RISE at Rutgers/UMDNJ
Research In Science and Engineering

2009 Summer Research Symposium

Sponsored by:

Rutgers Graduate School-New Brunswick

UMDNJ Graduate School of Biomedical Sciences at Robert Wood Johnson Medical School

August 5, 2009

2009 Summer Research Symposium

Featuring Oral Presentations by 28 Summer Scholars

Wednesday, August 5, 2009

Biomedical Engineering (BME) Building
599 Taylor Road
Busch Campus, Rutgers University, Piscataway, NJ

8:30 – 8:50 AM	**Continental Breakfast**	**BME Atrium**
9:00 – 10:00 AM	**Welcome and Plenary Session**	**BME Auditorium**

Carlos Gutiérrez, Ph.D.
Distinguished Professor of Chemistry
California State University, Los Angeles
"Design of New MRI Contrast Agents:
Selective Acylation of Symmetric Polyamines"

10:00 – 11:15 AM	**Student Research Presentations**	**Rm 126/Rm 128**
11:15 – 11:30 AM	Break	BME Atrium
11:30 – 12:45 PM	**Student Research Presentations**	**Rm 126/Rm 128**
12:45 – 01:00 PM	Break	BME Atrium
01:00 – 02:00 PM	**Student Research Presentations**	**Rm 126/Rm 128**
02:00 PM	**Buffet Luncheon**	**International Lounge** Busch Campus Center

Sponsored by:

RISE (Research In Science and Engineering) at Rutgers/UMDNJ
and affiliated NSF-sponsored summer programs at Rutgers:
ISURF[1] component of IGERT[2] Program on the Science and Engineering of Stem Cells
REU[3] in Structured Organic Particulate Systems (SOPS)

[1] ISURF = IGERT Summer Undergraduate Research Frontiers;
[2]IGERT = Integrative Graduate Education and Research Traineeship
[3]REU = Research Experience for Undergraduates

Design of New MRI Contrast Agents:
Selective Acylation of Symmetric Polyamines

Carlos G. Gutiérrez, PhD
University President's Distinguished Professor
Chemistry
California State University, Los Angeles

Carlos G. Gutiérrez, University President's Distinguished Professor of Chemistry at California State University, Los Angeles, was in born in Mexico in 1949. When he was seven, his family moved to Los Angeles, CA. As an undergraduate at UCLA (1967-71) he pursued interests in art, film, and literature before completing the BS in chemistry. His film work led to an Academy of Motion Picture Arts and Sciences Award in animation in 1973 for the educational film "Antimatter", made with his undergraduate roommate. He earned the PhD in synthetic organic chemistry at the University of California, Davis (1975) for work on the preparation of the Himachalene family of sesquiterpenes. In 1976 he was appointed to the faculty at California State University, Los Angeles (Cal State LA). He was promoted to professor in 1984, serving as chair of the Department of Chemistry & Biochemistry from 1988-1992. He was a visiting scientist at UC Berkeley from 1989 through the winter of 1991.

Gutiérrez is a synthetic organic chemist, with interests at the interface of organic, inorganic and biological chemistry. He and his students design and synthesize molecules useful as probes to study the details of iron acquisition, transport, and utilization by bacteria. His interest in polyfunctional molecules has lead to studies on the synthesis of magnetic resonance imaging contrast agents, unsymmetric dendrimers, and novel metal-organic three-dimensional materials.

In addition to his scientific rsearch, he has successfully administered research and research training programs over three decades. He has worked to increase the participation by minority group members in scientific careers, directing the Cal State LA Minority Access to Research Careers (MARC) program since 1978 and the Minority Biomedical Research Support (MBRS) program since 1992 (now the Research Initiative for Scientific Enhancement). He is proud of the achievements of the many Cal State-LA MARC and MBRS-RISE students, numbering hundreds of graduates, including roughly 100 who are currently earning the PhD at universities nationwide.

Dr. Gutiérrez has served the scientific community with leadership positions on committees of the National Institutes of Health, the National Science Foundation, the State of California and various foundations. He was founding chair of the American Chemical Society Committee on Minority Affairs, helping establish the ACS Scholars Program, which since 1995, has contributed to the development of more than 2000 talented minority undergraduates in the chemical sciences.

He is widely recognized as an exceptional educator and mentor. Recognition includes being named the 2005 U.S. Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education, receiving the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (1996) from President Clinton, and the AAAS Lifetime Mentor Award. At Cal State-LA, he has been recognized for excellence in teaching by colleagues and by students.

Gutiérrez is married to Cal State LA organic chemistry Professor Linda M. Tunstad, and is the father of three. The family includes a steady-state population of three to five cats. In addition to synthetic chemistry, he enjoys art, music, road- and mountain biking, and snowboarding.

SUMMER PROGRAMS

RISE (Research In Science and Engineering) at Rutgers/UMDNJ

RISE seeks to extend the pathway to graduate study and careers in the sciences, math and engineering for underrepresented minority, disadvantaged, and first generation college students. Jointly sponsored by Rutgers Graduate School–New Brunswick and UMDNJ Graduate School of Biomedical Sciences at RWJMS, RISE is hosting 30 scholars this summer. These students, selected from 350 applicants, represent 22 sending schools throughout the United States and its territories, and, in addition, reflect a broad spectrum of STEM disciplines as well as psychology and the behavioral sciences. Students spend the summer actively engaged in cutting-edge research under the guidance of carefully matched faculty mentors. An outstanding suite of professional development activities, including training in scientific writing and speaking, career guidance, guest speakers, and GRE preparation, complements the research. Some of our scholars also participate in affiliated research programs at Rutgers sponsored by the National Science Foundation (NSF). These include the Summer Undergraduate Research Frontiers (ISURF) component of the Rutgers IGERT Fellowship Program on Stem Cells, the Research Experience for Undergraduates (REU) in Structured Organic Particulate Systems (SOPS), and the REU in Discrete Mathematics and Theoretical Computer Sciences (DIMACS). One scholar was co-sponsored by the Rutgers BioMaps Graduate Program.

ISURF

ISURF (IGERT Summer Undergraduate Research Frontiers) operates as an undergraduate partner program to the Rutgers-NSF IGERT graduate fellowship program on the Science and Engineering of Stem Cells (www.igert.rutgers.edu, NSF DGE 0801620). The ISURF program, while no longer funded as part of the IGERT grant, proved extremely successful in past years and is now funded by supplemental grants. The program works closely with RISE at Rutgers/UMDNJ and supports a handful of students for summer research. These students work under the direct supervision of IGERT faculty members and Graduate Fellows, who represent eight participating graduate programs spanning the life sciences, physical sciences, and engineering. Students are immersed for ten weeks in cross-disciplinary projects within the IGERT's thematic focus on the synthesis, analysis, and integrative applications of Stem Cell research. Students are exposed to the current and ever-growing challenges of integrating research advances across diverse fields such as cell biology and molecular genetics; polymer and nanomaterials synthesis; and biomechanical and tissue engineering.

REU - SOPS

The Engineering Research Center on Structured Organic Particulate Systems (ERC-SOPS), sponsored by the NSF, is comprised of four institutions where Rutgers is the lead university; the other three are NJIT, Purdue, and the University of Puerto Rico Mayagüez. This ERC is producing globally competitive engineers with the depth and breadth of education needed for success in technological innovation and for effective leadership of interdisciplinary teams throughout their careers. It also seeks to increase the future pool of qualified high-tech workers, including women and minorities. One facet of the educational environment that helps achieve this goal is REU-SOPS, a summer research experience for undergraduates (REU) site at Rutgers. Students participate in highly successful academic seminars through the RISE (Research in Science and Engineering) program

ACKNOWLEDGEMENTS
RISE at RUTGERS/UMDNJ

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Institutional Sponsorship

Rutgers, The State University of New Jersey,
Graduate School – New Brunswick

University of Medicine & Dentistry of New Jersey
Graduate School of Biomedical Sciences at Robert Wood Johnson Medical School

External Support

Celgene Corporation

Merck Research Laboratories

Federation of American Societies for Experimental Biology
(FASEB/MARC Program)

NSF - Northeast Alliance for Graduate Education & the Professoriate

Public Service Electric and Gas

United States Department of Labor Workforce Innovation in Regional Economic Development WIRED Initiative (Bio-1 Grant)

New Jersey Space Grant Consortium

Our research programs would not be possible without the support of the dedicated faculty members at Rutgers and UMDNJ-GSBS at RWJMS who have donated their time, materials and laboratory space. We are also extremely grateful for the financial support that some of our mentors provided through research grants or supplements. In addition, we thank the graduate students and post-docs who provided invaluable guidance as "near-peer" mentors.

Participants - RISE and Sister Programs

Nianest Alers[1] ~ University of Puerto Rico-Aguadilla
Lauren Anllo[1] ~ The College of New Jersey
Rocio Arroyave[1,3] ~ University of Puerto Rico-Mayagüez
Melvili Cintron[1] ~ University of Puerto Rico-Mayagüez
Renee Clarke[1] ~ New York City College of Technology
Shirley Diaz-Hernandez[1,2]* ~ Universidad Del Este
Samantha Espinosa[1] ~ College of Saint Elizabeth
Howard Forbes Jr. [1]* ~ University of the Virgin Islands
Nisha George[1] ~ University of Maryland, Baltimore County
Simon Gordonov[2] ~ Rutgers, The State University of New Jersey
Laura Hagens[1] ~ Rowan University
Mayda Hernandez[1] ~ University of Puerto Rico-Rio Piedras
Joseph Hyman[1,3] ~ University of Maryland, Baltimore County
Gulden Kaplan[1] ~ The College of New Jersey
Liz A. Jimenez Martinez[1,4]* ~ Bard College
Caitlin Kowalsky[1,3] ~ The Cooper Union for the Advancement of Science & Art
Whitney Kropat[1] ~ University of Washington
Vladimir Lokskin[2] ~ Rutgers, The State University of New Jersey
Daniel Mateo-Ortiz[1,3] ~ University of Puerto Rico-Mayagüez
Morris Michael[1,3] ~ Columbia University
Madison Myers[1,2] ~ University of Guam
Emily Nowicki[1] ~ The College of New Jersey
Eileen Oni[1,2] ~ Rowan University
Enmanuelle Pardilla[1] ~ University of Puerto Rico-Rio Piedras
Norma Iris Rodriguez[5] ~ University of Puerto Rico-Mayagüez
Jairo Sierra[1] ~ Montclair State University
Janice Sotomayor[1] ~ Pontifical Catholic University
Lee Tillman[1] ~ California State University, Northridge Campus
Kelly Toppin[1,4]* ~ Shippenburg University
Francisco Velazquez[1] ~ University of Puerto Rico-Aguadilla
Yasah Vezele[1,3] ~ University of Rhode Island
Bethany Walton[1]* ~ Ramapo College of New Jersey
Immanuel Williams[1,4] ~ University of Maryland, Baltimore County

