theoretical model of the DR6-NAPP interaction was constructed. The model implicates a lone NAPP alpha helix-loop motif as crucial to DR6 binding and recognition. We performed structure-based virtual screening experiments on NAPP using focused peptide libraries. Select peptide screening hits were docked to NAPP and the binding modes optimized. Final scoring and ranking was handled using a novel empirical method for estimating protein-peptide binding affinities. Our results suggest structure-based peptide virtual screening and optimization and scoring, are effective methods for identifying viable peptide inhibitors of the DR6-NAPP, protein-protein, interaction.

140

Bethany Mastronardi, **Katie Baldwin**, and Dr. Sue A. Kelley. The Effect of Adding Pictures to Concrete and Abstract Words. Psychology Department, Lycoming College.

Previous research has found that concrete words are remembered more easily than abstract words, perhaps because concrete words are tangible which makes it easier to produce images to accompany the words. If this is the case, then memory for abstract words may be improved if images are provided. The current study hypothesized that concrete words would be remembered more than abstract words and that there would be a greater recall of words (both concrete and abstract) when the words were paired with pictures. Participants (26 females and 20 males) viewed a slideshow containing 20 words, alternating between abstract and concrete, and were asked to recall as many words as possible after the slide show had ended. One group viewed a slideshow with only words, whereas the other group viewed the words along with corresponding images. In general, participants remembered more words when they were shown with pictures. Interestingly, more abstract words were remembered when paired with images, and more concrete words were remembered when there were no images. The reason people may have recalled concrete words better without imagery is because they don't need pictures to help remember material objects. Perhaps the images that were provided interfered with participants' own visual images. Further, females remembered significantly more words when pictures were added to the slideshow. Perhaps women are more visual learners. Understanding the role that images play in memory could have implications for the field of education.

142

Marie Alnadi. Effects of Constant Blue Light on Food and Water Intake, Circadian Activity, Melatonin Levels, Adiposity, and Behavior in Rats. Psychology Department, John Carroll University.

Melatonin is a hormone that is produced and secreted from the pineal gland in the dark and that helps to regulate sleep. High levels of melatonin during the winter have been linked to Seasonal Affective Disorder (SAD). Blue light, which suppresses melatonin, has been utilized as a therapy for SAD. Altered melatonin levels have been reported to have an effect on metabolic function. Food Intake, relative food intake, water intake, circadian rhythms, adiposity and melatonin levels were measured in twenty four Long Evans rats, twelve exposed to a 12-h/12-h light/dark cycle (LD) compared to twelve animals exposed to continuous blue light (BL) for eighteen days. The BL animals had lower food and water intake, lower relative food intake, decreased melatonin levels, and higher adiposity compared to the LD group. In addition, circadian activity in BL animals became free running and decreased over time when compared to the LD group. The BL rats also became more irritable and excitable compared to the LD rats. This study provides insight into the negative effect of melatonin suppression on metabolic function, and circadian rhythms, as well as the effect of continuous blue light on behavior. It also provides an understanding of the mechanism underlying the positive results obtained utilizing light therapy in treating SAD.

143

Lindsay Mitchell. The Effects of Temperature Increase on Sucrose Biosynthesis as a Measure of Photosynthetic Activity in *Arabidopsis thaliana* (Brassicaceae).

Environmental and ecological changes due to temperature increases such as those associated with global climate change have been well documented. And while global temperature has increased 0.6 °C over the past century, regional temperatures show greater fluctuations, sparking research in quantifying plant responses to heat stress. Since carbohydrates are the main end product of photosynthesis and, for the sake of stability and mobility, sucrose is the preferred vehicle for translocation of photoassimilate, sucrose biosynthesis can be used as a marker for photosynthetic activity. Genetically distinct *Arabidopsis thaliana* ecotype Col-0 seeds were obtained from TAIR and grown on M&S basal salt agar enriched with 1N KOH after surface sterilization and a d=4 cold germination period. Control and heat stressed groups both received 12 hour photoperiods. Control plants were grown at 23/23°Cday/night mean temperatures and heat stressed plants were grown at 29/23°C day/night mean temperatures. Using sucrose bioassays, sucrose was hydrolyzed to glucose and fructose by invertase resulting in an increase in absorbance (at 340 nm) directly proportional to sucrose concentration. Plants were harvested at d=10 and [sucrose] was quantified (mg/ml) by comparing to sucrose standards. Sucrose levels were significantly lower in heat stressed plants as compared to control group, indicating that heat adversely affects the rate of photosynthesis. Measurement of sucrose level can be useful in the fields of agronomy, ecology, and plant physiology as well as applying the results to future consequences of global climate change.