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**POSTER
ABSTRACT
BOOK**

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Table of Contents

Program Area	Poster Number(s)
ADVANCE.....	1-14
AGEP.....	15 - 22
CREST/HBCU-RISE.....	23 - 64
GSE.....	65 - 90
HBCU-UP.....	91-103
LSAMP.....	104-120
RDE.....	121-138
TCUP.....	139

ADVANCE

1

Engaging Men in Institutional Transformation

Canan Bilen-Green
North Dakota State University

The NDSU Advance FORWARD project focuses upon the institutional and individual responsibilities for working toward a gender diverse faculty and a supportive, inclusive, and collegial environment. A unique initiative is the Advocates & Allies program designed to intentionally involve faculty men in institutional change to transform departmental cultures and practices. Advocates recruit and train other faculty men as allies, and increase their own knowledge of topics such as unconscious bias and male privilege by discussing relevant literature. On issues of gender equity, men are more open to critique if they hear it from respected male faculty.

2

Iowa State ADVANCE: Progress Toward Transformation

Bonnie S. Bowen
Iowa State University

ISU ADVANCE has become Iowa State's most prominent vehicle to recruit, retain, and advance women and women of color in ISU STEM faculty positions. We are known for a well-managed network, innovative research, and an integrated approach to change. Our program identifies cultures, practices, and structures that enhance or hinder the careers of ISU faculty, and works with faculty and administrators to transform university policies, practices, and academic culture in pursuit of a diverse and vibrant faculty in STEM disciplines.

3

ADVANCEing Faculty by Creating a Climate of Success

Jenna P. Carpenter
Louisiana Tech University

The ADVANCEing Faculty Program in the College of Engineering and Science at Louisiana Tech University aims to enable women faculty to participate in a supportive, nurturing work environment, thus enhancing job satisfaction, research productivity, and retention. The goals of the program are to: 1) strengthen gender-neutrality of the climate by reducing isolation and instituting faculty training; 2) increase retention; and 3) enhance promotion and leadership opportunities. Unique aspects include seeking broad participation, building on-campus partnerships, and institutionalizing programs. This poster reviews impact across the college campus and state, including formative assessments, as well as plans for years three and four.

ADVANCE

4

Formative Evaluation as Catalyst for Institutional

Melissa McDaniels
Michigan State University

During the first three years of its ADVANCE Institutional Transformation grant, Michigan State University has utilized a set of formative evaluation strategies as engines for institutional transformation project. These strategies include an annual review/ RP&T policy analysis, development of a regression model to predict faculty retention, and department chair inventories. The structure and outcomes, where available, are strategies will be presented in this poster.

5

NPA ADVANCE: Facilitating the Advancement of Women.....

Kathleen Flint Ehm
National Postdoctoral
Association

The transition from postdoctoral scholar to faculty is the time of greatest attrition of women, relative to men, from the academic career pipeline in science and engineering. The principal reasons appear to be related to family formation and confidence issues, which create challenges that often disproportionately impact women's careers. To help mitigate these issues, the NPA, with funding from the National Science Foundation, has undertaken the NPA ADVANCE project. NPA ADVANCE aims to foster the transition of postdoc women into the professoriate through the promotion and dissemination of promising institutional practices. More information can be found at www.nationalpostdoc.org/advance.

6

Gender Bias in Scholarly Recognition

Phoebe S. Leboy
Association for Women in
Science

Awards are important markers of success in any career, and in academia they play a central role in hiring, promotion, and tenure decisions. Unfortunately, striking gender disparities in scholarly recognition have hindered the advancement of women and impaired their retention as leaders in STEM. Our goal is to maximize objectivity in the process of giving recognition to scholarly accomplishments. We are working with seven disciplinary societies to identify patterns of behavior that perpetuate implicit bias and develop best practice guidelines. We anticipate that the AWARDS project will lead to similar efforts to improve recognition of women in biomedical societies.

ADVANCE

7

IDEAL: Year Two Achievements

Amanda Shaffer
Case Western
Reserve University

Institutions Developing Excellence in Academic Leadership (IDEAL) is a three-year NSF ADVANCE PAID project to seed gender equity transformation at five regional institutions of higher education in northern Ohio. The goal of this partnership is to create an institutional learning community that is empowered to develop and leverage knowledge, skills, resources, and networks to transform academic cultures and enhance equity and inclusion. IDEAL adapts and disseminates the successful academic leadership development and institutional transformation methods developed by CWRU during its five-year ADVANCE Institutional Transformation initiative. This poster describes the institutional transformation themes, goals, and initiatives of IDEAL's first two years.

8

Implementation of Recruitment & Mentorship Activities by a Collaboration.....

Chrystal A. S. Smith
University of South Florida

The Alliance for the Advancement of Florida's Academic Women in Chemistry and Engineering (AAFAWCE) is a collaboration of five Florida state universities: University of South Florida, Florida State University, University of Florida, Florida Agricultural and Mechanical University and Florida International University. AAFAWCE focuses on implementing recruitment and mentoring activities on their campuses. These activities include: 1) workshops on strategies to increase the diversity of faculty candidate pools; 2) seminars on work/life balance issues; and 3) developing networks to identify faculty mentors and women protégés. In Spring 2012, AAFAWCE will host a COACH workshop on enhancing leadership skills of women faculty.

9

The University of New Hampshire's ADVANCE Program

Ruth Varner
The University of
New Hampshire

The University of New Hampshire's (UNH) ADVANCE PAID program was developed with four primary goals focused on advancing STEM women faculty at UNH: 1) facilitate disciplinary advancement in research and teaching; 2) increase capacity to influence policy and decisions institutionally and nationally; 3) increase satisfaction with resource and research support and minimize feelings of isolation; and 4) increase satisfaction with colleagues, and the deans and chairs who mentor them. These goals are being accomplished through two major initiatives: professional development for STEM women faculty and department chairs and mini-grants to support scholarly partnerships and leadership roles at UNH and nationally.

ADVANCE

10

Gender & International Research Collaborations

Kathrin Zippel
Northeastern University

Women and individuals from underrepresented minorities in the United States seem to be less involved in international research collaborations than men from majority groups. We report the results of an international workshop on international research collaboration funded by the NSF OISE (June 2010), a study of NSF Principal Investigators involved in international collaborations, and of the 2006 NSF Survey of Doctorate Recipients. We find that the gender gap in international collaborations is largest at the senior level and gender does shape the experiences of international research collaborations because of gendered mobility and academic cultures internationally, and complicated by the need for negotiation for resources and flexibility.

11

ADVANCE-Purdue Center for Faculty Success

Suzanne Zurn-Birkhimer
Purdue University

ADVANCE-Purdue focuses on recruitment, retention, and advancement of women STEM faculty at Purdue University. One of ADVANCE-Purdue's strengths is the blending of programming and research. The Center develops and implements programming designed to impact the institution through the hiring process and faculty professional development opportunities. The ADVANCE-Purdue research team assesses the theoretical models on which programs are based, and is developing new models that might be more inclusive in how they represent women faculty members' experiences. ADVANCE-Purdue continually provides campus leadership with evidence of program effectiveness and will offer a basis for campus-wide changes to policy and practice.

12

Empowering STEM Community College Faculty

Sybil Burgess
Brunswick Community College

Brunswick Community College (BCC) has received a \$200,000 grant from the NSF-ADVANCE program to coordinate a comprehensive study of the status of community college women faculty in STEM disciplines. This project involves a consortium of seven community colleges within a 250 mile radius within southeastern North Carolina. These community colleges will participate in institutional data collection and faculty climate surveys. As an extension of these data collection efforts the project will also include data gathered from across the nation for STEM women community college faculty. This data will include items such as tenure models, primary research requirements, course teaching loads, advising expectations and typical administrative duties etc.

ADVANCE

13

A "Small Wins" Approach to Transforming Institutions

Donna L. Sollie
Auburn University

The goal of Advance Auburn is to identify cost-effective "small wins" approaches to creating lasting change in the culture and climate of science, engineering, and mathematics disciplines. ADVANCE institutions completed a survey that asked them to identify perceived costs and benefits of initiatives at their universities. The most cost-effective practices included the "small wins" initiatives of facilitating women's participation in key academic committees, publicizing and facilitating the use of family-friendly policies, offering grant-writing/publication workshops, and providing mentoring programs on promotion and tenure, departmental and university culture, work-life balance, and teaching. Implications focus on ways that educational institutions can adapt and implement "small wins" initiatives.

14

Advancing Excellence Through Evaluation

Julia McQuillan
University of Nebraska-Lincoln

Integrating evaluation and programming enhances our ADVANCE efforts. The evaluation team is central to our project. It includes an Associate Dean of Libraries, internal evaluator, a Sociologist co-PI who directs a survey unit, the ADVANCE Director, the project manager, and an Administrative director. Bi-weekly meetings ensure that we evaluate events and review recently collected data to inform programming decisions. Presenting data to chairs and faculty helps disseminate ADVANCE information. We track registration and attendance with an involvement matrix that enables assessment of the reach of ADVANCE. The logic model focuses efforts and ensures efficient and comprehensive programming and evaluation.

AGEP

15

The Institute on Teaching & Mentoring

Robert Belle
Southern Regional
Education Board

The Compact Institute on Teaching & Mentoring is the nation's largest gathering of racial/ethnic PhD. scholars seeking careers in academia. The Institute addresses the minority faculty shortage by providing scholar attendees support to pursue PhDs and become college professors. The Institute focuses on increasing the percentage of minority PhDs and helps diversify the pool of candidates for faculty positions in the academy. The Institute is a venue where students share insights and tips for success in graduate work, build a community among themselves and faculty, and enrich their research and teaching skills. AGEP scholars enhance their professional development by attending the Compact Institute.

16

FACES: Changing the "Face" of Academia

Comas Haynes
Georgia Institute
of Technology

FACES endeavors to increase the number of under-represented minorities (URMs) that attain science and engineering doctoral degrees, as well as those that enter academia. Primary focus is placed upon impacting the recruitment, retention, and professoriate preparation of students spanning from undergraduate research experiences through doctoral programs of study. The target group is comprised of select scholars (undergraduates) and fellows (graduates) associated with metro-Atlanta universities/colleges Georgia Tech, Emory, Morehouse, and Spelman. Based upon these constituents, the demographical impact is naturally weighted toward African-Americans, but other URMs (e.g., Latino) are also beneficiaries.

17

CUNYAGEP Strategies for Promoting Systemic Change

Gail Smith
City University of New
York Graduate Center

CUNY AGEP activities are designed to increase the number of underrepresented minorities (URMs) in STEM and SBE faculty positions at American universities, colleges, and community colleges. Such activities include recruitment, academic, financial and social support, professional development, mentoring and evaluation. Faculty, students and administrators -- the major stakeholders in the project -- spearhead campus change through a joint assessment of the impact of such activities.

