

February 22-24, 2007

Host: University of South Florida

Tampa, Florida



Florida-Georgia Louis Stokes
Alliance for Minority
Participation





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The Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) project is a coalition of twelve academic institutions in Florida and one in Georgia with a commitment of increasing the production of baccalaureate degrees awarded in science, technology, engineering, and mathematics (STEM) disciplines and influencing the enrollment of these B.S. degree recipients into STEM graduate programs.

Guided by a framework established by the National Science Foundation (NSF), the FGLSAMP project utilizes a holistic plan to influence the progression, persistence and graduation rates of underrepresented minorities in STEM areas. The measure of program success revolves around a holistic approach that encompasses 3 primary focal points:

Progression- Heightened academic performance and progress through the matriculation continuum

Persistence- Maintain student retention within STEM disciplines

Graduation- Maintain students within the academic pipeline until graduation in STEM/Non-STEM areas

The impact of FGLSAMP upon its scholars is significant in that the project aims to provide activities that compliment classroom learning coupled with professional development. FGLSAMP students are impacted through a wide array of mechanisms and activities such as:

Financial Assistance

- Performance Based stipend award
- Research stipends/awards

Academic Enhancement

- Summer Bridge program
- Tutorial program
- Workshops and seminars

Professional Development

- Faculty and Graduate Mentoring
- Financial support for participation in professional conferences

Undergraduate Research Experiences

- Academic year and summer research support
- Workshops-developing research presentations

Graduate School Preparation

- GRE Preparation workshops
- Assist with securing graduate school opportunities-as needed

The FGLSAMP project is completing its fourteenth year of operation, and has achieved visibility within participating institutions and from other institutions around the nation. Through supplemental funding awards by NSF, FGLSAMP is now supporting approximately 34 students pursuing PhD degrees through the Bridge to the Doctorate Program. The Bridge to the Doctorate Program is currently housed at Florida State University and University of South Florida.

The primary funding of FGLSAMP operations support is through the National Science Foundation. A special state appropriation by the Florida Legislature supplements the NSF funding and supports scholarships, internships, and seminars for undergraduate and graduate STEM majors at each institution. A representative from each institution serves on the FGLSAMP steering committee; in addition, broad-based activities are reviewed by the FGLSAMP Governing Board, which is comprised of the president of each FGLSAMP institution.



Florida Agricultural and Mechanical University
Tallahassee, Florida 32307-3100

Excellence with Caring

Florida-Georgia Louis Stokes Alliance for Minority
Participation (FGLSAMP) Central Office
1540-A South Adams Street
Tallahassee, FL 32307

Telephone: (850) 561-2467
Fax: (850) 561-2684

Conference Participants:

We are pleased to have you join the Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) in the 14th annual FGLSAMP EXPO. EXPO 2007 is a united effort of all FGLSAMP institutions and is being hosted by University of South Florida located in Tampa, Florida. We hope you find FGLSAMP EXPO 2007 to be a stimulating, informative, and engaging event. I express my appreciation to all participating institutions, the National Science Foundation, and governmental/industrial organizations for their support of FGLSAMP and this conference.

FGLSAMP EXPO 2007 also marks the 15th consecutive year of operation for the FGLSAMP program. During this time our organization has been successful in our goal to increase, significantly, the number of minorities obtaining B.S. degrees in science, technology, engineering, and mathematics (STEM) disciplines. We have also experienced a sizable growth in the number of students enrolling in STEM graduate programs. This has been due in large part to the success of the FGLSAMP Bridge to the Doctorate programs at both Florida State University and University of South Florida. I hope the conference students will have an opportunity to interact with our Bridge to the Doctorate students and college program administrators about current opportunities in graduate programs.

EXPO 2007 will feature a variety of activities that include academic enhancement workshops and seminars, information on research opportunities, graduate school preparation and more. I encourage students to capitalize upon the opportunities to obtain research internships, network with research professionals, and explore professional career opportunities with our corporate/industry partners.

I thank all of the people who worked diligently to make FGLSAMP EXPO 2007 a successful event.

Sincerely,

Ralph W. Turner, Ph.D.
FGLSAMP Project Director



National Science Foundation
WHERE DISCOVERIES BEGIN

February 5, 2007

Dear FGLSAMP EXPO 2007 Participants:

I am extremely please to welcome you to the 14th annual FGLSAMP EXPO. This year's EXPO will be an exciting event that promises to be intellectually stimulating, academically beneficial, and inspiring to those aspiring to becoming excellent scientists, engineers, and researchers. It is my sincere wish that you take this time to actively engage in all of the conference activities and make your EXPO 2007 experience one that will be a platform for your future success.

FGLSAMP EXPO will give students, graduate school and corporate recruiters, and STEM faculty to interact with one another on a constant basis. It is my hope that students will come away with heightened interest in pursuing STEM graduate degrees and that exhibitors are pleased with the quality of our highly motivated FGLSAMP students.

The National Science Foundation and I, am proud to have FGLSAMP serve as a vehicle to cultivate students with such great talent and potential for careers in STEM. The training and experience received by students through LSAMP programs is helping our nation address the critical shortfall of the scientists, engineers and researchers needed keep our country at the forefront of discovery. The nation's standard of living, economic power, and security heavily depend on the research of professionals in STEM areas and FGLSAMP is making a real contribution to our country's ability to continue to be a global leader in STEM areas.

Again, it is my pleasure to welcome you to participate, engage and enjoy FGLSAMP EXPO 2007. Please take advantage of all of the activities and events.

Sincerely,

A. James Hicks,
National LSAMP Director



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Florida Agricultural and Mechanical University

TALLAHASSEE, FLORIDA 32307-3100

CASTELL VAUGHN BRYANT, INTERIM PRESIDENT

OFFICE OF THE PRESIDENT

TELEPHONE: (850) 599-3225

FAX: (850) 561-2152

January 22, 2007

Dear 2007 FGLSAMP Expo Participants:

On behalf of Florida A&M University, welcome to the 14th annual Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) Expo. This event provides a valuable opportunity for an enlightening discussion concerning the areas of Science, Technology, Engineering and Mathematics (STEM).

Please know that FAMU is committed to ensuring that a solid environment exists for the nurturing of all students that pursue research opportunities here at the University. Florida A&M understands that this cultivation is indeed critical to accomplishing the collective goal of increasing the number of minority graduates in STEM disciplines.

As an institution of higher learning, part of our responsibility to those we serve continues to be encouraging excellence through all avenues of educational instruction. As a result of this responsibility, the FGLSAMP Expo is an excellent resource of measuring how ongoing instruction may develop into cutting-edge research. This event provides a unique opportunity for the exchange of ideas and networking with other scholars. Therefore, it is our hope that this experience will awaken your creativity and strengthen your quest for knowledge.

Thanks again for your participation and best wishes for continued academic success.

Sincerely,

Castell Vaughn Bryant
Interim President



UNIVERSITY OF SOUTH FLORIDA

Office of the President

Dear FGLSAMP Conference Attendees:

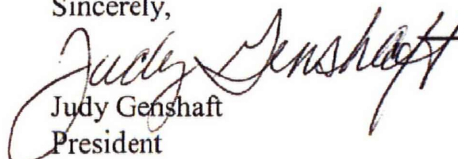
On behalf of the University of South Florida, I am very pleased to welcome you to the 14th Annual Florida-Georgia Louis Stokes Alliance for Minority Participation Career EXPO 2007. We are honored to host this year's Career EXPO and the venue it provides for FGLSAMP and Alliance scholars to celebrate and share their educational and intellectual achievements.

USF is proud to participate with FGLSAMP to help educate the next generation of enlightened leaders who will shape the world of the 21st century. FGLSAMP and Alliance affiliates, regionally and nationally, are working together to build an environment that will grow and enhance the presence of minorities in science, mathematics, engineering, and technology. The holistic approach fostered by the FGLSAMP program includes experiential training and opportunities for students to study with renowned faculty working on the leading edge of discovery in their fields of inquiry. The hard work and effort of many FGLSAMP students will be obvious when they present their research in the oral and poster competitions. We look forward to seeing the perseverance of these exceptional students rewarded with opportunities for graduate education and employment.

USF's objectives include engaging in teaching, research and service on critical issues of both local and global importance. USF's national reputation as a dynamic research university is attracting more and more of the nation's best and brightest scholars to the Tampa Bay area. Research is taking place across an astonishing array of disciplines such as biotechnology and systems, and many other cutting-edge interdisciplinary areas. USF ranks among the nation's elite research institutions according to the prestigious Carnegie Foundation for the Advancement of Teaching. We provide educational opportunities to the people of our diverse region, prepare our students to live and work in a multicultural society, conduct research with particular relevance to diverse metropolitan areas, and engage the intellectual resources of the University in helping communities solve problems.

During your stay in the Tampa, please consider our home as your home. We invite you to stroll about our campus, visit our colleges and converse with our faculty and students. Again, welcome to FGLSAMP Career EXPO 2007.

Sincerely,


Judy Genshaft
President


50 YEARS
CELEBRATING SUCCESS
1956-2006



Dear FGLSAMP Conference Attendees:

On behalf of the faculty, staff and students of the College of Engineering at the University of South Florida (USF), I am very pleased to extend a cordial welcome to the 14th Annual Florida-Georgia Louis Stokes Alliance for Minority Participation Career EXPO 2007. We are delighted that you have chosen USF and Tampa as the site for your meeting.

I congratulate the Conference Committee for putting together an outstanding program. I trust that you will find the program of compelling interest and that the activities in which you will be engaged will significantly benefit both your professional and personal development.

The College of Engineering at USF is the fastest growing College of Engineering in the country today. We are not growing simply in numbers, our real growth is in the contributions we are making and the long-lasting impact on societal problems. Our faculty is at the forefront of interdisciplinary work where we bring together strengths from different fields of study to provide meaningful and innovative solutions to problems. The College, for example, is involved with faculty from the College of Medicine, Biology, and Chemistry in the Florida Center of Excellence in Biomolecular Identification for Targeted Therapeutics.

Please feel most welcome to visit our college and pursue, together with our faculty and staff, this and the many opportunities that exist for graduate studies in areas as diverse as biomedical engineering, unmanned vehicle systems, pattern recognition, nanomaterials and nanomanufacturing, transportation systems, energy systems, wireless technologies, software testing and reliability, engineering management, and many other emerging and developed interdisciplinary areas. I also encourage you to visit other USF campus facilities such as the library and bookstore and to take some time to enjoy the many attractions available in the Tampa Bay area.

Please do not hesitate to contact my office if you feel we can in any way make your visit with us more enjoyable and worthwhile.

Sincerely,

A handwritten signature in black ink that reads "Sunil Saigal". The signature is fluid and cursive, with the first name "Sunil" and last name "Saigal" clearly distinguishable.

Sunil Saigal, Ph.D., P.E.
Professor and Interim Dean



To 2007 FGLSAMP Conferences Attendees:

As Dean of the USF Graduate School and Associate Provost, it gives me great pleasure to welcome you to the 14th Annual Florida-Georgia Louis Stokes Alliance for Minority Participation Career Expo 2007 being held here at the University of South Florida.

With the depth and breadth of this FGLSAMP Expo 2007, you have extraordinary opportunities to present your research, meet accomplished scientists and researchers in STEM disciplines of study, receive tours of cutting-edge research facilities, and interact with graduate programs from our nation's finest research and teaching institutions. We are delighted to have the opportunity to introduce you to some of the exciting research and graduate education programs at USF. We are proud of our novel research initiatives in the life sciences, advanced materials, nanotechnology, sustainable healthy communities, the geosciences, and computational visualization, to name just a few areas where our faculty and graduate students are working across a spectrum of interdisciplinary boundaries. Moreover, these research activities are in synergy with USF's investment in signature programs in graduate education (IGERT, NSF Bridge to the Doctorate, Alfred P. Sloan, and Diverse Student Success Programs) that have resulted in significant gains in our graduate enrollment of underrepresented students.

During your visit, I encourage you to find time to interact with USF faculty, graduate program directors, and students to learn about the exciting opportunities available on our campus. You will find USF to be a vibrant, intellectually stimulating institution that values diversity, one that is committed to developing a community of scholars where all students might thrive!

Best regards,

A handwritten signature in dark ink that reads "Delcie R. Durham". The signature is written in a cursive style with a clear, legible font.

Delcie Durham, Ph.D.

Associate Provost for Research & Dean, USF Graduate School



Excellence With Caring

Florida Agricultural and Mechanical University

TALLAHASSEE, FLORIDA 32307-3200

TELEPHONE: (850) 599-3276

FAX: (850) 561-2551

OFFICE OF THE PROVOST AND
VICE PRESIDENT FOR ACADEMIC AFFAIRS

Dear EXPO 2007 Participants:

Welcome to the 14th Annual Florida-Georgia Louis Stokes Alliance for Minority Participants (FGLSAMP) EXPO. Florida A&M University is very proud to serve as the host institution for the FGLSAMP program. We recognize the tremendous contributions of the LSAMP programs to addressing the critical shortage of trained scientists, engineers, and researchers throughout our great nation. Programs such as FGLSAMP provide tremendous opportunities for students pursuing careers in science, technology, engineering and mathematics (STEM).

As the lead institution of FGLSAMP we are committed to creating opportunities through collaborative efforts with all 13 alliance institutions. FGLSAMP is a critical component in the collective effort to increase the number of STEM undergraduate and graduate degrees awarded to underrepresented populations in STEM areas.

FGLSAMP EXPO is a great opportunity for students to enhance their academic performance, develop graduate school and professional networks, and broaden perspectives opportunities in research.

Again, welcome to FGLSAMP EXPO 2007. It is our sincere hope that you will thoroughly enjoy and benefit from your EXPO experience. FGLSAMP is an exceptional means to achieving your academic and professional goals.

Sincerely,

Debra Austin, Ed.D.
Provost and
Principal Investigator, FGLSAMP

Why Graduate School?

If you want to make more money, have greater flexibility and more opportunities, then Graduate School is for you. In addition to providing more knowledge and understanding of your discipline, it will allow you increased marketability and for some professions it is simply required for what you want to do (for example, psychologists, physical therapists, and counselors are all required to have graduate degrees to practice).

The typical person with a graduate degree will earn an average salary of \$74,602 per year, compared to \$51,206 for an individual with a bachelor's degree, and only \$27,915 for someone with a high school diploma. Not only are annual earnings more, but you are also more likely to have greater savings over your career.

What do you need to pursue graduate education?

- Apply Online!
- Provide official transcripts from previous institutions.
- Submit official GRE or GMAT scores.

Assistantships and fellowships are available from most graduate schools.



More Information

For more information, the following websites are helpful:

You can also visit the UCF Graduate Students website at www.graduate.ucf.edu for program specific deadlines and supporting documents, as well as information on how to finance graduate school.

- **FRESCH! Free Scholarship Search**
www.freschinfo.com/index.phtml
- **FastWeb Free Scholarship Search**
www.fastweb.com
- **UCF Test Preparation**
www.testprep.ucf.edu



UNIVERSITY OF CENTRAL FLORIDA

GRADUATE STUDIES

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www.graduate.ucf.edu

The Bridge to the Doctorate Program at the University of South Florida

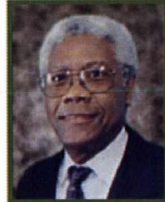


Career Goals:
Ph.D., Biomedical
Engineering;
Industry/
Research

Rufael Berhane
B.S.— Mechanical Engineering
University of North Carolina-Charlotte, 2006



Dr. Ashanti Pyrtle
Program Director;
Assistant Professor of Chemical Oceanography
USF College of Marine Science



Dr. Ralph Turner
Director of FGLSAMP



Dr. Shekhar Bhansali
Program Co-Director;
Associate Professor of Electrical Engineering
USF College of Engineering



Career Goals:
Ph.D., Industrial
& Management
Engineering;
Faculty/
Research

Dayna Lee Martinez
B.S.— Industrial Engineering
University of Puerto Rico, Mayagüez, 2006



Career Goals:
Ph.D., Biomedical
Engineering;
Industry/
Research

Natasha Cover
B.S.— Biology
Virginia Union University, 2006

"The Bridge to the Doctorate Program hosted at USF provides under-represented STEM minority undergraduates with a wonderful opportunity to pursue Ph.D. degrees in STEM areas such as marine sciences and geosciences that have traditionally been sparsely represented by this population."



Career Goals:
Ph.D., Chemical
Oceanography;
Faculty/
Research

Susana Mulikin
B.S.— Chemistry
Fayetteville State University, 2001



Career Goals:
Ph.D., Physical
Oceanography;
Faculty/
Research

Luz Raquel Hernández-Cruz
B.S.— Marine Biology
University of Puerto Rico - Humacao, 2002

FGLSAMP

The Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) is a coalition of 13 institutions that includes: University of South Florida, University of Florida, Florida A&M University, University of Central Florida, Tallahassee Community College, Albany State University, Bethune-Cookman College, Florida International University, Florida Memorial University, University of Miami, Florida State University, Miami Dade College, and Florida Community College. FGLSAMP is dedicated to increasing the number of students who receive undergraduate and graduate degrees in Science, Technology, Engineering and Mathematics (STEM).



The University of South Florida is the site for the third NSF FGLSAMP Bridge to the Doctorate Program. USF is a major metropolitan research university with campuses in Tampa, St. Petersburg, Sarasota, and Lakeland. Over the last two decades, USF has taken its place among the top 50 public research universities in the United States and is one of only three *Research I* universities

in Florida. USF is focused on formulating bold ideas and using its research resources to create innovative solutions for the global community.

Unique Features of the Bridge to the Doctorate Program

- Diversity Awareness Workshop for Faculty Mentors
- Biogeochemical Sensors, Development and Applications Course
- Science and Engineering Instruction and Professional Development Course
- Undergraduate Research Opportunities

"Fostering new cross-disciplinary expertise and research endeavors in marine, environmental, biological and chemical sciences, and biomedical sensor designs and other engineering applications."

For additional program information contact: Ashanti Pyrtle, Project Director, USF College of Marine Science
140 7th Ave. S., St. Petersburg, FL 33701, 727.553.1301, apyrtle@marine.usf.edu



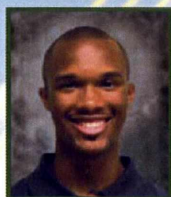
Career Goals:
Ph.D., Biomedical
Engineering;
Faculty/
Research

Sheana Green
B.S.— Physics
Delaware State University, 2006



Career Goals:
Ph.D., Computer
Engineering;
Faculty/
Research

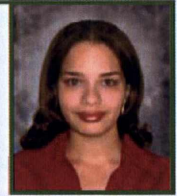
Ransford Hyman, Jr.
B.S.— Mathematics and Computer Engineering
Bethune-Cookman College, 2006



Career Goals:
Ph.D., Biomedical
Engineering;
Faculty/
Research

Marcus Marley
B.S.— Mechanical Engineering
North Carolina A&T State University, 2006

Career Goals:
Ph.D., Mechanical
Engineering;
Faculty/
Research



Issa Ramírez
B.S.— Mechanical Engineering
Inter-American University of Puerto Rico, 2006

Career Goals:
Ph.D., Biological
Oceanography;
Faculty/
Research



Karyna Rosario-Cora
B.S.— Industrial Microbiology
University of Puerto Rico, Mayagüez, 2002

Career Goals:
Ph.D., Engineering
Science;
Industry/
Research



Andrea Rocha
B.S.— Biology
Texas A&M University-Corpus Christi, 2000

Career Goals:
Ph.D., Biomedical
Engineering;
Industry/
Research



Nicole Williams
B.S.— Biology
Florida A&M University, 2006

For more information, please visit us on the Web, where you can view the Bridge to the Doctorate Program brochure and print out a program application:

www.msphds.usf.edu/BDFellowship/



Who is Eligible?

- Holder of a B.S. degree in a STEM discipline from an undergraduate LSAMP institution
- One who is admitted to or intends to apply to a graduate degree program in a STEM-related field

Benefits of the Bridge to the Doctorate Program

Gain knowledge in both science and engineering fields and research expertise in the development and application of sensors for marine, environmental, biological, chemical and biomedical science and engineering related research endeavors.

- Financial support package: 2-year fellowship of \$30,000 per year, and for doctoral students an additional 2 years of support at a minimum of \$15,000 per year
- Full graduate school tuition and fees support
- Participation in workshops, seminars and short courses on professional development, science and engineering—related topics
- Cross disciplinary science and engineering academic curriculum
- Professional and research travel opportunities

Application Requirements

- Completed *Bridge to the Doctorate Fellowship* application
- Brief personal statement outlining interests in the project and career goals
- Unofficial transcript

For more information contact:

Ashanti J. Pyrtle, Ph.D.,
Project Director; Assistant Professor,
USF College of Marine Science
140 7th Ave. S., St. Petersburg, FL 33701
727.553.1301; apyrtle@marine.usf.edu

Shekhar Bhansali, Ph.D.,
Project Co-Director; Associate Professor,
USF Department of Electrical Engineering
4202 E. Fowler Ave., ENB118, Tampa, FL 33620
813.974.3593; bhansali@eng.usf.edu

The Bridge to the Doctorate Program at USF is a joint effort between the Colleges of Marine Science and Engineering.



Left: USF's College of Marine Science (St. Petersburg) houses: two State of Florida research vessels, research labs, Center for Ocean Technology, Center for Coastal Ocean Mapping, and Institute for Marine Remote Sensing.
Right: Engineering Building III (Tampa) is the newest of the College of Engineering's seven facilities. The building houses four departments, faculty offices, and state-of-the-art research labs.