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SPONSORING PROGRAMS

[1] Research in Science & Engineering (RISE) at Rutgers/UMDNJ
[2] ISURF Summer Component of the Rutgers NSF Stem Cell IGERT
[3] NSF REU in Structured Organic Particulate Systems
[4] NSF REUin Discrete Mathematics and Theoretical Computer Science (DIMACS)
[5] Summer Scholar, "Bridge to the Doctorate, UPR- Mayagüez to UMDNJ"
*8-week participant (Presented at poster session only)

Schedule of Student Presentations

Sessions 1-3 BME Room 126		Sessions 4-6 BME Room 128	
Session 1		Session 4	
10:00-10:15	Simon Gordonov	10:00-10:15	Francisco Velazquez
10:15-10:30	Yasah Vezele	10:15-10:30	Emily Nowicki
10:30-10:45	Samantha Espinosa	10:30-10:45	Laura Hagens
10:45-11:00	Madison Myers	0:45-11:00	Morris Michael
11:00-11:15	Lauren Anllo	11:00-11:15	Melvili Cintron
	BREAK		*BREAK*
	Session 2		Session 5
11:30-11:45	Nisha George	11:30-11:45	Mayda Hernandez
11:45-12:00	Caitlin Kowalsky	11:45-12:00	Lee Tillman
12:00-12:15	Janice Sotomayer	12:00-12:15	Eileen Oni
12:15-12:30	Enmanuelle Pardilla	12:15-12:30	Nianest Alers
12:30-12:45	Whitney Kropat	12:30-12:45	Daniel Mateo
	BREAK		*BREAK*
	Session 3		Session 6
1:00-1:15	Rocio Arroyave	1:00-1:15	Vladimir Lokshin
1:15-1:30	Norma Iris Rodriguez	1:15-1:30	Immanuel Williams
1:30-1:45	Gulden Kaplan	1:30-1:45	Jairo Sierra
1:45-2:00	Joseph Hyman	1:45-2.00	Renee Clarke

Sessions 1-3
BME Room 126

Session 1

Moderator: Martha Soto, Ph.D.
Dept. of Pathology & Laboratory Medicine, UMDNJ-Robert Wood Johnson Medical School

10:00-10:15	**1.1. Simon Gordonov** Rutgers, The State University of New Jersey	**Investigation of Mesenchymal Stem Cell Proliferation, Viability, and Differentiation in 3-D Polymeric Scaffolds for Tissue Regeneration**
10:15-10:30	**1.2. Yasah Vezele** University of Rhode Island	**Evaluation of Acetaminophen Powder Hydration using Raman Spectroscopy and Water Activity measurements**
10:30-10:45	**1.3. Samantha Espinosa** College of Saint Elizabeth	**Direct Allene Synthesis**
10:45-11:00	**1.4. Madison Myers** University of Guam	**Screening of hormonal receptors insulin-like growth factor receptor (IGFR) and progesterone receptor (PR) in rat tumors exposed to alcohol *in utero* using immunohistochemistry (IHC)**
11:00-11:15	**1.5. Lauren Anllo** The College of New Jersey	**Molecular mapping of a novel morphogenesis gene in *Caenorhabditis elegans***

Session 2

Moderator: _____, Ph.D.
Dept. of _____

11:30-11:45	**2.1. Nisha George** University of Maryland, Baltimore County	**Expression of antiangiogeneic protein, EMAPII, by pancreatic α and β cells.**
11:45-12:00	**2.2. Caitlin Kowalsky** The Cooper Union for the Advancement of Science & Art	**Synthesis and Modification of Carbon Nanotube Fibers**
12:00-12:15	**2.3. Janice Sotomayer** Pontifical Catholic University	**Identification of genes that interact with the eukaryotic elongation factor 3 in *Saccharomyces cerevisiae***
12:15-12:30	**2.4. Enmanuelle Pardilla** University of Puerto Rico, Rio Piedras	**The formation of trace memories increases the survival while decreasing the proliferation of newly generated cells in the hippocampus of the adult brain**
12:30-12:45	**2.5. Whitney Kropat** University of Washington	**VLT/SINFONI observations of nearby Lyman Break Galaxy analogs**

Session 3

Moderator: Henrik Pedersen, Ph.D.
Dept. of Chemical and Biochemical Engineering, Rutgers University

1:00-1:15	**3.1. Rocio Arroyave** University of Puerto Rico, Mayagüez	**Analysis of the effects of shearing conditions on the distribution of MgSt using Laser-Induced-Breakdown-Spectroscopy and Near Infrared Spectroscopy**
1:15-1:30	**3.2. Norma Iris Rodríguez** University of Puerto Rico-Mayagüez	**Investigation of the Interaction Between LC3, Rab7 and p62 in Bladder Cell Line**
1:30-1:45	**3.3. Gulden Kaplan** The College of New Jersey	**Screening for roles of conserved *Caenorhabditis elegans* microRNAs in models of injury-induced neuronal necrosis**
1:45-2:00	**3.4. Joseph Hyman** University of Maryland, Baltimore County	**Comparison of Tablet Dissolution by Standard Testing (USP II) and Simulated In-vivo Conditions (TIM-1)**

Sessions 4-6
BME Room 128

Session 4		
Moderator: Charles Roth, Ph.D. Dept. of Chemical and Biochemical Engineering, Rutgers University		
10:00-10:15	**4.1. Francisco Velázquez** University of Puerto Rico-Aguadilla	**Branching patterns differ between high and low frequency spiral ganglion neurons.**
10:15-10:30	**4.2. Emily Nowicki** The College of New Jersey	**Examining Circadian Clock Candidate Genes in *Emiliania huxleyi***
10:30-10:45	**4.3. Laura Hagens** Rowan University	**Studying the conformational changes in α-synuclein that lead to aggregation and onset of Parkinson's disease using cy3b dye**
10:45-11:00	**4.4. Morris Michael** Columbia University	**Production of Nanosuspensions using Flow-Induced Phase Inversion (FIPI)**
11:00-11:15	**4.5. Melvili Cintron** University of Puerto Rico-Mayagüez	**Effects of dietary phytochemical cancer chemopreventive compounds in the transcriptional activation of the Nrf2-antioxidant signaling pathways leading to cancer prevention.**

Session 5		
Moderator: Paul Copeland, Ph.D Dept. of Molecular Genetics, Microbiol & Immunol, UMDNJ-Robert Wood Johnson Med Sch		
11:30-11:45	**5.1. Mayda Hernandez** University of Puerto Rico-Rio Piedras	**The effect of Beclin 1 heterozygosity on Aging in a mouse model**
11:45-12:00	**5.2. Lee Tillman** California State University, Northridge	**The effects of stereotype-consistent information verses stereotype-inconsistent information on memory**
12:00-12:15	**5.3. Eileen Oni** Rowan University	**Identifying microRNA precursors capable of cleavage by Microprocessor in embryonic stem cells**
12:15-12:30	**5.4. Nianest Alers** University of Puerto Rico-Aguadilla Campus	**Characterization of a putative negative regulatory element in the Sel P 3'UTR**
12:30-12:45	**5.5. Daniel Mateo-Ortiz** University of Puerto Rico-Mayagüez	**Flow variability in continuous powder feeders**

Session 6		
Moderator: KiBum Lee, Ph.D. Dept. of Chemistry and Chemical Biology, Rutgers University		
1:00-1:15	**6.1. Vladimir Lokshin** Rutgers, The State University of New Jersey	**EGFP knockdown in neural stem cells using CdSe/CdS/ZnS core/shell quantum dots functionalized with siRNA**
1:15-1:30	**6.2. Immanuel Williams** University of Maryland, Baltimore County	**Allocation of Monetary Resources in HIV-infected Community**
1:30-1:45	**6.3. Jairo Sierra** Montclair State University	**Suppression of GRM1 expression by siRNA in an ecdysone-regulated system in a human melanoma cell line**
1:45-2.00	**6.4. Renee Clarke** New York City College of Technology	**Investigation of surface energy changes during mirocontact printing.**

Sessions 1-3
BME Room 126

1.1. **Simon Gordonov**
Rutgers University

Mentor: Prabhas Moghe, Ph.D.
Department of Biomedical Engineering
Department of Chemical and Biochemical Engineering
Rutgers University

Investigation of Mesenchymal Stem Cell Proliferation, Viability, and Differentiation in 3-D Polymeric Scaffolds for Tissue Regeneration

It has been recently shown that human mesenchymal stem cells (hMSCs) exhibit multilineage differentiation capabilities on 2D poly-desaminotyrosyl-tyrosine ethyl ester (DTE) carbonate biomaterials. Additionally, induction-specific soluble cues provide a means of creating a suitable cellular microenvironment to selectively guide stem cell lineage commitment. However, stem cell function on 2D surfaces is rarely and sub-optimally representative of cellular behavior in 3D *in vivo* environments. Therefore, we investigated the roles of pseudo-3D polymeric electrospun poly(DTE carbonate) scaffolds of varying fiber diameter and porosity on hMSC viability, proliferation, and differentiation. These parameters are important for cellular function in tissue regeneration. Differences in scaffold fiber diameter and porosity were achieved by varying the poly(DTE carbonate) weight-volume percentage (wt/vol %) in two types of solvents; hexafluoroisopropanol and dichloromethane. We have shown that hMSCs seeded in poly(DTE carbonate) scaffolds proliferate and are 100% viable over a one week-long incubation in basal growth media. Additionally, at 3 weeks post-seeding we used an Alizarin Red S calcium stain to detect mineralization, a marker of osteoblastic differentiation, and an AdipoRed fluorescent lipid-binding stain to detect intracellular lipid accumulation, an adipocytic marker. Imaging of differentiated hMSC staining showed that, given the necessary inductive soluble cues, hMSCs are capable of differentiating into osteoblasts and adipocytes in poly(DTE carbonate) scaffolds. These results show promise in the applicability of these biomaterials for stem cell expansion, maintenance, and differentiation to desired cell types for tissue engineering applications.