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AGEP

18

North Carolina OPT-ED Alliance

Valerie S. Ashby
University of North
Carolina at Chapel Hill

North Carolina Alliance to Create Opportunity through Education (NC OPT-ED) is an AGEP sponsored program that is designed to increase significantly the number of underrepresented minority (URM) students receiving Ph.D. degrees and ultimately entering the professoriate in science, technology, engineering, and mathematics (STEM) disciplines. NC OPT-ED combines the resources of three AGEP institutions: North Carolina Agricultural and Technical State University (NC A&T), North Carolina State University (NCSU) and the University of North Carolina at Chapel Hill (UNC-CH). Each of our North Carolina AGEP institutions employs creative strategies, develops infrastructure, and engages in substantive partnerships with minority-serving institutions to enhance recruitment, retention, and advancement of students from URM groups.

19

SEAGEP Science and Engineering in the Global Context Program

Anne Donnelly
University of Florida

To address the need for global experience at the graduate level, the South East Alliance for Graduate Education and the Professoriate developed an international project and 3-credit graduate course in collaboration with the University of Florida International Center entitled "Science & Engineering in the Global Context." The program consists of short STEM-focused trips to Chile, China, South Africa, and Brazil for 10-15 participants per destination. The goal of the program is to assist scholars in developing global competencies in preparation for academic careers and to contribute to the research base on the efficacy of short-duration trips on cultural awareness.

20

The Michigan State University CAFFE: The difference between discipline-specific.....

Steven Thomas
Michigan State
University

The Center for Academic and Future Faculty Excellence (CAFFE) is a Michigan State University initiative funded by the National Science Foundation. The CAFFE provides a diverse set of activities to prepare graduate students and post-docs for successful academic careers. The CAFFE features a "Menu" covering four major areas: Expectations of Academic Institutions, Faculty Knowledge Essentials, Academic Work Skills and Responsibilities, and Professional Attitudes/Ethics. With this Menu, an individual working with a faculty mentor develops a curriculum of professional development that complements discipline-specific preparation. This parallel mentoring, at all stages of academic development, is a core feature of the CAFFE.

AGEP

21

IBP-Partnerships for Diversity — New Initiatives

Ashanti Johnson
Institute for Broadening
Participation

The Institute for Broadening Participation (IBP) is a non-profit organization created to design and implement strategies to increase access to STEM (Science, Technology, Engineering, and Mathematics) education and careers for diverse underrepresented groups. The poster will highlight new IBP initiatives in supporting career transitions -- particularly for underrepresented minority scientists- focusing on 1) strengthening the undergraduate summer research experience to prepare for graduate school; 2) the transition from PhD grad to postdoctoral fellow; and 3) the challenges facing junior faculty. The overarching theme will address resources to support mentoring and long term mentor networks.

22

Making Mentoring Skill Development Accessible: A M

David Siegfried
Institute for Broadening
Participation

Mentoring is recognized as a critical element of an effective student centered program and while there is an abundance of resources to assist faculty with strategies for improving the management, programmatic, and instructional aspects of their student programs; the quality of these resources varies and the accessibility is limited, scattered among different organizations, institutions, and websites. IBP is addressing this problem by creating a digital interactive student-faculty manual to improve accessibility and organization of these resources. The manual provides information to the students, undergrad, grad, postdocs, junior and senior faculty on effective mentoring:
www.pathwaystoscience.org.

23

The Use of Event Sequence Diagram (ESD) in Assessing the Safe Operations of Reactor

Sukesh Aghara
Prairie View A&M

The event sequence diagram (ESD) is a fundamental building block of any probabilistic risk assessment (PRA). As a graphical representation of the flow through various stages of an accident sequence, it provides information that is used by the analyst and the safety auditors responsible for complete assessment. By studying an ESD diagram one can analyze the accident sequences, or upset conditions in a process and how the sequence progression is mitigated or terminated through procedure guidance, operator intervention. This paper will discuss the recent nuclear accident at Fukushima in context with the ESD and its use by PRA teams.

24

Synergistic Potentiation of Cisplatin with MFH

Merlis P. Alvarez Berrios
University of Puerto Rico

Studies aimed at understanding the mechanisms involved in the synergistic potentiation of cisplatin with magnetic fluid hyperthermia (MFH) treatment in cancer cells have been performed. We hypothesized that magnetic fluid hyperthermia would produce thermal chemosensitization in cancer cells. Results show that MFH is more effective in inducing cell death in combination treatment when compared to hot water hyperthermia under the same conditions, and it suggests that there is an additional mechanism due to which MFH is more effective. MFH appears to be an excellent candidate for the application of localized HT in combination with Cisplatin.

25

Generation & Application of Localized Service Plasmons by Excitons in Individual Carbon Nanotubes

Igor Bondarev
North Carolina Central
University

Optical properties of semiconducting carbon nanotubes (CNs) originate from excitons and may be tuned by an electrostatic field applied either parallel, or perpendicular to the CN axis. In both cases, exciton properties are mediated by surface plasmon excitations. We demonstrate the possibility of the controlled surface plasmon generation by optically excited excitons in CNs. The effect results in the macroscopic population numbers of surface plasmons associated with high-intensity optical-frequency fields localized along the CN surface. These fields can be used in new tunable applications of CNs, such as near-field nonlinear-optical probing, sensing, and materials nanoscale modification.

The work is supported by NSF (ECCS-1045661 & HRD-0833184), NASA (NNX09AV07A), and ARO (58986-PH-REP).

CREST/HBCU-RISE

26

Research Infrastructure in Advanced Materials

Ashok Batra
Alabama A&M University

The poster briefly describes research at Alabama A&M University with a RISE grant in the area of Advanced Materials and Nanophotonics. The research topics include: nanostructured binary materials and their application to chemical sensing; growth of novel triboluminescent crystals and their application to structural health monitoring; rare-earth ion doped oxyfluoride nanostructured glasses for luminescent devices; high-yield organic solar cells sensitized with metal nanoparticles; two-photon biophotonic nanomaterials for cancer diagnostics/treatment; and nanopatterned substrates for plasmonic sensors. These topics are based on the realization that a research infrastructure in nanoscience/nanotechnology is indispensable to advances in the field of materials science and optics.

27

The Usefulness of Nanomaterials in.....

Ronda Bibbs
Alabama State University

Streptococcus pneumoniae remains a significant human pathogen. Over the past decade, increases in antibiotic resistance in this bacterium have been well documented. This resistance highlights the need for new antimicrobials. The objective of this research is to test metal based nanomaterials to determine their ability to inhibit the growth of *S. pneumoniae*.

Titanium oxide, gold spheres, and silver PVP have been tested as potential inhibitors of *S. pneumoniae* growth. The bacteria were exposed to nanoparticles during growth in liquid media for an entire growth cycle. All nanomaterials tested have shown potential usefulness against *S. pneumoniae* infection.

28

IGERT on Magnetic & Nanostructured Materials

Suely M. Black
Norfolk State University

IGERT-MNM represents the culmination of over 10 years of NSF-HRD (CREST, RISE and PREM) investment in the development of the Center for Materials Research (CMR) at Norfolk State University, and the establishment of the PhD. in Materials Science and Engineering in 2007. IGERT-MNM, awarded in 2010, focuses on training PhD. students at NSU, Cornell, and Purdue in the interdisciplinary area of nanoscience and engineering by their participation in multidisciplinary and multi-campus projects on metamaterials, multilayered structures, and nano-magnetic properties for nanoscale applications. Also, through engagement in pedagogy, trainees develop the skills to generate, conserve, transform, and disseminate emerging interdisciplinary knowledge.

CREST/HBCU-RISE

29

Energy-Efficient Routing in Robotics.....

Donovan Bradley
North Carolina
Central University

We present a novel routing algorithm to increase network lifetime for wireless robotics networks. We accomplish this goal by implementing a sink-initiated routing protocol that uses weighted load-balancing strategies to distribute the energy drain uniformly across the nodes in the network. Through experimentation we show that our algorithm outperforms a high-performing algorithm in the literature both in throughput and efficient network energy utilization by communicating global network conditions with minimal control message overhead.

30

Immunogenicity of Chlamydia trachomatis with a Mucosal Vaccine

Stacie J. Fairley
Alabama State University

Our research goal is to develop a vaccine against Chlamydia trachomatis, the most reported bacterial sexually transmitted infection worldwide. We focused on its major outer membrane protein (MOMP) and cloned a truncated MOMP (aa 249-370) peptide in pESUMO plasmid. Restriction enzyme and sequencing analyses confirmed the presence and good orientation of truncated MOMP (rMOMP-249). rMOMP-249 was expressed, purified, and analyzed by SDS-PAGE and Western blot. A prerequisite for an efficacious Chlamydia vaccine is one that should induce Th1 responses. Thus, studies are ongoing to combine rMOMP-249 with IL-12 and test the construct's ability to induce Th1 responses using mouse macrophages.

31

Spectroscopy of light hypernuclei within three-bod

Igor Filikhin
North Carolina
Central University

The alpha-cluster models $(\alpha+\Lambda)+n+n$ and $\alpha+\alpha+\Lambda$ are applied for description of the low-lying spectra of the ${}^7_{\Lambda}\text{He}$ and ${}^9_{\Lambda}\text{Be}$ nuclei. We proposed new phenomenological potentials to describe the $\alpha\Lambda$ and αN interactions. Configuration space Faddeev equations are used to calculate energy of the bound states. A variant of the method of analytical continuation in coupling constant is applied to calculate the resonance energies of low-lying levels. The proposed model reproduces well available ${}^7_{\Lambda}\text{He}$ and ${}^9_{\Lambda}\text{Be}$ spectral data. Based on this consideration we propose new classification for ${}^9_{\Lambda}\text{Be}$ spectrum as a set of spin-flip doublets.

CREST/HBCU-RISE

32

CFEA Student Research

Lisa Gardner
Alabama A&M University

The CFEA has focused on integrative, multidisciplinary research and strengthening our understanding of the region's forest ecosystems and anthropogenic impacts. Since its inception in 2004, we have engaged 35 graduate students and 111 undergraduate students -- the majority of whom are minorities -- in fields ranging from silvicultural studies and wildlife ecology to genetics and recreation. Students have gone on to a variety of research-related industry and federal careers. These students have been involved in 90 publications and 200 presentations. This poster focuses on the graduate students and their accomplishments and, by extension, the accomplishments of CFEA.

33

TerraFly for Geodata Time Series

Naphtali Rische
Florida International University

TerraFly users visualize and query aerial imagery and data layers. Users virtually 'fly' over imagery via a web browser, without any software to install or plug in. Tools include user-friendly geospatial querying, data drill-down, interfaces with real-time data suppliers, demographic analysis, annotation, route dissemination via autopilots, customizable applications, production of aerial atlases, and application programming interface (API) for web sites. A movie illustrating the TerraFly-powered Time series Hydrology application: <http://n0.cs.fiu.edu/TF-Hydro>
Miami Through Time animation: <http://tv.cs.fiu.edu/tm/prod/timeseriesFull.htm>

The TerraFly project has been featured on TV news programs (including FOX TV News), worldwide press, covered by the New York Times, USA Today, NPR, and Science and Nature journals.

