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WELCOME LETTER

Dear MORE 2010 Participant,

On behalf of the MORE Division and NIGMS, I want to express our appreciation for your time and commitment on behalf of programs to improve diversity in the biomedical and behavioral research workforce. Most of us come to these endeavors from a background in bench science but we all come with a passion to develop the next generation of science leaders. We have learned on the fly – the hard way. This "How To" conference is a new twist for us and intended as a means of sharing ideas and understandings that will help us make our efforts more effective.

The meeting is packed with concurrent sessions and a poster session from your peers on curricular improvements that should keep you fully occupied and give you a lot of ideas and new skills to take home. However, we could not possibly fit in all of the important concepts in student development activities so some of your questions and concerns may go unanswered. We always look forward to impromptu conversations and mini-meetings in the casual settings of meals and after dinner relaxation. The MORE staff is looking forward to learning as much as we can, both from the structured sessions and from our interactions with each of you.

Welcome and thanks again for your being here.

Clifton A. Poodry Ph.D., Director
Minority Opportunities in Research Division
NIGMS/NIH

DAILY SCHEDULE – *all activities will take place on the Lobby Level*

Wednesday, June 9, 2010

3:00 PM – 5:00 PM	Meeting Registration	LaSalle Ballroom Foyer
5:00 PM – 6:00 PM	Welcome & Meeting Objectives	Executive Forum
6:00 PM – 8:00 PM	Social Reception & Poster Session	LaSalle A

Thursday, June 10, 2010

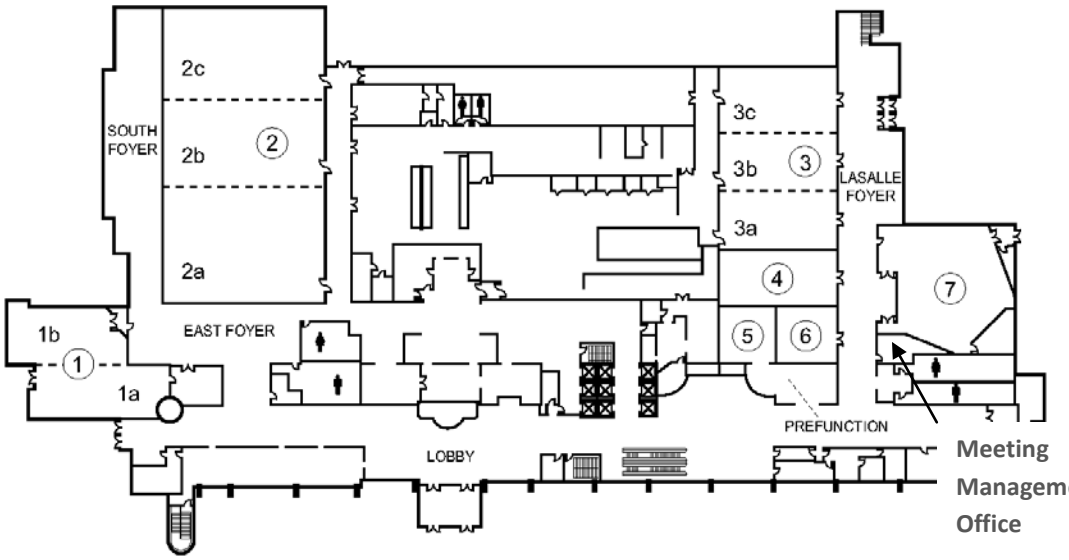
7:00 AM – 8:00 AM	Breakfast	LaSalle B/C
8:30 AM – 10:00 AM	How to Provide Training and Evaluation of Mentors	Executive Forum
	How to Write Effective Letters of Recommendation for Students	Division
	How to Best Prepare Students for Scientific Meetings and Summer Research Experiences	LaSalle A
	How to Select Students Who Will Pursue PhD Programs	Madison
	How to Help Students Prepare Competitive Applications for Graduate School	Dearborn
10:00 AM – 10:30 AM	Coffee Break	LaSalle Ballroom Foyer
10:30 AM – 12:00 PM	How to Provide Supplemental Instruction	Executive Forum
	How to Select Students Who Will Pursue PhD Programs	Madison
	How to Help Students Prepare Competitive Applications for Graduate School	Dearborn