1.2. Yasah Vezele
University of Rhode Island

Mentor: Paul Takhistov, Ph.D. and Marlena Brown
Department of Food Science
Rutgers University

Evaluation of Acetaminophen Powder Hydration using Raman Spectroscopy and Water Activity measurements

The investigation of hydration on three grades of powder acetaminophen was studied. Acetaminophen that is exposed to moist environments can decrease in strength over time due to electrostatic attraction of charged particle or a viscous saturated film layer on the surface of the powder. This is a major problem in the Pharmaceutical industry. In order to solve this problem, humidity ranging from 7-100% was measured using a Hygrometer and a Raman Spectrophotometer of each powder. The data indicated some energy changes of chemical bonds due to the different levels of hydration and an increase in moisture absorption with increasing humidity and particle size. In addition, the chemical potential of the system was equal in both the ideal and non-ideal phase at equilibrium due to Gibbs free energy. Finally, these measurements are used to improve nondestructive methods during manufacturing and interpret the behavior of powders with changing humidity.

1.3. Samantha Espinosa
College of Saint Elizabeth

Mentors: Rojita Sharma, B.S., Lawrence Williams, PhD.
Department of Chemistry and Chemical Biology
Rutgers University

Direct Allene Synthesis

Here we present a simple, convenient, single flask synthesis of allenes from inexpensive commercial materials. In contrast to alkenes and alkynes, allenes are stereogenic and span three carbons and offer unique structural scaffolds and opportunities for chemical synthesis. Although many diverse alkenes and alkynes are available, few allenes can be obtained from commercial sources. For example, Sigma-Aldrich, one of the most widely used chemical supply companies, offers 67 alkenes and 88 alkynes but only 5 allenes. Normally, allene synthesis requires many separate reactions and the isolation and purification of many intermediates. Our approach focused on a multiple component reaction sequence to prepare allenes by sequential addition of reagents. Specifically, combination of alkynylides with aldehydes, exposure to methane sulfonyl chloride, and then transfer to a suitable cuprate reagent solution gave allenes directly. Importantly, alkynylides are available and used directly from combination of commercial alkynes and base; a wide range of aldehydes is commercially available, as is methane sulfonyl chloride. Cuprates are easily prepared in situ from commercial reagents as well. Moreover, we found a recently described copper hydride source can be used in this procedure to prepare mono-, di-, and tri-subsituted allenes with high stereoselectivity. The yields of allene synthesized by our method are high (80-90%). For example, nona-3, 4-dienylbenzene was obtained in 79% yield by alkynylation of hydrocinnamaldehyde and 1-hexyne with n-butyl lithium as base, followed by mesylation, and then treatment with copper hydride on 22 mg scale. This method should facilitate the study and use of allenes.

1.4. Madison M. Myers
University of Guam

Mentors: Wendie Cohick, Ph. D. and Ms. Tiffany Polanco
Department of Endocrinology and Animal Biosciences
Rutgers Univeristy

Effects of alcohol exposure *in utero* on hormone receptor expression and mammary gland density

Recent studies have shown that alcohol exposure *in utero* can increase breast cancer risk, however this idea has not been extensively studied. Since breast cancer development and progression are regulated by steroid hormones and growth factors, hormonal receptors serve as clinical markers. Detection of hormone receptor expression is a valuable tool in breast cancer diagnosis. It provides relevant information about prognosis and available treatment approaches. Our lab has shown that alcohol exposure *in utero* increases susceptibility to mammary tumors and alters tumor development. Rats exposed to alcohol in the fetal environment develop more malignant tumors as well as a greater number of estrogen-receptor-negative tumors. The present study investigates the effect of alcohol exposure *in utero* on human epidermal growth factor receptor-2 (HER-2) and progesterone receptor (PR) expression. Pregnant Sprague-Dawley rats were fed either a liquid diet containing 6.37% ethanol, an isocaloric liquid diet, or an ad libitum rat chow diet during days 11-21 of gestation. Pups were injected with n-nitroso-n-methyl urea (NMU) to induce mammary carcinogenesis. At study termination, tumor tissue was collected for the detection of PR and HER-2 by immunohistochemistry (IHC). Since rats exposed to alcohol *in utero* developed more estrogen receptor negative tumors, we suspect that alcohol-exposed animals will develop more PR and HER-2 negative tumors. Studies also have shown that increased mammary density leads to an increased breast cancer risk. We measured mammary gland density in 20-day-old rats, however no difference was found between the three groups.

1.5. Lauren M. Anllo
The College of New Jersey

Mentors: Martha Soto, Ph.D., Huajiang Xiong, Ph.D.
Department of Pathology
UMDNJ-Robert Wood Johnson Medical School

Molecular mapping of a novel morphogenesis gene in *Caenorhabditis elegans*

In order to understand how cells and tissues move during embryonic morphogenesis, it is necessary to understand the regulators of the cytoskeleton. The WAVE/SCAR protein complex promotes polymerization of actin cytoskeletal filaments at the leading edge of cells undergoing movements. Upon activation by the small GTPase, Rac, this complex binds Arp2/3, which initiates branched actin filament polymerization. Cell migrations including those regulated by the WAVE/SCAR pathway are coordinated through changes in cell shape. *C. elegans* embryos lacking any component of the WAVE/SCAR pathway fail to complete epidermal enclosure due to morphogenesis defects, and they exhibit the "Gut on the exterior" or "Gex" phenotype. Some components that regulate actin polymerization, like the upstream signals, are unknown. Cloning novel mutants with the Gex phenotype may identify these missing components. This study seeks to map a novel gene encoding a potential component of this pathway. A genetic screen that was performed to identify novel WAVE/SCAR regulators obtained the *C. elegans* mutant *pj21*, which exhibits the Gex phenotype. DNA was extracted for single-nucleotide polymorphism (SNP) mapping from *pj21* mutants, amplified via polymerase chain reaction (PCR), cut with a restriction endonuclease, and visualized with UV transillumination on an agarose gel. Comparison of mutant DNA cutting patterns to those of wild-type DNA identified SNPs linked to *pj21* in segments 12, 13 and 14 of chromosome 1, thus narrowing the molecular location of *pj21*. These results will help when cloning *pj21*, after which the PJ21 protein and its potential interaction with the WAVE/SCAR pathway can be studied. Since defective WAVE proteins have been associated with metastasis, this knowledge of WAVE/SCAR regulators can guide research concerning novel cancer therapeutics.

2.1. Nisha George
University of Maryland Baltimore County

Mentor: Ramsey Foty, Ph.D., Connan Vaca
Department of Surgery
UMDNJ-Robert Wood Johnson Medical School

Expression of antiangiogeneic protein, EMAPII, by pancreatic α and β cells.

This project is designed to determine whether α and β pancreatic islets cells express the antiangiogenic protein, endothelial monocyte- activating polypeptide (EMAP) II. The pancreas contains islets of glucagon producing α cells and insulin producing β cells. Improper function of these cells can lead to various adverse health effects. A major disease, commonly known as diabetes, is caused by the underproduction of insulin by β-cells. Attempts have been made to treat diabetes by injecting pancreatic islets into the livers of diabetic patients. However, these islets were observed to lack proper vascularization; possibly due to the presence of an antiangiogenic protein on their surface. EMAP II is a cytokine-like molecule first identified from murine methylcholanthrere A-induced fibrosarcomas. In earlier experiments, EMAPII had been shown to have antiangiogenic properties defined by inhibition of vessel ingrowth in a Matrigel model and a corneal eye model. Our hypothesis is that α and β cells express antiangiogenic proteins and that down-regulation of such proteins may improve islet vascularization. Our objective was to first determine whether islet cells express EMAPII. Upon determination of EMAPII's association with α or β pancreatic islets, future steps can be taken toward engineering cells that lack expression of EMAPII; which may potentially allow for proper vascularization of pancreatic islets and can serve as a treatment for diabetes. We used immunoblot and immunofluorescence analysis to determine whether α (α-TC) and β (INS-1 and MIN6) cells express EMAPII. Western blot analysis showed the expression of EMAPII by the α and β cell lines. These results were also supported by immunohistochemical analysis, which demonstrated EMAPII localization in pancreatic islets.

2.2. Caitlin Kowalsky
The Cooper Union for the Advancement of Science and Art

Mentors: Alexander Neimark, PhD and John Landers
Department of Chemical and Biochemical Engineering
Rutgers, The State University of New Jersey

Synthesis and Modification of Carbon Nanotube Fibers

Carbon nanotubes fibers (CNF) hold great promise for the development of novel biomedical and pharmaceutical nanotechnologies that include drug delivery, biosensors, neural transplants, and tissue engineering. CNF represent a nanostructured organic-inorganic composite system, which engineering properties can be tailored in the process of fabrication. Wet spinning for the fabrication of (CNF) involves the injection of a dispersion of single-walled carbon nanotubes (SWNT) into a rotating coagulating bath. In doing so, the fiber solidifies and after some duration the fiber is washed and extracted from the bath. It is this last step of extraction that contributes greatly to the final mechanical properties of the fiber and has yet to be investigated in the literature. By keeping all other experimental parameters constant we intend to examine the extent of which the rate of extraction has on the mechanical properties of the fiber.