Expo 2007 Conference Schedule

Thursday, February 22, 2007

TIME	EVENT	LOCATION
2:30 pm – Until	Hotel Check-in	Embassy Suites
2:00 pm – 6:00 pm	Registration (pre-register for events)	Embassy Suites
3:00 pm – 7:00 pm	Oral Presentation Loading	Embassy Suites
5:30 pm – 7:30 pm	Welcome Dinner (buffet style) (Byron Greene, FGLSAMP) (Sylvia Thomas, USF)	Embassy Suites
7:00 pm – 11:00 pm	USF Student Mixer Poetry Jam/DJ music	Embassy Suites

Friday, February 23, 2007

TIME	EVENT	LOCATION
7:00 am – 8:30 am	Buffet Breakfast	Embassy Suites
8:30 am - 9:30 am	Judges' Meeting/Breakfast	Embassy Suites
8:30 am – 9:30 am	FGLSAMP/BD Graduate Panel (Byron Greene, FGLSAMP) (Delcie Durham, Ph.D. Dean of USF Graduate School)	Embassy Suites
9:30 am – 5:00 pm	Exhibitors	USF Hall of Flags
10:00 am – 12:00 pm	Session I Oral Presentations	To Be Announced
12:30 pm – 1:30 pm	Box Lunch with Exhibitors	USF Courtyard
2:00 pm – 5:30 pm	Session II Oral Presentations	USF
2:00 pm – 3:00 pm	Graduate Market Place (optional pre-registration)	USF ENB 313
2:00 pm – 3:00 pm	Moffit lab Tour (pre-registration required)	USF
3:00 pm – 5:30	Workshops	USF
6:00 pm – 7:30 pm	Networking Dinner (Joan Mitchell, Ph.D., IBM Keynote Speaker)	Embassy Suites
7:30 pm – until	On your own Exhibitor Interviews/workshops	Embassy Board Room

Expo 2007 Conference Schedule

Saturday, February 24, 2007

TIME	EVENT	LOCATION
7:00 am – 8:30 am	Breakfast in the Atrium	Embassy Suites
7:00 am – 8:30 am	Poster Set-up	USF CUTR
9:00 am – 11:00am	Session III Poster Presentations GRE Workshop High Tech Lab Tours (pre-registration required)	USF CUTR USF ENB 116 USF
9:00 am – 12:00 pm	Exhibitors	USF Hall of Flags
10:00 am – 12:00 pm	Steering Committee Meeting	USF
1:00 pm – 3:00 pm	Keynote Luncheon (Byron Greene, FGLSAMP) (Nathan Thomas, USF)	Embassy Suites

Expo 2007 Registration Information

Registration process

All Expo participants must complete a registration form below. Registration fees include: admission, conference materials, and meals. Payments must be submitted on or before January 18, 2007. Sorry, no single day registration. Exhibit space is guaranteed only upon receipt of fees. No refunds will be extended after January 19, 2007. Registration will be complete only after registration forms and fees have been received by the FGLSAMP Central Administration Office.

Registration Class	Fee
Student	\$180.00
Faculty	\$230.00
Exhibitor	\$450.00
Each additional exhibitor	\$325.00

Conference Accommodations

A block of rooms has been reserved at the Embassy Suites in Tampa, FL. All Non-FGLSAMP attendees must make their own room reservations. The Embassy Suites is offering a conference room rate of \$142.00 per night, plus tax, for single and double occupancy. To reserve your room at the the Embassy Suites, please call the hotel's reservation desk at (813) 977-7066. The over-flow hotels will be at the LaQuinta Inn Tampa on 3701 E. Fowler Ave, call (800) 531-5900 and Wingate Inn- Tampa USF on 3751 E. Fowler Ave, call (813) 979-2828 for reservations and to request FGLSAMP group rate.

Expo 2007 Presentations

Poster Presentations

1. Poster presentations are displays on scientific poster boards (3ft x 4ft).
2. They may not include exhibits of models, devices, or computer programs.
3. They must be prepared in advance.
4. Presenters must be available to discuss their displays during their assigned session.
5. Posters must be readable from at least three feet away.
6. The presentation title must be at least two inches high.
7. Beneath the title, the name(s) of the student author(s), faculty advisor, and home institution must be at least one inch high.

** Anything outside this guideline is your responsibility to find appropriate accommodations. You will not be allowed to post anything on the walls. **

Oral Presentations

1. Oral presentation are usually done as power point presentations.
2. Each student is allotted 10 minutes to present and 5 minutes for the questions and answer period.
3. All presentations should be saved to a USB flash drive.

If you are doing a PowerPoint presentation, and require special software outside the basic Microsoft, you are required to bring a laptop to accommodate your presentation requirements. A few extra presentation boards will be available for emergencies.



Dr. Joan L. Mitchell graduated from Stanford University with a B.S. in physics in 1969. She received her M.S. and Ph.D. degrees in physics from the University of Illinois at Champaign-Urbana in 1971 and 1974, respectively. She joined the Exploratory Printing Technologies group at the IBM T. J. Watson Research Center immediately after completing her Ph.D. She was a manager there for nine years. She then worked for three years in IBM Marketing before returning to the IBM Research Division in 1991 to work again in the Image Technologies group as a manager. From 1987 through 1994, she was a member of the ISO and CCITT International Joint Photographic Experts Group which standardized the color image JPEG compression algorithm. She was the final editor of JPEG Part 1, and in 1992, co-authored a book about JPEG. In 1994, she took a two year leave of absence from IBM during which she co-authored a book on MPEG, consulted for IBM Burlington, and was a visiting professor at the University of Illinois for six months. She returned to the IBM T.J. Watson Research Center as a Research Staff Member in the Image Applications Department. For the last three years she was on temporary assignment with the IBM Printing Systems Division in Boulder, CO, transferring there permanently in 2002.

Since 1976, Joan has worked in the field of image processing and data compression. She received IBM Outstanding Innovation Awards for Two-Dimensional Data Compression in 1978, for Teleconferencing in 1982, for Image View Facility in 1985, for Resistive Ribbon Thermal Transfer Printing Technology in 1985, for Speed-Optimized Software Implementations of Image Compression Algorithms in 1991, and for the Q-coder in 1991. December 2001, she was awarded an Outstanding Technical Achievement Award for Algorithms for Improved Printer Performance Transferred to IBM's Printing Systems Division and her Twenty-first Invention Achievement Plateau Award. She was elected to the IBM Academy of Technology in 1997, and became an IEEE Fellow in 1999. She is a member of APS, IEEE, IS&T, and Sigma Xi and co-inventor on 40 patents. She was made an IBM Fellow in 2001. In 2002, she initiated a Master Inventor program for PSD in Boulder and became a Master Inventor there. She recently became a certified PADI Dive Master.

Nathan Thomas, PhD, is the Director of Diversity at the University of South Florida Lakeland where he manages all aspects of campus diversity, teaches graduate courses in Counselor Education and undergraduate courses in Leadership Studies. Dr. Thomas earned his doctoral degree in Ecological – Community Psychology from Michigan State University and Master's and undergraduate degrees in Clinical/ Community Psychology from Norfolk State University . Over the last 18 years he has addressed the importance of student development in secondary and higher education, organizational effectiveness, leadership and community development, educational and social equity, and the implementation and evaluation of formal mentoring programs. His research includes creating a grounded theory around Identity-based mentoring using his “Thomas Principles” (Identity Development, Social Support, Psychological Support, Academic Support, Sense of Belonging, and Leadership Development) to promote student college adjustment, grade point average, retention and graduation. He is conducting a longitudinal study with an ethnic-based mentoring program at Michigan State University . Dr. Thomas has implemented his "Thomas Principles" in two Midwestern universities and over ten Southeastern universities, to improve the recruitment, retention and graduation of students in general and specifically underrepresented students and women in computing and technology. By changing Identity Development to Professional Development and Academic Support to Professional Support, Dr. Thomas has used his principles to create a mentoring approach that is designed to support new college faculty and staff adjustment and retention.

KEY

ASU- Albany State Univ
BCC- Bethune Cookman College
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FIU- Florida International University
FMU- Florida Memorial University
FCCJ- Florida Community College at Jacksonville
FSU- Florida State University

FAMU- Florida Agricultural and Mechanical University
NC A&T- North Carolina Agricultural and Technical State University
SU- Syracuse University
TCC- Tallahassee Community College
UCF- University of Central Florida
UF- University of Florida
UM- University of Miami (FL)
USF- University of South Florida

ASU

Abayomi, Emilola
Blunt, Brittany
Blunt, Harold
Buddington, Antonio
Carthon, Shanica
Clark, Rodney
Cobey, Chanel
Ellsberry, Timothy
Favis, Martez
Ferguson, Lashanda
Hart, Courtney
Harvey, Keisha
Henderson, Jonathan
Hogan, Dennis
Johnson, Linden
Jones, Tiffanie
King, Shawn
Lester, Sandra
Murray, Davoy
Nairn, Devern
Nelson, Tashiba
Owens, Julius
Smith, O'Neil
Williams, Marchada

Aerospace Corp.

Caldwell, Walter
Harrell, Elaine

BCC

Abernathy, Erika
Boykin, Donald
Carty, Winfield
Duncan, Markee
Elam, Bobby
Hudson, Brittany
Jn Baptiste, Courtney
Middleton, Clindon

Mincey, Justin
Morris, Larry
Nettles, Tachelle
Porter, Brittany
Presuma, Dumitru
Smith, Virginia
Steplin, Henry
Thompson, Karmethia
Wallace, Stefan
Williams, Tahiem
Young, Shanterial

CUNY

Lambert, Tiffany
Lambert, Wilmot
Mejia, Evelyn
Mercedes, Maria
Raffi, Elizabeth
Thenor, Martino

FIU

Abou-Baker, Nabil
Aguirre, Ivan
Alfonso, Jossue
Arango, Juan
Atencia, Luis
Azan, Daniel
Bernhard, Staci
Campanha, Avital
Campanha, Richard
Chacon, Luis
Diaz, Jonathan
Diaz, Manuel
Elsayed, Adel
Emile, Sandy
Gonzalez, Alejandro
Jean-Pierre, Jenny
Lubin, Victor
Mendez, Felix
Monroy, Viviana
Navarrete, Andrea
Soldo, Tatiana

FMU

Augustin, Arlan
Bleasdell, Gwennyth
Brathwaite, Ottley
Gallon, Ahmad
Gibbs, Desari-Ann
Hospedales, La Tisha
Joseph, Dasney
Oatman, Lashawn
Pierre, Keisha
Pierre Hall, Shaun
Williams, Brenton

FCCJ

Cain, Christopher
Chatman, Jessica
Degefa, Aderaw
Eskandari, Yasmin
Jackson, Robyn
Medina, Laura
Shuman, A.
Starks, Lynett

FSU

Henry, Shawn
Koo, Ana Cristina
McKinnon, Bettye
Rodriguez, Andre
Sapp, Kevin
Sparrow, Quinton

FAMU

Addison, Antoinette
Anderson, Evan
Barker, Kimberly
Battaglia, Jeff
Byrd, Tiara
Canady, Cedric
Charles, Cherise
Davis, Elizabeth
Dozier, Amina

FAMU cont.

Edakore, Uzega
 Eke, April
 Gaines, Al
 Gant, Jerone
 Hall, Derek
 Hardaway, Jessica
 Hinds, K. Denaye
 Ivey, Latreca
 Jacobs, Edwina
 Johnson, Tamina
 Lartey, Latoya
 Lee, Shawna
 Lewis, Jeyre
 Little, John
 Mateeia
 McGee, Dwight
 Milton, Cheryl
 Mitchell, Ryan
 Parker, Lambert
 Penny, Justin
 Rennie, Kevon
 Rice, Tiffany
 Russel, Christina
 Savage, Cheyela
 Sookrom, Heidi
 Stafford, Cleo
 Stephens, Ronald
 Stewart, Nakosi
 Tate, Jaired
 Tooks, Kendra
 Washington, Cecilia
 White, Arian
 Wiley, Kaleena
 Wilson, Shile

NC A&T

Grant, Jamil
 Johnson, Kristie
 Worku, Dereje

SU

Tanieka Motley

TCC

Aliyy, Usamah
 Anderson, Shantell
 Chipeta, Martha
 Collins, C'keisha
 Cox, Rugayyah
 Davis, Tyesha
 Dennard, Arthur
 Dinh, Tam
 Etienne, Kenneth
 Galloway, Robert
 Henderson, Sharisse
 Holland, Moses
 Jaccob, Erland
 King, Reginald
 Lafrance, Jacques
 Lee, Camesha
 Maddox, Derrius
 Moody, Nakita
 Ojutalayo, Ayokunle
 Patel, Kevin
 Patel, Shriya
 Pierre, Magdala
 Pinder, Shakera
 Poitier, Chris
 Remy, Lorna
 Richmond, Devina
 Robinson, Darel
 Scott, Shye
 Shah, Chirag
 Shah, Joly
 Soto, Reamonn
 Vaden, Mone't
 West, Jason

UCF

Smith, Linda
 Nevarez-Pagan, Alexis

UF

Archer, Akibi
 Bagnel, Marcus
 Hernandez, Roberto
 Johnson, Jameyel
 Letzen, Brian
 Simpson, LaKausha
 Watson, Jeremy
 Watson, Jerod

UM

Gray, Erica
 Sacasa, Marianne

USF

Alvarado, David
 Bailey, Kathryn
 Beharie, Jheanell
 Claudio, Cecilia
 Cotner, Bridget
 Echols, Erica
 Fomban, Nuvala
 Fraser, Julia
 Garcia, Andre
 Guerra, Jaime
 Harrison, Dorothy
 Hollingshed, Johnathan
 Jackson, Estrella
 La Rosa, Henry
 Larco, Fritz
 Linares, Sara
 Miller, Jason
 Nguyen, Minh
 Price, Dorielle
 Pulecio, Javier
 Rodriguez, Jael
 Rosario, Karyna
 Shelton, John
 Smith, Fabian
 Smith, Lyndonia
 Suprina, Sendy
 Tejera, Melba
 Thomas, Phaedra
 Veronock, E.
 Vilceus, Daniel

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Iowa State

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Stanford University

University of Florida Cell Biology

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University of Iowa

University of Kansas

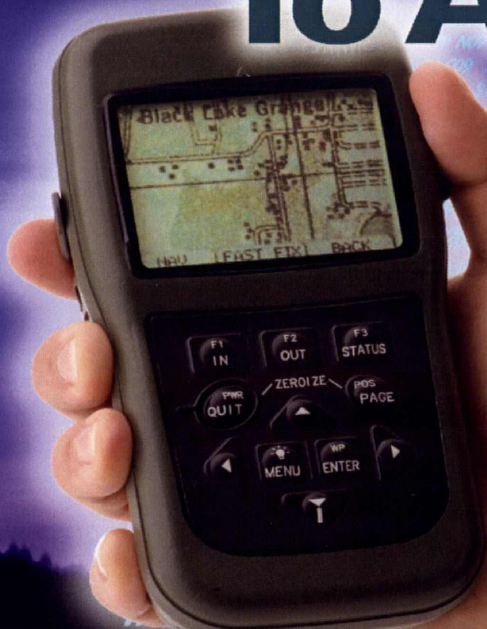
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W S04 514°03.3 E017°27.4
W N05 514°57.5 E019°36.0
W S05 512°10.4 E019°13.4
W C01 513°11.1 E021°10.1 06:04 1m03.7s
W C05 516°12.5 E020°49.0
W N07 516°55.0 E022°56.3
W C07 517°03.0 E022°37.4 06:06 1m06.8s
W S07 517°16.7 E022°16.5
W C08 517°37.4 E023°58.5 06:08 1m09.7s
W C09 518°40.0 E025°34.9
W C09 518°49.1 E025°14.3 06:10 1m12.4s
W S09 518°58.0 E024°53.6
W C11 520°26.0 E027°33.8 06:14 1m17.6s
W C13 521°55.1 E029°40.9 06:18 1m22.3s
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President

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Trudie Kibbe Reed, Ed.D
President, Bethune-Cookman College

Workshop Descriptions

Career Opportunities in Industry and Government Labs

Dr. Jacqueline Akunda, Eli Lily and Company
Mr. Walter Caldwell, Aerospace Corporation
Ms. Debbie McCoy, Oak Ridge National Labs

Want a job in the industry in which you currently are preparing for? This workshop will offer career opportunities in the industry as well as in government.

Cracking the GRE

Ms. Regina Easley, Ph.D. Candidate
Ms. Sekeenia Haynes, Ph.D. Candidate

Explore the structure of standardized tests, successful strategies to reduce anxiety and improve test scores.

Funding Opportunities for Graduate School

Dr. Sonya Greene, United Negro College Fund Special Programs
Dr. Ashanti Pyrtle, University of South Florida –BD & Ford Fellowships

Students will learn about funding sources available for graduate students in the STEM sciences.

Fishes and Boulders: Utilizing Participatory Tools to Collaboratively Set Goals for Your Organization. (Parts One and Two)

Mr. Jason Miller, MA, University of South Florida
Ms. Melissa Rivera, Ed.D., Hunter
Ms. Cassie Workman, MA, University of South Florida

In this interactive workshop, participants will gain valuable skills and tools they can use to work with a community (such as student clubs, professional organizations or other groups) to set common goals and follow with appropriate actions, identifying resources and challenges along the way. Facilitators will train participants in leading several participatory experiences including "Fishes and Boulders" that can be used to build consensus among group members and gain a clearer understanding of a given situation.

Quality of Life Technology: A Research Experience at the University of Pittsburgh and Carnegie Mellon University

Ms. Jewel Barber, University of Pittsburgh
Dr. Dan Ding, University of Pittsburgh

The session will discuss how interdisciplinary research advances in robotics, bioengineering, artificial intelligence, and the health sciences are helping to transform the lives of the elderly and disabled. Information will be given on exciting graduate and research opportunities in these areas.

Transitioning to Graduate School – Is the Ph.D. Really Worth It?

Linda Knight, Florida A&M University
Dr. Keith Oden, Georgia Tech University

Students will learn best practices for successful transition to graduate school. Information will also be presented on preparing national fellowship applications and NSF Science Technology Centers (STCs).

Transition to Upper Divisions

Denise Yates, University of Illinois at Chicago
Norma Cano-Alvarez, ENLACE PLUS Program Coordinator

What transfer students need to know: Searching for the right four year institution, Survival tips for community college students.

USF Lab Tours

Nanomaterials and Nanomanufacturing Research Facility
Biosensors/Micro Electrical Mechanical Systems Laboratory
Biotechnology Laboratory
Surface Science Laboratory

Students will have the ability to pre-register and visit with several of the laboratories that the University of South Florida has to offer.

Writing a Successful Personal Statement

Dr. Deland Myers, University of Northern Iowa – Iowa AGEP
Dr. Phillip Kutzko, University of Iowa – Iowa AGEP

Student participants will learn the essentials to crafting an effective personal statement. Participants will learn strategies to help them accentuate their strengths and the basis for effectual written communication.

Roundtable Discussions

Dr. Sylvia Thomas, University of South Florida - GEM Fellowship Program
Tanieka Motley, Syracuse - Chemistry PhD. Candidate

Students will have the opportunity to meet with graduate students and ask any of their most pertinent questions that they want to know. This will be an informal session to discuss any issues surrounding graduate school.

Oral Presentation Schedule Session 1

Friday, February 23, 2007 10:00am – 12:00pm

Facilitator(s)	Title	Room
ALL	Oral Presentations(s)	CUTR 102 CUTR 202 ENG 004 ENG 201 ENC 1000 ENC 1002 ENB 313 ENB 261 ENC 2407

Friday, February 23, 2007 2:00pm – 3:00pm

Facilitator(s)	Title	Room
Bernard Batson Rafael Perez	Graduate Market Place	ENB 313

Oral Presentation and Workshop Session 2

Friday, February 23, 2007 3:00pm – 4:00pm and 4:30pm – 5:30pm

Facilitator(s)	Title	Room
ALL	Oral Presentations(s)	3-4; 4:30-5:30 pm ENB 116 4:30 -5:30 pm ENC 1000 3-4; 4:30-5:30 pm ENC 228 3-4; 4:30-5:30 pm ENC 228A
Dr. Sonya Greene - UNCF SP Dr. Ashanti Pyrtle - USF	Funding Opportunities for Graduate School	3:00 –4:00 pm ENA 105
Dr. Rafael Perez - USF	Career Opportunities in Industry and Government Labs	3:00 –4:00 pm PHY 141
Jewel Barber – University of Pittsburgh	Quality of Life Technology: A Research Experience at the Univ. of Pittsburgh and Carnegie Mellon Univ.	3:00 –4:00 pm CUTR 102
Eva Fernandez - USF	Moffit lab Tour	2:00 –3:00pmTBD
Jason Miller, MA, Cassie Workman, MA, Melissa Rivera, Ed.D. (Hunter)	Fishes and Boulders: Utilizing Participatory Tools to Collaboratively Set Goals for Your Organization	3:00 – 4:00 pm part 1 4:30 – 5:30 pm part 2 ENC1002
Linda Knight - FAMU Keith Oden – Georgia Tech Univ.	Transitioning to Graduate School – Is The Ph.D. Really Worth It?	4:30–5:30 pm ENA 105
Denise Yates, Univ. of Illinois - Chicago	Transitioning to the Upper Division	4:30–5:30 pm CUTR 202
Dr. Deland Myers, Iowa AGEP Ms. Dr. Phillip Kutzko, Iowa AGEP	Writing a Successful Personal Statement	ENG 003 4:30–5:30 pm
Dr. Sylvia Thomas, USF Tanieka Motley, Syracuse	Roundtable Discussions	TBD 4:30–5:30 pm

Workshop Schedule Session 3

Saturday, February 24, 2007 9:00 am – 10:00 and 10:00 am – 11:00 am

Facilitator(s)	Title	Room
Regina Easley, Ph.D. Candidate	Cracking the GRE	9–10am ; 10-11am ENA 105
Denise Yates, Univ. of Illinois - Chicago	GRE Online Practice Exam	ENB 116
Peter Stroot, Ph.D. Martin Beerborn, Ph.D. Shekhar Bhansali, Ph.D Robert Tuft, Ph.D	USF Lab Tours	9:00–10:00 a m 10:00 – 11:00 am USF Hall of Flags

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Presenter: Gwenyth Bleasdel
 Classification /Major: Senior / Chemistry
 Institution: Florida Memorial University
 Internship Site: Duquesne University
 Preceptor: Dr. Rose Mary Stiffin

“Design and Synthesis of p25/CDK5 Inhibitors Based on Roscovitine”

In Alzheimer's disease (AD) two aberrant proteins amyloid plaques (A β) and Neurofibrillary tangles (NFTs) have been identified. A β peptide is produced from soluble amyloid precursor protein (SAPP) as a result of two sequential proteolysis steps by β -secretase [beta-site Amyloid Precursor Protein Cleaving Enzyme (BACE)] then γ -secretase. NFTs, are made up of several proteins but primarily hypophosphorylated Tau. P25/Cyclin dependant kinase 5 (p25/CDK-5), hypophosphorylates Tau at Ser 205 by using ATP as a phosphate source. This project seeks to design and synthesize inhibitors of p25/Cdk-5 based on the ATP binding site.