10:30 AM – 12:00 PM	What Makes an Effective Program Coordinator: Roles, Responsibilities, and Skills Needed	Division
12:00 PM – 2:00 PM	Lunch	LaSalle B/C
2:00 PM – 3:30 PM	How to Provide Training and Evaluation of Mentors	Executive Forum
	How to Write Effective Letters of Recommendation for Students	Division
	How to Best Prepare Students for Scientific Meetings and Summer Research Experiences	LaSalle A
	How to Select Students Who Will Pursue PhD Programs	Madison
	How to Help Students Prepare Competitive Applications for Graduate School	Dearborn
3:30 PM – 4:00 PM	Coffee Break	LaSalle Ballroom Foyer
4:00 PM – 5:30 PM	How to Develop an Evaluation Plan and What are the Characteristics of an Effective Evaluator	LaSalle A
	How to Utilize Student Records for Student Advising and Guidance	Madison
	How to Provide Supplemental Instruction	Executive Forum
	What Makes an Effective Program Coordinator: Roles, Responsibilities, and Skills Needed	Division
6:00 PM – 8:00 PM	Dinner	LaSalle B/C

Friday, June 11, 2010

7:00 AM – 8:00 AM	Breakfast	LaSalle B/C
8:30 AM – 10:00 AM	How to Develop an Evaluation Plan and What are the Characteristics of an Effective Evaluator	Executive Forum
	How to Utilize Student Records for Student Advising and Guidance	Madison
	How to Provide Supplemental Instruction	LaSalle A
	What Makes an Effective Program Coordinator: Roles, Responsibilities, and Skills Needed	Division
10:00 AM – 10:30 AM	Coffee Break	LaSalle Ballroom Foyer
10:30 AM – 12:00 PM	How to Develop an Evaluation Plan and What are the Characteristics of an Effective Evaluator	Executive Forum
	How to Utilize Student Records for Student Advising and Guidance	Madison
	How to Provide Training and Evaluation of Mentors	LaSalle A
	How to Write Effective Letters of Recommendation for Students	Division
	How to Best Prepare Students for Scientific Meetings and Summer Research Experiences	Dearborn
12:00 PM – 2:00 PM	Box Lunch Distribution	LaSalle Ballroom Foyer

WESTIN O'HARE
LOBBY LEVEL FLOORPLAN



1. LAKESHORE ROOM
   1a. LAKESHORE A
   1b. LAKESHORE B
2. GRAND BALLROOM
   2a. SALON A
   2b. SALON B
   2c. SALON C
3. LASALLE BALLROOM
   3a. LASALLE SALON A
   3b. LASALLE SALON B
   3c. LASALLE SALON C
4. MADISON
5. DEARBORN
6. DIVISION
7. EXECUTIVE FORUM
8. TERRACE

LOBBY LEVEL

MORE 2010 ORGANIZING COMMITTEE

Clifton Poodry, Ph.D
Director, Division of Minority Opportunities and Research,
National Institutes of Health

Shawn Drew, Ph.D
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Program Director, Biostatistics Training, and
Chair, Committee to Maximize Representation
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Bethesda, MD 20814
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GENERAL INFORMATION

MEETING MANAGEMENT OFFICE

For general inquiries regarding the workshop, please visit the meeting management office located the LaSalle Office on the Lobby Level.

REGISTRATION

The registration area is located on the Lobby Level in the LaSalle Ballroom Foyer and will open at 3:00PM on Wednesday, June 9. Registration includes complimentary meals, admission to the registered workshops, general session, social reception, poster session, and one copy of the Program.

Hours

Wednesday, June 9 3:00PM – 5:00PM

CANCELLATION AND REFUND POLICY

To receive a refund for registration, the receipt and a letter requesting a refund of the registration fee **must have been received** by **June 2, 2010**.

PUBLICATION PICK UP & BADGES

Westin O'Hare

Please pick up your Program and Badge at the Registration Desk. Badges must be worn at all times during the MORE 2010 "How To" Conference. You will not be allowed access to the sessions or the reception without a badge.