34

Demographic Effects of Bleaching In the Principal Caribbean.....

Raisa Hernandez-Pacheco
University of Puerto Rico

In 2005 the northeastern Caribbean experienced an unprecedented massive bleaching event. We analyzed changes in the vital rates of a *Montastraea annularis* population before, during, and after the event; stochastically projected the population under different bleaching regimes; and quantified the population level effect of the event. Transition matrices were constructed following individual colonies. Population growth rate was in equilibrium, suffered a decline two years after the event, and recovered by 2008. Stochastic simulation indicates that an annual probability of bleaching > 6% would result in a low population growth rate with a 54% reduction in colony abundance after 100 years.

CREST/HBCU-RISE

35

Cross-Layer Link Adaptation Strategies for MANETs

Justin O. James
Prairie View A&M
University

We developed a cross-layer design that combines adaptive multiresolution modulation (AMM) at the physical layer with a truncated automatic repeat request (ARQ) protocol at the data link layer to maximize spectral efficiency under the given delay and error constraints. Simulation results illustrate that retransmissions at data link layer alleviate stringent error control requirements at the physical layer, thus enabling a considerable spectral efficiency gain. The gain offered by allowing retransmissions at the data link layer is comparable with that provided by diversity, given that the maximum number of transmissions per packet is equal to the diversity order.

36

Indoor Situational Awareness System

Kareem Babajide
Prairie View A&M
University

The ever changing complexity of battlefield operations makes it imperative to implore cost-effective technology that will affect improved covert operations, real time solutions for decision making, and minimize the risk to friendly soldiers and innocent civilians. Our mobile station (MS) provides real time visualization through a system of sensors and radios. Localization of the MS (SRV-1) is based on time of arrival (TOA) while relying on algorithm based on the least square approach.

37

Fabrication of Conductive Nanofibers from Function

Omotunde Olubi
Clark Atlanta University

Polypyrrole and poly (2-methoxystyrene) (doped with SWCNT) functionalized with dinitrophenyl (DNP) groups, capable of specifically engaging target proteins anti-DNP IgE and IgE on mast cell surfaces, have been electrospun into nanofibers. Characterization of the nanofibers was carried out by imaging with SEM, AFM and Optical Microscope. The fiber diameters ranged from 150nm to 600nm. Preliminary binding studies of the nanofibers with fluorescent anti-DNP IgE showed that the fibers specifically bind to the protein IgE. The electronic properties of the nanofibers are being investigated. Preliminary studies suggest that the fibers may be developed molecular level sensors for biomarkers.

CREST/HBCU-RISE

38

**Clark Atlanta
University CREST:
Center for Functional
Nanoscale Materials**

Ishrat M. Khan
Clark Atlanta University

Center for Functional Nanoscale Materials (CFNM) constitutes a concentration of researchers, teachers, and resources devoted to addressing the need for increasing the pool of talented scientists, increasing our understanding of the nanoscale and maintaining the Nation's technical competitiveness in the emerging field of the nanoscale. Instrumental to realizing these goals has been the development of national and international partnerships between the Center and a number of institutions. The goals of CFNM include: (a) conducting beneficial and innovative research for the benefit of the Nation and all humanity, and (b) increasing the number of students pursuing graduate and undergraduate degrees in the natural and physical sciences.

39

**Effects of Nanoparticle
Surface Charge on
Cellular Mechanism of
Internalization *Invetro***

Magda Latorre-Esteves
University of Puerto Rico-
Mayaguez

Magnetically responsive nanomaterials are the subject of intense research focusing on their synthesis, characterization, and functionalization. They are attractive in various novel applications such as: a) targeted drug delivery; b) MRI contrast enhancement agents; and c) agents for cancer treatment. For these applications to succeed, nanoparticle physicochemical properties (e.g., shape, size, surface chemistry) must be tailored to promote specific nanoparticle/cell interactions. We have synthesized superparamagnetic iron-oxide nanoparticles functionalized with covalently-grafted carboxymethyl-dextran chains with different degrees of COOH substitution. This confers the effect of giving these nanoparticles different net surface charges, allowing systematic assessment of surface charge effect on nanoparticle/cell interactions.

40

**Photothermal lens
detection & imaging
through.....**

Aristides Marcano
Delaware State University

We report on the use of photo-thermal lens spectrometry for the detection of absorption of gold nanoparticles embedded in highly-scattering, non-absorbing latex solution. Although the concentration was fixed at 200 ppb, the latex concentration was varied up to 180 g/mL. The data indicate that for optical extinction values below 1 the method can be considered free of scattering effects. We discuss the possibility of photothermal lens imaging through highly turbid samples.

CREST/HBCU-RISE

41

PhD Program in MSE at Tuskegee University

Shaik Jeelani
Tuskegee University

The PhD Program in Materials science and Engineering at Tuskegee University started in 1998 with support from the National Science Foundation under the Center for Research Excellence in Science and Technology (CREST) grant. It is the University's first doctoral program, which is designed to substantially increase the number of African American PhDs in materials science and engineering. In March 2011, the Tuskegee University Board of Trustees approved the program to be designated as the Department of Materials Science and Engineering in the College of Engineering and Physical Sciences. Tuskegee University has already produced 21 graduates in Materials Science and Engineering.

42

Center for Research & Education in Optical....

Noureddine Melikechi
Delaware State University

The Center for Research and Education in Optical Sciences and Applications was established in 2006 with a mission to promote multidisciplinary research and education in optics; enhance research capabilities by engaging a diverse population of students; provide a rich intellectual environment for collaborative research; and develop collaborations with the larger community. We describe its achievements, growth, long-term goals, and discuss the lessons learned.

43

Donor-Acceptor Pyrene Alkylamide Derivatives Affinity for Metallic Carbon.....

Chantel I. Nicolas
Clark Atlanta University

While it has been shown that large aromatic molecules can preferentially suspend metallic single-walled carbon nanotubes (SWNTs), the investigation of the effect of functional groups on selection mechanism is lacking. Three pyrene alkylamide derivatives have been shown experimentally to separate SWNTs according to electronic structure and diameter. Using molecular mechanics and first-principles density functional calculations, we investigate the interactions between these pyrene derivatives and SWNTs. Our calculations reveal the detailed acceptor behavior exhibited by these derivatives. This approach provides a way to effectively investigate the spontaneous self-assembly of molecules onto the sidewalls of SWNTs and graphene.

CREST/HBCU-RISE

44

Electron Jumps between Weakly Coupled.....

Igor Filikhin
North Carolina Central University

We are investigating electron localization in GaAs/Al_{0.70}Ga_{0.30}As double concentric quantum rings (DCQR) when a perpendicular magnetic field is applied. In weakly coupled double quantum ring, it is possible for single electron energy levels associated with different rings to cross. Degeneracy is avoided by anti-crossing of corresponding levels of DCQR. We show that in this DCQR the electron spatial transition between the rings occurs due to the electron level anti-crossing. Results of numerical simulation for the electron transition are presented. Effect of trapping of an electron in the inner QR of the DCQR is studied to be applicable for quantum computing.

45

Cycloaddition Functionalization of Carbon Nanotube

Olayinka O. Ogunro
Clark Atlanta University

Covalent functionalizations represent a promising avenue to tailor electronic properties of carbon nanotubes. Recent experimental demonstrated an effective approach toward reducing the off-currents of the mixed nanotube mats for transistor applications via nanotube functionalization, with fluorinated olefins. We have studied the electronic structure characteristics of the corresponding [2+2] cycloaddition onto nanotubes using first-principles density functional calculations. Our calculation results reveal that the experimentally observed suppression of metallic conductivity can be attributed to a symmetry-induced cycloaddition scheme that effectively opens a gap for metallic tubes.

46

Magnetic Nanoparticles Coated with Thermo-Responsive.....

Liliana Polo-Corrales
Universidad Puerto Rico

The temperature of the medium surrounding nanoparticles can be determined by monitoring the change in fluorescence of a thermoresponsive/fluorescent polymer, combining a fluorescent monomer and N-isopropyl acrylamide (NIPAM). p-NIPAM is an attractive component in magnetically actuated drug release using magnetic nanoparticles and oscillating magnetic fields. The relative fluorescence intensity increased rapidly due to energy dissipation from the magnetic nanoparticles upon the application of an oscillating magnetic field, demonstrating that this is a heterostructured nanomaterials suitable to monitor the temperature evolution during magnetic heating.

CREST/HBCU-RISE

47

**NMSU CREST Center
for Computational
Biology**

Enrico Pontelli
New Mexico State
University

The Poster will summarize the activities and accomplishments of the New Mexico State University CREST Center for Computational Biology and Bioinformatics, in terms of research performed, educational development and outreach activities.

48

**Nano Materials for
Biomedical & other
Device App**

Aswini Pradhan
Norfolk State University

Development of nanotechnology opens new fascinating opportunities in the field of biomedical, environmental, and energy applications. We are in the process of developing various nanomaterials for different biomedical applications under the CREST Center at Norfolk State University, for examples: Au/Ir₂O₃ and ZnO nanowires for neural probe and sensor applications; and Ferrite-based core-shell nanostructures for drug delivery. We are conducting toxicity study of the nanoparticles/structures, and theoretical studies of these nanostructures. The common goal is to develop and fabricate biocompatible nano- and bio-inspired material, and devices on a multidisciplinary platform that is highly integrated with interdisciplinary education, training, and outreach activities.

49

**CREST Program at
University of Hawaii at
Hilo**

Donald Price
University of Hawaii at Hilo

The goal of this NSF CREST Project is to increase the productivity and diversity of UH Hilo's graduate program in Tropical Conservation Biology and Environmental Science. The CREST team is pursuing three highly synergistic subproject areas: 1) the phenotypic and genetic responses of species to environmental gradients; 2) the ecology of pristine and human-impacted coral reef ecosystems; and 3) the long-term impacts of climate change on forest dynamics and bird and plant community structures. The TCBES Program works closely with undergraduate degree-granting and research-experience programs to advance students from underrepresented groups to better prepare Hawaii's next generation of science professionals.

CREST/HBCU-RISE

50

Ecosystem Functions & Processes in Disturbed Forest Ecosystem...

Angela Reedy
Alabama A&M University

Although prescribed fires and logging treatments are commonly utilized in forest management, it fails to consider implications of such practices to soil biogeochemical nutrient cycling patterns essential to long-term soil sustainability. This study comprehensively evaluates soil biogeochemical cycling patterns and responses to ecosystem disturbances. It uses microbial DNA sequencing, soil/environmental chemistry, and landscape level analyses to investigate changes in soil microbial communities, carbon sequestration, and nutrient retention/release mechanisms in a disturbed forest ecosystem. Some broader impacts include: (a) providing means to attract underrepresented African-American students to soil/environmental sciences; (b) training students to utilize state-of-the-art instrumentations in soil/environmental analysis; and (c) integrating research techniques into soil science research/ teaching for undergraduate/graduate courses.