Presenter: Brittany Blunt
 Classification/Major: Junior / Chemistry
 Institution: Albany State University
 Internship Site: Albany State University
 Preceptor: Dr. Seong Seo

“Synthesis of Poly-Isopropylacryamide Microgels”

Scientists have given significant interest to the field of Nanoscience in the last decade. Researchers have tried to understand and define the different properties of polymeric nanomaterials. Polymer microgels, however, have new properties that can not be obtained from regular polymer solutions and are the central focus of this research. Responsive microgels respond by changes in swelling due to changes in the environment such as temperature and pH. Poly-isopropylacryamide is a type of responsive microgel that is widely used. We studied the characteristics of Poly-isopropylacryamide microgels, such as the decrease in particle size around the LCST, with a series of different temperatures. First the microgels were synthesized using free-radical precipitation polymerization. These microgels were then observed under a microscope. Next we used Photon Correlation Spectroscopy, also known as a Particle Size Analyzer, to determine the particle size. The particle sizes ranged from around 1260nm to 503nm in the experiment. From this we observed how the microgels respond to variations in temperature. We concluded that Poly-isopropylacryamide microgels can further be used in various applications including drug delivery systems and biotechnology.

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: Cedric L. Canady Jr.
 Classification/Major: Junior / Chemistry
 Institution: Florida A&M University
 Internship: Florida A&M University-Department of Chemistry
 Preceptor: Dr. Maurice Edington

“A Thermal Dynamic Study of Met-Hemerythrin”

My research objective is to conduct a thermodynamic study of Met-hemerythrin by using a series of techniques such as dialysis, uv- visible absorption spectroscopy, and photoacoustic calorimetry. The protein being studied is hemerythrin, which has the ability to exist in three different forms as deoxy, oxy and met-hemerythrin. The reoccurring problem of blood shortages during emergency medical procedures and the ongoing war has now created a need for alternatives to human blood. Various blood supply organizations are in a daily search of blood and someday artificial blood substitutes may simplify the search. Proteins are biological compounds that are vital to the structure and functions of all living cells and viruses. Uv- visible absorption spectroscopy is a technique used to characterize molecules to be used for photoacoustic calorimetry. Proteins have the ability to be separated from small molecules by dialysis through a semipermeable membrane. Protein molecules are retained in the dialysis bag and the small molecules diffuse into the surrounding solution. Dialysis was used to convert oxy-hemerythrin to met-hemerythrin. Photoacoustic calorimetry is used in quantifying non-radiative processes. The results obtained will give a better understanding of met(hr) and the mechanism by which the molecules relaxes.

Presenter: Shaun-Pierre Hall
 Classification/Major: Junior / Chemistry
 Institution: Florida Memorial University
 Internship Site: Duquesne University, Dept. of Chemistry & Pharmaceutical Sciences
 Preceptor(s): Dr. Jeffery, D. Evanseck and Dr. Wilson S. Meng

“Molecular Dynamic (MD) Simulation of O10H6 Peptide in Solution and Spectrophotometric Analysis of its Lysing Properties”

A short cationic peptide, O10H6 (ornithine*10, histidine*6) with known DNA condensation capability has been studied for its lysing properties. The inclusion of histidines was hypothesized to provide escape from harsh pH conditions of the endosomal pathway. A hemolysis assay was used to evaluate the membrane-destabilizing activity of O10H6 as a function of pH concentration, and/or states of protonation. Multiple (MD) simulations of O10H6 were done at three different protonation states using the micro-canonical ensemble to explore conformations over 1 ns. For each protonation state six 1 ns MD simulations were carried out. Superimpositions, RMSDs and quantitation were used to observe and analyze the different protonated states and to see if and how they each determined the conformation of the peptide.

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: Sherrisse A. Kelly
Classification/Major: Senior / Chemistry
Institution: Florida A&M University
Internship: Syracuse University
Preceptor(s): Dr. Daniel E. Schuehler and Dr. Michael B. Sponsler

"Synthesis of Diruthenium Connectable Molecular Components"

Connectable molecular components (CMCs) may be used to make connections within molecular circuits in the future. During this project, many methods were investigated in order to find a successful way to synthesize a diruthenium connectable molecular component. Several benzo-bis(imidazolium) salts with different R-substituents (benzyl (Bn), tert-butyl (tBu), mesityl (Mes), o-methoxyphenyl (o-An)) were targeted for synthesis, and the case with the Bn and o-An substituents were successfully made. The tetraamines were successfully made in all four cases. The tetrabenzyl benzo-bis(imidazole) was treated with base to form a carbene, which underwent reaction with Grubbs' first generation catalyst (G1). Once the desired product was presumably synthesized using ligand exchange reactions, proton NMR was used for confirmation. Attempted purifications and isolation of the product were unsuccessful.

Presenter: Julius Owens
Classification/Major: Senior / Chemistry
Institution: Albany State University
Internship Site: Albany State University
Preceptor: Dr. Oluseyi A. Vanderpuye

"Pregnancy-Associated Plasma Protein-A Structure and IGFBP-4 levels in Abnormal Pregnancy Sera"

Pregnancy-Associated Plasma Protein-A (PAPP-A) is a zinc metalloprotease whose concentration is greatly increased in normal pregnancy blood. PAPP-A proteolytically cleaves and inactivates Insulin-like Growth Factor Binding Protein-4 (IGFBP-4), one of 6 IGFBPs that regulate activity of Insulin-like Growth Factor-I. PAPP-A serum concentrations are decreased in pregnancies carrying fetuses with extra chromosomes (trisomies). We have hypothesized that (1) lowered PAPP-A levels in abnormal pregnancy sera may arise from the effects of structural changes in PAPP-A and (2) concentrations of IGFBP-4 in pregnancy serum may correlate with PAPP-A levels. Results are reported for (a) ELISA measurement of paired PAPP-A and IGFBP-4 values in normal and abnormal pregnancy sera. (b) Western blotting analysis of sera by using monoclonal antibodies to PAPP-A's MBP subunit. For 13 different donor pregnancy sera involving fetal trisomies, 10 normal pregnancy sera and 8 non-pregnancy sera, there was no correlation between concentrations of IGFBP-4 and PAPP-A. The MBP subunit of PAPP-A was detected in 3/4 normal pregnancy sera, 0/3 sera involving trisomies and 0/1 non-pregnancy sera. Although IGFBP-4 is one of only two known substrates for PAPP-A protease, pregnancy sera IGFBP-4 concentrations were not correlated with those of PAPP-A. Studies need to be performed with larger numbers of sera to see if these observations hold. Supported by an award from the ASU Office of Research from NIH Grant no: 5P20M0001085-03

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: Brittany Porter
 Classification/Major: Junior / Chemistry
 Institution: Bethune-Cookman College
 Internship Site: North Carolina State University-Department of Chemistry
 Preceptor(s): Dr. P.A. Maggard and Dr. P.M. Shanbhag

"The Flux Synthesis and Photocatalytic Activity of La₂Ti₂O₇"

While solid-state preparative methods to investigate photocatalytic solids are nearly always used, flux methods provide a better control over particle sizes and morphologies. Photocatalytic La₂Ti₂O₇, a member of the family of (110) layered perovskite-type materials, was synthesized by a molten salt (or flux) method at 1100° C for reaction times ranging from 1 hour to 10 hours. Sample purities were confirmed using Powder X-Ray Diffraction (PXRD) data and particle sizes were examined using Scanning Electron Microscopy (SEM) and UV-Vis diffuse reflectance spectra (DRS). DRS revealed that the La₂Ti₂O₇ compounds absorbed light of wavelength 325-350 nm and had optimal band gaps ~3.5-3.8 eV, higher than that of the solid-state synthesis of La₂Ti₂O₇ (3.2 eV-3.6eV). Photocatalytic testing showed that products synthesized using longer reaction times showed higher rates of activity for hydrogen production with a maximum observed rate of 1070 μmol of H₂/g.

Presenter: Kevon Rennie
 Classification/Major: Senior / BioChemistry-Pre-Dentistry
 Institution: Florida A&M University
 Internship Site: Florida A&M University
 Preceptor: Dr. Elliot Treadwell

"Determining the Relationship Between Bone Lead and Hypertension"

This experiment aims to find the link between bone lead concentration and hypertension. We will utilize some of the information acquired from various scientific sources on the effects of bone lead on the body. We will be using the Atomic Absorbance Spectrometer (AAS) to measure the amount of lead in the blood and the K-Shell X Ray Fluorescence (K-XRF) machine to measure the amount of lead in the bone. This we hope will give us the necessary information to calculate the diffusion of lead from the bone to the blood and vice versa.

Presenter: Chyealla Savage
 Classification/Major: Senior / Chemistry
 Institution: Florida A&M University
 Internship Site: Florida A&M University – Department of Chemistry
 Preceptor: Dr. Nelly Mateeva

"Molecular Recognition of Amino Acids by Diaza-18-Crown-6"

Crown ethers are well known for their ability to form selective and stable complexes with variety of metal ions, small molecules, as well as more complex species such as amino acids and small peptides. This process results in formation of a "supramolecular complex" and has multiple applications such as separation and identification of the "guest" molecules, transportation through a liquid membrane and creating simplified models for investigation of complex biological processes. This study investigates the complexation between diaza-18-crown-6 and different amino acids in presence or absence of metal ions. The study showed that the stability of the complexes and the distribution coefficients depend on the amino acid studied, pH of the solution, the presence or absence of a metal ion as well as on the counterion used.

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: O'Neil Smith
 Classification/Major: Junior / Chemistry
 Institution: Albany State University
 Internship Site: University of Kansas
 Preceptor: Dr. Robert Dunn

"Modification of Atomic Force Microscopy (AFM) and Near-field Scanning Optical Microscopy (NSOM) Probes"

In the field of microscopy, there is a continuous demand for increased resolution and a greater parametric monitoring of various samples (particularly biological samples) through improved imaging and detection methods. Scanning probe microscopy (SPM) is one method that has been developed, which provides for high resolution imaging. In lieu of the demand for enhanced performance, our project seeks to highlight the use of nanotechnology and analyte specific indicators to improve probes for scanning probe microscopy. We present the scientific protocol for attaching carbon nanotubes to conventional AFM probes, which will provide a route enabling enhanced performance. We render details of the wet chemistry methodologies employed to purify, cut and attach these carbon nanotubes and also provide microscopic images (TEM, SEM, and AFM) of each step. Similarly, near-field scanning optical microscopy (NSOM) probes were utilized to create a pH sensitive probe that can provide greater insight into particular biological processes during scanning. This approach involves the covalent immobilization of a suitable indicator, via photo polymerization, at the aperture of the NSOM probe that will allow for the rapid and sensitive detection of changes in pH based on the interaction between the analyte and indicator.

Presenter: Quinton Sparrow
 Classification/Major: Senior / Chemical Science
 Institution: Florida State University
 Internship: Florida State University
 Preceptor: Dr. P.B. Chase

"Purification of Human Cardiac Troponin with Removed N-Terminus"

Recombinant human cardiac Troponin (Tn) is proteolytically cleaved in the presence of the protease Thrombin. The Troponin complex consists of three Subunits; TnI which binds actin, TnC which binds calcium, and TnT which binds tropomyosin. The location of this cleavage site is outside the core domain of the Troponin complex near the N-terminus of TnT. The involvement of the N-terminus of TnT during the muscle contraction cycle can be investigated by removing the N-terminal fragment by Thrombin. Recombinant Tn is prepared by using an Escherichia coli vector. After growth, induction, and cell membrane lysis, Tn is purified using a glutathione S-transferase (GST) affinity tag, attached to the N-terminus of TnT and GST column. The highly purified Tn is then digested with Thrombin and purified again using an anion exchange column. When determining the location of the cleavage site, previously purified and unaltered Tn was subjected to thrombin digestion. HPLC and SDS-PAGE results were used to confirm digestion in a localized area. HPLC peaks were collected for N-terminal sequencing.

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: O'Neil Smith
Classification/Major: Junior / Chemistry
Institution: Albany State University
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CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: Arian White
Classification/Major: Senior / Chemistry
Institution: Florida A&M University
Internship: Georgia Southern University
Preceptor(s): Dr. Brian P. Koehler, Dr. Norman Schmidt and Dr. Kelly Robillard

“The GC Analysis of Cholesterol and Physterols in Vidalia Onions”

It has been commonly accepted that cholesterol is not found in plant materials. This belief exists because cholesterol is typically present in small amounts and methods of cholesterol detection at such a level were underdeveloped until recently. The goal of this project was to identify the sterol composition of Vidalia onion, confirm the presence of cholesterol and quantify the amounts of both cholesterol and B-Sitosterol in the onions. This experiment examines unsaponified and saponified Vidalia onion samples using gas chromatography and compares these results to those found in samples of common White onion. In all cases the saponified samples contained more cholesterol (11 ppm vs. 4 ppm) and B-sitosterol (40 ppm vs. 13 ppm) than the unsaponified samples, suggesting that saponification yields a better estimate of the total sterol content of the onion.

COMPUTER SCIENCES

Presenter: Harold Blunt
Classification/Major: Junior / Computer Science
Institution: Albany State University
Internship Site: Albany State University
Preceptor: Dr. Gwendolyn Campbell

“Development of a Database Management Tracking System for the Mathematics and Computer Science Department”

In this project, we created a database to track the progress of graduates. The relational database management system of Microsoft Access and Visual Basic 2005 were used. Microsoft Access is used due to the fact it is easy to retrieve, track, and manage information. One of the key advantages of Microsoft Access is its rapid application development. The next part of the project consisted of using Visual Basic 2005, which allows the programmer to access data using ADO.NET and its DataT-able, DataReader, DataAdapter, and DataSet classes. It also allows the programmer to build Windows applications to run on the .NET 2.0 platform and create XML Web Services. Visual Basic can be run either interactively as an interpreted language or compiled into an executable. Using Visual Basic 2005 allowed us to import the database previously created in Microsoft Access. This program can further be used as a tool to track the progress of former graduates at any University.

COMPUTER SCIENCES

Presenter: Ahmad Gallon
 Classification/Major: Senior / Computer Science
 Institution: Florida Memorial University
 Internship Site: Iowa State University
 Preceptor: Dr. Ben Wonseroj

“Intrusion Detection Systems in Wireless Ad-Hoc Networks”

Wireless local area networks (WLANs) go through threats that are numerous and prospectively destructive. Defense issues ranging from misconfigured wireless access points (WAPs) to session hijacking to Denial of Service (DoS) can plague a WLAN. Wireless networks are not only susceptible to TCP/IP-based attacks native to wired networks, they are also subject to a wide array of 802.11-specific threats. To aid in the defense and detection of these potential threats, WLANs should employ a security solution that includes an intrusion detection system (IDS). Even organizations without a WLAN are at risk of wireless threats and should consider an IDS solution. The problem with current intrusion detection systems is that they are designed for wired networks and do not consider wireless attacks.

Presenter: JeRone Gant
 Classification/Major: Senior / Computer Information Sciences
 Institution: Florida A&M University
 Internship Site: Florida A&M University – CIS Department
 Preceptor: Christy Chatmon

“Security and Privacy Concern’s for Ubiquitous Applications such as RFID’s”

As the use of RFID technology in our society has gained popularity security and privacy have become major concerns. The deployment of RFID impacts our ethical and sociological issues. In discussing the security and privacy issues, researchers must also investigate current and future uses of RFID’s and suggest some solutions to these concerns. In conducting this research, information was gathered from articles that discussed RFID technology. Though RFID tags provide some security mechanism, they intensify privacy threats and pose new security risks.

Presenter: Edwina Jacobs
 Classification/Major: Junior / Computer Information Systems
 Institution: Florida A&M University
 Internship: Florida A&M University – CIS Department
 Preceptor: Dr. Hongmei Chi

“User Authentication Through Typing Patterns”

It is argued that the use of keystroke rhythm is a natural choice for computer security. This position stems from observations that similar neuro-physiological factors that make written signatures unique are also exhibited in a user’s typing pattern. When a person types, the latencies between successive keystrokes, keystroke duration, finger placement and applied pressure on the keys can be used to construct unique signature (i.e., profile) for that individual. The keystroke dynamics of a computer user’s login string provide a characteristic pattern that can be used for verification of the user’s identity. Keystroke patterns combined with other security schemes can provide a very powerful and effective means of authentication and verification of computer users. Keystroke dynamics are rich with individual mannerism and traits and they can be used to extract features that can be used to authenticate/verify access to computer systems and networks. In the upcoming month data will be obtained in order to draw a conclusion. The methods used to prove the theory that typing patterns can be used as a means of verification is the many scholarly articles and findings of individuals that have taken an interest in this method of identification. Through these findings researchers are able to understand the pitfalls and work on implementing this form of identification.

COMPUTER SCIENCES

Presenter: Jameyel Johnson
Classification/Major: Senior / Computer Science
Institution: University of Florida
Internship Site: University of Florida
Preceptor: Dr. Pete Dobbins

“Google Map Viewer”

Many individuals take road trips frequently, or have occupations in which they are required to travel to various parts of the country on a regular basis. In doing so, most will get the address of their destination, go to mapquest.com, enter the information and print out the directions/map. Although this will most likely get one to a destination, it is not always the best method, route of travel, or level of detail that may be required. The purpose of the Google Map Viewer (GMV) is to create an efficient method of caching Google maps to a local hard drive and also create a user-friendly interface to interact with that data. With GMV, one can now cache a general area to a local hard drive and take a dynamic form of a map with them giving them the ability to label points, calculate distances, zoom in and out quickly, and load maps more efficiently. GMV has added 25 new menu actions and 6 modes to the pre-existing Google Maps application.

Presenter: Tiffanie N. Jones
Classification/Major: Senior / Computer Science
Institution: Albany State University
Internship Site: University of South Carolina
Preceptor: Dr. Michael Huhns

“Saving Lives With A Click: An Emergency Medical Reasoning Engine”

With today's increasing usage of Pocket PCs for medical and personal reasons, developing software for Pocket PCs that will aid individuals in emergency situations is inevitable. With this in mind, this work briefly introduces medical software, which is referred to as EMRE (Emergency Medical Reasoning Engine) and is similar to WebMD, for Pocket PCs that will aid individuals in emergency situations. It's designed to prompt to users a series of questions pertaining to their situations. Based upon the user's responses, the decisions for diagnosis are narrowed and a diagnosis is displayed along with advice that can be considered until medical attention is rendered. Currently, the decision mechanism is based on a prototype. In order for EMRE to become beneficial software, another decision mechanism must be implemented. The decision mechanism that is suitable and under consideration is influence diagrams, which combine Bayesian reasoning with multi-attribute utility theory. A Bayesian Network is a directed acyclic graph of interconnected nodes. This mechanism is relevant because this form of network is used to model a domain containing uncertainty in some manner. Overall, the EMRE concept can be looked upon as an electronic first aid kit.

ENGINEERING

Presenter: Ivan F. Aguirre, Jr
Classification/Major: Senior / Computer Engineering
Institution: Florida International University
Internship Site: Florida International University
Preceptor(s): Dr. Wilmer Arellano and Dr. A. Malek

“Handicapable Head-Controlled Wheelchair”

The invention of the wheelchair has given many people with a difficulty in walking the ability to find a newfound rejuvenation in their changed lives. Even the latest motorized joystick controlled chairs still exclude many persons such as quadriplegics. My team's research objective has been to find an alternative means to control a motorized wheelchair, creating a more enabling device. We have studied past projects in this field including: voice-controlled, head-force controlled, and ultrasonic sensor controlled wheelchairs. These topics have been dissected as well as preliminary patent research has been performed. Through the guide of Professor Wilmer Arellano, our team has found a unique method to capture head movement and control a motorized wheelchair accordingly – without obtrusive, invasive equipment. We find this research project to be extremely beneficial to society, giving personal mobility and freedom to many more persons than ever before.

Presenter: Jamil Grant
Classification/Major: Senior / Mechanical Engineering w/ Aerospace Option
Institution: North Carolina A & T State University
Internship Site: North Carolina A & T State University
Preceptor: Dr. William J. Craft

“Nickel- Titanium Shape Memory Alloy Motor”

Shape memory alloys (SMA) have been an extensively used material for actuators in micro-electro-mechanical systems (MEMS) because actuation force and displacement are greatest in SMA amongst many actuator materials. Of the alloys currently available for SMA actuators, the most popular system is Nitinol (or NiTi) due to its good oxidation resistance, reversible martensitic transformation, broad range of transformation temperatures (from -100 - 100 °C), and specific power density. Current commercially available SMA wire has easily achieved no-load strain of 5% with medium gage SMA wires demonstrating an axial force capacity of 2 Newtons or more. Shape memory alloys are a special type of material that exhibit two unique properties: pseudo-elasticity and shape memory effect (SME). SMA undergoes SME because of martensitic or diffusion-less transformation where each atom has a slight displacement, creating observable changes throughout the structure. This alloy has the ability, once heated, to return to its parent austenite phase where it exists at higher symmetry. Upon cooling, the material returns to one of many martensitic phases where it exists at lower symmetry. It is even possible for many variants of martensite to be present in the same material. Pseudo-elasticity is a rubber-like flexibility that allows the SMA to be contorted for a variety of purposes. Once contorted, the application of heat will cause the alloy to undergo martensitic transformation. Upon completion of the cycle, the alloy will have returned to its original shape. The development of SMA based electromechanical devices delivers traditional mechanical motion with non-traditional methods. Rather than electromagnetic components rotating a central axis to produce power, the SMA motor utilizes contracting elements to achieve angular motion. Motion is accomplished with sequenced electrical signals sent across each element. Rotary motion is the resultant of the elements dynamic interaction with central axis. Based on this concept, our team is developing a feasibility model that will assist in demonstrating the device. We believe that our macro-scale model can be reduced one or more orders of magnitude and perhaps to the MEMS level.