CYBER CAFÉ

Internet kiosks will be provided for checking email in the LaSalle Ballroom Foyer beginning Wednesday, June 9th at 3:00PM through Friday, June 11th.

FOOD AND BEVERAGE

Continental breakfast, lunch, and dinner will be provided during the conference.

HOUSING INQUIRIES

Westin O'Hare Hotel

Please visit the hotel reservations desk to make changes to your hotel stay.

Address: 6100 North River Road, Rosemont, IL 60018

Phone: 847-698-6000 Fax: 847-698-3993

POSTER PRESENTATIONS
The poster presentations will be able to viewed in **LaSalle A**

Poster viewing and display hours are Wednesday, 6:00 PM – 8:00PM
Your poster board number is listed next to your abstract title.

Poster Mounting & Policy:

- Presenters must mount their posters no later than 5:30PM on Wednesday.
- Presenters are expected to be at their poster boards to answer questions.
- Posters must remain on display from 6:00 PM – 8:00PM.
- ***Please do not leave belongings, poster containers, or any materials under the poster boards or in the poster area. MARC is not responsible for articles left in the poster area.***

RECORDING
NOTE: Recording any workshop or poster presentation by any means (photographing, audio taping, videotaping) is prohibited, except by a MARC authorized agent for official purposes or by first authors who want to photograph their own poster presentations.

SPECIAL NEEDS:
Registrants with special needs are advised to contact the MORE 2010 Meeting Management mjackson@faseb.org or dking@faseb.org prior to the meeting. For onsite inquiries, please contact the Meeting Management Office in the LaSalle Office on the Lobby Level at the Westin O'Hare.

TRANSPORTATION
Airport: The O'Hare International Airport is located minutes away from the Westin O'Hare and approximately 30 minutes from downtown. Information is available at http://www.chicago-ord.com.

Complimentary Airport Shuttle Service: Complimentary shuttle service to and from the Chicago O'Hare International Airport, available every 30 minutes except 12:00am - 5:00am. During these hours, please call hotel direct at 847-698-6000 to arrange service. If traveling internationally, please let the operator know when calling the hotel to specify arrival location.

Taxicabs: A cab ride costs $15.00 from the airport to the Westin O'Hare for one person. Pick up is available at all terminals from the lower level curb front. Metered rates apply to all destinations. There may be an additional charge for extra baggage. $1 will be charged for the first additional passenger and $.50 will be charged for each additional passenger.

POSTER SESSION ABSTRACTS

P1 - BIOLOGY WITHOUT BORDERS: AN INTEGRATIVE STRATEGY FOR INCREASING CONCEPT RESONANCE AMONG BIOLOGY MAJORS

Bryan M. Dewsbury, Marcy K. Lowenstein, Adam Rosenblatt, **Ophelia Weeks**
Florida International University, 11200 SW 8th Street, OE 167, Miami, Florida, 33199

An effective biology program requires that students learn the core biology material, be proficient in other subjects (such as calculus and statistics) and develop related skills (laboratory and critical thinking), for a holistic understanding of biological concepts. Conventional biology departments typically require courses like calculus and/or statistics for their majors but tend to treat such courses as separate entities, with minimal focus on the connections between them. We present here a pedagogical paradigm called 'The Teaching Pentagon'. The Teaching Pentagon minimizes the artificial endpoint that tends to be placed after biology, and biology-related classes. Biology major courses can be developed in lockstep with other 'supporting' classes, thus increasing the resonance of the subject within the students. This synchronized-syllabi approach increases efficacy of the teaching process by maintaining open lines among instructors of the courses that constitute the pentagon, and maximizes student engagement. The end result is immediate contextualization of the material so that the information is understood and integrated into a scaffold of knowledge and not merely regurgitated on examinations. This mechanism is malleable, and 'supporting' classes are determined by the needs of the 'principal' biology class. We use as an example in this presentation, General Biology II, a typical second-semester entry-level course for biology majors. Supported in part by NIH/NIGMS T36 GM078004. FIU'S MARC U*STAR APPLE