51

Self-Assembly of Bioactive Polymer on Graphene Nanoribbon

Darkeyah G. Reuven
Clark Atlanta University

We have investigated the self-assembly of bio-active polymer, modified poly (2-methoxystyrene) on graphene oxide nanoribbons (GONRs). Topographic imaging revealed ordered polymer features, aligned chevron (V) shapes, on the GONRs with heights from 59-74nm. There were no distinguishable oriented structures on the amorphous SiO₂ surface. The reduction of GONRs (R-GONR) significantly reduced oxygen species on the basal plane of the GONRs, oxygen species remained available at the edges. Topographic imaging revealed R-GONR of 0.5nm height with ordered polymer structures composed of aligned chevron (V) shaped polymer features with heights from 4.5-20nm.

52

Data Mining for Personalized Medicine

Naphtali Rishe
Florida International University

The use of data-driven, expert-based, Clinical Decision Support Systems (CDSS) has become a common practice in several areas of modern medicine. The treatment of complex diseases is much more challenging, where the human genome is just one out of an array of factors that influence the dynamics of the disease. The exponentially increasing number of genomic studies related to diseases such as cardiovascular disease, diabetes, and hypertension, is driving the need for accelerated dissemination of such findings into clinical practice. The overall purpose of this project is to design and develop unified methods for generating clinical genomic and metabolic evidence, and encapsulate them in a way that will facilitate their integration with CDSS.

CREST/HBCU-RISE

53

Cyber-ShARE Center of Excellence

Ann Q. Gates
University of Texas
at El Paso

The Cyber-ShARE Center brings together experts in computer science, computational science, education, earth science, and environmental science. The team addresses the challenge of providing information to scientists and other users of cyberinfrastructure (CI) that allows them to make informed decisions about the resources that they retrieve and to have confidence in using results from CI applications. The team conducts innovative research to facilitate the development of CI applications and increase their use by scientists by enhancing CI results with provenance information, trust recommendations, and uncertainty levels (essential areas for the success of CI); and by creating scientist-centered tools and artifacts.

54

CREST Center for Laser Science & Spectroscopy

Jaetae Seo
Hampton University

The CREST Center for Laser Science and Spectroscopy (CLaSS) at Hampton University continues to promote new knowledge in selected areas of optical sciences and technology and provides education and research opportunities for a diverse group of students and faculty. The goals of CLaSS are: 1) to enhance and strengthen the existing research capability and faculty productivity; 2) to increase the number students from underrepresented groups earning degrees in STEM areas; 3) to perform outreach to local K-12 schools. Research thrusts in CLaSS include nonlinear spectroscopy of nanocrystals, fluorescence spectroscopy and laser crystal development, and laser remote sensing.

55

Binding Studies of Polyaniline Metal Salt Composite

Tiana Shaw
Clark Atlanta University

Polyaniline has been shown to be an excellent polymer as the active material in sensors. The conductivity of polyaniline can be changed/controlled through the reaction of redox reactive materials and the resulting system in a polyaniline/metal-salt composite. The change in ratio of the imine to amine groups in the polyaniline should indicate the binding and reduction or oxidation of the polymer when mixed with a metal. In our study, copper (II) nitrate was bound to polyaniline. The binding of the salt caused the reduction of the copper and changed the oxidation state of the polymer. The metal salt composite was characterized using UV-Visible Spectroscopy, IR Spectroscopy, and Scanning Electron Microscopy.

CREST/HBCU-RISE

56

Active Learning Inclusive Excellence in Public Schools....

Oscar Marcelo Suarez
University of Puerto Rico-
Mayaguez

Seeking to further diversity in the future workforce, the Nanotechnology Center at the University of Puerto Rico-Mayaguez pieced together a multilayer outreach approach involving low-income middle and high schools in Western Puerto Rico. Reaching out to more than 350 students, the Center auspices 13 (6 intermediate and 7 high schools) materials science and engineering (MSE) clubs. From creating comic strips to constructing balloon models, MSE Club members discover and learn complex nanotechnology concepts while developing key skills. We present successful active learning activities and strategies tailored to engage students and foster further interest and knowledge in MSE and nanotechnology.

57

C-V Data & Geometry Parameters of Self-Assembled

Vladimir Suslov
North Carolina
Central University

The electron properties of InAs/GaAs quantum rings (QR) in a magnetic field are studied. The original effective model, based on single band kp -approximation with energy dependence of effective mass, is applied. We used two sets of the geometry parameters for the self-assembled QR. The first is the experimentally proposed geometry; the second follows from the oscillator model, due to the relation between parameters of the model and real sizes of quantum objects. We show that the results of the calculations for energy of electron in magnetic field with the second geometry fit the experimental data rather well.

58

Biexcitonic Non-Linearities in Carbon Nanotubes

Toros Torosyan
North Carolina
Central University

We obtained an analytical expression for biexciton binding energy as a function of the inter-exciton distance and binding energy of constituent quasi-one-dimensional excitons (coupled electron-hole pairs excited by external optical radiation) in single-wall semiconducting carbon nanotube systems. This allows one to trace biexciton energy variation and relevant non-linear absorption under external conditions whereby the exciton binding energy changes. These results are useful for the development of tunable optoelectronic device applications of optically excited carbon nanotubes, such as optical switching, sensing, and quantum computing, including the strong excitation regime with optical nonlinearities. This work is supported by NSF (grants ECCS-1045661 & HRD-0833184), NASA (grant NNX09AV07A), and ARO (grant W911NF-10-1-0105).

CREST/HBCU-RISE

59

Research on Environmental Sustainability.....

Venkatesh Uddameri
Texas A&M University-
Kingsville

Texas A&M University's Center of Research Excellence, CREST-RESSACA (HRD-07348500) promotes research opportunities for undergraduate and graduate students focusing on the sustainability of semi-arid coastal areas. The Center enables hands-on experience with state-of-the-art instrumentation and methodologies within laboratories and at various field sites. Being located in the heart of predominantly Hispanic South Texas, a major part of CREST-RESSACA's mission is to increase the representation of minorities attaining doctoral degrees within the field of environmental engineering. During the project's four years, the Center has used South Texas as a test-bed, research at CREST-RESSACA aims to generate knowledge necessary to tackle the challenges threatening the sustainability of semi-arid regions.

60

Located Euler Deconvolution

Gordana Vlahovic
North Carolina
Central University

The New York-Alabama (NYAL) lineament is a northeast trending, 1600 km long, linear magnetic feature of the eastern United States and can be identified on the total magnetic intensity field maps, from the Mississippi embayment in the southeast to the Green Mountains in the northeast. The second most active region of the United States east of the Rocky Mountains, seem to align along that lineament. Since the distribution of these earthquakes does not appear to follow any structural direction known from surface geology, one hypothesis about the seismic activity of that region is therefore that it is due to the reactivation, in the modern stress field, of the fault at the origin of the NYAL lineament. In this work, we apply the located Euler deconvolution technique to the magnetic data of the eastern United States in order to determine the location and depth of the magnetic basement in the vicinity of the NYAL lineament.

61

Fisk's Center for Physics & Chemistry of Materials (CPCoM)

Warren Eugene Collins
Fisk University

CPCoM does state-of-the-art research with four coordinated thrust areas: Nanomaterials and Sensors, Surface Science, Crystal Growth, and Optical Materials. The center also has four outstanding community outreach programs: 1) The Saturday Science Academy for high school students, 2) Science Club for Middle-School students, 3) GUSTO summer science camp for girls, ages 9-15 years, and 4) THRUST summer science camp for boys, ages 9-15 years. The center further serves as the basis for the Masters-to-PhD Bridge program which can have significant impact on the number of minorities receiving a PhD in STEM.

CREST/HBCU-RISE

62

Land-use strategies & forest land cover change in Alabama

Buddhi R. Gyawali
Alabama A&M University

Economic expansion in the 20th century had taxed natural resources severely, and these demands will continue to increase. Our research seeks to provide some answers to the perplexing question, "How can we wisely utilize natural resources (e.g. forest land) and at the same time protect the environment and maintain a high quality of ecological services and sustain economic growth?" We will determine the effects of landowner strategies on the patterns of forest composition change and forest fragmentation and identify the relationships between forest landscape ecological functions.

63

Doctoral Research in Multifunctional Optical Nanomaterials

Jaetae Seo
Hampton University

The goals of this award were to develop the educational research program in nanooptics in the growing Physics PhD program at HU and to build a pipeline for students pursuing advanced research in nanoscience and nanotechnology. The specific emphasis of the grant was to enhance the education and research capabilities in the area of optical nano-physics. Research activities in this program focused on two trusts: 1) multifunctional nanoscale metals for optical applications; 2) rare earth-activated nano-composites for photonic applications. The presentation will include successful research and education activities of HBCU-RISE at Hampton University.

64

Overview of the CREST Computational Center for Fundamental.....

Branislav Vlahovic
North Carolina Central University

The center is based on five interdisciplinary research projects: nanotechnology, nuclear physics, hypernuclear physics, robotics, geophysics, and seed projects that have as the common component advanced computational methods. It provides an interdisciplinary environment that allows investigators to carry out collaborative research of a scope and complexity that is not possible through traditional funding modes. Center overall mission is to leverage our strong computational science and experimental programs to advance the frontiers of fundamental and applied research while educating a new cadre of STEM students. It will enhance the participation of minority students in STEM areas, where they are critically underrepresented.

65

Increasing Diversity in Computing Programs

Lecia Barker
NCWIT

NCWIT Extension Services Consultants (ESCs) assisted 38 members of the NCWIT Academic Alliance (AA) with increasing diversity in their undergraduate computing programs. The consultants followed a research-based consulting process and used research-based resources to maximize the effectiveness of client efforts. Our poster will illustrate the many initiatives clients undertook and the results they achieved towards greater inclusion and parity.

66

Maintaining Efficacy & Interest in STEM Over School Transitions

Joan M. Barth
University of Alabama

Recruitment of students into STEM undergraduate programs depends to a large degree on maintaining student efficacy and interest in math and science from elementary school through college. We investigated teacher and classroom factors that affect student interest and efficacy in math and science over four key transition periods: the transition to middle school; the transition to high school; the last two years in high school; and the first year of college. Results suggest that students who perceived their teachers as being supportive and using engaging classroom strategies showed greater interest and efficacy in math and science over these critical transitions.

67

The Laboratory Environment & Stereotype Threat

Eric Deemer
Louisiana Tech University

The mediated relationship between perceptions of the science laboratory environment and science self-efficacy was investigated using a multi-group mediation design. Participants were 407 undergraduate students in physics, chemistry, and biology laboratory classes. Results indicated that stereotype threat partially mediated this effect for laboratories lead by female, but not male, instructors. Mastery and performance achievement goals were significant mediators in both groups. Notably, there was a significant negative effect of the laboratory environment on stereotype threat in the female instructor model, whereas this effect was not significant in the male instructor model. Implications for fostering science motivation among women are discussed.