ENGINEERING

Presenter: K. Denaye Hinds
 Classification/Major: Senior / Civil & Environmental Engineering
 Institution: Florida A&M University
 Internship Site: FAMU-FSU College of Engineering – Civil & Environmental Engineering Departments
 Preceptor(s): Dr. Makola Abdullah and Marlon Hill, Doctoral Student

“The Effects of Extreme Wind Events on Civil Structures”

Due to global warming, it is believed that wind events are increasing in frequency and intensity. The ability to estimate the potential damage of a building or group of buildings due to the effects of extreme wind events, such as, hurricanes and tornadoes is becoming more important. Wind damage bands are used to predict the probable maximum damage degree of a building or group of buildings. The damage estimation model utilizes an objective weighting technique incorporating component cost factors, conditional failure probabilities, and location parameters to develop wind damage bands. The damage estimation method used was effective for estimating the probable maximum losses and produced reasonable results for the structures on the Florida A&M campus. Understanding how a structure performs during a hurricane is a powerful tool that is important in determining what needs to be done to minimize losses from these wind events.

Presenter: Linden Johnson
 Classification/Major: Junior / Mathematics
 Institution: Albany State University
 Internship Site: Georgia Institute of Technology
 Preceptor: Dr. Glenn J. Rix

“Reducing Seismic Hazards on Ports”

In 1995 the Great Habshin earthquake struck Japan. The Port of Kobe, Japan’s major port, suffered severe damage that essentially shut it down and required over two years to fully repair. Prior to the disaster, Kobe had ranked sixth among container ports world wide; in 1997 it ranked seventeenth (Chang S.E. 2000). The impact of losing some of the most important import and export resources in the country has raised the cost of moving goods to more than 400% of the original cost (Cole Emerson). This shocking turn of events served to highlight and accelerate pre-disaster economic trends (Chang S.E. 200). Smooth and efficient transportation of goods is vital both for the development and competitive strength of trade and industry for the United States. However, with nonexistent response times and the potential for catastrophic damage, natural hazards such as earthquakes represent significant economic and physical hazards to our ports and not to mention our society in general. Natural hazards affect a port’s infrastructure and operation. Along with the Port of Kobe, many port facilities have been damaged in the past due to liquefaction induced by earthquakes. As a response to this predicament, two experimental studies were performed. For liquefaction remediation on hydraulic fills, a small liquefaction tank was used to evaluate the reliability of different vertical drains and colloidal silica grouting systems to prevent the development of excess pore pressure in saturated soils. In the second experiment an instructional shake table was used to test a typical crane system under various levels of earthquake input motion. Construction and evaluation of a different bracing system was also tested to improve the performance assessment of container cranes. As a conclusion, both experimental studies prove to be affective and will provide useful insights into the full-scale tests on container cranes and hydraulic fills.

ENGINEERING

Presenter: Jeremy Watson
Classification/Major: Senior / Civil Engineering, Transportation Track
Institution: University of Florida
Internship Site: HDR, Inc., Jacksonville, FL
Preceptor: Dr. Yafeng Yin

“Relieving Traffic Congestion in NYC: A Congestion Pricing Approach”

New York City is home to over 8 million residents, making it one of the most heavily populated areas in the United States and the world. Several corporations have headquarters located in New York City, and its financial district is responsible for billions of dollars in revenue each year. Accordingly, traffic is many times the result of a successful and booming economy. Traffic depicts the coming and going of commuters as they work, eat, shop, etc., providing the life blood to a city's economy. At what point does the hustle and bustle move from healthy to harmful? When the number of vehicles on the road consistently increases and exceeds the road capacity, delays can hurt a city's economy. One possible solution to relieving traffic congestion is a scheme called congestion pricing. To explore the possibility of implementing congestion pricing in New York City, this study evaluated current congestion pricing strategies, major congestion zones in New York City, and current policies that affect transit in the City. Analysis shows that despite successful implementation of congestion pricing in London, New York City, though similar in size, economy, and international culture, faces different obstacles before any pricing scheme can be put in place. This study is part of a growing body of research on congestion pricing and its possible implementation in the United States.

Presenter: Kaleena Wiley
Classification/Major: Senior / Biology
Institution: Florida A&M University
Internship: FAMU-FSU College of Engineering Center for Cutting- Edge Technologies
Preceptor(s): Dr. Hans Chapman and Dr. Yaw A. Owusu

“Development of an Efficient Biological Photovoltaic Cell for Alternative Renewable Energy Applications”

The depletion and environmental problems associated with fossil fuels have led to major advances in the development of alternative renewable energy sources. The use of naturally occurring biological materials such as plants as a useful material in developing photovoltaic cells is gaining prominence. A bio-cell is an artificial plant cell that will pose as an alternate in the construction of photovoltaic (PV) or solar cells. In this research at the FAMU Center for Cutting-Edge Technologies, our goal is to design and manufacture an affordable photovoltaic cell that will mimic the electrical energy transferred during photosynthesis in plants. In such bio-electronic photovoltaic devices, it is envisioned that the electrically functional parts of the plants will replace the crystalline silicon traditionally used in the manufacturing of PV cells. Crystalline silicon is very expensive in production and time consuming. The bio-cell, on the other hand, is cost effective in manufacturing, contains naturally occurring, abundant, and renewable resources. Thus far, we have conducted microscopic and UV – Vis spectroscopic analysis of plants like Kudzu, Aloe Vera, and Cactus. Current experimental work is geared toward performing chemical conductivity and photoconductivity studies on the plant species, using a conductivity meter and a solar simulator. As well, we are beginning to find appropriate cell design using design expert and AutoCAD. On completion, we expect the novel bio-cell to have a greater efficiency in solar applications, than those containing the crystalline silicon.

ENGINEERING

Presenter: Marchada Williams
 Classification/Major: Sophomore / Pre-Engineering
 Institution: Darton College
 Internship Site: Albany State University
 Preceptor: Dr. K. C. Chan and Dr. Atin Sinha

“Mass Loss Due to Evaporation on Leaf Substrates”

As part of a larger research effort, a device to hold and mimic leaves as they sit on a plant or tree was designed and created to measure the evaporation rate of the leaves with drops of water added to them. The device was created using Solid Works™ software to sketch and dimension the model. The dimensioning of the device was critical during the modeling process because of the small and secluded environment in which the device was used. The mass and the dimensions of the device were critical because of the sensitivity of the balance. Using a rapid prototyping procedure and 3D printer, a low mass, hollow ABS plastic holder met the design criteria. The device was designed to be efficient as well as easy to use while inside the controlled environmental chamber. The evaporation mass loss data was collected using computer software to record the evaporation rate of the water from the leaves with and without sessile droplets. The data was charted on Excel™ to view the mass loss against time. Further research will be done in the future to retrieve more information concerning this experiment.

Presenter: Sihle Wilson
 Classification/Major: Senior / Electrical & Computer Engineering
 Institution: Florida A&M University
 Internship Site: FAMU-FSU College of Engineering – Department of Industrial and Manufacturing Engineering/ Research Center for Cutting Edge Technologies
 Preceptor(s): Dr. Yaw A Owusu and Dr. Hans Chapman

“A Comparative Analysis of the Power Output of Crystalline Photovoltaic (PV) Modules Using a Solar Tracking System”

Photovoltaic (solar) panels or modules are used to capture light energy from the sun and convert it into electrical energy. They are used for a variety of applications such as high/low power and mobile loads. In this project, two widely used photovoltaic (PV) modules namely, monocrystalline and polycrystalline, have been used in the design and assembly of a solar tracking system. A comparative analysis involving the two types of PV modules was done. The aim was to determine which type of module produced the greater output. Several factors affect the overall productivity of a solar system. These include but are not limited to, time of day, time of year, latitude and atmospheric conditions, all of which were dealt with throughout this project. First the solar tracking system was designed and assembled. The tracker, also known as the Sunflower, is located at the Centennial Building, Innovation Park Tallahassee. This system was used to collect data using monocrystalline and polycrystalline modules in various configurations. The configurations were stationary zero degrees, stationary forty degrees and solar tracking at forty degrees. After data acquisition, a statistical software “Design Expert V6.0” was used to analyze the data. This analysis showed the effect of the chosen factors on the power output of the two types of modules. The results showed that the monocrystalline module produces greater power output than its polycrystalline counterpart. A final experiment was set up to determine the mode that produces the greatest power output. For continuing work, the effects of temperature on the performance of these modules are currently being investigated.

LIFE SCIENCES / BIOLOGY

Presenter: Kimberly Barber
 Classification/Major: Senior / Chemistry
 Institution: Florida A&M University
 Internship Site: Florida A&M University
 Preceptor: Dr. Ugochukwu, N.H. and Dr. C. L. Figgers,

“Dietary Caloric Restriction Modulates The Antioxidant Capacity and Dislipidemia in The Plasma Of Streptozotocin-Induced Diabetic Rats”

Objective: Hyperglycemia with resultant oxidative stress has been proposed as the pathogenic mechanism linking insulin resistance with endothelial dysfunction during diabetes. Dietary caloric restriction (CR) has been known to improve glyce-mic control in obese type 2 diabetes. Therefore, the aim of this study was to investigate whether CR modulates the plasma antioxidant capacity and dyslipidemia in streptozotocin-induced diabetic rats. Design and Methods: Forty male Wistar rats were subjected to 30 % caloric restriction (20 animals) and ad libitum feeding (20 animals) for 9 weeks before the induction of diabetes. Results: Caloric restriction significantly ($p < 0.01$) reduced the body weight, reactive oxygen species and total cholesterol levels in non-diabetic and diabetic rats. Caloric restriction was also found to improve blood glucose levels, glycated hemoglobin, malondialdehyde, triglyceride, oxidized glutathione and reduced glutathione levels in the experi-mental animals. Conclusion: These results indicate that oxidative stress and dyslipidemia which increase during diabetes are attenuated by dietary caloric restriction.

Presenter: Cherise Charles
 Classification/Major: Senior / Animal Science
 Institution: Florida A&M University
 Internship Site: Florida A&M University
 Preceptor: Dr. Tanise Jackson

“Characterization of LKR-13 Cells in Nude Mice”

The goal of our research project is the characterization of LKR-13 in nude mice. LKR-13 is a lung adenocarcinoma cell line derived from K-ras (LA1) mice. This line of cells is very aggressive and rapidly grows in immunocompromised mice. The fast growth of the cells prevents effective research and treatment of the adenocarcinoma because the survival rate of the mice is 3-4 weeks after injection making it impossible to develop a viable treatment. This project is geared towards the character-ization of the LKR-13 cell line in nude mice so that animals will be able to live through the chemotherapy treatment regimen designed to reduce the tumor’s growth. First we weighed 40 nude mice and recorded the data. Then, we injected ten mice with a 100,000 dose, another ten mice with a 250,000 dose, ten with a 500,000 dose, and finally, ten with a 1 million dose of cancer cells. The mice are being monitored under controlled conditions daily to observe the rate of progress of the cancer cells by observing their movements and any changes in behavior. The challenge we face is the lack of information about the LKR-13 cell, how it begins, how it works and how we can treat and prevent it.

LIFE SCIENCES / BIOLOGY

Presenter: Timothy Ellsberry
 Classification/Major: Sophomore / Biology
 Institution: Albany State University
 Internship Site: Albany State University
 Preceptor: Dr. Edward E. Lyons

“Isolation and Enumeration of Salmonella on Fruits and Vegetables”

In recent years, outbreaks of infection associated with raw and minimally processed fruits and vegetables have occurred with increased frequency (Guo et al 2001). However, contrary to many beliefs, Salmonella can be contracted by eating more than improperly cooked poultry and eggs. One can also become infected by Salmonella by the ingestion of raw meat, seafood, drinking non-pasteurized milk, as well as other dairy products and produce. Salmonella serotypes are estimated to cause approximately 1.5 million cases of foodborne infections each year in the United States, with 15,000 hospitalizations and 500 deaths (Guo et al 2001). Four very commonly used fruits and vegetables were used to test for Salmonella by means of swabbing the surface area. Upon obtaining samples of microbacterium from the surface area, they were placed in Brain Heart Infusion broth (BHI). Various characterization tests were performed to identify if Salmonella was actually present on the surface of carrots, bell peppers, tomatoes, and strawberries. In order to isolate Salmonella, transparent colonies were collected from streaked plates on MacConkeys and Xylose Lysine Deoxychlorate (XLD) agar. In order to confirm the results of the characterization test, a Triple Sugar Iron agar (TSI agar) was performed. A serial dilution was done to illustrate the amount of bacteria/ml. Carrots and strawberries had the most Salmonella, while bell pepper and tomatoes had the least. Carrots and strawberries grow in/ or closer to the ground as oppose to tomatoes and/or bell pepper, which could explain the various amounts of Salmonella found.

Presenter: Derek Hall
 Classification /Major: Junior / Biology
 Institution: Florida A&M University
 Internship Site: Florida A&M University
 Preceptor: Dr. Alexis Brooks-Walter

“Detection of Bis-Phenol Compounds”

Over the years many bacteria have developed resistance to antimicrobial agents. It is essential that novel compounds be identified to prevent the spread of common diseases. In this study we investigated the antimicrobial properties of ten synthetically made chemical compounds. Of the ten compounds, two compounds were determined to have antimicrobial properties. These two compounds were previously established to have similar structure. The optimal concentration of these compounds was determined to be 1mg/ml. In studies examining the time dependent killing of the compounds, it was confirmed that the bis-phenolic compounds killed both Staphylococcus aureus and Escherichia coli within 2 hours. These results were confirmed using a cell proliferation test. This test examines the uptake and degradation of tetrazolium. These results demonstrate that the bis-phenolic compounds were cytotoxic within thirty minutes. In conclusion, these two compounds represent novel and potential antimicrobial drugs.

LIFE SCIENCES / BIOLOGY

Presenter: Keisha Harvey
 Classification/Major: Junior / Biology
 Institution: Albany State University
 Internship Site: University of California Berkeley
 Preceptor: Dr. Iswar Hariharan

"Isolation of New Alleles of Bunched"

Tumor-suppressor genes function to suppress growth and block the development of cancer. In one study, *Drosophila melanogaster* was shown to have orthologs of 177 out of 289 human genes that are implicated in human diseases. More specifically, the bunched gene is homologous to the mammalian TSC-22 gene, which may function as a tumor suppressor. The bunched gene has three isoforms: bunched-a, bunched-b, and bunched-c. A previous study identified mutant alleles of bunched-a in a genetic screen for mutations that cause overgrowth. It is hypothesized that activation of bunched-a results in excessive growth. My study is aimed at isolating mutant alleles that specifically disrupt bunched-a or which eliminate the activity of both isoforms. To obtain novel bunched alleles, male *Drosophila* were fed ethyl methanesulfonate (EMS) to induce mutations. An F2 screen (involving two generations of crosses) was carried out to identify mutations that failed to complement the lethality caused by an inactivation of bunched. Once such mutations are identified, I will sequence the bunched gene from the mutant and determine the precise defect at the molecular level. This study will help us understand how both *Drosophila* bunched and human TSC-22 regulate tissue growth.

Presenter: Latoya Lartey
 Classification/Major: Senior / Chemistry
 Institution: Florida A&M University
 Internship Site: Florida A&M University - Chemistry
 Preceptor: Dr. Ngozi Ugochukwu

"The Modulatory Effects of Dietary Caloric Restriction on the Cardiovascular Risk Factors in the Plasma of STZ-Induced Diabetic Rats"

Diabetes mellitus is a significant risk factor for cardiovascular diseases due to the effects of low-grade systemic inflammation which is mediated by oxidative stress. Caloric restriction has been found to significantly reduce oxidative stress during diabetes and to modulate the expression of some inflammatory biomarkers in disease. This investigation determined the association between inflammation, diabetes mellitus and cardiovascular disease by measuring levels of various inflammatory biomarkers and anti-inflammatory mediators found in the plasma of Wistar rats. Forty male Wistar rats were randomly divided into four groups: nondiabetic feeding ad libitum (NAL) and under caloric restriction (NCR), and diabetic feeding ad libitum (DAL) and under caloric restriction (DCR). These experimental rats were subjected to feedings for a total of 63 days (9 weeks) with caloric restriction feeding reduced by 30% before the induction by interperitoneal injection of streptozotocin (35 mg/kg body weight). Two weeks after streptozotocin injection, the animals were euthanized and their plasma collected and stored at -80°C until further assessment using biochemical assays. The inflammatory cytokines [interleukin (IL)-1?, IL-4 and IL-6] and tumor necrosis factor ? up-regulated in diabetes were found to be significantly depressed by caloric restriction, whereas the anti-inflammatory mediators, haptoglobin and IL-10 levels, were increased. These results indicated that caloric restriction through its suppression of inflammatory responses, could be used as a therapeutic/preventative strategy for the attenuation of the development of diabetic complications.

LIFE SCIENCES / BIOLOGY

Presenter: Ryan D. Mitchell
 Classification/Major: Senior / Environmental Science
 Institution: Florida A&M University
 Internship Site: Florida A&M University – Environmental Sciences Institute
 Preceptor: Dr. Richard Gragg, Dr. E. Johnson, and Dr. E. Treadwell

“OTEC – Ocean Thermal Energy Conversion”

This project seeks to employ a variation of the current Ocean Thermal Energy Conversion (OTEC) technology to generate clean energy. The variation involves the use of thermoelectrics to exploit the thermal gradient of the ocean waters. We will study the logistical aspects of implementing this technological adaptation using mathematical and environmental modeling principles. Other critical aspects also have to be considered in assessing the feasibility of developing an OTEC facility including geographical characteristics, infrastructural and financial limitations as well as regional political and economic stability. OTEC is an exciting alternative source of cleanly derived energy with the potential to provide vast amounts of power and several other spin off benefits. The vast scope of this energy resource can be placed in perspective by considering that the total solar energy absorbed by the oceans per day, is far greater than 1,000 times the current total worldwide human energy consumption! There have been several proposed approaches to harnessing this resource but so far, the closed cycle (CC OTEC) and open cycle (OC OTEC) have been the most successful, both experimentally and theoretically. In the CC OTEC system or Rankine Cycle, the cold deep ocean water is pumped up into the considerably warmer region near the surface. Vaporization of a working fluid, such as ammonia, which vaporizes at around 22 degrees Fahrenheit is used to turn a turbine. It is then re-condensed and returned to the closed system loop. In the OC OTEC application the warm sea water is flash vaporized in a vacuum. The low pressure steam produced drives the turbine in this case, with the cold water being used to condense the spent steam, resulting in a useful waste product – desalinated water. OTEC faces the same challenges as many other forms of renewable energy if the primary focus is immediate financial profit and the bottom line. When all factors are considered, it stands as quite possibly the best and most viable renewable energy source for which scientists have been searching.

Presenter: LaShawn Oatman
 Classification/Major: Junior / Biology
 Institution: Florida Memorial University
 Internship Site: Florida Memorial University
 Preceptor: Dr. Dimitri Tamalis

“Characterization of Bovine Rumen Microbial Diversity Using 16S rRNA Sequences”

The presence of bacteria in the rumen has been known since the late 19th century and knowledge of their activities has grown steadily since. The advent of culture techniques for strict anaerobes and the formulation of habitat-simulating media in the 1940s and 1950s resulted in the cultivation and isolation of a variety of rumen organisms. These studies, based on standard morphological and physiological techniques, have shown that the microbial ecosystem of the rumen is highly complex. However, traditional studies of phylogeny have their limits, because of the fastidious growth requirements of many of the species. Specifically, many species fail to grow and others grow inefficiently, making identification and enumeration tedious and inaccurate. We describe a new PCR method for the assessment of microbial biodiversity in complex ecosystems such as the bovine rumen. This method utilizes two primers from the conserved region of the 16S rRNA gene and amplifies a 326-389 bp fragment. This fragment length affords ease of sequencing, which can be done in one cycle as well as sufficient information to distinguish between different species. *Butyrivibrio fibrisolvens*, *Ruminococcus flavefaciens*, and *Lactobacillus* were all detected in the bovine rumen using this approach. Fifteen percent of the sequences examined were identified as previously reported uncultured rumen bacteria, while 89% belong to bacteria that have never been identified. Among the bacteria identified were the autochthonous bacteria listed above as well as several allochthonous species.

LIFE SCIENCES / BIOLOGY

Presenter: Nakosi Stewart
 Classification/Major: Senior / Chemistry
 Institution: Florida A & M University
 Internship Site: Florida A&M University-Dept. of Chemistry
 Preceptor: Dr. Ngozi Ugochukwu

"Dietary Caloric Restriction Modifies Inflammatory Responses in the Livers of Streptozotocin-induced Diabetic Rats"

Chronic systemic low-grade inflammation plays a key role in the development of insulin resistance, a hallmark of type 2 diabetes. Caloric restriction has been shown to improve glycemic control in diabetes and moderate expression of some markers of inflammation that are up-regulated during aging. This study was planned to investigate the role of dietary caloric restriction without malnutrition in modulating oxidative stress-induced inflammatory responses in the livers of non-diabetic and streptozotocin (STZ)-induced diabetic rats with a view to assessing its effectiveness as a nutritional intervention for diabetes. Forty male Wistar rats were subjected to 30% caloric restriction (20 animals) and ad libitum feeding (20 animals) for nine weeks before induction of diabetes by intraperitoneal administration of 35 mg/kg body weight streptozotocin. Caloric restriction was found to significantly reduce the liver glucose, MDA, TG and GSSG levels, and non-significantly reduce the ROS levels in both non-diabetic and diabetic animals. Caloric restriction significantly increased the concentrations of GSH (and GSH/GSSG ratio), haptoglobin, IL-1?, IL-10 and reduced the TNF-?, IL-4 and IL-6 levels in the non-diabetic and diabetic animals when compared with their counterparts. The results show that caloric restriction was able to down-regulate the pro-inflammatory mediators and up-regulate the anti-inflammatory cytokines implicated in inflammatory responses during diabetes probably due to its anti-oxidative properties.