2.3. Janice Sotomayor Albino
Pontifical Catholic University of Puerto Rico

Mentors: Terri Kinzy, Ph. D., and Mr. Arjun Sasikumar
Department of Molecular Genetics, Microbiology and Immunology
UMDNJ-Robert Wood Johnson Medical School

Identification of genes that interact with the eukaryotic elongation factor 3 in *Saccharomyces cerevisiae*

Over the past years there has been a high incidence of people who die from fungal infections. Most of the limited number of drugs available to treat these types of infection have either harmful side effects or are susceptible to resistance. Eukaryotic translation elongation factor 3 (eEF3) is a protein of interest for scientists looking for a novel specific target to fight fungal infections. eEF3 is an essential fungal protein that is involved in removing deacylated tRNA from the ribosomal E site during translation elongation. This factor is of specific interest in yeast since it is a protein with no known homologue in mammalian systems, making it a candidate for fungal specific drug target. In order to better understand the function of eEF3 we are performing a genetic screen using a strain of the yeast, *Saccharomyces cerevisiae*, expressing eEF3 P915L, a mutant form of eEF3 in which amino acid proline is changed to leucine. This strain, which is temperature-sensitive and unable to grow at 35°C, will be used to perform a high copy suppressor screen to identify proteins that interact with eEF3. We will transform TKY1495 (eEF3 P915L) with a high-copy yeast DNA library, containing all the yeast genes. Transformants will be selected based on their ability to grow on media plates lacking uracil since the plasmid library has *URA3* as a marker. Once they grow at 30°C, 2 copies of each plate will be produced by replica plating, one of which will be incubated at 30°C and the other at 35°C. The colonies that grow at 35°C are the ones that potentially have the gene which interacts with the protein synthesis apparatus of the cell. We will verify the suppression by isolating the plasmid and retransforming TKY1495 to get colonies that can still grow at 35ºC. The high-copy suppressor plasmids so obtained will be sequenced to identify the genes involved in suppression. Based on the genes identified, further experiments will be designed to characterize the interaction between them and eEF3.

2.4. Enmanuelle Pardilla Delgado
University of Puerto Rico, Río Piedras Campus

Mentors: Tracey J. Shors, Ph.D. and Megan Anderson
Department of Psychology
Rutgers University

The formation of trace memories increases the survival while decreasing the proliferation of newly generated cells in the hippocampus of the adult brain

Thousands of new neurons are generated in the dentate gyrus of the hippocampus each day. Many of the new cells die within weeks of being born. However most of the cells can be rescued from death if learning occurs (Gould et al., 1999; Shors, 2009). Therefore learning increases the survival of new neurons. It is unclear whether learning increases the proliferation of these new cells in the hippocampus. To address this question groups of rats were trained on a learning task, known as trace eyeblink conditioning, right after being labeled with BrdU or one week later when the cells are about to die. Rats were first implanted with electrodes to deliver the unconditioned stimulus eyelid stimulation and record eyeblinks. Rats were then habituated to the conditioning chamber. As controls, some rats were kept naïve for each time point. Training consisted of 600 trials over four days. Rats were either sacrificed four days after the BrdU injection to observe the effects of learning on proliferation or 28 days later to illustrate the effects of learning on survival. An ANOVA indicated a significant effect of learning on survival between groups ($F_{3,38}$ =8.4, $p < .001$). A post hoc analysis indicated that the number of BrdU-labeled cells that were generated 30 minutes before training decreased after training. In contrast, the number of cells that were generated one week before training increased, as shown previously. These results indicate that the experience of training decreases the number of cells that are being generated while at the same time increases the survival of cells that are already present and are about to die. Stress of training may be the cause of decreased proliferation. Alternatively, the decrease in proliferation may compensate for the increase in survival after learning.
(Funded by NSF Research Experience for Undergraduate IOS - 0444364)

2.5. Whitney Kropat
University of Washington

Mentor: Andrew J. Baker, Ph.D.
Department of Physics and Astronomy
Rutgers University

VLT/SINFONI observations of nearby Lyman Break Galaxy analogs

Lyman Break Galaxies (LBGs), which dominate high redshift surveys, are used for statistical analysis of clustering, feedback, dynamics, and modeling of galactic evolution. However, most studies of these objects use photometric measurements and template spectral energy distributions, which give little insight into the distribution and kinematics of gas in LBGs. Instead, using a set of six compact galaxies selected from the Sloan Digital Sky Survey data to have high UV luminosities and surface brightnesses, we investigated the properties of low-redshift ($\langle z \rangle \sim 0.16$) LBG analogs. Using the first spatially resolved comparisons of these systems, we gain insights on processes driving the evolution of LBGs. We derived the extinction using flux ratios between Paschen-α/H-α, Paschen-α/H-β, and H-α/H-β emission. Additionally, we analyzed the distribution and dynamics of ionized gas reservoirs within each galaxy, finding that despite having ordered rotational motion in four of the six galaxies, $V_{rot} / V_{disp} < 1$ for all galaxies. These dispersion-dominated galaxies seem to be compatible with formation from both cold flow accretion models and mergers of low-mass systems. Two galaxies show signs of mergers: G2116 is a currently interacting system, and G1434 shows a double-peaked continuum likely from a recent merger.

3.1. Rocio del C. Arroyave Egipciaco
University of Puerto Rico – Mayagüez Campus

Mentors: Aditya U. Vanarase and Fernando J. Muzzio, Ph.D.
Department of Chemical and Biochemical Engineering
Rutgers, The State University of New Jersey

Analysis of the effects of shearing conditions on the distribution of MgSt using Laser-Induced-Breakdown-Spectroscopy and Near Infrared Spectroscopy

Lubricants can greatly facilitate processing steps such as mixing and tableting by impacting powder flow. Since over-lubrication causes reduction in the dissolution and hardness of tablets, blend flowability and tablet properties will depend on the extent to which the blend has been exposed to shear. Formulations of magnesium stearate (MgSt), exposed to different shear conditions, were evaluated for their homogeneity. Powder samples were initially scanned using near infrared spectroscopy (NIR) and tablets at constant pressure were examined by laser-induce breakdown spectroscopy (LIBS). Experimental conditions examined were different levels of strain and shear in a couette shear cell. NIR measurements showed that relative standard deviation (RSD) decreases with increase in MgSt concentration. Homogeneity also improved with increased amount of shear and NIR captured this effect very well. LIBS were performed on tablets using 13 sites and 31 shots per site and an average intensity was measured over all the measurements. RSD was calculated between 20 tablets as each experimental condition. RSD showed an increase with increase in strain. The trends in RSD observed by NIR measurements were different from the LIBS. Average LIBS intensity was found to be a maximum at maximum strain. This effect was found only for MgSt and not for $Ca(PO_4)_2$.

3.2. **Norma I. Rodríguez Malavé**
University of Puerto Rico - Mayagüez Campus

Mentors: Edmund Lattime, Ph.D. and Sandra Chesoni, Ph.D.
Department of Surgery
UMDNJ-Cancer Institute of New Jersey

Investigation of the Interaction Between LC3, Rab7 and p62 in Bladder Cell Line

Autophagy is an organelle and protein-recycling process in which a double membrane structure called an autophagosome encapsulates cytoplasmic constituents and delivers them to lysosomes for degradation. Autophagy is induced under various stress conditions including nutrient starvation and hypoxia. It has been implicated in both tumor progression and suppression. An early step in autophagy is the cleavage of LC3. The cleaved protein is then used in vesicle nucleation and is a marker for the formation of autophagosomes. Subsequent steps in autophagy involve fusion of autophagosomes with lysosomes forming autolysosomes and protein degradation. Infection of cells with vaccinia virus also induces LC3 cleavage. As many therapeutic cancer vaccines use the vaccinia virus as a vector we sought to investigate the effect of viral infection on downstream markers of autophagy, Rab7 for autolysosome formation and p62 for protein degradation. We induced autophagy in bladder cancer cells and observed the localization and degradation of the autophagy related proteins by immunoflourescence and western analysis. We observed differences in p62 levels and colocalization of Rab7 and LC3 by immunoflourescence. However we did not see differences in p62 levels by western analysis. Our results suggest that viral infection may initiate incomplete autophagy in host cells.

3.3. Gulden Kaplan
The College of New Jersey

Mentors: Monica Driscoll Ph. D. and Mr. Shaunak Kamat
Department of Molecular Biology and Biochemistry
Rutgers University

Screening for roles of conserved *Caenorhabditis elegans* microRNAs in models of injury-induced neuronal necrosis

Micro-RNAs are small (~22nt) noncoding RNA molecules that bind to partially homolous sites on mRNA targets and suppress gene expression by degradation of the message or translational repression. miRNA regulation has many functional outcomes, including modulation of canonical pathways of cell death such as p53-mediated apoptosis. The Driscoll lab studies molecular mechanisms of necrotic neuronal death, with a major focus on toxicity of hyperactivated ion channels as occurs in stroke. Our goal is to test the influence of miRNAs in non-canonical death paradigms such as necrotic cell death induced by Ca^{2+} excitotoxicity, the underlying cause of neuronal damage in the event of trauma or seizure. A key initial aim is to normalize genetic backgrounds of *C. elegans* miRNA deletion strains by outcrossing with wild-type N2 nematodes. The outcrossed mutant strains will then be introduced in a *mec-4(d)* genetic background, which expresses a mutant hyperactive MEC-4 cation channel that remains constitutively open and causes necrosis by excessive Ca^{2+} influx into the cell. Necrosis is assayed in the six mechanosensory neurons of *C. elegans* by visualizing the P_{mec-4}::GFP reporter strain in impacted neurons under a standard epifluorescence microscope. Thus, miRNA deletion mutants *miR-45(n4280)* and *miR-124(n4255), which are miRNAs that are conserved between nematodes and humans,* may not only be necrosis suppressors, but also may identify a link between miRNAs and the necrotic cell death pathway. Our results should provide greater insight into the molecular mechanisms underlying the poorly understood process of neuronal necrosis and may hold implications for the treatment of neuronal injury following stroke, trauma or seizure.

3.4. Joseph Hyman
University of Maryland, Baltimore County

Mentors: Alberto Cuitino, PhD., and Mr. Daniel Braido
Department of Mechanical and Aerospace Engineering
School or Engineering, Rutgers University

Comparison of Tablet Dissolution by Standard Testing (USP II) and Simulated In-vivo Conditions (TIM-1)

Shearing of the tablet surface and mixing of tablet fragments show great variability in the USP II, and fluctuations in the flow within the USP II vessel leave the test vulnerable to high hydrodynamics variability within the small geometry. Using FLUENT (a computational fluid dynamics program) and experimental methods, mixing of the fluid, surface shear on the tablet, and drug release were studied in the TIM-1 system (an *in vitro* GI tract model used for tablet dissolution that closely simulates the physiological processes in the stomach and small intestines). Comparing fluid (from computational models) and drug release profiles from the TIM-1 system and the USP II, a correlation between TIM-1 (nearly in vivo) and USP II hydrodynamic behavior and drug release can be achieved. In verifying/nullifying a correlation between the profiles, properties and problems with the USP II testing method are evaluated.