68

Great Science for Girls Quality Assessment Tool

Cheri Fancsali
AED

Great Science for Girls (GSG) teamed with the Weikart Center to develop a program quality assessment tool for afterschool centers. The tool is intended to be low stakes, helping after-school programs and the organizations that operate them learn about the degree to which the programs follow youth development principles as well as specific GSG principles, such as gender equity and hands-on, inquiry-based informal science education. It is also intended to foster reflection and sharing around good practice, and to guide program planning and improvement. The tool will be distributed widely and available free on the GSG website.

69

The Role of Pre-Calculus in STEM Career Choices.

Ulrike Genschel
Iowa State University

This project studies factors through which mathematics and statistics training influences career options and choices in STEM with emphasis on gender differences. We focus on the mathematical history of students, and course and instructor specific data as well as data on mathematics self-efficacy. We seek to understand characteristics of these students in general after taking introductory college level mathematics and statistics, and the role contextual factors and introductory mathematics and statistics courses play in STEM retention. We will show preliminary results regarding the pre-calculus sequence at ISU focusing on student success in this sequence, STEM attrition and performance in downstream courses.

70

Effects of Engineering Projects on Women

Brett D. Jones
Virginia Polytechnic
Institute & State University

How does applying the problem-based learning (PBL) principles of problem definition and team facilitation to first-year design courses affect women's beliefs about and their persistence in engineering when compared to traditional engineering design project pedagogy? To address this research question, we are conducting a mixed-methods longitudinal study of first-year project pedagogies at two universities: the biomedical engineering program at Georgia Tech (which applies an innovative PBL approach); and the first-year general engineering program at Virginia Tech (which incorporates hands-on experience with engineering design). Interventions were implemented to test the effects of problem definition and team facilitation on students' motivation.

71

Community College Pathways to STEM Education for Women

Lois Joy
Education Development
Center

Do community college systems of support for STEM (science, technology, engineering, mathematics) education and occupations reproduce or challenge gender stereotypes? In this research, we examine how gender stereotypes are woven into the institutional fabric of two Massachusetts Community Colleges. Drawing from interviews with administrators and faculty as well as a student survey and focus groups, we examine how systems of support for community college STEM education enhance or discourage women from entering the male-dominated fields of engineering and computer systems engineering technology. With specific attention on the recruitment, support, and progress of students through community college STEM programs, we ask whether the institutions that support STEM education serve women as well as men.

72

Girls RISEnet: Building Capacity to Engage Minority Girls in STEM

Judy A. Brown
Miami Science Museum

Girls RISEnet is broadening capacity of informal science educators to engage/motivate minority girls to explore and pursue science/engineering careers, addressing national need to prepare the next generation of female engineers. Key to the project is a national network of eleven science centers/museums, serving as regional training hubs for museum practitioners. Unified training program materials presented at National Institute are accessible on a resource-rich website.

A national environmental scan assessed number/kind gender equity/diversity programs present in science institutions; data suggested desire to create more exhibits/programs to attract girls to STEM, share resources/strategies for targeted programs, and build outreach capacity, especially for underserved girls.

73

Sustainability Topics for Female Recruitment

Leidy Klotz
Clemson University

One way to meet the need for increased participation of women in engineering is to emphasize aspects of engineering that appeal to women but are not typically associated with engineering in the minds of students. A subject that may fit this description is sustainability, defined as meeting social, environmental, and economic needs without compromising the ability of future generations to do the same. This research project will investigate: a) ways in which high school physical science teachers currently address sustainability-related topics; and b) whether exposure to these topics increases the likelihood that women major in engineering.

74

Gender Attitudes & Tests in College Science

Eric Loken
Penn State University

We report preliminary results from a study of large scale undergraduate science classes designed to link explicit and implicit attitudes with in-class test performance. Almost four thousand students in introductory physics, chemistry, and biology courses completed questionnaires assessing their identification with science, identification with their gender, and beliefs about gender stereotypes regarding the discipline. They also completed corresponding implicit association tests (IATs) to assess the same underlying attitudes. The explicit and implicit measures were then analyzed in the context of class test performance, both at the item level, and aggregating performance across the semester.

75

G-SPELL: Gender & Science Proficiency for ELLs

Sonya N. Martin
Drexel University

In this presentation, we argue that intersectionality and cultural sociology can be used as complementary theoretical frameworks to gain multifaceted understandings about the learning needs of language minority (LM) and English language learner students (ELL) in science classrooms. We specifically focus on intersections between gender, ethnicity, and language in the classroom. We draw connections between international migration patterns and the impact on individual teachers, students and communities in local contexts to illustrate some of the challenges facing teachers and students in linguistically and ethnically diverse science classrooms in two urban K-8 schools.

76

Using Social Network Analysis to Inform Community

Peggy S. Meszaros
Virginia Polytechnic Institute & State University

The Appalachian Information Technology Extension Service (AITES) project's goal is to increase girls' interest in jobs requiring information technology (IT) skills through the development of community capacity. Emphasis is placed on developing community capacity through the training of Community Cohort Teams (CCT). Team members train key "Secondary Stokers," who surround the girls. Through the transfer of knowledge between CCT Members and Secondary Stokers and from these Secondary Stokers to Tertiary Stokers, community capacity is built. Social Network Analysis provides an additional lens to make sense of project diffusion, as well as identify best practices and appropriate and effective course corrections.

77

ENGAGE: Using Research Based Strategies to Retain

Susan Staffin Metz
Stevens Institute of
Technology

The overarching goal of ENGAGE is to increase the capacity of engineering schools to retain undergraduate students by facilitating the implementation of three research-based strategies to improve students' day-to-day classroom and educational experience. Teams from 20 engineering schools will be working to implement ENGAGE strategies in the 1st and 2nd year when student attrition is highest. The following strategies were selected because research indicates that they improve retention of undergraduate engineering students, particularly women: use everyday examples that are familiar to students to teach concepts in STEM courses; improve students' spatial visualization skills; increase and improve faculty-student interaction.

78

Interest in Computer Science: Baseline Result...

Jill Denner
ETR Associates

This poster will present research findings that can be used to increase the number of community college students who pursue a 4-year degree in computer and information sciences. Students enrolled in Introductory Programming classes in 13 California community colleges in the Fall of 2010 were invited to participate. Responses from 546 male and 191 female students from a baseline survey show that high levels of motivation predicted high intention to pursue a computing related major (CRM). Video game play was also associated with intentions to pursue a CRM, and some aspects of family support were predictive for females, but not males.

79

Women in Community College Transfer Pathways

Becky Wai-Ling Packard
Mount Holyoke College

Results are presented from a longitudinal study focused on the progress of women within the STEM community college transfer pathway in Massachusetts. Progress on transfer actions were analyzed by gender and in relation to the composition of their mentoring networks, for community college students across four semesters. In addition, gender differences were analyzed with regard to students' persistence in STEM from the community colleges to four-year institutions, with a focus on key barriers and facilitators (including mentoring).

80

Pathways to Self-Efficacy & Retention of Women

Rachelle Reisberg
Northeastern University

Four universities (Northeastern, RIT, Virginia Tech, and Wyoming) are participating in a longitudinal study to determine the effect of self-efficacy on the retention of women in undergraduate engineering. Controlling for demographic characteristics, this year's study examines the effect of contextual support on three dimensions of self-efficacy: work, career, and academic. Contextual support was defined as the encouragement provided through such institutional means as financial aid or mentorship, and through modeling and conversation. The data revealed that social support from friends, family, and faculty, and from college support services furnish a powerful and independent impact on efficacy over and above demographic qualities.

81

Strengthening the Professoriate at Iowa State University

Diane Rover
Iowa State University

SP@ISU's mission is to support faculty as they develop Broader Impact (BI) activities for NSF proposals, integrate these activities into their research, and receive professional recognition for BI work through the promotion and tenure process. To begin the project, we conducted a needs assessment with ISU faculty and staff to identify opportunities where SP@ISU could provide support as PIs prepare NSF proposals. Based on this assessment we developed a plan to meet these needs. We developed web resources that contain information about campus programs, literature to support BI effectiveness and promote upcoming events. We offered workshops as a means to provide this information to faculty.

82

Science Teachers' Interaction with Males & Females

Jennifer A. Schmidt
Northern Illinois University

Video data from 12 high school science classrooms were examined to describe teachers' use of instructional practices and to characterize teachers' verbal interactions with male and female students. Teachers relied heavily on seatwork and lecture, spending little time on labs. Most verbal interactions with students were focused on moving the day's activities along, rather than on presenting or elaborating content. Teachers spent an average of 39% more time addressing male students than female students. In particular, teachers addressed males more often than females in matters related to presentation and elaboration of course content, in matters related to classroom management.

83

Gender, Literacy, & Science Learning

M. Cecil Smith
Northern Illinois University

The study took place in 12 science classrooms -- general science, biology, chemistry, physics -- in one large suburban high school, and involved 244 students (115 F, 129 M). Students' self-assessments of in-the-moment engagement (concentration, effort, skillfulness) during literacy practices (reading, writing, doing math) and while participating in classroom learning activities (discussing science, doing labs, observing demonstrations) were examined. Engagement during learning tasks has been shown to significantly predict motivation and subsequent academic performance. Differential engagement between males and females on literacy tasks and learning activities is related to some observed gender differences in science achievement.

84

Early Engineering Interests & Attitudes: Can We Identify Them?

Julie Thomas
Oklahoma State University

Signals researchers explored the relationships between 3rd grade parents', children's, and teachers' science and math attitudes, interests, and beliefs about stereotypically masculine and feminine activities. Within the context of the engineering design cycle researchers examined a potential relationship between responses regarding the appropriateness of girls' and boys' engagement in engineering activities. Results suggested girls are more egalitarian in their attitudes, though boys engage in engineering activities at a higher rate. Parents of American Indian girls scored the lowest in their egalitarian attitudes. Researchers hope to expand on these survey items to further reflect the engineering design cycle.

85

Students' Role Assignment in Engineering Team Work

Yevgeniya V. Zastavker
F. W. Olin College of Engineering

We investigate how classroom factors influence engineering students' role assignments within group work. Using interviews with 24 first-year engineering undergraduates in introductory project-based design courses at two small technical schools, we ask: 1) How do students' perceptions of course goals influence roles and task differentiation within group work? 2) What classroom factors influence these perceptions? Analysis indicates three main factors -- grades, clients, and faculty interventions -- affect students -- personal goal orientations, perceptions of classroom goal structures, and conceptions of group work. These factors may influence functional role specialization -- repeated adoption of specific group work roles during students' academic engineering careers.

86

National Girls Collaborative Project: Building the Capacity of STEM.....