MATHEMATICS / MATH EDUCATION

Presenter: Emilola Abayomi
 Classification/Major: Senior / Mathematics
 Institution: Albany State University
 Internship Site: Miami University @ Ohio
 Preceptor: Dr. Vasant Waikar

"Reckless or Responsible: A Multivariate Statistical Analysis of Consumer Spending"

As Americans spend more and save less, there is a need to evaluate variables which influence spending habits. First, we reduce the number of variables with Principal Components analysis and identify underlying factors by grouping correlated variables in Factor Analysis. Finally, we use Discriminant Analysis to develop a rule for classifying individual consumers as either reckless or responsible spenders.

Presenter: Antonio Buddington
 Classification/Major: Junior / Mathematics
 Institution: Albany State University
 Internship Site: Princeton University
 Preceptor: Dr. Nan Yao

"Analyzing the Thickness of a TEM Sample Using EELS and Integration Techniques"

This paper deals with analyzing the thickness of a thin sample in a Transmission Electron Microscope (TEM) using spectrum imaging techniques. While in the TEM, the electrons for the exposed material will undergo deflection. In doing so, valuable information about its physical properties (specifically its thickness) will be obtained. However, this paper will provide a quantitative analysis of the sample's thickness by utilizing only the electron energy loss spectrum (EELS) obtained from the TEM; and making inferences with various incorporated computer software.

LIFE SCIENCES / BIOLOGY

Presenter: Nakosi Stewart
 Classification/Major: Senior / Chemistry
 Institution: Florida A & M University
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 Preceptor: Dr. Ngozi Ugochukwu

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MATHEMATICS / MATH EDUCATION

Presenter: Emilola Abayomi
 Classification/Major: Senior / Mathematics
 Institution: Albany State University
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 Institution: Albany State University
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Oral Abstracts

MATHEMATICS / MATH EDUCATION

Presenter: Richard Campanha
 Classification/Major: Senior / Mathematics
 Institution: Florida International University
 Internship Site: MIT - Dept. of Aeronautics and Astronautics 2005 MIT Summer Research Program (MSRP)
 Preceptor(s): Dr. Olivier L. Weck and Mr. William D. Nadir

“ISRU Analysis and Recommendations”

The purpose of this paper is to note which ISRU options are currently available for use within the next 15 years for use on the Martian surface. A MATLAB v.7 code was created that designs each ISRU component run in parallel, (as much as is allowable) so that individual masses, power usages, and volumes may be summed up to give a high level view of which structure is the optimal choice. ISRU plants are sensitive to the physical components they are made up of. This affects the power, mass, volume, and even oxidizer to fuel ratio. This paper takes into account these things, and tries to offer solutions to resolve additional components of propellant. To make comparisons easier, the source code provides graphs of mass, power, volume versus CH₄/O₂ production rate per day. This paper should give NASA a very conservative estimate of how each ISRU plant should work, as well as what should be the optimal configuration for an ISRU to operate on the surface of Mars. In addition, the paper provides the number of systems as an upper bound for realistic production rates in the order of 5- 20 kg per 12-hour day.

Presenter: Amina Dozier
 Classification/Major: Senior / Mathematics
 Institution: Florida A&M University
 Internship: Clemson University
 Preceptor: Dr. Neil Calkin, Dr. Kevin James and Dr. Dave Penniston
 Clemson University

“Blankits and Covers Finding Covers with an Arbitrarily Large Lowest Modulus”

In this research we will look at different ways to find covers with a large lowest modulus. We found some conditions necessary for a collection of congruence classes to cover the integers. We determined that certain types of collections of congruence classes cannot cover the integers. To compute a cover we created a program that uses a greedy algorithm that will determine whether or not we have found a cover along with printing out the blankit that was constructed. In the end, we have a cover with lowest modulus 14.

MATHEMATICS / MATH EDUCATION

Presenter: Bobby Elam
 Classification/Major: Junior / Mathematics
 Institution: Bethune-Cookman College
 Internship Site: Alliance/ AGP Research Project Summer 2006 University of Iowa
 Preceptor: Dr. Raul E. Curto

“Classification of 2×2 Square Matrices for Which the Norm Equals the Spectral Radius”

A square matrix A whose entries are real numbers is said to be normal if $AA^t = A^tA$, where A^t denotes the transpose of A . In this project we will:

1. Classify all 2×2 normal matrices;
2. Prove that for all such matrices the largest eigenvalue (in absolute value) equals the norm of the matrix;
3. Classify all normaloid matrices, that is, all 2×2 matrices of real numbers for which the above property holds true.

We will first study in detail exactly what $AA^t = A^tA$ means, provide many numerical examples, and calculate eigenvalues with and without computer assistance. We will then try to gain an understanding of what normaloid means, to finally reach a classification theorem for normaloid matrices. The project will involve the analysis of many examples, and will allow us to get familiarity with symbolic manipulation, particularly the software package Mathematica. Thus, as a by-product, we will learn how to use Mathematica to attack and solve a number of other problems, both within linear algebra and mathematics in general.

Presenter: La Tisha Hospedales
 Classification/Major: Junior / Mathematics
 Institution: Florida Memorial University
 Internship Site: Florida Memorial University
 Preceptor: Dr. Carlos Canas

“A Simple Explanation of the Mandelbrot Set”

The Mandelbrot set is the set of all complex number Z for which the Mandelbrot sequence $Z_0 = Z, Z_{n+1} = Z_n^2 + Z$ for $n = 0, 1, 2, \dots$ remains bounded. In other words, there is a real number A such that $|Z_n| < A$ as n goes to infinity. Graphing the convergence of this sequence in the complex plane gives rise to a fractal. The generation of fractals is indeed enthralling but its explanation is essentially ambiguous and of an intricate mathematical nature and so not easily understood. Here we attempt to explain using a very simple iteration algorithm how such fractal arises. We will also discuss its implications in explaining chaotic behavior.

MATHEMATICS / MATH EDUCATION

Presenter: Shawn King
 Classification/Major: Junior / Mathematics
 Institution: Albany State University
 Internship Site: Tuskegee University
 Preceptor: Dr. Mahesh V. Hosur

“Thermo-Mechanical and Flexural Properties of Nanoclay/Sc-15 Epoxy-Polyether Polyol Nanocomposites”

During this eight week summer research project, we have prepared different composite matrix samples containing sc-15 epoxy, different percentages of I.30E nanoclay and polyol. Components were mixed using a magnetic mixer rotating at 1200 rpm and at a temperature of 60oC. It was important to maintain a temperature near 60°C because a temperature either lower or higher would cause results to vary. The samples were cured at room temperature for 24 hours and later post-cured at 500°C for 5 hours. Tensile tests were performed on the different samples at a crosshead speed of 1 mm/min in order to determine the behavior of our samples when subjected to axial stretch loading. This provided us with various physical properties of our samples: average peak stress (MPa), average strain at failure, and the tensile modulus (GPa) for each set of samples. A stress/strain curve was then plotted. Flexure tests were also performed on samples of dimension 100 x 20 x 4.8 (L x W x D) at a crosshead speed of 2mm/min to determine the behavior of materials when subjected to simple beam loading. During these tests, maximum fiber stress and maximum strain was calculated for increments of load. The results were plotted on a stress/strain curve.

Presenter: Cheryl Milton
 Classification/Major: Senior / Mathematics
 Institution: Florida A&M University
 Internship Site: Florida A&M University- Mathematics Department
 Preceptor: Dr. Bruno Guerrieri

“An Algorithm for Determining the Medial Axis of 2D Convex Polygons”

The medial axis of a 2D convex polygon, in general, is a subset of the set of interior points equidistant from at least two edges of the polygon. This study presents a simple algorithm for determining the medial axis of a 2D convex polygon. The algorithm principally uses the bisectors of the angles of the polygon, general properties of Euclidean Geometry, and the precise definition of the medial axis of a 2D convex polygon to calculate the medial axis. The medial axis of a 2D convex polygon is recorded in the form of a mathematical graph.

PHYSICS

Presenter: Marcus Bagnell
Classification/Major: Junior / Physics
Institution: University of Florida
Internship Site: Particle Engineering Research Center
Preceptor: Dr. Kevin Powers

"Static Light Scattering - Finding Particle Size Distributions Using Mie Theory"

This experiment proposes a quick and simple method of obtaining particle size distributions by looking at light scattering patterns of small spheres. Laser light is directed through a dilution of polystyrene spheres ranging in size from 600nm to 10 μ m. Scattered light is collected using a photon counter mounted on a goniometer, and intensity of light as a function of angle is measured. This measurement is compared with Mie Theory which describes plane waves scattered by spherical particles.

Presenters: Dasney Joseph and Ottley Brathwaite
Classification/Major: Sophomore / Physics and Junior/Physics
Institution: Florida Memorial University
Internship Site: Florida Memorial University
Perceptor: Dr. Ayivi Huisso

"Extensive Measurements of 1/f noise in CMOS and BJT Transistors Using NSF funded 1/f noise Instrumentation"

Due to improvements in the transistors fabrication, most of noise sources are due to hole mobility-fluctuations in the base and electron mobility-fluctuations in the emitter. In these extensive measurements, we will identify the magnitude of mobility-fluctuation 1/f noise sources in the base and the emitter of PNP transistors, which will be biased at the high and low resistances. The two noise spectra of the same base current and emitter current will be measured and its Hooge's parameter, γ , giving the magnitude of the 1/f noise, which will be compared to the Hooge's parameter, γ , obtained from our the mobility-fluatuactions theoretical calculations.

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: Tiara Hardaway
Classification/Major: Senior / Chemistry
Institution: Florida A&M University
Internship Site: Florida A&M University – Department of Chemistry
Preceptor: Dr. Jesse Edwards

“Solvation Studies of Estradiol Derivative Selective Estrogen Receptor Modulators”

Breast cancer is one of the leading causes of death in women between the ages of 35 and 55 years of age. Current treatments focus on the estrogen responsive population. This work will also focus on a unique class of selective estrogen positive receptive modulators. Three classes of selective estrogen receptor modulators (SERM's) will be discussed in this work. These compounds were synthesized and tested for bioactivity by Dr. John Cooperwood's group. We used the Sybyl6.9 suite of programs to perform FlexX and Cscore series of docking calculations to determine the binding energies of these ligands in the estrogen active site. Using the docking results and molecular dynamics simulations, we are able to provide evidence of intermolecular interactions between the estrogen active site and ligands of 2 classes of the compounds being studied. In particular, we used the structure of the ligand, 4-Hydroxytamoxifen a currently used pharmaceutical, bound in the active site of the PDB crystal structure 3ERT, as the reference molecule. Using the results of the docking calculations we were able to determine that scoring functions containing free energy expressions with hydrogen bonding terms provided the lowest free energy of binding on a consistent basis and exhibited the highest correlation with the experimentally determined bioactivities. In the case of the estradiol and 17-ethynyl estradiol derivatives the correlation (R^2) between activity and the ChemScore (part of Cscore series) scoring functions were 0.86 and 0.89, respectively. There was only one exception, the morpholinyl derivatives received high docking scores but had the lowest bioactivities. These results suggest hydrogen bonding played an essential role in the activity of these compounds just as in the case of the crystal structure of 4-Hydroxytamoxifen. We will also, present the molecular dynamic simulations of these molecules in order to examine the motion of these systems in solvent. Contour maps of the flexible ends of these compounds will be generated to examine barriers to rotation of the oxy-bridge amino groups at the ends of the compounds.

Presenter: Charlyne Jean
Classification/Major: Senior / Chemistry
Institution: Florida A&M University
Internship Site: Florida A&M University - Chemistry Department
Preceptor: Dr. Jesse Edwards

“Interaction Energies of Carbon and Aluminum Electrodes with Organic Electronics”

One of the fundamental research questions in organic electronics is the interaction at interface between the electrode and the conducting organic system. The efficiency of the electronic devices depends significantly on the ability of the conjugated material system to conduct electrons to the electrode. The degree to which this is accomplished is affected by the interactions at these sites. This work will present results from quantum mechanical calculations on the surfaces of electrodes (Aluminum and Carbon graphite sheets) sandwiching various conducting polymers and/or organic molecules. The results will first employ molecular dynamics simulations to generate stable surface interface models to which the quantum mechanics will be applied. The interaction energies of these systems will be compared. Larger interaction energies should be associated with greater potential for change conductance.

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: Davoy Murray
Classification/Major: Junior / Chemistry
Institution: Albany State University
Internship Site: Albany State University
Preceptor: Dr. Seong Seo

"Direct Monitoring of Gold Nanorod Growth"

The versatile seed-mediated approach in aqueous surfactant solutions has been adopted in this study for the synthesis of gold nanorods. Gold nanorods have many potential applications because their longitudinal plasmon band is highly sensitive to their aspect ratio, and typically red-shifts to the near IR region as aspect ratio increases, but blue-shifts as aspect ratio decreases. These changes in the longitudinal plasmon resonance can be monitored using UV-vis absorption spectroscopy in order to determine the formation and extinction of gold nanorods in the synthesis. Unlike the use of strong reducing agents to make spherical gold nanoparticles, the growth of gold nanorods requires weak reducing conditions, leading to an unknown degree of gold reduction. Thus cyclic voltammetry can be used to interrogate the redox chemistry of the gold seed and corresponding nanorods. This experiment describes the use of UV-vis absorption spectroscopy and cyclic voltammetry to monitor the growth of gold nanorods from gold nanoparticle seeds, as it relates to the desired shape and identity

Presenter: Julius Owens
Classification/Major: Senior / Chemistry
Institution: Albany State University
Internship Site: Albany State University
Preceptor: Dr. Oluseyi A. Vanderpuye

"Pregnancy-Associated Plasma Protein-A Structure and IGFBP-4 levels in Abnormal Pregnancy Sera"

Pregnancy-Associated Plasma Protein-A (PAPP-A) is a zinc metalloprotease whose concentration is greatly increased in normal pregnancy blood. PAPP-A proteolytically cleaves and inactivates Insulin-like Growth Factor Binding Protein-4 (IGFBP-4), one of 6 IGFBPs that regulate activity of Insulin-like Growth Factor-I. PAPP-A serum concentrations are decreased in pregnancies carrying fetuses with extra chromosomes (trisomies). We have hypothesized that (1) lowered PAPP-A levels in abnormal pregnancy sera may arise from the effects of structural changes in PAPP-A and (2) concentrations of IGFBP-4 in pregnancy serum may correlate with PAPP-A levels. Results are reported for (a) ELISA measurement of paired PAPP-A and IGFBP-4 values in normal and abnormal pregnancy sera. (b) Western blotting analysis of sera by using monoclonal antibodies to PAPP-A's MBP subunit. For 13 different donor pregnancy sera involving fetal trisomies, 10 normal pregnancy sera and 8 non-pregnancy sera, there was no correlation between concentrations of IGFBP-4 and PAPP-A. The MBP subunit of PAPP-A was detected in 3/4 normal pregnancy sera, 0/3 sera involving trisomies and 0/1 non-pregnancy sera. Although IGFBP-4 is one of only two known substrates for PAPP-A protease, pregnancy sera IGFBP-4 concentrations were not correlated with those of PAPP-A. Studies need to be performed with larger numbers of sera to see if these observations hold. Supported by an award from the ASU Office of Research from NIH Grant no: 5P20M0001085-03

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: O'Neil Smith
Classification/Major: Junior / Chemistry
Institution: Albany State University
Internship Site: University of Kansas
Preceptor: Dr. Robert Dunn

"Modification of Atomic Force Microscopy (AFM) and Near-field Scanning Optical Microscopy (NSOM) Probes"

In the field of microscopy, there is a continuous demand for increased resolution and a greater parametric monitoring of various samples (particularly biological samples) through improved imaging and detection methods. Scanning probe microscopy (SPM) is one method that has been developed, which provides for high resolution imaging. In lieu of the demand for enhanced performance, our project seeks to highlight the use of nanotechnology and analyte specific indicators to improve probes for scanning probe microscopy. We present the scientific protocol for attaching carbon nanotubes to conventional AFM probes, which will provide a route enabling enhanced performance. We render details of the wet chemistry methodologies employed to purify, cut and attach these carbon nanotubes and also provide microscopic images (TEM, SEM, and AFM) of each step. Similarly, near-field scanning optical microscopy (NSOM) probes were utilized to create a pH sensitive probe that can provide greater insight into particular biological processes during scanning. This approach involves the covalent immobilization of a suitable indicator, via photo polymerization, at the aperture of the NSOM probe that will allow for the rapid and sensitive detection of changes in pH based on the interaction between the analyte and indicator.

Presenter: Kendra Took
Classification/Major: Sophomore / Chemistry
Institution: Florida A&M University
Internship Site: Army High Performance Computing Research Center
Preceptor(s): Dr. Francis Hill, Dr. Elijah Johnson and Dr. Jesse Edwards

"Octanitrocubane"

The objective of this project is to determine the strength of the various bonds present in octanitrocubane(ONC). Through directly comparing octanitrocubane and its parent molecule, cubane, both strain energies of octanitrocubane and cubane are analyzed. The electron density is also computed. The goal is to understand the characteristics of ONC as an explosive and to verify its effectiveness. Through computational work the strain energy is determined; the area where the strain energy is located is the region with the greatest electro-negativity. Since electron density (the probability of finding electrons in a given volume) correlates with the strain energy, electron density also has significance in this work. The most prominent explosive, trinitrotoluene (TNT) is used to explore octanitrocubane's explosiveness comparing the physical and chemical properties of both ONC and TNT. Octogen, commonly referred to as HMX, is the explosive that is currently used by the U.S. army. By analyzing HMX's properties, a comparison was drawn between the two, which revealed that octanitrocubane is a more potent explosive than its antecedents HMX and TNT. The structure and the molecular formula of octanitrocubane play a major role in determining why ONC is very stable, highly explosive and a very strained molecule. In the future the U.S. army could find ONC to be very productive.

CHEMISTRY / BIOPHYSICAL CHEMISTRY

Presenter: Cecilia Washington
Classification/Major: Junior / Chemistry
Institution: Florida A&M University
Internship Site: Florida A&M University - Chemistry Department
Preceptor: Dr. Jesse Edwards

"Intercalation of Organic Clay Mimics"

The synthesis of three different layered compounds will be discussed with 3,5 pyrazoledicarboxylic acid and Benzylamine, 3-chlorobenzylamine or 4-chlorobenzylamine as the layered crystals. Each of the solids was tested for the ability to intercalate small organic molecules. Specifically, each crystal was sonicated in the presence of toluene and phenol for two hours. Once the sonication was concluded a TGA and NMR test was used to determine whether intercalation of the guest between the clay mimic layers would occur. Results of the intercalation experiments for the phenol guest will be discussed. A further project was begun to determine whether co-crystals would form with the molecules that was used as fungicides. Three fungicides were chosen based on their ability to interact through hydrogen bonding with a second, complimentary molecule. The structures and co-crystallization reactions will be discussed.

COMPUTER SCIENCES

Presenter: Arlan Augustin
Classification/Major: Senior / Management Information Systems
Institution: Florida Memorial University
Internship Site: Florida Memorial University
Preceptor: Dr. Carrol Christian

"An Online Bookstore Catalog"

Over the past years, Florida Memorial has made some drastic changes. This institution went from being named, "Florida Memorial College," and now the current name is, "Florida Memorial University." Over a couple years, the transition from a college to a university has given Florida Memorial tremendous recognition, not only in the city of Miami Gardens, but also throughout the United States. In this transition, Florida Memorial has given its faculty, staff, guest and students a chance to make more of a technological advancement by, having more online resources such as; IQ. Web, WebCT, an online admissions application and many other resources are available on the institution's homepage. To add to the institution's technological advancements, an online bookstore catalog where students can view the available products in the bookstore (Lion's Shop), place orders with a confirmation number so they can pick up their order when it is ready. By having such a resource, would prevent students from having to make various attempts to the bookstore in quest of a specific book, whereas they can go online and see if that book is available in the catalog and they can make a request to purchase or put that specific book on hold for pick up.

COMPUTER SCIENCES

Presenter: Rodney Clark
 Classification/Major: Junior / Computer Science (Math Emphasis)
 Institution: Albany State University
 Internship Site: Albany State University
 Preceptor: Dr. Wanjun Hu

“How Windows’ Registry Affects Computers”

This project is about how Windows’ Registry affects a computer. Ad-ware and Mal-ware can control your computer by changing the Windows’ Registry, and we can also manage our computers by modifying the Windows’ Registry. We started this program from scratch meaning we built a computer from scratch and loaded Microsoft XP for a clean environment. By comparing daily saved copies of Windows’ Registry, we will be able to identify what changes have been made to it. Using software, we can also trace how Windows’s Registry is accesses when an application starts. This is a preliminary report of our work

Presenter: Dennis Hagan Jr.
 Classification/Major: Senior / Computer Science
 Institution: Albany State University
 Internship Site: Albany State University
 Preceptor: Dr. Gwendolyn Campbell

“Development of a Database Management Tracking System for the Mathematics and Computer Science Department”

In this project, we created a database to track the progress of graduates. The relational database management system of Microsoft Access and Visual Basic 2005 were used. Microsoft Access is used due to the fact it is easy to retrieve, track, and manage information. One of the key advantages of Microsoft Access is its rapid application development. The next part of the project consisted of using Visual Basic 2005, which allows the programmer to access data using ADO.NET and its DataTable, DataReader, DataAdapter, and DataSet classes. It also allows the programmer to build Windows applications to run on the .NET 2.0 platform and create XML Web Services. Visual Basic can be run either interactively as an interpreted language or compiled into an executable. Using Visual Basic 2005 allowed us to import the database previously created in Microsoft Access. This program can further be used as a tool to track the progress of former graduates at any University.