P2 - BIOLOGY WITHOUT BORDERS: AN INTEGRATIVE STRATEGY FOR INCREASING CONCEPT RESONANCE AMONG BIOLOGY MAJORS

Myron Evans, Laura Florez, Abner Murray, Ana Pena, Genesis Perez, Jackie Rodriguez, Ta Tram, Jacqueline Zayas, George Medina, Ophelia Weeks
Florida International University, 11200 SW 8th Street, OE 167, Miami, Florida, 33199

FIU's MARC U*STAR APPLE, A Peer-to-Peer teaching and Learning Experience, is a student-centered research experience that provides MARC U*STAR fellows with the opportunity to share with each other some of the research tools they have acquired in their respective home labs. A team of MARC U*STAR fellows has the opportunity to develop a workshop which is focused on a specific molecular biology or behavioral biology research protocol. A MARC USTAR mentor, post-doc or graduate student appropriate for the research method, reviews the fellow-generated method/protocol for accuracy and monitors activities during the workshop. These workshops are designed by and for fellows to share research protocols and techniques without burden to their home labs. Thus far, instrumentation provided for each research classroom is basic and fundamental to molecular biology studies (e.g. PCR, gel electrophoresis, bacterial cloning, etc.) and to behavioral biology studies (e.g. video tracking and analyses). In the molecular biology research classroom, fellows learn and actively demonstrate methodologies used for protein and nucleic acid analyses, while in the behavioral biology research classroom fellows use Ethovision, an automated tracking software, that is versatile and can be used for broad-based applications commonly used in behavioral experiments. This tracking system accommodates maze tests and social interaction studies on a range of animal models including but not limited to rodents, fish, and insects. A poster and oral presentation workshop was added this semester, since four of our fellows have been award recipients (some repeat recipients) for their oral and poster presentations; again this addition was enthusiastically fellows-generated. We envision that APPLE will be a prominent and visible component of FIU's MARC U*STAR Program, and one that may set a precedent for additional research classrooms in MARC U*STAR Programs at other institutions. Supported by NIH/NIGMS T34 GM083688

P3 - MODELING INSTRUCTION IN INTRODUCTORY PHYSICS

Eric Brewe, Laird Kramer
Florida International University, Miami, Florida 33199

Modeling Instruction is a pedagogical approach that focuses on qualitative and quantitative model development and testing in introductory physics. In Modeling Instruction students are actively engaged in a cycle of model development that starts with qualitative features and builds to quantitative and is employed consistently and explicitly in learning about each new concept. Modeling Instruction conveys content through student investigations of various models that are consistent with observations and measurements. A modeling course focuses on model development and testing in the context of physics. Although teaching about the scientific process is a primary goal of these courses, teaching for conceptual understanding is similarly valued. Modeling Instruction has produced significant learning gains, enhanced attitudes toward physics and increased student retention. This poster will describe the implementation of Modeling Instruction in the Quantifying Biology in the Classroom (QBIC) program at Florida International University and the report gains in student understanding and attitude. Supported in part by NIH/NIGMS T36 GM078004.

P4 - IMPROVING QBIC STATISTICS COURSES WITH TECHNOLOGY RESOURCES AND REAL DATA

Ramon Gomez, Samuel Shapiro, Ophelia Weeks
Florida International University, 11200 SW 8th Street, OE 167, Miami, Florida, 33199

The National Academies' report of 2003 produced recommendations for a new curriculum in biology that emphasize a strong foundation in quantitative sciences, especially for future research scientists. The report recommended an increased exposure of biology students to statistical methods. A special undergraduate program for selected biology majors was inaugurated at Florida International University in 2007. This undergraduate program identified as QBIC, an acronym for "Quantifying Biology in the Classroom" is rigorous and interdisciplinary. It emphasizes the use of mathematics and statistics for analyses of biological/ biomedical data and includes two statistics courses during the sophomore year. Our poster describes the lead author's experience in teaching these courses with technology resources and real data to improve students' understanding. The traditional approach to teaching Statistics consists of using a board during lectures, a textbook as a reference, and supplementary materials posted on a website. Two technology additions were integrated in our courses: the daily use of PowerPoint for lectures as well as statistical software (SPSS) for data computations and analyses. Each student had access to a desktop personal computer and real data from the biological/biomedical field were included in numerous examples and exercises. Data generated in the biology and ecology labs were also used to illustrate statistical concepts and teach the statistical software. As illustrated on this poster the addition of Power Point and SPSS as well as the use of real data provide a very effective teaching-learning model for these two types of statistics courses. While using this methodology QBIC students were able to learn more quickly and effectively. This was evidenced by the number of extra topics covered, the acquired knowledge of statistical software and overall students' performance. Supported in part by NIH/NIGMS T36 GM078004.