Karen A. Peterson
National Girls
Collaborative Project

The National Girls Collaborative Project uses collaboration to expand and strengthen STEM-related opportunities for girls and women. The NGCP model creates a network of researchers, extension service agents, and practitioners, facilitating collaboration, and delivering high-quality research-based professional development. This model changes the way practitioners and educators work to advance the participation of girls in STEM, facilitating the development of gender equitable educational practices, awareness of the role of early education in STEM workforce development, and mutual support of peers locally and nationally. Nearly five million girls are currently served by programs that participate in the NGCP network.

87

Female Recruits Explore Engineering (FREE) to Diverse Young Women Traveling Pathways to STEM

Monica Bruning
Iowa State University

The FREE project and Diverse Young Women Traveling Pathways to Science, Technology, Engineering, and Mathematics is a longitudinal intervention-oriented research study offering new perspective through the implementation of innovative methodology focused on understanding why so few high school girls pursue engineering. The results of the study are clear – with the necessary social capital, ‘community’ support over time, and a self- and peer-guided journey into relative engineering spaces – interest and choice is significantly impacted.

88

4 Change: Enhancing Engineering Society K-12 Outreach

Betty Shanahan
Society of Women
Engineers

4 Change is a collaboration between AISES, NSBE, SHPE, and SWE to increase the outreach capacity and effectiveness among engineering society leadership, staff, and volunteers who are striving to connect and engage all girls in engineering. The objectives are: to build the outreach capacity among society staff and volunteers who develop and offer outreach programs; engender a culture of assessment in the outreach community; create cultural awareness and integrate proven practices for underrepresented groups into outreach planning and implementation; and create a network of knowledgeable society staff, members and leaders committed to developing effective K-12 outreach activities with measureable outcomes.

89

Persistence in Engineering by Gender & Race

Susan M. Lord
University of San Diego

Concern for workforce needs, social justice, and the diversification of the profession has driven considerable research on women and minorities in engineering. There is a need for more research from an intersectional perspective that considers gender and race. In this grant, we have shown that women in all racial groups graduate in 6 years at rates comparable to men. We have also studied how the way we measure persistence of engineering students affects our conclusions. Findings from a longitudinal, comprehensive dataset of more than 75,000 students matriculating in engineering at nine universities reveal that trajectories of persistence from eighth-semester enrollment to six-year graduation are non-linear and racialized.

90

gseSpace Online Community: It's All About You!

C. Diane Matt
Women in Engineering
ProActive Network, Inc.

gseSpace (GSE 1016711) is exploring needs of GSE stakeholders (you!) for a dedicated online learning community. Potential benefits include the ability to connect with peers; exchange ideas; find partners; and share and retrieve relevant knowledge. Stakeholder expectations for such a virtual community will be determined by conducting a needs assessment. In July 2011, we will survey GSE stakeholders--past and present principal investigators as well as others--on potential value, willingness to participate and desired capabilities. Stakeholder needs based on survey results will shape the design of the learning community. It IS all about you!

HBCU-UP

91

Enhancing the Chemistry Curriculum in the Department

George Acquah
Bowie State University

This project has five goals: (1) Develop and Implement a Biochemistry Laboratory course that will be integrated into the current Biochemistry Lecture Course; (2) Enhance the Organic Chemistry Lab II course curriculum with more inquiry-based experiments; (3) Acquire instrumentation to further develop the state-of-the-art teaching and research infrastructure; (4) Assess and Evaluate student understanding of organic chemistry lecture and lab before and after the infusion of new instrumentation and updated experiments, and; (5) Disseminate findings through journal articles, conferences and colloquia presentations. Metrics and data concerning the overall effectiveness of the project will be collected, analyzed and disseminated.

92

Elucidating Undergraduates Epistemology of Science

Leigh Arino de la Rubia
Tennessee State University

A combination of student understanding of the nature of science, an epistemology of science, the student's culture and general worldview has been shown to influence a student's success in science. The underlying scientific epistemological view (SEV) of the student may be a significant factor in student views about science as well as the student's level of success in science. This poster outlines the first year of a mixed-methods Education Research project to elucidate the SEVs of diverse science majors at HBCUs and other universities to determine to what extent student SEV is a factor in undergraduate students' experiences and persistence.

93

Increasing Minority Success in STEM

Calvin Briggs
Lawson State Community College

The Students, Teachers, Educational Partners, and Undergraduate Programs in Science, Technology, Engineering, and Mathematics (STEP-UP in STEM) at Lawson State Community College (LSCC), sponsored by the National Science Foundation (NSF) promotes the persistence of underrepresented minorities in STEM. The "Increasing Minority Success in STEM" poster will describe STEP-UP in STEM's enhanced instructional strategies, academic enrichment activities, and student success stories. The overarching goal of the STEP-UP in STEM is to increase the number of underrepresented minorities in STEM professions, supporting the goal of the National Science Foundation to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.

94

Learning with Multimedia Case Studies

Jan E. Broussard
Louisiana State
University-Eunice

Educational technology literature has advocated the use of multimedia case studies to convey technical concepts. This study is an effort to examine the impact of the LITEE case studies, particularly the Telemedicine in India case study, on students' learning of information technology concepts. Data results focus on increases in actual knowledge, perceptual increases in problem solving skills, perception of learning, higher order cognitive skills improvement, and changes in attitudes toward MIS subject matter. Learning style, gender, GPA, program of study, and level of study are all variables used to analyze and interpret the results from the study.

95

The Center for Mathematical Achievement in Science.....

Danny Hubbard
Grambling State University

The Center for Mathematical Achievement in Science and Technology (CMAST) was established in 2005 at Grambling State University. The implementation project sought to increase the success rate of STEM majors at GSU. The major focus was to increase STEM student performance by reforming mathematics curriculum and course structure in entry level mathematics courses. The project succeeded in increasing the success rate from an average of 20% (fall 2004) to 57.9% (fall 2010). The project also supported research and training activities, including faculty development.

96

Factors Impacting Student Success in Engineering at HBCUs

Felecia M. Nave
Prairie View A&M
University

In 2007, investigators from Prairie View A&M University and Texas A&M University were awarded an HBCU-UP Education Research Project to conduct a mix-method research study aimed at identifying the factors that most significantly impact the academic success of African American students majoring in STEM at HBCUs. Phase I captured the perspective of students (focus groups) and faculty (one-on-one interviews) in a College or School of Engineering at various HBCUs. For Phase II, a questionnaire for students and faculty was developed based on themes identified during Phase I and administered to both in STEM disciplines HBCUs. This presentation details the preliminary results and factors identified in Phase I of the research project.

97

A Critical Language Acquisition Program (CLAP)

Camellia Moses Okpodu
Norfolk State University

Skype™ is an example of a worldwide online application that can be used for acquiring new language skills. As a free Internet voice chatting service, it has the ability to connect people in real-time, no matter the geographical location. In the summer of 2010, Norfolk State University's Intelligence Community Center for Academic Excellence (IC-CAE) provided an introductory Arabic class for twenty-five high school students as a pilot project for the development of a critical language acquisition program (CLAP). The lessons used for the languages were tied into the Virginia Standards of Learning (SOL) for World Geography and Culture.

98

Financial Literacy: a FORCE for Calculus Achievement

Carolyn Morgan
Hampton University

It is important to initiate the basics of undergraduate research early in the college curriculum. A primary avenue for this infusion is a gatekeeper course with the assistance of an advisor or role model in the discipline of the undergraduate student. At Hampton University, a privately endowed, co-educational Historically Black University founded in 1868, the Financially Oriented Research Calculus Experience (FORCE) education research study is being conducted to answer the question: Does a model of curricular instruction focused on the integration of financial applications into student research projects significantly increase achievement in calculus for STEM majors?

99

Improving Student Persistence in Developmental Math Courses

John Reutter
J. F. Drake State Technical
College

Drake State has a current enrollment of 1,565 students, up 124% over all 2007. Developmental math is crucial to Drake State student success as over 65% of entering students are not ready for college-level math. These students have great overcoming their math fears and persistence has consistently ranged around 25% - 30% for several years. Drake State experimented with curriculum revision, changes in teaching strategies, and the use of supplemental instruction. Last year, the persistence rate jumped to 62%. The most significant revision was the addition of supplemental instruction in 2009-10. The reasons for its success are explained.

HBCU-UP

100

Investigation of Effects of Scaffolding Creative Problem Solving Through Question.....

Wei Zheng
Jackson State University

This project builds on the synergy among creativity, self-regulated learning, and motivation, and presents a new holistic conceptual framework of Self-Regulated Learning and Creative Problem Solving (SRL-CPS). Through collaboration among faculty members from engineering and education, the project team will adopt and develop scaffoldings for SRL-CPS, and test and improve them through the research. The research participants will be randomly selected from diverse freshmen in their mandatory service learning for fulfilling the first-year experience requirement, as well as in their subsequent education at Jackson State University. The research will employ quasi-experimental design with the mixed research methods and longitudinal study. Its findings are targeted to contribute to new knowledge on the process of students' higher-order skill development and effective instructions that can facilitate this process.

101

Modeling & Designing Resource Efficient Distributed Network....

Anthony M. Driver
Tuskegee University

Objectives consist of modeling a distributed network management system for MANET's and to demonstrate its effectiveness using OPNET simulation. Also, a set of Management Information Base (MIB) elements will be implemented in each node and cluster head. We consider dividing numerous ad hoc nodes into management clusters where each cluster has a cluster head. These highly mobile nodes use multi-hop intra-cluster communication within the cluster and multi-hop inter-cluster communication between cluster heads.

102

Enhancing Computing Education at Virginia State University with a New Information.....

Dawit Haile
Virginia State University

Via a two-year NSF HBCU-UP Targeted Infusion Grant entitled "Developing a New Information Technology (IT) Curriculum at Virginia State University (VSU)" awarded in 2010, VSU embarked an effort to enhance its computing education with an IT curriculum. This poster demonstrates the development approach and the curriculum. Equipped with both IT and CS curricula, VSU is now uniquely positioned to offer varieties of career choices to its students. Moreover, to stir students' interest, VSU organized "IT Knowledge Contests" and funded students with "IT Scholarship". Nevertheless, the project is being carried out smoothly and future work includes implementation of the IT curriculum.

103

Characterization of Gene Expression Patterns in Breast Cancer Subtypes

Lishann Ingram
Clark Atlanta University

Gene expression patterns, either up regulated or down regulated, for two different cell lines, Estrogen Receptor Positive, and Triple-Negative, with reference to Normal Cell-Line were investigated. Reverse Transcriptase-PCR shows that TGFBR1, TGFB3, and EGFR gene transcripts are expressed in both cancer lines but not in the normal line. qPCR data suggests that TGFBR1 is overexpressed in the triple negative cell line. EGFR expression in the triple negative line suggests that this line is also a representation of a basal like tumor. Immunostaining indicated that EGFR is present on the cell surface of triple negative line but was internalized in ERP, and normal cell line.