COMPUTER SCIENCES

Presenter: Martino Thenor
Classification/Major: Senior / Computer and Information Science
Institution: New York City College of Technology
Internship Site: New York City College of Technology
Preceptor: Dr. Xiangdong Li

"Windows 2003 Operating System Security Research"

Securing Small Business Wireless Network. Wireless Network is enabling 2 or devices to communicate using standard network protocols without using cables. You need an Access Point (could be a wireless router) to connect all the network devices. The Access Point enables all devices to share one internet connection. Since Wireless transmission uses radio waves to transfer the signal, that signal can be intercepted by other receiving devices which don't belong to your network. Wireless Network is fantastic but it has lots of security problems. Most manufactures like LINKSYS and NETGEAR that made Access Points (Wireless Routers) disables all security settings in order for the devices to work without any configuration just by plugging it to an outlet and to an internet connection. They also set default username and password to these devices which are available to anyone who goes to their websites. Knowing this, it makes it very easy for anyone to use your signal to surf the internet and steal your data to commit fraud. To prevent or lessen the changes of security breach of a Small Business Wireless Network, we implemented and tested security techniques using wireless routers and common security features of Microsoft Windows operating systems (Windows 2003 Server, 2000 Professional). The following are the steps we took throughout the research to better secure the Wireless Network we built:

- * Strategic location of Access Point (Wireless Router).
- * Changed default login settings of Access Point and change name of SSID.
- * Used encryptions created specifically for Wireless Network: WEP & WPA.
- * Disabled DHCP function of Access Point or limit the number of available IP.
- * Enable MAC Address Filtering and Internet access restriction on Access Point.
- * Installed Windows 2003 Server, create domain, and encrypt all Shared Folders.
- * Disable the Wireless Network's SSID (the network's name) broadcast function.
- * Enabling HTTPS and disabling wireless access of the Access Point's GUI to present wireless configuration of the network.

Change the default subnet.

Presenter: Jerod Watson
Classification/Major: Senior / Computer & Information Sciences
Institution: University of Florida
Internship Site: Convergys Corporation
Preceptor: Dr. Alan Cooke

"Do Positive Electronic Agent Recommendations Translate Across Product Categories?"

As technological innovations continue to push the limit of possibility in today's economy, one such innovation, the electronic recommendation agent, is becoming an increasingly powerful tool in the world of electronic commerce. The electronic recommendation agent is a software tool that attempts to understand the human decision making process basing its results on a set of information provided by the user. This study tests the ability of an agent to make positive product recommendations in a preliminary category and then again in a secondary category using only the initial information provided by the user. As the scope of e-commerce increases, the success of these cross-category recommendations will lead to a greater understanding of personalized e-commerce techniques.

ENGINEERING

Presenter: Akibi Archer
 Classification/Major: Senior / Mechanical Engineering
 Institution: University of Florida
 Internship Site: Georgia Institute of Technology
 Preceptor: Dr. Ken Gall

“Characterization of Thermo-Mechanical Properties of Acrylate Based Shape Memory Polymers Using DMA and Nano-indentation.”

Shape memory materials are classified as materials that can be deformed and will return to their original shape when acted upon by an external stimuli, such as heat, or electric current. This study dealt with the characterization of shape memory polymer based on their thermo-mechanical properties due to nano-indentation. The acrylate based shape memory polymers used in this study were Diethyleneglycol Dimethacrylate (DEGDMA) and Polyethyleneglycol Dimethacrylate (PEGDMA). The polymers were tested using the Dynamic Mechanical Analysis (DMA) and the MTS Nano-indentor. The polymers were classified by the weight percentage of cross-linker, the percentages tested were 0%, 10%, 20%, 50%, and 100%. The DEGDMA and PEGDMA showed to have opposite effects on the glass transition temperature, T_g , which is the temperature range where the material transforms from a glass-like substance to a rubbery substance. The polymers were found to have controllable glass transition temperatures and a very high recovery rate after indentation. These conclusions prove to be beneficial to many future applications, which include medical devices and electric components. For a medical device use, a shape memory polymer can be loaded with a drug that is administered orally, and when it reaches the exact area of application an external heat source can be applied which will cause the shape memory polymer to release the drug. This research is considered ground breaking research in this esoteric field, which will require future detailed research in order to develop fully functional applications.

Presenter: Eric Bunting
 Classification/Major: Sophomore / Pre-Engineering and Mathematics
 Institution: Bethune-Cookman College
 Internship Site: University of South Florida
 Preceptor: Dr. Shekar Bhansali and Dr. Niranjana Ramgir

“Fabrication of Silicon Nanowires on a Silicon Substrate”

Nanowires are extremely thin wires with a diameter of a few nanometers (nm) or less, where $1 \text{ nm} = 10^{-9}$ meters. There are multiple types of nanowires including: metallic, semiconducting, and insulating, which can be made of various materials. Methods for fabricating nanowires are suspending them, or creating them in a vacuum held at the extremities, depositing them, or growing them on the surface of a different nature, and synthesizing them, or assembling them directly from atoms. This experiment demonstrates an alternate method for fabricating silicon nanowires by which they are grown on a silicon substrate. The methodology of this experiment includes: cleaning silicon wafers using RCA (Radio Corporation of America) method, depositing a layer of chromium followed by a layer of gold on the silicon wafer using the thermal evaporation method, and growing the silicon nanowires at 1000°C for 2 hrs in high temperature furnace. Nanowires can be used to make faster and cheaper circuit boards for electronics; this process is significant because it reduces the cost of fabricating silicon nanowires and therefore any processes in which silicon nanowires are used.

ENGINEERING

Presenter: Erica Gray
Classification/Major: Senior / Biomedical Engineering-Mechanical Engineering
Institution: University of Miami
Internship Site: Cordis Corporation
Preceptor: Dr. Loren Latta

“Mechanics of Stent X in Below the Knee Arteries”

Chronic critical limb ischemia (CLI) currently affects more than 750,000 people in the United States today. If the symptoms of CLI go ignored, it can ultimately result in amputation of the foot. Currently treatments for CLI include, medications, cessation of smoking and surgery. Based on a developmental perspective, this article reviews studies on the use of Stent X in the infra-popliteal blood vessels to treat and prevent CLI. External compression tests of the stented arteries, biomechanics of the stented arteries and tensile strength tests of the non-stented arteries were performed. The findings indicate that Stent X is able to remain stationary under normal flexion and extension of the ankle and knee. However, the results also indicate that the structure of the stent is not suitable in the anterior tibial, specifically directly above the ankle. While preliminary results seem promising, to maintain Cordis Corporation's excellent customer satisfaction more clinical trials are suggested.

Presenter: Ana Christina Koo
Classification/Major: Senior / Industrial & Manufacturing Engineering
Institution: Florida State University
Internship Site: High Performance Materials Institute (HPMI)
Preceptor: Dr. Shiren Wang, Dr. Zhiyoung Liang, Dr. Ben Wang and Dr. Chuck Zang

“Precise Cutting of Single-Walled Carbon Nanotubes”

Through various research projects engineers have tried to achieve the ultimate mechanism for controlling the length of nanotubes when these are cut. The goal is to cut sufficiently short nanotubes without damaging its sidewalls. Short nanotubes with open ends represent a great promise to industry due to its applications which are actually real due to its different characteristics such as its selectable electrical properties, strength (strongest fiber possible), and diamond-like thermal conductivity among others. My task in this research is to cut the magnetically aligned single-walled nanotubes membranes, commonly known as buckypaper, in lengths ranging from 50 to 200 nm. From a single aligned buckypaper sheet several strips are cut and stacked together in order to form a rigid block. Water is used as a resin; given that the cutting is made at very low temperatures, it freezes quickly and attaches each layer to the layer below and above it. As mentioned before, short lengths provide us with a better quality on nanotechnology applications and such quality is achieved only at certain conditions. Using an extremely precise diamond's cutting edge of 1-2 nm radius on a ultra-microtome machine at a temperature of -60 °C, the cutting is then proceeds. After the cutting is performed the SWNTs (single-walled nanotubes) are studied with different characterizations and tests such as transmission electron microscopy (TEM) and Raman characterization. These studies indicate that the nanotubes were properly cut and insignificant damage was found in the sidewalls.

ENGINEERING

Presenter: Brian Letzen
 Classification/Major: Senior / Electrical Engineering
 Institution: University of Florida
 Internship Site: McKnight Brain Institute
 Preceptor: Dr. Mareci

“Implanted MR Coil System for In Vivo Imaging & Spectroscopy of a Bioartificial Pancreas”

Of the total U.S. population, 6.3% have diabetes, and 5-10% fall under the category of Type-I diabetes. A proposed solution is the tissue engineered pancreatic substitute. Central to this research is the need for an in vivo mechanism to monitor a host's glucose regulation resulting from the tissue engineered pancreas. This will be carried out through the use of nuclear magnetic resonance (NMR) techniques to monitor construct function and post-implantation physiological effects. This research focuses on inductively coupling an implanted NMR coil with an external coil to overcome SNR limitations. Effective inductive coupling, along with the use of an 11.1 T configuration, can increase the Signal-to-noise ratio by a factor of approximately 10%, enough to allow for successful monitoring. Over sixteen different probe-configurations will be conducted to obtain the optimal signal sensitivity that is necessary. These configurations involve multiple frequencies and different circuit designs, including a two-turned solenoid and a loop-gap resonator. Multiple frequency tuning will allow the measure of magnetic resonance from important biological nuclei, including ^1H , ^{19}F , and ^{31}P . Various factors will be tested, including the size of the implanted coil, the ability to insulate the coil, and the ease of experimental protocol. These methods will guarantee the success of in vivo monitoring to examine the function of the pancreatic substitute correlated to end point physiologic events. Eventually, this project, as a whole, can lead to a solution to Type-I diabetes.

Presenter: Marianne Sacasa
 Classification / Major: Senior / Biomedical Engineering
 Institution: University Of Miami
 Internship Site: UM Miller School of Medicine – Biomaterials Laboratory
 Preceptor: Dr. Fotios Andreopoulos

“Engineering a Dual Growth Factor Delivery Hydrogel”

A vascular injury results in pathological repair and remodeling of vascular smooth muscle cells. Revascularization of the blood vessel occurs when proliferation, migration and remodeling of preexisting mature endothelial cells is activated in a process called angiogenesis. It was reported that granulocyte colony-stimulating factor (G-CSF) can activate proliferation, maturation and functional activities of granulocytes, such as angiogenesis (1,5). A study was conducted to compare the proliferation in vitro in the human endothelial cells (HUVEC) of the cytokines, basic fibroblast growth factor (bFGF) and G-CSF. The results demonstrated how bFGF had a maximal proliferation response compared to G-CSF, but the same order of magnitude for migration. This study demonstrates that G-CSF and bFGF can lead to healing of chronic wounds through angiogenesis. Now a dual growth factor polymer scaffold is being engineered to deliver both G-CSF and bFGF at significant rates to promote proliferation of HUVEC cells.

ENGINEERING

Presenter: Evelyn Mejia
 Classification/Major: Senior / Mechanical Engineering
 Institution: City College
 Internship Site: City College
 Preceptor: Dr. James Hammonds

“Self-Powered Oil-Fired Heating System Based on Thermophotovoltaic Power Generation”

Self-powered appliances, such as a home heating system, have the potential to operate independently from the electric power grid. Thermophotovoltaic (TPV) power generation is well suited for self-powering. This involves generation of electric power by converting radiant heat emitted by a high temperature emitter into electricity using photocells. Since the amount of power generated depends on how much energy is emitted, the radiant emitter becomes an important component of the TPV converter. In this project, a self-powered oil-fired heating system based on thermophotovoltaic power generation was designed and analyzed. For this project, computational and experimental analyses were used to maximize the emitter temperature, measure the emitter temperature distribution, and vary the geometry of the experimental setup in order to reach the desired temperature. The computational fluid dynamics (CFD) model simulated the heat transfer in the combustion chamber. Using the CFD model, possible changes to the shape of the cylinder, placement of the TPV cells, and insulation thickness were explored so as to maximize the emitter temperature and exceed the target of 1300°C. From the CFD, the experimental analysis was designed; this work was part of an iterative process of adjusting the model and the experiments based on their results. The other analysis performed was experimental analysis; two geometrical cases were considered. In the first design case, the experiment was performed using a low Nitrogen Oxides (NOx) (Blue Flame) burner with an open-end cylindrical Silicon Carbide (SiC) attached as a flame tube. The SiC emitter was selected because it can withstand temperatures above 1300°C, which is ideal for energy conversion. The emitter was wrapped with a refractory blanket to simulate the thermal resistance of the photovoltaic cells. In second design case, the flame tube was simply used to guide the flame toward a flat plate emitter, refractory blanket, and TPV cells that were placed at the open-end of the combustion chamber like a “target wall”. The results for the first case showed the maximum temperature along the emitter was 1283°C and the second case, the gas temperature at the target wall reached 1569°C. Therefore, the second case was the ideal approach because it shows promise of being able to heat up the emitter above the desired temperature, 1300 °C.

Presenter: Chirag Shah
 Classification/Major: Sophomore / Engineering
 Institution: Tallahassee Community College
 Internship Site: Tallahassee Community College
 Preceptor: Wilbert Butler

“Phase Change”

Phase Change is the newest technology for the computer processor cooling. When over clocked, the processor will generate lots of heat and will shut down if not cooled properly. The purpose of this project is to observe how much I can over clock my processor in order to build a phase change that will allow further over clocking.

ENGINEERING

Presenter(s): LaKausha T. Simpson, Shaun Fusher & Darinka Butirich
Classification/Major: Senior / Industrial Engineering
Institution: University of Florida
Internship Site: Shands @ The University of Florida
Preceptor: Dr. Rudy Santacrose

“Shands Health Care Critical Care Patient Database Development”

As a requirement of University of Florida College of Engineering Department of Industrial and System Engineering Department course Senior Design, LaKausha T. Simpson, Darinka Butirich, and Shaun Fisher conducted this project to incorporate skills taught throughout undergraduate study of Industrial Engineering. The project was requested by Irene Alexaitis, Director of Nursing for Shands at UF in the summer of 2006. Upon the approval of the project primer by Rudy Santacrose, the official project proposal was implemented with the following objective: “Develop user-friendly and easily modified database to utilize practice standards, benchmarks, and historical data to quickly highlight trends and outliers upon surgery completions.” The purpose of the objective was to counter the statement “Shands’ Division of Critical Care lacks patient care procedures that will allow timely data collection and analysis of practice standards, benchmarks, and historical data to quickly highlight trends and outliers upon surgery completions.”

Presenter: Tatiana Soldo and Luis Atencio
Classification/Major: Seniors / Mechanical Eng. & Computer Science
Institution: Florida International University
Internship Site: Florida International University
Preceptor: Dr. Sadjadi

“Transparent Grid Enablement of a Hyper Matrix Multiplication Program Using TRAP/J and Grid Superscalar”

This poster describes how applications written in the Java language can be transparently adapted to run in a Grid environment. To accomplish this, the poster describes the utilization of a Grid framework called GRID Superscalar, and an enabling tool called TRAP/J. The goal of GRID Superscalar middleware is to minimize the complexity of developing Grid applications. TRAP/J (Transparent Reflective Aspect Programming in Java), provides the adaptive behavior by taking as input, an existing Java program and generating an adapt-ready application that essentially provides the mechanism to adapt the original (existing) program at runtime or at startup time. All this process occurs transparently; namely, with no modification to the original source code. Transparent Grid Enablement will be demonstrated, based on a Matrix Multiplication (matmul) program, a hyper matrix multiplication program that will be adapted to run on a Grid.

ENGINEERING

Presenter: Dereje G. Worku
 Classification/Major: Junior / Mechanical Engineering w/ Aerospace Option
 Institution: North Carolina A & T State University
 Internship Site: North Carolina A & T State University - Physics/Chemical Engineering
 Preceptor: Dr. Stanley Tozer and Dr. Eric Palm

“Frequency Drift with Temperature TDO (Tunnel Diode Oscillate)”

The precision with which frequencies can be measured has made the use of oscillators ideal for measurements. Oscillators are widely utilized to study material properties, such as magnetic field, superconductivity, surface impedance, thermal expansion, resistance, Capacitance, and Inductance. My research involves how frequency drifts with temperature in a tunnel diode oscillator. The main objective of the experiment is to build an LC-circuit driven by tunnel diode and measure small changes in inductance and capacitance of each component in our circuit. And compare our results by using other measurement instruments such as Network Analyzer and Time Domain Reflectometer (TDR), and analyze the correlation between resonance frequency, inductance, and capacitance with temperature.

LIFE SCIENCES / BIOLOGY

Presenter: Shanica Carthon
 Classification/Major: Senior / Biology
 Institution: Albany State University
 Internship Site: University of Texas at El Paso
 Preceptor: Dr. Sukla Roychowdhury

“Differential Interactions of α and β Subunits of G Proteins with Tubulin/Microtubules”

Heterotrimeric G proteins play a central role in transmembrane signaling pathways by coupling a wide range of receptors to their effector molecules. G protein γ heterotrimers are inactive in cellular signaling. Receptor activation allows G α to change its association with G $\beta\gamma$ in a manner that both subunits then participate in signaling processes by interacting with intracellular effectors. Emerging evidence suggests that there are interactions between G proteins and microtubules. Recently, G protein coupled receptor activation by agonists (isoproterenol and UK14, 304) suggests $\beta\gamma$ subunits of G proteins are involved in microtubule assembly in vivo. G $\beta\gamma$ was preferentially bound to microtubules rather than soluble tubulin. The present study was undertaken to understand the relationship between α subunits of G protein (G α) and microtubule/tubulin in vivo. To conduct the study, Pheochromocytoma (PC12) cells were cultured and treated with the agonist UK14, 304. Subsequently, cytoskeletal and soluble protein fractions were isolated. Gel electrophoresis, immunoblotting, and confocal microscopy were then used to test the association of G α with microtubules/soluble tubulin and how G protein activation modulates the association. Preliminary findings show that unlike G $\beta\gamma$, G α was preferentially bound to soluble tubulin. Our result suggests that α and $\beta\gamma$ subunits of G proteins interact differentially with microtubules/tubulin system even without agonist activation, and solidify our hypothesis that tubulin/microtubules is an integral part of G protein mediated signaling.

LIFE SCIENCES / BIOLOGY

Presenter: Chanel Cobey
 Classification/Major: Junior / Biology
 Institution: Albany State University
 Internship Site: University of Florida
 Preceptor: Dr. Kevin Powers

"Raman Spectroscopic Study of Necrosis in Human Lung Epithelial Cells (A549) in Culture"

Raman micro spectroscopy was used to monitor spectral and molecular changes in human lung carcinoma epithelial cells (A549) when a toxic chemical was used to induce cell death. Necrosis was induced using 100 μ M Triton X-100. The study also showed the capability of Raman spectroscopy as a non-invasive method of distinguishing various stages of cell death. Raman microscopy measurements were assayed at time intervals of 24, 48, and 72 hours. Essential biochemical changes took place during cell death as denoted by DNA cleavage, protein degradation, and the formation of lipid vesicles. The Raman spectrum of dead human lung cells indicated a breakdown in the phosphodiester bond and O-P-O stretching of DNA corresponding to the 788nm peak. The 782nm peak is due to U, C, and T Ring of Bromine. The sharp peak at 1005nm is classified as phenylalanine and indicates a decrease in protein content or a breakdown of phenyl groups. Another decrease in intensity was found in the vibrations of adenine, guanine, carbohydrates, and the C-H deformation of proteins (1322 and 1342nm). These complex changes are the effects of the induction of cell death by a toxic agent. By the use of curve fitting, these spectral changes were computed and identified as indications of cellular death.

Presenter: Latreca Ivey
 Classification/Major: Senior / Biology
 Institution: Florida A&M University
 Internship Site: Florida A&M University – Department of Biology
 Preceptor: Dr. Richard Miller

"Measuring the Phenotypic Variation in Natural Population of an Invertebrate"

Adult female dragonflies (Order Odonata: Suborder Anisoptera) require specific aquatic habitats in which to oviposit their eggs. Therefore, there exists the potential in many populations for male size to influence male-male competition for positioning within the ecological habitat to guarantee access to females. The goal of this study is to survey local dragonfly species diversity and abundance and to determine whether there exists any discernable measure of sexual dimorphism in size among dragonfly taxa. We surveyed eight locales around Tallahassee including lakes, ponds, streambeds, meadows and forests. We photographed and measured total length, head width, wing widths, thorax and abdomen sizes to the nearest 0.1mm and specimens were sexed and identified to the genus and/or species level. Differences between genders and four distinct species are analyzed for statistical differences in an overall size index using principal components analysis and analysis of variance. The highest species diversity of dragonflies occurred in the natural vernal pond whereas among aquatic habitats, the site with the lowest species diversity was a small artificial water impoundment. Statistical analysis reveals a marked difference in the principal component size index (PCA1) between species. However, we accept the null hypothesis of no size difference between adult males and females for each dragonfly species investigated. Among the Golden-Winged Skimmer, there is a trend suggesting males are larger than females but further sampling is required to distinguish a significant difference as an indication of sexual dimorphism. Future mate-choice research will investigate whether factors other than size may be operating for females. Future ecological research will investigate habitat qualities of natural versus artificial water bodies as promoters of species diversity and abundance.

LIFE SCIENCES / BIOLOGY

Presenter: Wilmot Lambert
Classification/Major: Senior / Biology
Institution: Medgar Evers College
Internship Site: Medgar Evers College
Preceptor: Dr. Ebere Nduka

"Role of Hormones in Bivalves"

Classical hormones have long been associated mainly with vertebrates. Invertebrates these hormones are known to be chemical messengers and active signal transmitters. In previous studies we measured levels of monoamines, epinephrine, norepinephrine, dopamine and serotonin in the oyster *Crassostrea virginica* using high performance liquid chromatography. In this study we measured the levels of the steroids testosterone and estradiol 17 β in the tissues of the bivalves *Crassostrea virginica* and *Mytilus edulis*. Results from our present study using ELISA have indicated detectable levels of testosterone and estradiol in the gonads, adductor, and gills of these bivalves. The role of these steroids in bivalves is not very clear. Levels of both steroids were detected in higher quantities in the gonads compared to the quantities found in adductors and gills. Amounts of testosterone measured in gonadal tissues ranged from 9.371 mg/gm tissue (ww) to 10.651 mg/gm (ww). The presence of high amounts of steroids in the gonads may be associated with the reproductive activity in the tissue. We therefore intend to explore the relationship between levels of the steroids during the different seasons especially in spawned animals.