P5 - DEVELOPMENT OF A ROGUE'S GALLERY THAT ILLUSTRATES PRACTICAL ERRORS IN CARRYING OUT TLC ANALYSES

Jawary Prieto, Pablo Sacasa, J. Martin E. Quirke
Florida International University, Miami, Florida 33199.

Laboratory textbooks and manuals rarely illustrate what happens when students fail to follow instructions on techniques. Thus, students may be uncertain why they must use a methodology and how to diagnose mistakes, when they are made. This presentation, which was developed as part of an *Organic Chemistry laboratory course for* ***QBIC*** scholars, provides photographic evidence of the consequences of making errors in Thin Layer Chromatography (TLC) analyses. The mixture used in the TLC analyses is the crude product of the photooxidation of protoporphyrin-IX dimethyl ester. (The reaction is interesting because it provides a simple illustration of the underlying principles of photodynamic therapy for treatment of cancer.) The mix consists of the red starting porphyrin, along with two green isomeric products, photoprotoporphyrin-IX dimethyl esters, which are polar and run close together. The photographs demonstrate the result of more than 10 common errors in TLC analyses including choosing incorrect solvent systems, plate gouging and incorrect spotting. Not only will students see the consequences of errors in TLC technique, but also they can use the pictures to identify the cause of their mistakes. In addition to helping undergraduates in their course work, the gallery will be of use to both graduate and undergraduate chemistry and biology students doing research work that requires TLC analyses. Supported in part by NIH/NIGMS T36 GM078004.

P6 - EMERGING STRATEGIES FOR AN INNOVATIVE UNDERGRADUATE BIOLOGY CURRICULUM AT FIU CALLED *QBIC*

Ophelia Inez Weeks, Enrique Villamor, Samuel Shapiro, Philip K. Stoddard, Martin Tracey, John Makemson, Sophia Bhaijee
Florida International University, 11200 S.W. 8th St., Miami, Florida 33199

QBIC (**Quantifying Biology in the Classroom)** at Florida International University (FIU) Biological Sciences Department is a block program with a lock-step curriculum designed to bolster student links between subject areas. Each block consists of a cohort of 24 scholars, and the curriculum is a rigorous, four-year program that is *interdisciplinary, quantitative,* and organized into two parts. *Part one* covering freshman - sophomore years, is foundational with a strong interdisciplinary emphasis. *Part two* covering the junior-senior years, is more flexible offering some tailored-upper level courses and encouraging independent research in funded research programs. Scholars take lower division natural and physical science courses together, working within an integrated, conceptual framework. The program integrates course material in biology, mathematics and statistics such that data generated in the biology labs are used to teach statistical concepts and biological processes are used to illustrate mathematical techniques. Thus, QBIC scholars are able to see how mathematics can model biological processes. A summer capstone modeling and simulation workshop, a journal club course and a calculus lab are signature courses for QBIC. A capstone summer *modeling and simulation workshop* follows Part one. Using biomedical engineering, computer science and statistics tools, this capstone workshop provides scholars with the opportunity to consolidate knowledge acquired during their first two years in the program. The *QBIC Journal Club* fosters interactive discussions with small groups of 8-10 students, where the facilitator directs them to make connections between specific concepts in research papers and the same concepts in their other courses. Data collected throughout the year in biological sciences courses are analyzed in the *Calculus Lab.* Overall, the goal of the QBIC Program is that ***scholars finishing the program will have the skills needed to move fluidly among conceptual, analytical and quantitative approaches to solving biological problems*** **(**http://qbic.fiu.edu). Supported by NIH/NIGMS T36 GM078004.