Session 4-6
BME Room 128

4.1. Francisco E. Velázquez Planas
University of Puerto Rico at Aguadilla

Mentors: Felicia L. Smith and Robin L. Davis, PhD
Department of Cell Biology and Neuroscience
Rutgers University

Branching patterns differ between high and low frequency spiral ganglion neurons.

An extensively examined morphological feature in the auditory system is the branching patterns of the central projections that extend to the Schwann-glial border and bifurcate depending on characteristic frequency (CF). Low CF fibers extend only a short distance and bifurcate at a wide angle in order to innervate their cochlear nucleus targets, while high CF fibers extend for greater distances and bifurcate at a narrower angle. The aim of our project is to measure the axon length and angle of bifurcation elaborated by spiral ganglion neurons *in vitro* to determine the regulatory elements that control CF-specific morphological characteristics. We used a specialized culture preparation of paired hair cell micro-isolates isolated from different cochlear regions to analyze CF-specific branching patterns. Our preliminary data shows that the hair cell micro-isolates are important in regulating the length of the process. For example, when apical hair cell micro-isolates are paired with apical neurons, the measured length of the process is (631 ± 114 μm, n=5) compared to the basal hair cell micro-isolates paired with basal neurons (314 ± 45 μm, n=6; $p<0.05$). This indicates that the peripheral receptor cells have a powerful impact on axonal length, even without the presence of the central target cells. Future experiments are designed to examine branching angle as well as to determine the specific factors that affect CF-specific spiral ganglion neuron morphology. Supported by NIH NIDCD R01 DC-01856.

4.2. Emily Nowicki
The College of New Jersey

Mentors: Dr. Todd P. Michael and Wenqin Wang, M.S.
Department of Plant Biology and Pathology
Rutgers University

Examining Circadian Clock Candidate Genes in *Emiliania huxleyi*

The circadian rhythm is an endogenous clock that regulates internal functions and processes of organisms. Studies are necessary to understand the extent that circadian clock genes are conserved from unicellular to higher organisms. Circadian clock studies can also increase knowledge of how living things grow, which for plants can be vital for alternate fuel research. The highly reflective, widespread phytoplankton *Emiliania huxleyi* was tested for the presence of circadian rhythm genes. Putative genes were found using Basic Local Alignment Search Tool (BLAST), by comparing the *E. huxleyi* genome with known circadian clock genes in *Arabidopsis thaliana*. These candidate genes were screened for rhythm using quantitative polymerase chain reaction (qPCR) over a 48-hour period, using samples collected at 4-hour intervals. Our studies suggest that 1) circadian clock genes in *E. huxleyi* are genetically homologous to those in *Arabidopsis*, 2) *E. huxleyi* cellular functions are mediated by a circadian clock, and 3) the six genes tested so far all show expression peaks at similar time points during the day. Additional genes will be tested in further studies to develop a clearer picture of the circadian clock's role in this organism.

4.3. Laura Hagens
Rowan University

Mentors: David S. Talaga, Ph.D. and Jason T. Giurleo, Ph.D.
Department of Chemistry and Chemical Biology
Rutgers University

Studying the conformational changes in α-synuclein that lead to aggregation and onset of Parkinson's disease using cy3b dye

1% of Americans are diagnosed with Parkinson's disease by the age of 65 and 4% by the age of 85. A leading cause of this disease is believed to be the aggregation of α-synuclein (α-syn) in brain cells. It is known that α-syn undergoes a conformational change from natively unfolded monomers to high ordered cross-beta amyloid fibrils. This occurs through a process that is referred to as amyloidogenesis. However, the mechanism of the aggregation is not well understood. Understanding this mechanism has the potential to lead to new therapeutic targets that can help not just Parkinson's patients, but also those suffering from over 20 other amyloid-related diseases such as Alzheimer's and Type II Diabetes. A19C, α-Syn mutant, was labeled with the extrinsic fluorophore Cy3b. Time-correlated single photon counting (TCSPC) was used to measure the fluorescence lifetime of Cy3b as a way to monitor the conformational changes of the host protein via Cy3b's interaction with one or more of the four available tyrosine residues. We have tested the labeling scheme by exposing the protein to sodium dodecyl sulfate (SDS), which is known to induce an alpha-helical secondary structure, and by incubation with polytetrafluoroethylene (PTFE) balls, which are known to induce cross-beta structure. Preliminary results indicate that Cy3b's fluorescence lifetime is only slightly modulated by these conditions. Though not conformationally sensitive, Cy3b still has potential use as a Förster Resonance Energy Transfer (FRET) donor.

4.4. Morris Michael
Columbia University

Mentors: Fernando Muzzio Ph.D, Frank Romanski and Eric Jayjock
Department of Chemical and Biochemical Engineering
Rutgers University

Production of Nanosuspensions using Flow-Induced Phase Inversion (FIPI)

Phase inversion is the process in which an emulsion of immiscible liquids can transition between oil-in-water and water-in-oil systems. The goal of this project is to investigate whether smaller particle size can be produced using flow-induced phase inversion verse using shear solely. Phase inversion depends on a host of operating conditions such as shear rate, concentration, viscosity and temperature. Although phase inversion has been known to be spontaneous, the inversion usually occurs within an indeterminate region. The determination of this region is vital to understanding the system prior to incorporation of pharmaceuticals. In this project, the region is determined by applying a known shear, at a constant temperature, at a predetermined concentration, and observing the conductivity of the solution. Higher conductivities indicate a water continuous phase. A high pressure homogenizer or rotostater was used to apply shear force. In the range 800-1000 atms, the mean particle size achieved is 394 μm; a target of thousand-fold smaller is needed for the realization of nanosuspensions. The production of these nanosuspensions effectively increases the surface area for poorly water-soluble drugs, and as a consequence, increases the bioavailability of the drug.

4.5. Melvili Cintron
University of Puerto Rico – Mayagüez Campus

Mentors: Constance Saw, Ying Huang, Tien-Yuan Wu, A.-N. Tony Kong, Ph.D.
Department of Pharmaceutics
Rutgers University

Effects of dietary phytochemical cancer chemopreventive compounds in the transcriptional activation of the Nrf2-antioxidant signaling pathways leading to cancer prevention.

Phytochemicals are health beneficial chemicals produced in plants. During this study we examined the effects of Indole-3-carbinol (I3C), found abundantly in cruciferous vegetables such as broccoli and Brussel sprouts, and its active metabolite 3,3-di-indolylmethane (DIM), on the antioxidant responsive element (ARE)-mediated signaling and gene expression in order to elucidate their potential cancer preventive effects. ARE is a regulatory element of many phase II drug-metabolizing/detoxification enzymes and cellular defensive enzymes regulated by nuclear factor erythroid-related factor 2 (Nrf2) transcription factor. Human liver cancer cell line (HepG2-C8) was transfected with ARE-luciferase gene and tested with 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium (MTS) assay to determine the cytotoxicity of the compounds at different doses. Phenethyl isothiocyanate (PEITC) and sulforaphane (SFN) were used as positive controls, and DMSO 0.1% as an equivalent to no treatment control. ARE luciferase assay was used to quantify the amount of ARE-mediated induction being expressed after being stimulated by different doses of I3C, DIM, PEITC and SFN. The combination indexes of I3C with SFN or PEITC and DIM with SFN or PEITC in stimulating ARE-luciferase protein expression were also examined to test any potential synergistic effect between the combinations treatments. Other methods such as Western Blot and q-PCR to measure protein and mRNA expressions of Nrf2 and its downstream anti-oxidative stress enzyme, hemoxygenase-1 (HO-1), will also be conducted.

5.1. Mayda Hernandez
University of Puerto Rico, Río Piedras Campus

Mentors: Scott Goldman, V.M.D., Shengkan (Victor) Jin, Ph.D.
Department of Pharmacology
UMDNJ-Robert Wood Johnson Medical School

The effect of Beclin 1 heterozygosity on Aging in a mouse model

The process of macroautophagy has been linked to the process of aging in eukaryotic organisms in multiples studies, but the mechanism behind this relationship has not yet been revealed. In this study, we explored the effect of decreased autophagy via the Beclin1 +/- knock-out mouse model on the physiologic and biochemical aspects of the process of aging with respect to the phenomenon of cellular senescence. Preliminary data revealed an increase in a marker of cellular senescence, p16, in autophagy-deficient Atg5 +/- mouse embryonic fibroblasts (MEF) compared to their wild-type counterparts. Liver tissue was obtained from twenty-four month old male Beclin 1 +/- knock-out and Beclin 1 +/+ wild-type mice and used to generate tissue lysates. Lysates were then subjected to western blot analysis for markers of cellular senescence including the aging-related protein p16. Contrary to the results obtained from MEFs, the results of this analysis showed no significant difference in p16 expression between the mutant and wild-type mice. Physiological data was obtained using the rotarod test to assess the strength and overall fitness of mutant and wild-type mice. The latency to fall from the rod was measured for each mouse over three trials and the results were averaged and statistically analyzed using MS Excel. Initial analysis showed no statistical difference between the knock-out and the wild-type mice groups. Ongoing studies including further rotarod testing of different age and gender mouse groups, vertical rod testing and open field testing are currently underway to provide more data. Further testing is needed to study the effect of autophagy on the process of aging in the Beclin 1 +/- knock-out mouse model.