Presenter: Sandra Lester
Classification/Major: Senior / Forensic Science
Institution: Albany State University
Internship Site: University of Florida
Preceptor: Dr. Christopher Dervinis

"Establishing a Protocol for Organogenesis of Populus"

Trees, such as *Populus*, can sequester carbon dioxide through photosynthesis and store the carbon in their cell walls, stems, leaves, and roots. Understanding the biological pathways that control the uptake and storage of carbon dioxide and understanding the genes that ultimately control these processes can allow scientists to genetically engineer trees so they will proficiently store carbon. In this paper we examine different methods of sterilization and various media for callus inductions. A 20% bleach solution was found to be the best for sterilizing tissue. Callus induction proves to be higher on media containing sucrose and a combination of hormones. Callus growth was greater on leaves and stems and was not observed on petioles.

LIFE SCIENCES / BIOLOGY

Presenter: Maria Mercedes
 Classification/Major: Junior / Biology
 Institution: Brooklyn College
 Internship Site: Brooklyn College
 Preceptor: Dr. James Nishiura

“Investigations Into Cell Replication And Celldeath During Mosquito Midgut Metamorphosis”

Mosquitoes are vectors for microbes that cause many human diseases such as yellow fever, dengue fever and malaria. Widely used mosquitocides have juvenile hormone analogues (JHA) as their active agents. The JHAs block mosquito metamorphosis but the mechanisms by which they do so are not well understood. One overall purpose of our experiments is to study mosquito metamorphosis with the goal of understanding the mechanism of JH action. During mosquito metamorphosis there is a remodeling of the midgut. The larval midgut contains diploid and polytene cells. Midgut metamorphic remodeling involves removal of polytene cells by programmed cell death and an increase in the number of diploid cells. The pupal midgut is composed on only diploid cells. The remodeling of the midgut is altered by the exogenous application of the JHAs, pyriproxyfen and methoprene. The application of JHAs to 4th instars results in midguts with fewer diploid cells. The experiments reported here use Brdu to follow the pattern of diploid cell division during midgut remodeling. The results show that by 27 hrs after the last larval molt most diploid cell division occurs in the posterior midgut. 24hrs after the 4th instar molt polytene cell DNA synthesis ceases. The result also show that pyriproxyfen treatment during the fourth instar inhibits diploid cell division.

Presenter: Elizabeth M. Raffi
 Classification/Major: Senior / Neuroscience-Psychology
 Institution: Lehman College
 Internship Site: Lehman College
 Preceptor: Dr. Keith R. Happaney

“The Relation Between Personality Style Depends on Cultural Ideology”

Authoritarian parenting—a style in which parents demand strict adherence to a rigid set of guidelines—has been associated with hostility toward children, but this relation appears to depend on whether or not parents are from cultures that possess a collectivist ideology; i.e., subjugate personal desires for the sake of the group. For example, for those from collectivistic cultures, authoritarian parenting has been found to be unrelated to hostility toward children. (Rudy & Grusec, 2001, 2006) This might be because, as suggested by Rudy, Grusec, and Wolfe (1999), authoritarian parenting is consistent with the socialization goals of collectivistic groups and engaged in for the sake of the child. Conversely, for parents possessing a more individualistic cultural ideology, authoritarian parenting might represent more general cognitive or motivational factors. Recently, in a study in which collectivism was not measured, Happaney, Cassels, and Grusec (in preparation) showed that authoritarian mothers were cognitively inflexible, as assessed by a neurocognitive task used to assess the ability to use negative feedback to guide behavior. In the current study, 104 female undergraduate students, of predominantly Latino and African American background, completed questionnaires concerning their parenting styles/beliefs, the extent to which they manifested a more general authoritarian personality, and the extent to which they manifested a more general authoritarian personality, and the extent to which they possessed a collectivistic orientation. It was predicted that for those low in collectivism, authoritarian parenting would be predicted by authoritarian personality style whereas this would not be the case for those high in collectivism. Findings were consistent with these predictions and suggest that for individualistic people, authoritarian parenting might reflect a more general authoritarian approach to life. In future research, it will be important to assess the cognitive and motivational factors that might serve to differentiate authoritarian parents from differing backgrounds and whether ethnicity serves as a further moderator of these relations.

LIFE SCIENCES / BIOLOGY

Presenter: Shanterial Young
 Classification/Major: Senior / Biology
 Institution: Bethune-Cookman College
 Internship Site: Bethune-Cookman College
 Preceptor: Dr. Doris Ward

“Detection and Characterization of a Novel Bacteriocin from Staphylococcus epidermis that Exhibits Inhibitory Activity Against Pseudomonas spp.”

A Staphylococcus epidermis strain designated SCA1+ was isolated that exhibited antibacterial activity against several species of gram positive and gram-negative bacteria including isolates of Pseudomonas spp. Maximal antibacterial activity against target bacterial species was evident in cell free supernatant fractions following 18 hours of incubation at 37oC. Antibacterial activity, as assessed by the agar-well diffusion method, was stable over a pH range of 4 to 9. The putative bacteriocin, designated epidermin CA1+ was partially purified by ammonium sulfate precipitation followed by centrifugal filtering devices with 30,000 MWCO. The mode of action of epidermin CA1+ was bactericidal and resulted in cell lysis of target bacteria. Inhibitory activity of partially purified fractions was not sensitive to acid neutralization or catalase treatment. Incubation with the proteinaseK enzyme resulted in loss of activity. We also determined growth conditions influencing bacteriocin production by S. epidermis SCA1+.

MATHEMATICS / MATH EDUCATION

Presenters: Tam Dinh & Reamonn Soto
 Classification/Major: Sophomore / Engineering
 Institution: Tallahassee Community College
 Internship Site: Tallahassee Community College
 Preceptor: Calandra Walker

“The Geometry of Shooting a Basketball”

Using a basketball, we will show the relationship between the expulsion and range of a basketball goal on a basketball court. Our project will take us to the realm of geometry. We believe that the taller a person is, the higher the range that person will have when shooting at a 90-degree angle with an exertion force of 100%.

Presenter: Joly Shah
 Classification/Major: Sophomore / Biology
 Institution: Tallahassee Community College
 Internship Site: Tallahassee Community College
 Preceptor: Calandra Walker

“An Investigation of the Golden Mean”

The golden ratio, also known as the divine proportion, golden mean, or golden section, is number often encountered when taking the ratios of distances in simple geometric figures such as pentagon, pentagram, decagon, and dodecahedron. The purpose of this project is to investigate the golden mean’s connection with continued fractions, Fibonacci numbers, and music.

PHYSICS

Presenter: Tiffany A. Lambert
 Classification/Major: Sophomore / Environmental Sciences-Physics
 Institution: LaGuardia Community College
 Internship Site: LaGuardia Community College
 Preceptor: Dr. James Frost

"The Handheld Polarimeter Project"

In order to truly understand global warming, it is crucial to evaluate the role aerosols play in climate change. Present sunphotometer methods give excellent values for aerosol optical depth, but are limited in determining values of aerosol refractive index. We are developing a method that will synergize sunphotometer and polarimeter techniques and will give more accurate values for aerosol refractive index, optical depth and particle size. The handheld polarimeter and microtop sunphotometer are used to collect data to determine the properties of aerosols in Long Island City, and are compared with data from the AERONET CIMEL sunphotometer at CCNY. Our results show that the corresponding microtop AOT's are slightly below (~10%) the CIMEL. We are unsure if this difference is due to instrument bias, or location. Using the CIMEL and microtop AOT in the polarization analysis gives real refractive indices, which are in agreement with those obtained by CIMEL analysis.

Presenter: Kathryn Bailey
Classification/Major: Doctoral Student-FGLSAMP Bridge to the Doctorate /
Engineering Science-Environmental Engineering
Institution: University of South Florida – College of Marine Science
Graduate Advisor: Dr. John Paul

“The Use of Microarrays in the Detection of the Gene Expression of Ribulose- 1,5-bisphosphate carboxylase/oxygenase (RubisCO) in the Marine Environment”

The Calvin-Benson-Bassham (CBB) pathway is the primary pathway for the movement of inorganic carbon in the biosphere. The key enzyme in this pathway, ribulose-1,5-bisphosphate carboxylase/oxygenase (RubisCO) is encoded by the gene fragment *rbcl*. Recently, microarrays have been used to study functional gene expression from environmental samples. The purpose of this research is to combine microarray technology and *rbcl* expression analysis to investigate phytoplankton populations in the Mississippi River Plume. Total RNA was extracted from water samples collected from the Mississippi River Plume in 2005. cDNA was made from total RNA and amplified with *rbcl* primers in a polymerase chain reaction (PCR). PCR amplicons were labeled and hybridized to microarrays containing known PCR-amplified *rbcl* products obtained from various locations. Information from the microarrays will be compared to real-time PCR (RT-PCR) *rbcl* data obtained from the plume. These array and RT-PCR data will provide insight into which groups of phytoplankton are responsible for carbon fixation in the plume.

Presenter: Cecilia Claudio
Classification/Major: Graduate Student M.S. / Environmental Science & Policy
Institution: University of South Florida / Environmental Engineering
Graduate Advisor: Dr. Audery Levine

“Pathogen Monitoring, Disinfection Treatment Effectiveness, and Sampling Practices for Reclaimed Water”

Typically, the monitoring of the disinfection effectiveness and microbial quality of reclaimed water is conducted by routine monitoring of indicator organisms (IOs), pathogens, and the levels of the chlorine residual at the effluent. Statistical analyses of pathogens, IOs, and residual chlorine data (2001-2006) from eight water reclamation plants (WRPs) were carried out in order to evaluate the interrelationships between disinfection effectiveness and monitoring practices in the state of California. Because of the sample size for the pathogens (3/yr over 5 year span) and the statistical results obtained, it was concluded that IOs are not accurately representing the presence/absence of the pathogens, that there is no correlation among the pathogens, and that though in compliance with the monitoring regulations of the state of California, the sampling program used is not sufficient for determining disinfection effectiveness or accurate representation of the microbial water quality.

Graduate Presentations

Presenter: Sydni Credle
 Classification/Major: Doctoral Student / Mechanical Engineering
 Institution: University of Florida – Department of Mechanical & Aerospace Engineering
 Graduate Advisor: Dr. William E. Lear

“Reduction of Methanol Crossover in Direct Methanol Fuel Cells”

Direct methanol fuel cells (DMFC) are emerging as a viable technology to displace lithium-ion batteries as the main energy provider to portable devices such as laptops, cell phones, and PDAs. DMFCs are electrochemical devices that produce electricity as a by-product of a chemical reaction between methanol and oxygen across an ion-conducting electrolyte, commonly the polymer electrolyte membrane (PEM). A critical technological barrier of DMFC is a phenomena called ‘methanol crossover,’ which occurs when fuel from one side (anode) of the PEM electrolyte travels to the other side (cathode). This occurrence causes an inefficient usage of fuel and a decrease in the overall performance of the cell. One of the main research and development objectives for DMFC is the prevention of this occurrence. This presentation provides an introduction to DMFC technology, a detailed explanation of methanol crossover, as well as an overview of solution techniques to alleviate this problem.

Presenter: Nuvala Fomban
 Classification/Major: Graduate Student M.S. / Biomedical Engineering
 Institution: University of South Florida / Biosensors & Biomaterials Research Lab
 Graduate Advisor(s): Dr. Francis Moussy and Dr. Yvonne Moussy

“Development of Biodegradable Microspheres to Release Anti-Inflammatory Drugs around Biosensor”

The objective of this work is to develop biodegradable polylactic-co-glycolic acid (PLGA) microspheres for continuous delivery of an anti-inflammatory drug (dexamethasone) for a period of 4 weeks. These microspheres will be used to suppress the inflammatory reactions to implanted glucose biosensors. The microspheres were formulated by an oil-in-water emulsion technique and the size of the microspheres was estimated by NIH scion imaging. The microspheres were successfully fabricated and their average diameter was $45 \pm 13 \mu\text{m}$. Drug loading and release rates were determined by HPLC-UV analysis. It was determined that the drug encapsulation in the microspheres was approximately 5%. In vitro drug release was $31.14 \pm 1.34 \mu\text{g/day}$ for the first 3 days. Over the next 3 weeks, drug released varied gradually from $10.68 \pm 1.13 \mu\text{g/day}$ to $1.32 \pm 0.09 \mu\text{g/day}$. Based on these studies, it is concluded that dexamethasone can be successfully encapsulated and released from PLGA microspheres.

Presenter: Erica Echols
 Classification/Major: Graduate Student M.S. (2nd Year)-FGLSAMP Bridge to the Doctorate / Chemical Oceanography
 Institution: University of South Florida / College of Marine Sciences
 Graduate Advisor(s): Dr. Ashanti Pyrtle and Dr. Kathy Carvalho-Knighton

“TNT Remediation Using Zero-Valent Iron”

This research deals with the use of zero-valent iron (ZVI, Fe⁰) to degrade trinitrotoluene, more commonly known as TNT, into its by-products. The ultimate focus is on emulsifying Fe⁰ particles that are capable of promoting rapid and complete degradation of TNT molecules. ZVI has demonstrated effective degradation of TNT, however, these particles by themselves have significant problems in treating sorbed phase TNT. Fe⁰ emulsion systems were prepared from weighed portions of Fe⁰, water, surfactant and other environmentally safe organic liquids and blended together under high shear forces through the use of a high speed homogenizer. Sonication studies were done to test retention time of TNT on soil and sand. Emulsion studies were done to test effective degradation of TNT. All samples were analyzed using HPLC. Results from these studies will be presented.

Presenter: Henry La Rosa
Classification/Major: Graduate Student M.S.-FGLSAMP Bridge to the Doctorate / Electrical Engineering
Institution: University of South Florida / College of Marine Sciences
Graduate Advisor(s): Dr. Lee Stefanakos and Dr. Ken Buckle

“Investigation of the Rectenna Concept for Infrared Energy Conversion”

The development of a high efficiency antenna-coupled metal-insulator-metal (MIM) detector known as a Rectenna for infrared detection will be presented. In recent years terahertz imaging has attracted considerable attention towards the next generation of military, scientific, and commercial applications. To date infrared imaging has been done by using thermal and photon detectors. Photon detector requires cryogenic cooling making them expensive. Thermal detector on the other hand operates at room temperature, are easy to fabricate, but it suffers from less sensitivity and long response time. The proposed Rectenna carries the same advantages as the thermal detector, along with a much faster response and a higher sensitivity. The goal of this project is to get acquainted with the problems of the overall system design at lower frequencies and come up with possible solutions for infrared applications. In this presentation a fully develop 2.5GHz Rectenna will be presented as well as the preliminary simulations of the 94GHz system.

Presenter: T. Dwight McGee Jr.
Classification/Major: Graduate M.S. / Chemistry
Institution: Florida A&M University – Chemistry Department
Graduate Advisor: Dr. Jesse Edwards

“Electronic Structure and Properties of Small Halogenated Compound Excited States”

Halogenated compounds comprise a diverse class of molecules that has received much attention in recent years as a direct result of its importance in the area of global warming. It is these free halogens that catalytically add to the obliteration of the atmospheric ozone. The ability to theoretically model the thermochemistry of halogenated compounds is of grave importance due to the paucity of experimental information. Special attention will be made to fluoro and brominated hydrocarbons because it is several orders of magnitudes catalytically more active in ozone depletion. Previous theoretical work by Dixon et. al. on the ground states of several small halogenated compounds has prompted this work to parallel the work of Dixon on the excited states of these compounds. These compounds will be studied using advanced quantum mechanical techniques.

Presenter: Dorielle Price
Classification/Major: Doctoral Student (2nd year) FGLSAMP Bridge to the Doctorate / Electrical Engineering
Institution: University of South Florida / Florida-Bio-MEMS and Microsystems
Graduate Advisor: Dr. Shekhar Bhansali

“Effect of Microelectrode Size on Bbioimpedance Measurements of Human Umbilical Vein Endothelial Cells (HUVECs)”

The objective of this research is to design, analyze and determine the optimum electrode size for cell characterization using bioimpedance measurements. In particular, this project evaluates the effect of microelectrode size on bioimpedance measurements and describes a large source of error, namely electrode polarization impedance. Multiple arrays of four gold electrodes of diameters 500, 250, 100 and 50 μm were lithographically defined and fabricated for this experiment. Better characterization of cellular parameters with improved spatial resolution is achieved upon using microelectrodes with dimensions comparable to cell-size. Equivalent circuits were used to describe the systems and their fits were verified through simulations using LEVM (a complex nonlinear least squares fitting simulation program). Characteristic values of the systems, such as cell membrane capacitance and resistance, solution resistance, and electrode polarization, were extracted from the equivalent circuits and compared to values published in the literature.

Presenter: Javier Pulecio
Classification/Major: Graduate Student M.S.-FGLSAMP Bridge to the
Doctorate / Electrical Engineering
Institution: University of South Florida / College of Engineering
Graduate Advisor: Dr. Sanjukta Bhanja

“Quantum Cellular Automata”

Quantum Cellular Automata, also known as QCA, has been touted as a pragmatic use of quantum phenomena, which are currently viewed as a plague in nano-transistor technology. Recent work in Quantum Cellular Automata has expanded QCA technologies into magnetics, an area referred to as Magnetic QCA, by exploiting the magnetic interaction between neighboring cells (nano-magnets). The interactions of orderly fabricated nano-magnets and the viability of nano-magnetic structures as logic building blocks has yet to be explored in great detail. Through providing qualitative data from experimentation, this research will make contributions to further the understanding of both QCA logic devices and the physics of nano-scale magnetic structures. The purpose of this research is to fabricate nano-scale Magnetic QCA cells and determine how factors such as material, size, placement, crystalline structure, grain boundaries, deposition methods, and surface roughness affect magnetic properties of these structures, and characterize the quantum magnetic interactions between the nano-magnetic QCA cells.

Presenter: Karyna Rosario
Classification/Major: Doctoral Student (1st year)-FGLSAMP Bridge to the Doctorate / Marine Science-
Biological Oceanography
Institution: University of South Florida / College of Marine Science
Graduate Advisor: Dr. Mya Breitbart

“Characterization of Viruses in Reclaimed Water”

The increasing water demands of a growing population require alternative strategies for water conservation. Water reclamation and reuse is an important strategy to extend available water resources. The recent finding that plant viruses are abundant in human feces suggests that reclaimed water may contain pathogenic plant viruses. The primary goal of this study is to characterize viruses found in reclaimed water, with particular attention to plant pathogens. Through the use of total viral counts, electron microscopy, PCR, and metagenomic sequencing, this study will identify and quantify the viruses present in reclaimed water. Results show that viral counts in reclaimed water at the point of use are approximately 1000 times higher than in well water and that plant viruses from the Tobamovirus group are present in the reclaimed water supply. These results suggest a possible role of reclaimed water in the dissemination of highly stable and damaging plant viruses.

Presenter: Christina Russell
Classification/Major: Graduate Student M.S. / Chemistry
Institution: Florida A&M University – Department of Chemistry
Graduate Advisor: Dr. Jesse Edwards

“Molecular Dynamic Studies of Several HIV-1 Protease Modified Peptide Inhibitors: Shape & Size Specificity”

Protease inhibition to date is the most successful course in the treatment of HIV. In an attempt to achieve greater results in the inhibition of the HIV virus, Dunn et al synthesized a series of small polypeptides, a few amino groups long as potential protease inhibitors. The structure of these new peptides were designed to better adapt to mutations within the HIV-1 protease, providing increased inhibition. The newly synthesized peptides were modified at the central peptide bond by replacing the central carbonyl group with either hydrogen atoms, hydroxyl groups or a combination of the two. This would allow for increased flexibility of these compounds. Molecular dynamics (NVT ensemble) were used to study the flexibility of the peptides in reduced and native forms. Dynamic studies were conducted at two different dielectric constants, simulating in vacuum and in an aqueous environment (dielectric 78). In each of the cases the compound showed increased flexibility at a dielectric of 78. Also, Monte Carlo simulations were used to calculate volumes and radius of gyration of the minimized structures to determine the shapes of the HIV-1 synthesized protease inhibitors. There was apparent correlation between the calculated shape or volume and activity. Correlation between flexibility of the compound, side chain rotations, and the bioactivity will also be discussed.

Presenter: John Shelton
Classification/Major: Doctoral Student (2nd year) FGLSAMP Bridge to the Doctorate / Mechanical Engineering
Institution: University of South Florida – Mechanical Engineering
Graduate Advisor: Dr. Frank Pyrtle

“Energy Transfer of Nanofluid Suspensions”

Carbon nanotubes have been thoroughly documented to demonstrate superior heat transfer properties and that these properties decrease substantially as overall dimensions increase from the nanoscale to the microscale. In this work, further investigation is presented of the thermal properties of single walled carbon nanotubes (SWNT) suspensions in a single-phase fluid. from the nanoscale to the microscale using non-equilibrium molecular dynamics simulations and finite element analysis. Firstly, correlation was determined to relate the thermal boundary resistances within SWNT bundles with the anisotropic thermal conductivity. Secondly, heat fluxes between varying sized bundles of SWNTs and a surrounding Lennard-Jones (LJ) fluid were calculated and compared. Finally, it was shown that these results were comparable to published data.