LSAMP

104

Strengthening the STEM Pipeline in the Peach State

Cheryl D. Dozier
University of Georgia

The Peach State Louis Stokes Alliance for Minority Participation (Peach State LSAMP), established in 2005, is comprised of five University System of Georgia institutions. The Alliance has provided student funding, meaningful undergraduate research opportunities, professional development, and academic support to 1135 Peach State LSAMP students to date. Via collaborative -- programming including an annual research conference, summer bridge programs, faculty mentored research opportunities, peer mentoring, study groups, tutorial services, career and academic workshops -- the Peach State LSAMP institutions have significantly advanced their academic objectives and collectively achieved greater outcomes than would have been achieved through their individual efforts.

105

Supporting Underrepresented Minority Student Expertise in Science & Math Learning

Gail Coover
University of Wisconsin

WiscAMP includes 22 institutions working to increase the number of underrepresented minority (URM) students who graduate in science, technology, engineering, and math (STEM) within 5 years. WiscAMP is making progress toward its goals through the Small Grants Program, which supports the expansion of successful models already in place and facilitates collaborative relationships between alliance members. WiscAMP Excel, an 8-week summer program to accelerate student learning, is a new program implemented three years ago. Qualitative and quantitative evaluation outcomes show participation in WiscAMP Excel increases in students' math competencies, self-confidence, and commitment to their majors. Information about WiscAMP programs is provided.

106

LSAMP works at the University of Connecticut

Joy Erickson
University of Connecticut

The University of Connecticut is part of the Northeast LSAMP, which includes the University of Massachusetts, Northeastern University, the University of Rhode Island, and Worcester Polytechnic Institute.

Since its inception in 2003, UConn LSAMP has more than doubled the number of STEM graduates to more than 100 per year today.

- 92% of LSAMP scholars have earned their bachelor's degrees 74% of them in 4 years or under.
- In the fall of 2010, the average GPA of the senior class of LSAMP scholars was 3.6.
- In the fall of 2010, LSAMP achieved 100% retention in the STEM fields in all cohorts.

LSAMP

107

Promoting Change in Establishing Best Practices.....

Linda Figueroa
Colorado School of Mines

The focus of the LSAMP Bridge to the Doctorate (BD) program at Colorado School of Mines (CSM) is to promote institutional change by establishing best practices in graduate mentoring in science and engineering fields focused on earth, energy, and environment. CSM hosted its first LSAMP BD cohort in Fall 2010. CSM has modified the BD program established by Colorado State University (2006-2010) to fit the unique structure and environment at CSM. This presentation will describe BD professional development activities and their effectiveness.

108

North Star STEM Alliance--Minnesota's LSAMP Program

Anne Hornickel
University of
Minnesota

We will report results from the North Star STEM Alliance's baseline survey given in the fall of 2010. The purpose of the survey was to understand how multicultural and majority students perceive and feel about the support they receive from their colleges toward achieving a bachelor's degree in science, technology, engineering, and mathematics. The survey collected demographic information, high school preparation in subjects related to the STEM fields, self-efficacy in chemistry, math and physics, as well as information on the collegiate experience. Students were asked if they have, or plan to participate in various extracurricular, academic, and work-related activities. These data were collected to match questions asked by the National Survey on Student Engagement (NSSE).

109

Colorado Alliance for Minority Participation (CO-AMP)

Beverly S. Marquart
Colorado State University

LS CO-AMP is comprised of nine baccalaureate degree-granting colleges and universities, one community college and two junior colleges. The Alliance has established partnerships with the four tribal nations: Jicarilla Apache, Navajo Nation, Southern Ute Indian, and Ute Mountain Ute, located in the Four Corners region. CO-AMP Report Card since 1995-96:

- 89% Increase in STEM degrees awarded
- 84% Increase in undergraduate minority STEM enrollment
- STEM degrees awarded by ethnic breakdown:
 - 240% Increase in African American graduates in STEM
 - 76% Increase in Hispanic graduates in STEM
 - 64% Increase in Native American and multi-race graduates in STEM

LSAMP

110

THE PR-LSAMP/BD PROGRAM

Manuel Gomez
University of Puerto Rico

For the past twenty years, PR-LSAMP has successfully implemented its activities in Puerto Rico; helping thousands of undergraduate and graduate STEM students. We will present a summary of our program activities including the Bridge to the Doctorate Program which has sponsored 94 graduate students to this date.

111

The Virginia-North Carolina Louis Stokes Alliance.....

Marcus L. Martin
Virginia-North Carolina Alliance

The Virginia-North Carolina Louis Stokes Alliance for Minority Participation, under the stewardship of Principal Investigator Dr. Marcus Martin (Vice President and Chief Officer for Diversity and Equity, University of Virginia), is comprised of eight institutions with a mandate to increase the number of underrepresented minority graduates in the STEM fields. Support activities include an annual symposium, graduate school preparatory retreats, summer research opportunities, mentoring, tutoring, and stipends for students. The Alliance is currently in its fifth year.

112

More Than Just Another 'APP'

Mark Payton
Oklahoma State University

OK-LSAMP is completing its 17th year of providing opportunities for under-represented students completing degree requirements, not only at the undergraduate level, but also at the graduate level through the BD program. Scholars and Fellows are presented opportunities to work alongside internationally acclaimed researchers, conduct research in international locations, and present research in journals and at national conferences. Times are changing, and in order to keep up with the ever-changing technology, OK-LSAMP recognizes that Scholars need More than Just Another 'App' to achieve the success they are seeking. OK-LSAMP provides the 'App' for receiving experiences and training that lead to STEM degrees.

113

Large Scale Optimization Model Using Benders Decomposition.....

Sandro Paz
University of South Florida

The inclusion of many variables and constraints are characteristics of the problems faced by the energy package industry today. This paper presents the optimization of a large scale integer problem using a variant of Bender's decomposition throughout a numerical study. It can be used for any production planning or scheduling problem in this industry.

114

Determining Patient Flow & Resource Utilization

Monica Puertas
University of South Florida

The care of patients with multiple injuries demands a large amount of time and the majority requires total care over multiple stages. Such a complex situation requires: (1) a decision support tool to design a well-planned treatment path that achieves the goal of safety, quality and progression; (2) sufficient and well-managed resources. The purpose of this work is to apply healthcare systems engineering methods to improve the delivery of care, leading to an integrated, team-based care delivery frame, which considers the uniqueness of those patients, the complexity of treatment paths and provides the support to optimize the quality of care.

115

A study of the Putative Protective Effect of Pheny

Winchester Stuart
SUNY College
at Old Westbury

Arsenic contamination is a serious environmental problem affecting millions of people via contaminated drinking water extracted from underground aquifers in areas like Long Island. It has been shown that phenylmercaptoacetamide (PMA) has decreased the harmful effects of arsenic on *Caenorhabditis elegans*. In this study the interaction between PMA and arsenate is investigated using the nematode *Caenorhabditis elegans* as an indicator model. Synchronized colonies of nematodes were exposed in liquid medium to concentrations of arsenate with and without PMA in well plates and incubated for twenty-four hours. Mortality rates were calculated for control and treatments.

LSAMP

116

Louis Stokes Alliance for Minority Participation (LSAMP) -The Texas A&M University System

Karen Watson
Texas A&M University

The Texas A&M University System Louis Stokes Alliance for Minority Participation (TAMUS LSAMP) is a partnership comprised of Texas A&M University (TAMU), a Tier I institution; Texas A&M University-Corpus Christi (TAMUCC), an Hispanic serving institution; and Prairie View A&M University (PVAMU), an Historically Black College and University. From its inception in 1990, the mission of the alliance has been to broaden participation of underrepresented minorities (URM) in science, technology, engineering, and mathematics (STEM) disciplines by assisting the successful completion of STEM bachelor's degrees, and increasing the number of students interested in and academically qualified for matriculation into graduate programs.

117

A Genetic Study of the Tyrosine Decarboxylase.....

Camille Warner
SUNY College
at Old Westbury

Tyramine and phenylethylamine are biogenic amines that have been associated with food poisoning. Characterization and detection of these enzymes and their products is critical to monitor food safety. This study aims to sequence the *tdc* genes of *Lactobacillus sakei* and to determine whether the *gdc* gene in *Staphylococcus carnosus* is responsible for the conversion of phenylalanine to phenylethylamine. We were able to elongate the 12kb fragment that is known. Thin layer chromatography (TLC) was used to verify the production of the amines. The TLC image suggested that the gene was inactive or producing a small quantity of the protein.

118

LSAMP Indiana: Advancing STEM Education

Toyinda Wilson-Long
Purdue University

The LSAMP Indiana project is a collaborative among eight university campuses representing diverse perspectives and populations. This Alliance builds capacity in STEM by cooperating across institutions and by implementing programs that provide (1) early research and enrichment experiences; (2) teaching and mentoring opportunities on gatekeeper and upper-level courses; (3) personalized interactions with graduate students and faculty mentors beginning in a student's first year; and (4) professional and personal development opportunities. This poster presents an overview of institutional and statewide practices that align with program goals and of future plans within the Alliance.

LSAMP

119

The Georgia LSAMP Serves Research Students

Randal L. N. Mandock
Clark Atlanta University

The Georgia LSAMP has served research students by offering two research symposia per year, GRE preparation, travel to conferences and meetings, research mentoring, and scientific field trips. LSAMP scholars are organizing a STEM Student Council that will include membership from all alliance institutions. Non-STEM majors, such as from the business and education departments, are becoming involved with LSAMP activities. This collaboration is serving to broaden the career perspective of the LSAMP scholars.

120

A Synthetic Polypeptide Electrospun Biomaterial

Michael C. Cross
University of South Florida

Fiber mats of the synthetic anionic polypeptide poly (Glu, Tyr) were produced by electrospinning. Physical, chemical, and biological properties of fibers were characterized in vitro. Fibers were obtained from water at polymer concentrations of 20-60% (w/v). Spinnability was also influenced by applied voltage and collector distance. Fiber diameter was determined by scanning electron microscopy. Fibers were crosslinked and solubility in aqueous solution was assessed. Different proteases were used to study fiber degradation. Fibroblasts were used to test crosslinked fiber biocompatibility. Polypeptide fiber mats may be useful in applications in medicine, biotechnology, and other areas.

121

A Chronicle of Continuing Success

Diola Bagayoko
Southern University &
A&M College

The Louisiana Alliance is a 16 year old Senior Level Alliance. The major goals of the alliance are to increase the number and the quality minority STEM graduates and to enhance the percentage of these alumni who successfully pursue STEM graduate degrees, with emphasis on the PhD. Thirteen (13) LS-LAMP alumni earned STEM PhD degrees during the 2010-11 academic year. Several LS-LAMP scholars have received international research experience through funding from faculty and university grants. LS-LAMP institutions, including two community colleges, continue to promote the transfer of community college students to STEM Bachelor's degree programs on 4-year partner campuses.