5.2. Lee H. Tillman
California State University, Northridge

Mentors: Lee Jussim, Ph.D., Ms. Rachel Rubinstein, Mr. Sean T. Stevens, Ms. Kristin Vick
Dept of Psychology, Rutgers University

The effects of stereotype-consistent information verses stereotype-inconsistent information on memory

We are exploring whether stereotypes distort or assist memory and if they improve or undermine the accuracy of memory. One hypothesis is that stereotypes bias people towards remembering stereotype-consistent attributes. Another hypothesis is that stereotypes bias people towards remembering stereotype-inconsistent attributes. If either of the aforementioned biases occurs to an extreme, they could undermine accuracy. However, it is possible that stereotypes aid in memory because they provide a scheme for organizing information. We are examining the effects of memory among people who receive both stereotypical-consistent and stereotypical-inconsistent information about a Black and a White college applicant. Participants are given 2 applications from perspective Rutgers University students. Half of the applications give the race of the applicant, the other half does not. In one condition, the Black applicant will have stereotype-consistent extracurricular activities (*e.g.* plays basketball, in the NAACP) and in another the Black applicant will have stereotype-inconsistent extracurricular activities (*e.g.*, hockey team, chess club.) The same will apply to the White applicant. This will identify conditions under which participants recall more information.

5.3. Eileen Oni
Rowan University

Mentors: Ron Hart, Ph.D., Jonathan Davila, Chris Ricupero, Cindy Camarillo, Ph.D.
Department of Cell Biology and Neuroscience
Mavis Swerdel
W.M Keck Center for Collaborative Neuroscience
Rutgers University

Identifying microRNA precursors capable of cleavage by Microprocessor in embryonic stem cells

MicroRNAs, cleaved from hairpin-shaped precursor RNAs by a cellular complex known as the Microprocessor, play an important role in preserving the pluripotency of embryonic stem cells. The interaction between mature microRNAs and the mRNAs responsible for differentiation stimulates translational repression and/or degradation of the target mRNA, reducing protein synthesis. Through previous work, unique microRNA sequences have been identified through deep sequencing techniques. Since it is not fully understood which of these predicted precursor microRNAs are capable of hairpin cleavage, we aim to determine whether they are capable of such processing. Precursor microRNA sequences inserted downstream of a green fluorescent protein (GFP) plasmid by recombination were transfected into HEK-293 cells. For a visual assessment of hairpin cleavage, intensity of GFP fluorescence was noted through photomicroscopy and fluorescence activated sorting (FACS). From the inhibition of GFP fluorescence expression caused by cleavage of hairpin precursors in GFP mRNA, we conclude here that the predicted microRNA precursors are capable of cleavage. The results of these preliminary studies will help to determine, on a larger scale, which predicted microRNAs are capable of hairpin cleavage while understanding a significant participant of pluripotency regulation by producing a gain-of-function assay for newly-discovered microRNAs.

5.4. Nianest Alers Barreto
University of Puerto Rico in Aguadilla

Mentors: Paul Copeland, Ph.D., Jesse Donovan, Kelvin Cabán
Department of Molecular Genetics, Microbiology and Immunology
UMDNJ-Robert Wood Johnson Medical School

Characterization of a putative negative regulatory element in the Sel P 3'UTR

Selenium is an essential component of several metabolic pathways and is found in proteins as the amino acid selenocysteine (Sec). Sec incorporation occurs at in-frame UGA codons and this requires a Selenocysteine insertion sequence (SECIS) element located in the 3' untranslated region (UTR) of the mRNA. Two trans-acting factors are also required, a SECIS binding protein, and a Sec-specific elongation factor. Interestingly, the mRNA encoding the protein selenoprotein P (Sel P) has ten in-frame UGA codons and two SECIS elements in its 3' UTR. Sel P exists in several isoforms *in vivo* due to termination at several of its UGA codons. In addition to the SECIS element, the Sel P 3'UTR has a highly conserved sequence (nt 1-74) in its 5' end. To determine the functional relevance of this region in Sec incorporation, we cloned the Sel P 3'UTR into a luciferase construct containing an in-frame UGA codon and two constructs containing a deletion of nt 1-74 (Δ 1-74) and nt 1-273 (Δ 1-273) in the Sel P 3'UTR. mRNAs corresponding to these constructs were translated in Rabbit Reticulocyte Lysate (RRL) in the presence of ^{35}S-Met and Sec incorporation activity was measured by the ability to produce full-length luciferase. Deletion of nt 1-74 results in a 2-fold increase in total protein translation but not in Sec incorporation efficiency, which indicates that this conserved region has a repressive effect on translation. Surprisingly, deletion of nt 1-273 has wild type levels of total protein translation indicating that there may exist a positive regulatory element between nt 74 -273. We are currently performing RT-PCR to check if this result is due to differences in RNA stability. To determine if the sequence 1-74 has a repressor function on its own, we are also cloning its DNA into the native luciferase 3' UTR. We speculate that nt 1-74 performs a negative regulatory function by serving as a docking site for other trans factors that modulate the amount of Sel P isoforms synthesized.

5.5. Daniel Mateo-Ortiz
University of Puerto Rico – Mayagüez Campus

Mentors: Fernando Muzzi, Ph.D. and Aditya Vanarase
Department of Chemical & Biochemical Engineering
Rutgers University

Flow variability in continuous powder feeders

Continuous processing of powder blends has the ability to control disturbances online, avoiding the loss of valuable processing materials and enabling effective process control. As part of this product development process, research efforts have focused on examining and optimizing the production of homogeneous solid mixtures, which requires consistent feeding of the individual components. Minimizing variability of the individual components in a powder blend product requires the close study of feeding performance in order for optimization. This work seeks to look at the feeding of a Loss-in-Weight feeder to find maximum feed rate as well as the performance at several intermediate feeder rates for different feeder conditions. To obtain a consistent flow rate it is necessary to optimize feeder performance by selection of the proper feeder tooling (screw, screen). In order to evaluate flow variability, automated sampling was used which involves a precision scale with output to a computer. The Schenck AccPro II scale was used to record the weight every 1 s for three materials flowing through a Gericke GLD feeder. The feeder configurations that are examined are open helixes without center rods and closed augers of three different sizes. The data collected from the feeder showed that proper selection of the screw type and size has a significant impact on the capacity and performance of the feeder.

6.1. Vladimir Lokshin
Rutgers University

Mentors: KiBum Lee, Ph.D., Mr. Jongjin Jung, Ms. Elina Tzatzalos
Department of Chemistry and Chemical Biology
Rutgers University

EGFP knockdown in neural stem cells using CdSe/CdS/ZnS core/shell quantum dots functionalized with siRNA.

Understanding the regulatory roles of the genes involved in neural stem cell differentiation can lead to a better understanding of the nervous system and environmental cues that trigger differentiation. This may help develop treatments for currently incurable neurodegenerative diseases and injuries. This pilot study uses CdSe/CdS/ZnS core/shell quantum dots made soluble in aqueous environments. They are functionalized with siRNA specific for the knockdown of Enhanced Green Fluorescent Protein (EGFP). The goal of this project is to knock down that the expression of EGFP gene in neural stem cells. Fluorescence spectroscopy will be used to confirm siRNA attachment. Using different transfection techniques with neural stem cells we will optimize conditions for the knockdown of EGFP. This method can ultimately be used to study different genes involved in differentiation of neural stem cells into nerve tissue.

6.2. Immanuel Williams
University of Maryland, Baltimore County

Mentors: Nina Fefferman, PhD, Tamra Carpenter, PhD
DIMACS Center
Rutgers University

Allocation of Monetary Resources in HIV-infected Community

Human immunodeficiency virus (HIV) is one of the most severe and deadly pandemics that this world has ever seen. In some countries, a majority of the HIV-infected patients have a way of obtaining treatment so that their virus does not progress into acquired immunodeficiency syndrome (AIDS). However, in many impoverished third world countries monetary resources are very limited and communities are unable to provide treatment for all of the infected population. A mathematical epidemiological model was created to simulate an HIV outbreak in a third world country with a community-based economy in which monetary resources that come into the community will be shared by everyone. Examples of such economies might include a small village or an extended family. The epidemiological model includes the interplay between the economic productivity of the community and its ability to provide treatment to the infected population. Within this model there are providers (people who contribute financially to the system) and there are consumers (such as children who consume) and these individuals may be infected or may not. While producers provide immediate economic benefit to the community, the consumers will provide future economic benefit if they remain sufficiently healthy. Thus, this model is used to gain intuition to potentially inform policy decisions on how to allocate monetary resources between the infected providers and infected consumers. This model is also used to provide a treatment strategy that best assures the stability and long-term survival of the community.

6.3. Jairo Sierra
Montclair State University

Mentors: Suzie Chen, Ph.D. and Janet Wangari-Talbot
Department of Chemical Biology
Rutgers University

Suppression of GRM1 expression by siRNA in an ecdysone-regulated system in a human melanoma cell line

Melanoma is a form of skin cancer that arises from the neoplastic transformation of the pigment producing cells of the epidermis, melanocytes. According to the 2009 American Cancer Society estimates, in the United States alone, ~ 68,000 individuals will be diagnosed with melanoma with ~ 8000 of these cases resulting in deaths. Current treatments for metastatic melanoma include chemotherapy, radiation, surgical resection as well as adjuvant immunotherapy. Major problems such as tumor recurrence and unpleasant side effects arising from these treatments require the need for new therapies. Previously our laboratory identified that the ectopic expression of *GRM1* (metabotropic glutamate receptor I) in melanocytes was sufficient to induce melanoma in a transgenic mouse model (TG-3). Analysis of human biopsy samples as well as human melanoma cell lines showed that ~ 40% of the samples were positive for GRM1 expression. We hypothesize that reduction of GRM1 expression by either pharmacological or genetic mechanisms might be a way to reduce melanoma progression. For the genetic regulation of GRM1 expression, we are developing a siRNA system which is switched on by the presence of 20-OH ecdysone (ponasterone A) and turned off when the inducer is absent. Our preliminary results show that the siGRM1 expression induced by ponasterone A decreases endogenous GRM1 expression in our C8161 melanoma cell line. Future analysis of more siGRM1 inducible clones needs to be conducted to verify the effectiveness of the ecdysone-regulated siRNA system as a potential mechanism to suppress melanoma proliferation *in vitro* and *in vivo.*

6.4. Renee Clarke
New York City College of Technology

Mentors: KiBum Lee, Ph.D.
Department of Chemistry and Chemical Biology
Rutgers University

Staci Brown
Department of Physics and Astronomy
Rutgers University

Investigation of surface energy changes during mirocontact printing.