Presenter: Jaired Tate
Classification/Major: Graduate Student M.S. / Chemistry
Institution: Florida A&M University – Department of Chemistry
Graduate Advisor: Dr. Maurice Edington

“Spectroscopic Characterization of the Electronic Structural Properties of Diferric Model Complexes Containing the [Fe₂O(O₂CR₂)]₂⁺ Core”

Research efforts on synthetic oxygen bridged metalcomplexes have intensified in recent years due to their structural similarities to several dioxygen activation and transport metalloproteins. One of our research focal points is to understand the relationship between protein/solvent interaction and molecular oxygen binding to protein active sites. Studies of diferric model complexes therefore provide an opportunity to characterize the electronic structural properties of bimetallic centers, which complements synchronous work being done by our group on the diiron oxygen transport protein hemerythrin. Here a series of spectroscopic studies have been conducted on several diferric model complexes containing the [Fe₂O(O₂CR₂)]₂⁺ scheme to clarify how the metal center active-site electronic-structure is mediated by interactions with the surrounding solvent environment and donor ligands. Results from these studies and a discussion of their impact on our understanding of the electronic structural properties of diferric sites will be presented.

Presenter: Phaedra Thomas
 Classification/Major: Graduate Student / FGLSAMP Bridge to the Doctorate
 Institution: University of South Florida
 Preceptor: Dr. Kathleen Scott

“Stable Carbon Isotope Discrimination by Form IC RubisCO Enzymes of the Extremely Metabolically Versatile *Rhodobacter sphaeroides* and *Ralstonia eutropha*”

Variations in the relative amounts of ^{12}C and ^{13}C in microbial biomass can be used to infer the pathway(s) autotrophs use to fix and assimilate dissolved inorganic carbon. Discrimination against ^{13}C by the enzymes catalyzing autotrophic carbon fixation is a major factor dictating biomass stable carbon isotopic compositions ($\delta^{13}\text{C} = \{[^{13}\text{C}/^{12}\text{C}_{\text{sample}}/^{13}\text{C}/^{12}\text{C}_{\text{standard}}] - 1\} \times 1000$). Five different forms of RubisCO (IA, IB, IC, ID, and II) are utilized by algae and autotrophic bacteria reliant on the Calvin-Benson cycle for carbon fixation. To date, isotope discrimination has been measured for form IA, IB, and II RubisCOs, and their ϵ values ($=\{[^{12}\text{k}/^{13}\text{k}] - 1\} \times 1000$; ^{12}k and ^{13}k = rates of ^{12}C and ^{13}C fixation) range from 18 to 29‰, explaining the variation in biomass $\delta^{13}\text{C}$ values of autotrophs utilizing these enzymes. Isotope discrimination by form IC RubisCO has not been measured, despite the presence of this enzyme in many proteobacteria of ecological interest, including marine manganese-oxidizing bacteria, some nitrifying and nitrogen-fixing bacteria, and extremely metabolically versatile organisms such as *Rhodobacter sphaeroides* and *Ralstonia eutropha*. The purpose of this work was to determine the ϵ values for form IC RubisCO enzymes from *R. sphaeroides* and *R. eutropha*. Recombinant form IC RubisCOs were purified by conventional column chromatography procedures. Assay conditions (pH, dissolved inorganic carbon concentration) were tested to determine which parameters were conducive to the high rates of carbon fixation necessary for ϵ determination. Under standard conditions (pH 8.5 and 5 mM DIC), form IC RubisCO activities were sufficient for ϵ determination. Experiments are currently being conducted to measure the ϵ values of these enzymes. Sampling the full phylogenetic breadth of RubisCO enzymes for isotopic discrimination makes it possible to constrain the range of $\delta^{13}\text{C}$ values of organisms fixing carbon via the Calvin-Benson cycle. These results are critical for determining the degree to which Calvin cycle carbon fixation contributes to primary and secondary productivity in microbially-dominated food webs.

Presenter: Daniel Vilceus
 Classification/Major: Graduate Student (5 year BSME-MSME Program) / Mechanical Engineering
 Institution: University of South Florida – Mechanical Engineering
 Graduate Advisor: Dr. Ashok Kumar

“Quantitative Comparison of Thin Film Adhesion Between Scratch Testing and Four Point Bend Testing Methods”

The purpose of this research is replace the onerous but reliable four point bend test with the less intricate yet ambiguous scratch test method. Nanoindentors which have integrated scratch testing capabilities in their systems enable the critical loads at which thin films begin to fracture to be evaluated optically, acoustically, and or by way of analysis of the coefficient of friction. As the semiconductor technology moves further into scaled down device structures, modern day complexities in the fabrication processes become more prevalent. The increased numbers of devices fabricated in a single silicon chip has exponentially propelled required circuitry needed to interconnect devices. Sample preparation along with four point bend and scratch testing procedures were performed on samples containing a target film of Polyimide, Porous Silica, or Benzo Cyclo Butene to develop a basic understanding to correlate the mechanisms that control the delimitation of multi-layered structures in the aforementioned methods.

Presenter: Duane E. Williams
Classification/Major: Doctoral Candidate / Computational Chemistry
Institution: University of Florida – Department of Chemistry
Graduate Advisor: Dr. Kenneth M. Merz, Jr.

“Development of new MNDO Parameters for the Prediction of Chemical Shifts of Drug-like Compounds”

Using a divide and conquer approach to calculate nuclear magnetic resonance (NMR) chemical shifts at the Semiempirical (SE) quantum mechanical level, it is now feasible to routinely study protein systems with hundreds of atoms.¹ However, a known limitation of SE theory is that the method may not correctly predict properties for systems that were not appropriately accounted for in the parameterization. This study involves the generation of a new set of SE NMR parameters based on a large diverse set of drug-like compounds to extend the use of the method to more protein-ligand systems. The formalism is adopted from Patchkovskii and Thiel² and a genetic algorithm was used to generate this new set of SE (MNDO) NMR parameters.

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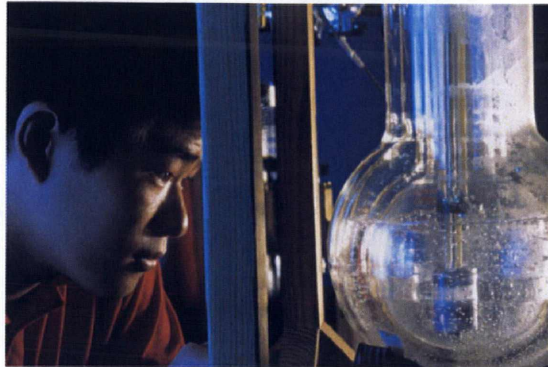
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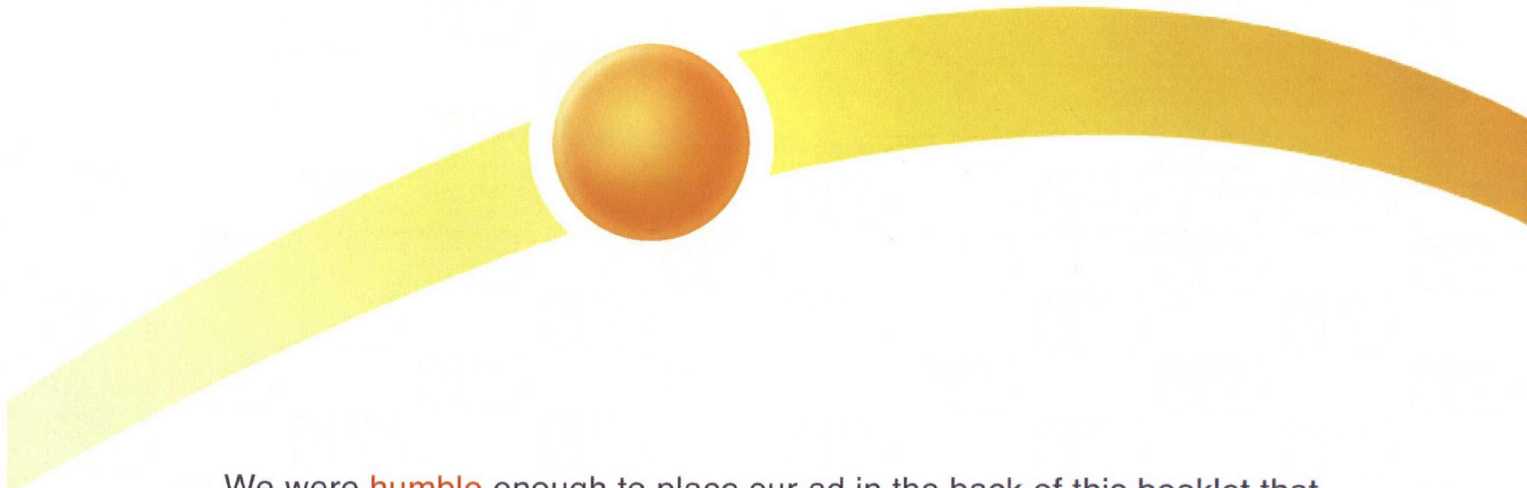
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LSAMP SUMMER OPPORTUNITIES

Research Experiences for Undergraduates (REU)

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Michigan State University, East Lansing, MI
Michigan Technological University, Houghton, MI



The Engineering Research Center for Wireless Integrated MicroSystems (WIMS)

is offering unique, exciting, and challenging summer opportunities for LSAMP undergraduate students interested in MEMS and microsystems research.

Applications are now being accepted for the 2007 LSAMP REU program

The WIMS ERC is focused on the intersection of three key areas: microelectronics, wireless communications, and micro-electromechanical systems (MEMS). WIMS REU students will spend ten weeks conducting research in a cross-disciplinary setting collaborating with faculty, graduate students, research engineers, scientists, and system integrators from industry.

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- **Environmental MEMS:** Microscale Gas Chromatography, Rapid Gas Analysis, Homeland Security
- **Mechanical Sensors:** Accelerometers, Gyroscopes, Pressure and Flow Sensors, Position Sensing
- **Microelectronics:** Low-Power Circuits, Sensors, Optimized Compilers, Test Algorithms
- **RF Wireless MEMS:** Microresonators, Filters, Antennas and Arrays, Micromechanical Transceivers
- **Optical MEMS:** Infrared Imaging, Digital Micromirrors
- **Engineered Systems:** Cochlear Implants, Neural Prostheses, Environmental Monitoring

Program Dates: May 29 to August 11, 2007 (10.5-week program)

Financial Support: \$3,600 to \$4,500 stipend for full 10.5 weeks based on level in school.
PLUS: On-campus housing and meals (value \approx \$3,000) and reasonable travel are provided.

Application Information:

For an LSAMP REU Application Form and more information, please visit website at www.wimserc.org

OR

Send your name, address, and phone number, e-mail address, and include a fax number (if available), and we will send an application to you.

Successful applicants are expected to have a minimum GPA of 2.8 on 4.0 scale. Applicants must be a citizen or permanent resident of the United States and an LSAMP student member.

Application deadline: March 15, 2007. Approved applicants will be notified by March 31. Applications received after March 31 will be reviewed and applicants contacted if positions are available.

REU Contact Person:

Peggy Henderson – WIMS Education Program Coordinator
Engineering Research Center for Wireless Integrated MicroSystems
220 EPB, 2609 Draper Rd., University of Michigan, Ann Arbor, MI 48109-2101
(734) 763-5144 • Fax: (734) 647-2342 • Email: peggyh@eecs.umich.edu





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www.gemfellowship.org

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For more information, please contact:

Bernard L. Batson

NSF IGERT, NSF Bridge to the Doctorate, Alfred P. Sloan Minority Ph.D. Programs

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- Administration Building (John & Grace Allen) ... (ADM) ..D-3
- > Cashier's Office
- > Student Welcome Center
- Alumni Center (Sam & Martha Gibbons) (ALC) ..E-5
- Anchin Center (DAC) ..E-3
- Andros Center (RAN) ..E-1
- Andros Office Classroom (AOC) ..E-1
- Argos Center (RAR) ..E-2
- > Residence Services
- Art Museum, Contemporary (CAM) ..D-2
- Arts & Sciences (Cooper Hall) (CPR) ..E-4
- Auxiliary Services (AUX) ..F-1
- Baptist Student Center (BPT) ..G-2
- Behavioral Sciences (BEH) ..E-3
- > Air Force, Army & Naval ROTC
- Beta Hall (RBE) ..E-2
- Bio-Science (BSF) ..D-3
- B'Nai B'rith Hillel House (HIL) ..G-2
- Bookstore (BKS) ..D-2
- Botanical Garden (GAR) ..A-4
- Business Administration (Ferguson Hall) (BSN) ..E-4
- Campus Information Center (CIC) ..D-5
- Castor Hall (RBC) ..E-2
- Catholic Student Center (off campus) (CTH) ..G-2
- Center for Economic Education
(Gus A. Stavros Center) (CEE) ..E-3
- Center for Urban Transportation Research (CUT) ..C-4
- Central Plant (CPT) ..D-2
- Central Receiving & Storage (CRS) ..C-2
- Chapel Center @ USF (CHA) ..G-3
- Chemistry (CHE) ..D-3
- Child and Family Studies (MHF) ..B-1
- Communication & Information Sciences (CIS) ..E-4
- Continuing Education/Educational Outreach . (NEC / MHH) ..A-1
- > Distance Learning
- > Lifelong Learning
- Credit Union, USF Federal (CRU) ..D-1
- Crosswinds Wesley Foundation (WFC) ..G-3
- Dance (FAD) ..D-2
- Delta Hall (RDE) ..E-2
- Diagnostic Institute, University (UDI) ..B-4
- Dialysis Center (DIA) ..A-2
- Education (EDU) ..E-3
- Education Research Child Care Development ... (ERC) ..G-4
- Embassy Suites Hotel C-5
- Engineering (Edgar W. Kopp) (ENG) ..D-4
- Engineering Building II (ENB) ..D-4
- Engineering Building III (ENC) ..D-4
- Engineering Modules A,B,C.....(EMA,EMB,EMC) ..D-4
- Engineering Laboratory (ENL) ..C-2
- Engineering Research (ENR) ..C-2
- Engineering Teaching Auditorium (ENA) ..D-4
- Epsilon Hall (REP) ..D-2
- Eta Hall (RET) ..E-1
- Eye Institute (MDO) ..C-2
- Facilities Planning & Construction (FPC) ..D-2
- Faculty Office Building (FAO) ..E-3
- > Graduate Admissions
- Family Center, USF (MGZ) ..B-1
- Fine Arts Studio (FAS) ..C-2
- Florida Mental Health Institute (Louis de la Parte) .(MHC) ..B-1
- Golf Clubhouse and Operations (GCH) ..E-1
- Greek Housing (GVA-N) F-1
- Grounds and Transportation (PPB) ..D-1
- Health Sciences (MDC) ..A-2
- > Medical Admissions
- > Shimberg Health Sciences Library
- Health Sciences Clinics (MDA) ..A-2
- Health Sciences Endoscopy Center (MDE) ..A-2
- Health Sciences Laboratories (MDL) ..A-3
- Health Sciences Nursing (MDN) ..A-2
- Health Sciences - Therapy (MDT) ..C-1
- Holly Housing (HAA-M) ..E-2
- Human Services (HMS) ..E-3
- Intercollegiate Athletic Facility (IAF) ..F-3
- Iota Hall (RIO) ..E-2
- Kappa Hall (RKA) ..E-1
- Kiran Patel USF Charter School (CSG) ..G-5
- Kosove Hall (RKO) ..E-2
- Lambda Hall (RLA) ..E-1
- Lawton and Rhea Chiles Center (LRC) ..A-1
- Library (LIB) ..D-4
- Life Science (Biology) (LIF) ..C-3
- Life Science Annex (LSA) ..C-3
- Lifsey (President's House) (PRS) ..E-5
- Magnolia Apartments (MAA-H) ..C-4
- Maple Suites (MPA-D) ..E-F-2
- Maintenance and Service Shops (PPC) ..D-2
- Marshall Center (Student Union) (CTR) ..D-2
- Moffitt Cancer Center and
Research Institute (CCD) ..B-2
- Moffitt Child Care Center (CDC) ..B-3
- Moffitt Garage (CCG) ..B-2
- Moffitt Research Institute (MRC) ..B-2
- Moffitt Tower (CCT) ..B-2
- Mu Hall (RMU) ..E-1
- Natural & Environmental Sciences (NES) ..D-3
- Parking Garage (Administration) (PKG) ..D-E-3
- Parking Garage (Crescent Hill) (CHG) ..E-2
- Parking & Transportation Services (PTA-B) ..C-2
- Physical Education (PED) ..F-3
- Athletics, Intercollegiate
- Physical Plant Operations (OPM) ..D-2
- Physical Plant (FMHI) (MHB) ..B-2
- Physics / Mathematics (PHY) ..D-4
- Pizzo Elementary School (PIZ) ..G-5
- Police, University (UPB) ..F-1
- Post Office, USF (PPA) ..D-2
- Printing Services (DUP) ..C-1
- Psychology Research (MGX) ..B-2
- Psychology / Communication Sciences
& Disorders (PCD) ..C-2
- Public Health (CPH) ..A-1
- Recreation Center (REC) ..F-3
- Research Park, USF B,C-4,5
- Science Center (SCA) ..D-3
- Shriners Auxiliary (SHA) ..B-3
- Shriners Hospital for Children (SHR) ..B-3
- Soccer and Track Stadium (STA) ..F-3
- Social Science (SOC) ..E-3
- Social Work, School of (MGY) ..B-2
- Special Events Center (SEC) ..D-2
- Student Health Services (SHS) ..E-2
- Student Services Building (SVC) ..D-3
- > Admissions, Undergraduate
- > Adult & Transfer Student Services
- > Advising, Undergraduate
- > Career Center
- > Educational Outreach
- > Financial Aid Office
- > Human Resources
- > Orientation
- > Registrar
- > Student Employment
- Sun Dome (SUN) ..F-4
- Teaching Auditorium - Theatre I (TAT) ..D-2
- Theatre Arts Rehearsal (TAR) ..D-2
- Theatre II (THR) ..D-2
- Theta Hall (RTH) ..E-1
- Transportation Inspection and
Storage (PPD) ..D-2
- University Lecture Hall (ULH) ..E-3
- University Mall Theatre - off-campus (UMT)
- University Technology Center I & 2 (UTC) ..C-5
- > Architecture and Community Design
- > Graphicstudio
- Village Student Housing Admin..... (VIA) ..F-2
- Visual & Performing Arts (FAH) ..C-3
- Westside Conference Center (MHA) ..A-1
- WUSF-FM 89.7 Radio (WRB) ..E-3
- WUSF-TV Channel 16 (TVB) ..E-3
- Zeta Hall (RZE) ..D-1

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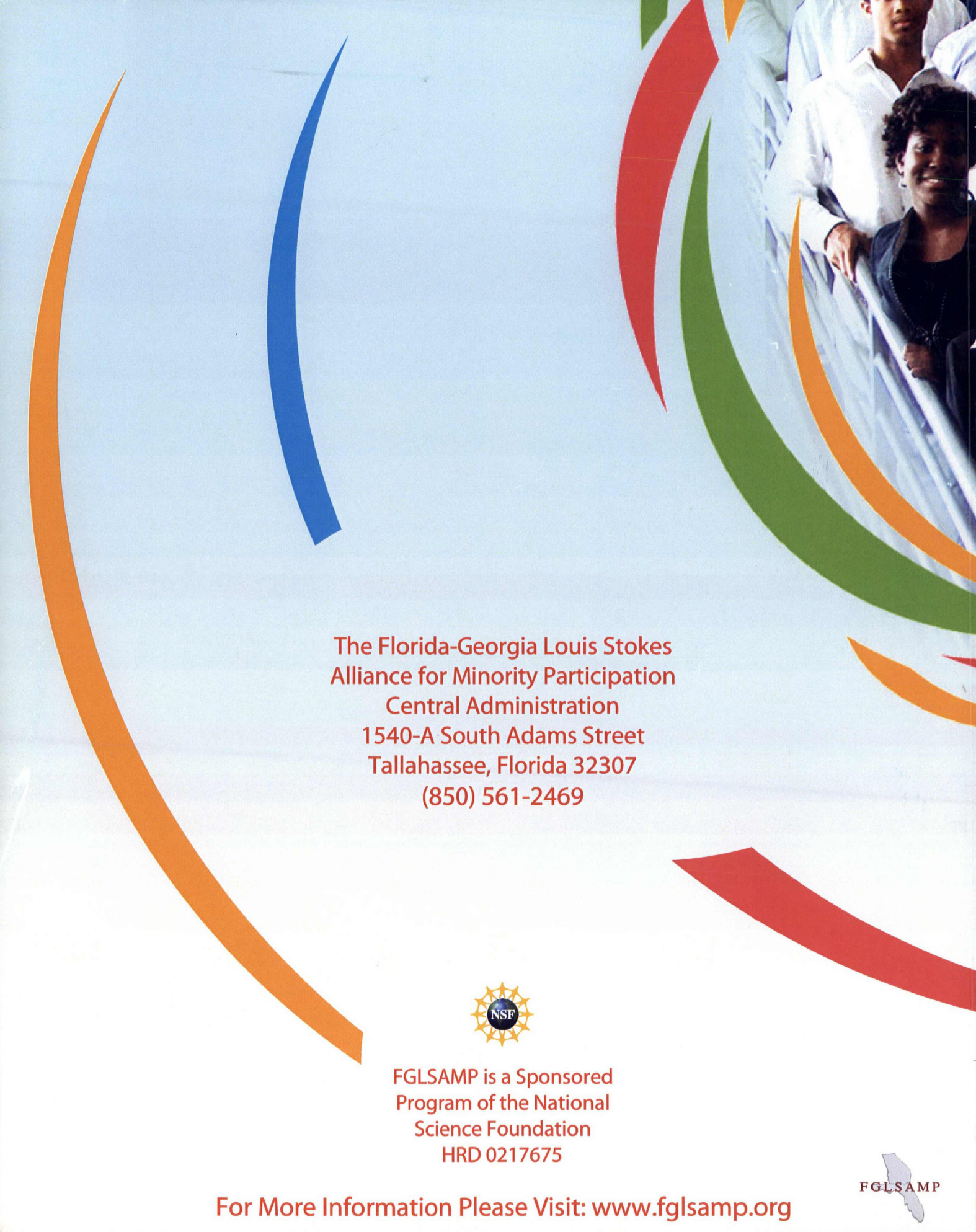
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