122

Engagement of Students with Disabilities in STEM

Sheryl Burgstahler
University of Washington

Looking for resources to learn how people with disabilities can be successful in science, technology, engineering, and mathematics (STEM)? Searching for ideas on how you can make your project's web and print resources, presentations, and activities more welcoming and accessible to everyone? The RDE Collaborative Dissemination project can help. Working together, a community of representatives of projects funded by NSF's Research in Disabilities Education (RDE) program, has collected print, video, and web content to share evidence-based practices and resources for increasing the successful participation of people with disabilities in STEM. For more information and resources visit <http://www.uw.edu/doi/RDE/>.

123

Alabama Alliance for Students with Disabilities.....

Overtoun Jenda
Auburn University

The Alabama Alliance for Students with Disabilities in Science, Technology, Engineering, and Mathematics (AASD-STEM) is a collaborative research project funded by the National Science Foundation, with the goal of increasing the quantity and quality of students with disabilities receiving associate, baccalaureate, and graduate degrees in science, technology, engineering, and mathematics (STEM) disciplines.

124

STEM-specific Studying & Learning Strategies

Dawn Tamarkin
Springfield Technical
Community College

The Alliance for the Advancement of Florida's Academic Women in Chemistry and Engineering (AAFAWCE) is a collaboration of five Florida state universities: University of South Florida, Florida State University, University of Florida, Florida Agricultural and Mechanical University and Florida International University. AAFAWCE focuses on implementing recruitment and mentoring activities on their campuses. These activities include: 1) workshops on strategies to increase the diversity of faculty candidate pools, 2) seminars on work/life balance issues, and 3) developing networks to identify faculty mentors and women protégés. In Spring 2012, AAFAWCE will host a COACH workshop on enhancing leadership skills of women faculty.

125

Inclusive STEM: Forging Accessible Pathways to STEM

Ronda Jenson
University of Missouri -
Kansas City, Institute for
Human Development

Students with disabilities, including veterans, have talents and career drive to offer, but often lack necessary education for employment in STEM fields. KC-BANCS (Building an Alliance for New Careers in STEM) seeks to increase the number of students and veterans with disabilities who: enter STEM post-secondary academic programs; complete two-year and four-year degrees in STEM fields; and ultimately enter the workforce in STEM related careers. KC-BANCS does this through partnerships with regional STEM educators, community organizations, and individuals with disabilities.

126

SciTrain: Accessible Science & Math for All

Chris Langston
Center for Assistive
Technology &
Environmental Access
(CATEA)

SciTrain helps high school science, computing, and math teachers provide quality education for all students, including those with disabilities. The project includes research and instruction for teachers on how to make courses, classrooms, and labs more accessible.

SciTrain uses Universal Design for Learning (UDL) as a basis for all instruction materials. Studies compare the ideal strategies recommended by SciTrain, strategies actually implemented by teachers, and the barriers or learning styles addressed. Results from studies have been used to edit and update the online modules via a continuous, iterative design process and produce an extensive literature review.

127

Spatial Thinking & Tactile Mapping

Amy Lobben
University of Oregon

This poster presents ongoing activities conducted through two projects, Spatial Thinking in the Curriculum of Students who are Blind or Low Vision (NSF HRD 0930769) and Tactile Mapping Dissemination Project (NSF HRD 0928074). Both projects include a research component, for which we have results (0928074) and preliminary results (0930769). Both projects will result in educational materials that have been and will continue to be used to enhance spatial thinking and tactile map production and use. We include examples of available materials (most notably a user manual for our Tactile Map Editor software) and provide resources for accessing additional materials on our website.

128

Science Olympiad, Students w/ Disabilities & STEM

Jay K. Martin
University of Wisconsin-
Madison

Science Olympiad is a national organization with more than 6200 teams of secondary students. The teams work together all year and compete in a variety of STEM challenges. Students with disabilities participate in Science Olympiad activities, leading to two unique opportunities: 1) Some of the students (and the coaches) need assistance with accommodations to enable participation, and 2) The students represent a significant population with potential for continued success in STEM. This poster describes the program developed between Science Olympiad and the Midwest Alliance in STEM to enable both opportunities to grow.

129

Ohio's STEM Ability Alliance: Ability Advising & Academic Coaching

John Flach
Ohio State University
Medical Center

OSAA is ensuring success through a model devised by NCAA college athletic teams for sustaining academic success: regular tracking of student performance, intervention to assure attendance, productive studying, monitoring of progress, and tailored tutoring. OSAA integrates the use of ODS and academic counselors with the intention to fully cover student's needs. This intensive coaching system is also being used to direct students to special help from psychosocial support groups and professional mentors. Meetings cover: internships/Co-op possibilities, mentoring, finding support groups, transition issues, time management, resume/cover letter/personal statement development, support for new students in college transition, personal relationships, interview preparation, graduate school, stress and coping skills.

130

Improving STEM Learning: Interactive RoboBooks

Elizabeth Murray
Center for Applied
Special Technology
(CAST)

RoboBooks, currently in development by Tufts University's CEEO, is an interactive electronic workbook that brings together many different technologies into one location, providing teachers an easy curriculum development and customization environment and students with engaging learning tools. Researchers at Tufts and CAST have worked together to incorporate UDL supports into the RoboBook software, developed Physics and Chemistry activities leveraging these supports, and piloted these materials with students in Boston Public Schools to explore RoboBook's capabilities for addressing a wider range of learners and investigate its impact on learning and engagement of students with high incidence disabilities.

131

Research in Disabilities Education: Reaching the Pinnacle

Elissa Wolfe Poel
New Mexico State
University

Reaching The Pinnacle (RTP) is a leadership program that focuses on mentoring, partner projects, and RASSI summer institutes. The project mission is to advance the participation of individuals with disabilities in STEM careers. RTP is a state-wide, collaborative effort among professionals at four-year universities (8), 2-year colleges (19), secondary schools (9 in New Mexico; 8 in far West Texas), affiliate partners (18), and sister NSF Alliances (8) -- all who encourage growth, achievement, awareness of higher education options, and opportunities in STEM careers for individuals with disabilities. Outcomes to be shared include graduation rates, program highlights, and post-graduation activities.

132

Developing Integration & Synergies at UF

Nargiza Rakhimova
University of Florida

There is a wealth of NSF-funded projects at the University of Florida (UF). Although they share the common goal of educating, training, and preparing students for professional careers, there is little interaction between these projects. The UF I-Cubed Program is a five-year NSF-funded project with the goal of fostering integration of student-based research and training programs in STEM and SBE disciplines. The Program has been working with NSF-funded and UF-based programs such as SPICE GK-12, UF Career Resources Center, International Center, and Libraries to build integration and synergies ensuring that student experiences are fully integrated with professional training activities across campus.

133

Attitudes & Behaviors of Students with LD

Dara Shifrer
The University of
Texas at Austin

The more negative academic attitudes and behaviors of students identified with learning disabilities are thought to compound their educational struggles. Some theorize that identified students' attitudes and behaviors are a result of their poorer academic histories. Alternatively, students identified with disability may have more negative attitudes and behaviors than similarly low-achieving students who are not identified, as a result of stigma and less positive social interactions. We use the large dataset of both regular and special education students -- The Education Longitudinal Study of 2002 -- to explore how academic histories and social influences (parents, peers and friends, teachers) are implicated in the more negative attitudes and behaviors of students identified with learning disabilities.

134

Emerging Best Practices from OSAA-Dayton

Clark Shingledecker
Wright State University

This poster features several innovative projects undertaken by OSAA Dayton that have shown promise as evidence-based best practices for transitioning 11-12 grade SwD into college STEM majors and for supporting academic success and personal and professional development while SwD pursue STEM degrees. These include the Diverse-Ability U on-campus experiences for high school SwD, and the OSAA Scholars program providing individualized college STEM SwD support and enhancement modeled after comprehensive academic and personal success programs for NCAA student athletes.

135

RDE-FRI: Analyzing the Use of C-Print Mobile Tech

Michael Stinson
Rochester Institute of Technology

This project addresses an unmet need for deaf and hard-of-hearing (d/hh) students to have wireless access to classroom captioning services in varied outdoor and indoor settings, including laboratories. Two goals of the project are: 1) To expand the types of venues in which C-Print Mobile is used to several other universities, a community college, and institutions with RDE-funded Alliances for Students with Disabilities in STEM; 2) To conduct experimental investigations to evaluate the extent to which the service aids students' access and learning in STEM labs at the postsecondary level. Poster session objectives:

1) Illustrate how the C-Print Mobile technology is being used in STEM college laboratory courses; 2) describe trials that have been conducted to date in laboratory settings; 3) share qualitative and quantitative findings from data collected as a result of the trials in laboratory courses.

136

BreakThru — The Georgia STEM Accessibility Alliance

Robert L. Todd
Georgia Tech/CATEA

BreakThru is a collaboration between the University of Georgia and Georgia Tech to provide mentoring for secondary and post-secondary students via the virtual world of Second Life, along with training and supports for teachers, mentors and students.

BreakThru will provide the evidence for scalable impact to other Georgia secondary and postsecondary institutions as well as the national needs of SwD in STEM courses and majors through its research initiatives. The data on scalable impact will be used to inform a model for replication using the virtual world and related social media.

137

Effects of Simulation Enhanced Training for Teachers

Tandra Tyler-Wood
University of North Texas

The purpose of this poster is to disseminate findings on the effectiveness of virtual classroom environments for training teachers to work in an inclusion science classroom. The research seeks to determine if virtual classrooms can increase teachers' knowledge and use of effective teaching strategies to improve the science achievement of students, especially students with special needs. This poster highlights the third year of our project which focused on comparing real students with disabilities with their avatars to determine if real students can be accurately depicted in the virtual classroom.

138

Transforming the Way STEM enrichment programs are made available to students at Hunter College

Stephanie Anderson
Hunter College

Hunter College's Science Mathematics Opportunities Network (SciMON) aims to transform the way STEM enrichment programs are made available to students by: (a.) identifying students for recruitment at a much earlier time; (b.) broadening participation; (c.) expanding paths for information at critical educational junctures; (d.) reinventing the mentoring of students and their research placements; and (e.) assessing the programs' effectiveness and tracking students' progress. SciMON first year accomplishments include considerable progress in creating institutional synergies that did not previously exist, and the use of a new Customer Relationship Management System to help broaden participation and track student progress for program evaluation purposes.

139

**American Indian Sign
Language Linguistic
Corpus**

Jeffrey Davis
University of Tennessee-
Knoxville

This poster features an extensive multimedia digital collection of American Indian Sign Language (AISL) lexical signs, grammatical features, and discourse genres developed with support from NSF's Documenting Endangered Languages (DEL) program. The project brings together sign language linguists and members of American Indian signing communities to make this sign language more accessible. In the process, we are incorporating emergent documentary linguistic technologies and using captions, voice-over, slow motion, and careful explanation to share the AISL digital corpus with scholars and community members for linguistic and cultural studies and for language revitalization. This draws attention to an important, yet sometimes overlooked part of American Indian cultural and linguistic heritage.