In order to investigate the functions of certain biomaterials in human stem cell behavior, biosurface engineering techniques such as microcontact printing and microfluidics can be applied to replicate the microenvironment in which these cells reside. During microcontact printing processes, the transfer of these biomolecules is influenced by the changes in surface energy and surface tension. To analyze these changes, contact angle measurements were performed at each stage of microcontact printing by using a rame hart goniometer. These measurements were taken on glass slides and polydimethylsiloxane, at various temperatures and after certain plasma treatments and cleaning techniques. The surface tensions were then calculated using Young's relation. . This information will enable us to determine the optimal conditions for the transfer of these biomolecules, which can be incorporated into the microcontact printing technique for producing high-resolution patterns and maximizing the efficiency of this process.

(Student Biographies Beginning on Next Page)

Biographies

Nianest Alers Barreto
Nianest Maria Alers Barreto was born in Mayagüez, Puerto Rico in August 7th 1988. This fall she will be a senior majoring in Biology at the University of Puerto Rico, Aguadilla campus. After graduation she plans to pursue a PhD. degree in Molecular Biology. Some of her hobbies are drawing, painting, reading and playing volleyball, a sport she has learn to love over the years. Besides making good friendships, Nianest feels the RISE program has helped her in understanding how graduate school works and she definitely recommends the program to other undergraduates.

Lauren M. Anllo
Lauren is a rising senior pursuing a B.S. in Biology and a minor in Psychology at The College of New Jersey. She is a violinist and a current member of the orchestra at her college. Lauren lives in Freehold, NJ. Becoming a part of Dr. Soto's lab through the RISE 2009 summer program has enabled her to discover an excitement and enthusiasm for research, which has encouraged her to seek a Ph.D. in Biology.

Rocio del C. Arroyave Egipciaco
Rocio del C. Arroyave Egipciaco was born in Rio Piedras, Puerto Rico. She is an Industrial Biotechnology student, considering making a double major in Chemical Engineering, at the University of Puerto Rico at Mayagüez. She has always wanted to be part of the change and being able to improve the lives of those who suffer today. Since medicine is an area that she has always found "tricky", the other way she thought she could help people is being part of the creation or process of solutions to improve people's health. As her first Summer Internship experience, she had the opportunity to participate at the RISE (Research In Science and Engineering) Program of RUTGERS, The State University of New Jersey. The experience that she has gained here and all the new techniques that she has learned have been extremely important for her development as a researcher and professional carrier. For this reason, this summer has been a very important one, since it has let her see, in a better way, how is the world of research.

Melvilí Cintrón
Melvilí Cintrón was born and raised in Cabo Rojo, Puerto Rico. She grew up in her parent's restaurant and was determined to become a chef after high school graduation. Besides her passion for food and the culinary arts, music has always fed her soul. Already admitted to major in voice at the CMPR and determined to become an opera singer, she transferred to University of Puerto Rico in Mayagüez to the Industrial Biotechnology program and sings in the university concert choir. After graduation in May 2010, she plans to go to graduate school and finish a PhD in biomedical sciences. During this summer she has been working at Dr. Kong's lab at the Ernest Mario School of Pharmacy and is mostly grateful to those who contributed for this incredible experience to be possible.

Shirley H. Diaz
Shirley H. Diaz was born in Humacao, Puerto Rico on September 13, 1987. With both parents chemists, she fell in love for science. Actually, she is an undergraduate student at Universidad del Este of Carolina, PR, majoring in biotechnology and getting a minor in education. During the past two years she forms part of RISE (NIH) program at her home institution, doing neuroscience research with Dr. Ana T. Mendez. She is an active member of the biotechnology student association and forms part of other honor programs at her institution. During this summer she is working with Dr.Shreiber in a bioengineering project, as part of the summer internship RISE at Rutgers University, NJ.

Samantha Espinosa
Samantha Espinosa was born and raised in Newark, NJ. While attending Belleville High School, she planned on pursuing music. She has been playing the violin for ten years and had plans to be a violinist. However, after having taken a chemistry course in high school with a great instructor she began to focus on Chemistry. Other than music, chemistry remains to be one of her passions. After graduation from the College of Saint Elizabeth in 2011, she plans to enroll in a graduate program for her PhD.

Howard Forbes Jr.
Howard was born in St. Croix, one of three islands in the United States Virgin Islands. He plans to graduate in May of 2010 with a Bachelor's of Science in Biology from the University of the Virgin Islands. As a MARC trainee, Howard has had the experience to conduct research with several mentors spanning the fields of agriculture, organic chemistry and plant genetics. In November of 2008, he received an award at the Annual Biomedical Research Conference for Minority Students (ABRCMS) for best poster presentation in the Physiological Sciences amongst 3000 other students from across the U.S. This summer, he was selected to take part in RISE and worked closely with Dr. Paul Takhistov to understand the kinetics of moisture absorption on the surface of acetaminophen particles. His experience here at the RISE program allowed him to really get an insight as to what graduate life is like and as a result, he plans to further his graduate studies at Rutgers University in the fall of 2010. He would like to thank all of the great people that he met while here with the highest regards to his mentor who really encouraged him to accomplish anything he put his mind to.

Nisha George
Nisha George is a rising junior at the University of Maryland Baltimore County. (Fear the Retriever, NOT TURTLE). Currently she is pursuing her degree in biology and intends to either go to medical school or graduate school. Her hobbies include singing, watching TV, talking to people, and taking long walks on the beach. Her main goal in life is to help people as much as she can while living the life from pay check to pay check in NYC. She would like to give a special thanks to Dr. Ramsey Foty for his excellent mentorship this summer and teaching me to think for myself. Shout out to my "buddy/not buddy" Connan for finding the things I did wrong in my experiment so I could get results and editing whatever I threw in front of him (told you I'd give you your credit ☺). Foremost, I am extremely grateful for being given an opportunity to be a RISE student.

Simon Gordonov
Simon Gordonov is a rising senior at Rutgers University majoring in biomedical engineering and minoring in biology. He works in the laboratory of Dr. Prabhas Moghe and has had the opportunity to immerse himself in a fascinating interdisciplinary field of stem cell engineering. The integration of biology, microscopy, and computational techniques provides a comprehensive approach to studying stem cell behavior and cell-biomaterial interactions, which are important for tissue engineering applications. Simon's research interests include studying the tumor microenvironment, which includes immune and stromal cells, computational modeling of cellular behavior and microarray analysis, as well as computer aided diagnostics, image analysis, and data mining. He plans to complete a master's degree in biomedical engineering and pursue an MD/PhD degree applying biomedical imaging and bioinformatics to pathological and radiological diagnostics.

Laura Hagens
Laura Hagens was born and raised in Northern New Jersey, but is now a rising senior at Rowan University majoring in biochemistry. This summer she is studying the protein Alpha-Synuclein and its involvement in amyloidogenesis in Dr. Talaga's Lab, Rutgers' Chemistry and Chemical Biology Department. Her long term goals include obtaining her Ph.D. and continuing to do research of proteins on molecular levels. She is eternally grateful to all those who've led to this experience which has brought a multitude of experience and benefits for her future including RiSE, family, friends, and the lab.

Mayda Hernández
Mayda Hernández was born and raised in San Juan, the capital city of Puerto Rico. She is currently a senior student at University of Puerto Rico, Rio Piedras Campus. Expecting to graduate in spring 2010 with a B.S. degree in Chemistry, Mayda plans to pursue a PhD in the field of Biochemistry. As a RISE 2009 student, Mayda worked in Dr. Victor Jin's lab with a project relating the cellular process of macroautophagy to the progression of aging in the Beclin 1 +/- knock-out mouse model. In her words, this summer offered her new skills and perspectives about the research world and scientific work, in addition to unforgettable friends and enriching experiences.

Joseph Hyman
Joseph was born in Baltimore, Maryland and lives in Baltimore County. Joseph is a rising senior and expects to graduate from the University of Maryland, Baltimore County in 2011 with a Mechanical Engineering B.S degree. His summer has been great working with Daniel Braido and Dr. Cuitino analyzing the correlation

between different tablet dissolution methods. The RISE program has facilitated Joseph with experiences that will play a significant part in molding his future as a researcher and an engineer. He appreciates all of the time and effort that was spent making this summer a memorable one.

Gulden Kaplan
Gulden was born in Willingboro but raised in Hamilton, New Jersey as one of four sisters. Gulden will be graduating Spring 2010 from The College of New Jersey with a Bachelor's Degree in Biology. Motivated by her background, she hopes to successfully represent Turkish women in science. Though her inspirational father has recently passed away, Gulden hopes to make him proud by attending graduate school in Molecular Biology or Microbiology. This RISE experience has provided Gulden with the guidance and confidence she desired to pursue her future dreams in research. Dr. Monica Driscoll and her graduate student Shaunak Kamat have enlightened Gulden in the fascinating field of neurodegeneration. The time spent with her advisors has been invaluable and unforgettable. She is truly honored and grateful to have been a part of such a dedicated research endeavor. Gulden will cherish this experience as her newfound perspective of science and personalized definition of success.

Caitlin Kowalsky
Caitlin Kowalsky was born and raised in Commerce Township, Michigan. She is currently a rising junior at The Cooper Union for the Advancement of Science and Art, in New York City, where she studies chemical engineering. After graduating from Cooper Union, Caitlin plans on pursuing a PhD in chemical engineering and eventually a MBA somewhere in the Midwest. When she is not studying she can be found baking, cooking, running, playing soccer, watching college football, and exploring NYC. While enjoying her summer here at Rutgers, Caitlin worked in Dr. Neimark's lab of the Chemical and Biochemical Engineering Department. The RISE program has provided Caitlin with experiences that have solidified her decision to continue on to graduate school. She would like to thank Dr. Neimark, Dr. Pedersen and John Landers for their help and guidance with her research.

Vladimir Lokshin
Vladimir Lokshin was born in Odessa, Ukraine on July 22, 1987. He has been playing cello for ten years and used to play in the college orchestra. After having taken an AP chemistry course in High School with a great instructor he decided to elect chemistry as his major in college. He expects to graduate from Rutgers University with a Bachelor's degree in Chemistry and Chemical Biology in Fall 2010. After graduation he expects to go to medical school. This summer Vladimir has been working in Dr. KiBum Lee's laboratory on applications of Highly Luminescent ZnS-Capped CdSe quantum dots as siRNA delivery agents for the study of neural stem cells.