P7 - SCIENCE AND SOCIAL JUSTICE: INITIATIVES AT ROOSEVELT UNIVERSITY

Robert Seiser and Cornelius Watson
Roosevelt University

Commitment to social justice has been a hallmark of Roosevelt University since its founding in 1945. Roosevelt's mission is to "educate socially conscious citizens for active and dedicated lives as leaders in their professions and their communities." We believe that our commitment to social justice requires the integration of issues of civic engagement throughout the science curriculum.

Faculty members in our department have introduced new pedagogies, community outreach and transformational learning principles into courses for science majors and non-majors alike. Our work continues through ongoing participation in a Bridges to the Baccalaureate partnership with Elgin Community College, as well as through the National Center for Science and Civic Engagement and Roosevelt's Mansfield Institute for Social Justice and Transformation. Our overall goals are (1) to improve learning outcomes, interest and retention in all science and mathematics courses, and (2) to increase science and math majors' appreciation of the social relevance of science.

To address these goals, the curricula of a number of biology courses have been revised to include social justice/civic engagement components. For example, a new course for non-majors, Biology 113: The Nature of Science explores the ways in which scientists study the natural world and solve problems. Contemporary issues such as climate change and pharmaceuticals serve as starting points for discussion and analysis. Students carry out individualized, community-based scientific inquiry projects and gain experience with experimental design and data interpretation.

The Biology 113 focus on scientific process and practice has resulted in marked changes in student attitudes, without compromising analytical skills and content knowledge. Assessments of learning gains indicate that non-major students in this course are just as likely as their biology major counterparts to understand the principles of scientific inquiry, and are more likely to consider new advances in science and technology with respect to their potential impacts on diverse populations.

P8 - INVESTIGATING AN INTERDISCIPLINARY UNDERGRADUATE RESEARCH COURSE AS A MECHANISM TO ENHANCE MINORITY PARTICIPATION IN RESEARCH

Mary A. Smith, PhD, Phyllis Ford-Booker, PhD, Ginger Powe, PhD and Dinitra White, PhD
North Carolina A&T State University

North Carolina A&T State University is an interdisciplinary centered university that encourages interdisciplinary and collaborative research and curriculum innovation across the campus and beyond. The STEM disciplines of biology, psychology and chemistry at North Carolina A&T State University are supported by NIH to provide undergraduate research training through MARC and RISE scholarship programs. To foster a broader impact, the faculties in these disciplines are collaborating to establish an interdisciplinary research methods course for undergraduates in their sophomore year. This course recruits students from the three disciplines. In this course, students learn research methodology by investigating themed projects using research methods common to psychologists, biologists and chemists. This course introduces students to research literature searches and summary techniques, experimental and descriptive research design strategies, generating research ideas and converting them into testable hypotheses, defining and measuring variables, collecting and analyzing data, and reporting writing styles. In the first iteration, the research focused on investigations of the natural product, caffeine. As an example of a psychology type study, students conducted survey research on the prevalence and consumption of caffeinated beverages with alcohol among college students. To understand how chemists and biologists do bench research, students extracted caffeine from beverages and investigated the effect on digestive bacteria. The outcome of this study will be determined by post surveys that measure student responses to the course, student pursuits of future research activities, the demand for us to continue to offer the course, and the impact on the ability of students to do quality research internships.

3T34GM083980-02S1 NIH/NIGMS ARRA Supplement to MARC Undergraduate Training Grant

P9 - AUTHENTIC LEARNING IN A LARGE, INTRODUCTORY COURSE FOR BIOLOGY MAJORS: USE OF CASE STUDIES TO ENGAGE STUDENTS IN SMALL GROUPS DISCUSSING REAL-WORLD PROBLEMS

Jacqueline Tanaka
Temple University, Philadelphia, PA

Many biology majors begin their college biology education in a large class with several hundred students. The pace is fast, often covering a chapter each class period. Students enter with their high school study skills and faculty enter with the task of transforming high school learners into college learners. Because the classrooms are large auditoriums, faculty teach using PowerPoint figures from the textbook. With so much material to cover, faculty have little opportunity to diverge from the script or interact informally with students.