Daniel Mateo-Ortiz
Daniel was born in the Republic of Panama, but has resided on Puerto Rico for most of his life. He is currently attending the University of Puerto Rico and is expecting to graduate in 2010 with a BA in Chemical Engineering with a certificate in Pharmaceutical Engineering. He is focused on gaining as much knowledge and positive experiences as possible, experiences that will add to his development as a professional and to his intellect. This summer research program will increase his knowledge and in addition open a window of opportunities in the field of study he wish to pursue. His dream is to become a passionate professor and researcher. He believes that desire to learn, the ability to strive, to accomplish goals and being passionate about ones goals, are key factors to become an outstanding person and professional.

Morris Michael
He was born in Sudan but grew up in Turkana district, Kenya. He is a rising Junior at Columbia university, majoring in Biomedical engineering. He expects to graduate with Bachelor of Science in the spring of 2011. He is not very sure about his future after undergraduate. He is brainstorming on pursuing his dreams to go to medical school or attending graduate school. This summer had open many doors for Morris. It is his first internship and first time exposed to an intensive laboratory work. This summer he had the opportunity to intern in Dr. Fernando Muzzio's lab. With the help of the graduate student Erick Jay jock, he studied the production of nanosuspensions using flow-induced phase inversion. At his leisure time he enjoys playing football (soccer), reading science journals and browsing websites. He feels that this summer internship had made him happy that he is potentially making an impact on the drug delivery system.

Madison Janelle M. Myers
Madison ("Maddy") was born in the Philippines on the 2nd of August 1987, where she was raised by her grandmother. In 1999, she and her siblings moved to Guam to live with their single mother. Today, she is a senior of the University of Guam majoring in Biology. Besides her academic work, she is involved in extracurricular activities such as Biology Club, Guam Medical Student Association, and the Student Health Outreach. At leisure, she enjoys quiet walks on the beach, cooking, and playing with her cat. This summer has given her the opportunity to participate in Rutger's Research in Science and Engineering Program working in Dr. Wendie Cohick's lab in Endocrinology and Animal Biosciences. The experience has piqued her interest in cancer research and she plans to attend Graduate or Medical School. Through RISE, she has learned many things about science, about other people, and most importantly about herself.

Emily Nowicki
Emily Nowicki, when not at school, internships, or abroad, resides in Fredon, New Jersey with her family. She is currently pursuing a degree in Biology at The College of New Jersey. She plans to attend graduate school for a doctorate in Biology or Molecular Biology upon completion of her undergraduate education. In her free time, she enjoys skiing, singing, cooking, hiking and traveling. Emily extends many thanks to her mentors, Dr. Todd Michael and Wenqin Wang, as well as everyone in the Michael lab for their support and guidance. She would also like to thank all of the programs and organizations that made funding for this great experience in the RISE program possible.

Eileen Oni
Eileen Oni was born and raised in Central New Jersey and is currently a senior at Rowan University majoring in Biological Sciences with a minor in Chemistry. Following graduation in May 2010, she plans to attend graduate school pursuing a PhD in cellular and molecular biology ultimately participating in industrial or pharmaceutical research. Throughout the RISE program, Eileen is conducting research on the contribution of microRNAs to the pluripotentcy of Embryonic Stem cells in Dr. Ron Hart's lab. The invaluable information and experiences that Eileen has acquired will surely prepare her for the future and would like to thank everyone who has made her time here possible.

Enmanuelle Pardilla
Enmanuelle is a rising senior of the University of P.R., Rio Piedras Campus majoring in Psychology. He plans to pursue a Master's degree, and later a PhD in neuroscience. His main interests are networking, basketball and bring something new to the world of science. As a part of the RISE 09 program he worked under the guidance of Megan Anderson, a graduate student in the lab of Dr. Tracy Shors in Rutgers University. His research topic was about how a specific type of classical learning, trace eyeblink conditioning, affects proliferation and survival of newly generated cells in the dentate gyrus, located in the hippocampus. He believes that, as his first research experience, he could not have had a better time. Academically and personally, it made him a much more mature student and researcher. While at first he had his doubts about attending RISE in the summer of 09, he will never regret nor forget everything he learned there.

Jairo Sierra
Jairo Sierra was born in the Dominican Republic, moved to the United States at the age of 13 and now resides in Paterson, New Jersey. Jairo is a rising senior, pursuing a B.S in Biology and a Chemistry minor at Montclair State University. Besides excelling in academics, Jairo is also an enthusiastic long distance runner for the track and field team at his institution. After obtaining his B.S, Jairo plans to attend graduate school and pursue a Ph.D. in Biomedical Sciences. This summer he had the wonderful opportunity of working with Dr. Suzie Chen and Janet Wangari-Talbot of the Department of Chemical Biology, in a project concerning development of new therapies to treat melanoma, a form of skin cancer. His experience at RISE has allowed him to strengthen his research skills, and provided him with the motivation and confidence to pursue a Ph.D.

Janice Sotomayor-Albino
Janice Sotomayor-Albino was born in Yauco, Puerto Rico. She is studying for her Bachelor degree in General Science with a minor in Chemistry at the Pontifical Catholic University of Puerto Rico and expects to graduate in May 2010. This summer she had the opportunity to work with Dr. Terri Kinzy and her neer peer mentor Arjun Sasikumar, identifying the genes which interact with eEF3 using *S. cerevisiae*. Even though she has worked previously in the microbiological field this was her first time doing genetic research. During her stay at Rutgers she has had the opportunity to learn new techniques. She is grateful to the RISE program and Dr. Kinzy for a wonderful summer experience as she now considers Rutgers to be a front runner among a list of institutions to pursue a graduate education.

Lee H. Tillman
Lee H. Tillman was raised in Tyler, Texas. He currently resides in Woodland Hills, California where he expects to receive his Bachelor of Science degree in Psychology in the spring of 2010 from California State University, Northridge. This summer Lee enjoyed working in the Social Perceptions Lab with Dr. Lee Jussim. His experience at RISE was of extreme importance to his personal and professional life thanks to the mentoring of his advisors and of the new friends he made on the way.

Francisco E. Velázquez Planas
Francisco was born in Baton Rouge, Louisiana on the 15th of May in 1988 at 3:35 pm, but raised in the city of Bayamon, Puerto Rico. He went to study a Major in Biomedics at the University of Puerto Rico at Aguadilla, neighbor to some of the greatest surf beaches of the beautiful island. Though passionate about his studies, Francisco also enjoys a series of varied hobbies. From practicing Tae kwon do, to writing poems, essays and songs, to reading, and playing guitar since he was young. In the last year, he has participated in the Summer Research Opportunity Program and Puerto Rico Louis-Stoke Alliance for Minority Participation program, and is now participating in the Research in Science and Engineering working in Dr. Robin L. Davis's Lab in Cell biology and Neuroscience where he has the opportunity to experience cell biology at its utmost capacity. His experience in this summer internship has allowed him to hone his skills in research and apply them to his field of study.

Yasah Vezele
Yasah Vezele is originally from Monrovia, Liberia but resides with her family in Providence, Rhode Island. A rising senior at the University of Rhode Island, she is majoring in Chemical Engineering on the Pharmaceutical Track. She is currently working alongside Dr. Takhistov in the Food Science Department at Rutgers, the State University. This summer she is investigating the influence of humidity on Acetaminophen powders. Last summer she researched the utilization of Biodiesel waste product Glycerol in Microbial Fuel Cell. During her spare time she is actively involved with the National Society of Black Engineering (NSBE) being the National Assistant Programs Chairperson. She is aspiring to attend graduate school in hoping to pursue a Ph.D in Food Science at Rutgers, the State University.

Bethany Walton
Bethany Walton was born and raised in Northern New Jersey. She is currently a rising senior at Ramapo College of New Jersey majoring in biochemistry. Upon graduation in spring of 2010, she plans to obtain a Ph.D. in the sciences and ultimately work in cancer research. As part of the RISE program, she carried out research on bacterial collagen under the mentorship of Dr. Barbara Brodsky. Bethany's experiences at RISE have helped prepare her for graduate school and have exposed her to several different research opportunities that she can pursue. Bethany is thankful for all the advice she has been given from her lab members and the program faculty and staff.

Immanuel Williams
I am from the University of Maryland, Baltimore County and I was born in Washington D.C. My major is Mathematics and my minor is in Biology. I am really interested in modeling biological systems and trying to generate some kind of result that can be used by anyone to improve their life. For example, the project that I am working on this summer deals with the allocation of monetary resources for treatment for HIV between producers and consumers within a model based community. I chose math as my major because it is interesting to look at a system of differential equations and come up with a conclusion about the model which is represented by the system of differential equations. I plan on obtaining my PhD in either Applied Mathematics or Bioinformatics.

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RISE Website
Evelyn S. Erenrich, Jason Rimmer

RISE Video and Photography
Josh Blaine, Jason Rimmer, Dawn Lopez

RISE Guest Speakers

The Devil in the Details: Record Keeping and Laboratory Data
Terri Goss Kinzy, Ph.D.
Associate Dean, UMDNJ Graduate School of Biomedical Sciences at RWJMS
Department of Molecular Genetics, Microbiology & Immunology
UMDNJ-Robert Wood Johnson Medical School

Choosing and Applying to Graduate School
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Graduate Student Panel
Kelvin Caban, Ph.D. candidate, Molecular Genetics, Microbiology and Immunology
Megan Anderson, PhD candidate, Psychology, and IGERT Fellow
Marc Carmichael, Ph.D. candidate, Biomedical Engineering
Matthew Metzger, Ph.D. candidate, Chemical Engineering

Make a Future Where You Can Make a Difference
Lyndon Mitnaul, Ph.D.
Research Fellow, Division of Cardiovascular Disease
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Clinical & Translational Research: The Surprising Connection Among Bones, Fat, and Nutrition
Sue Shapses, Ph.D.
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What Can You Do With a Ph.D.? – Our Alumni Tell their Stories
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