We developed a case study asking students how to save the Yukon River salmon from extinction. Climate change has increased water temperature allowing the *Ichthyophthirius parasite* to attack salmon adding stress to an overharvested population trying to spawn in degraded up-river streams. Students registered for a case study with our course facilitator and my co-instructor and I each facilitated 2-hour sessions for 25 students, total 500 students. Students were assigned one of 5 stakeholder roles. Our role was to keep the stakeholder groups “real” by providing feedback to their suggestions, hence the ‘authentic’ descriptor. Each stakeholder group prioritized their suggestions, presented them to the entire group and then the group resolved 5 steps everyone agreed on to address the problem. The evaluations indicated that students were enthused and inspired by the chance to ‘think like a biologist’ and to address and learn about a real world problem.

P10 - QUANTITATIVE METHODS COURSE FOR BIOMEDICAL SCIENCE GRADUATE STUDENTS

Michael J. Leibowitz, M.D., Ph.D.[1], Jerome A. Langer, Ph.D.[1], Quinn Vega, Ph.D.[2], Mildred Chaparro Serrano, Ph.D.[3]

[1]University of Medicine & Dentistry of New Jersey-Robert Wood Johnson Medical School, [2]Montclair State University, [3]University of Puerto Rico-Mayagüez Campus

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At the UMDNJ-Graduate School of Biomedical Sciences at Robert Wood Johnson Medical School (GSBS at RWJMS), we have Bridge to the Doctorate Programs (articulated M.S./Ph.D.) partnering with Montclair State University (NJ) and University of Puerto Rico-Mayagüez Campus, as well as an Initiative for Maximizing Student Development (IMSD) Program, all NIH-funded. Many Bridges students who "bridge" to GSBS at RWJMS and many of our incoming IMSD students have lower GRE scores than trainees admitted through other mechanisms to the Molecular Biosciences graduate programs, but the Bridges and IMSD students have similar success rates to those of the general population. Trainees benefit from support including tutoring by senior students, cognitive skills assessment and training, and counseling services, which are provided to all Ph.D. candidates. In addition, MORE trainees are encouraged to spread the Core Curriculum courses over two years, rather than take them all in one year, prior to the written qualifying examination. Because many of the graduate students struggle with quantitative methods in courses and in the laboratory, a 2-credit course in Quantitative Methods in Biological Sciences was added to the first semester of the Core Curriculum. This course includes lectures, group homework assignments and individual examinations. Over several years, the course evolved, including the implementation of heterogeneous student study groups, in which students are assigned to four-student groups, in which each group has one member from the 1st, 2nd, 3rd, and 4th quartile of class Quantitative GRE scores. In addition, an effort is made to make these groups ethnically diverse, which is possible. Since our students are about half U.S. citizens and half foreign, with the U.S. group being 30% underrepresented minority. Students reported liking these groups, in which weaker students received peer help and stronger students could develop their teaching skills. Anecdotally, some of these ethnically heterogeneous groups persisted as study groups in other Core Curriculum courses. This may have the additional benefit of increasing peer interactions among minority, non-minority and foreign trainees, who otherwise may remain more isolated during their training.

P11 - TRANSITIONS IN MATHEMATICS: RESEARCH MATH SKILLS FOR THE MATH SPEAKING

Estela Gavosto and Jarod Hart

"Transitions in Mathematics" is a one semester individualized project-based course wherein mathematics research skills are developed, along with the necessary general mathematics background to successfully complete a math/science career. A main goal of the course is to offer a sound alternative for transfer students and for students who decide relatively late in their academic careers to go into mathematics or disciplines that are intensely based in mathematics. Transfer credit of mathematics courses often does not correspond to the curriculum of the institution where the student is transferring. Moreover, testing the students often results in placement in courses that they had already partially completed elsewhere. This is demoralizing to the students, discourages their interest in math and science, and increases their time to degree.

For the past two semesters, as part of our IMSD program, we have offered the course "Transitions in Mathematics". In this course, each student is assigned a project in his or her intended area of study in science. Following a detailed assessment of their background, the students are also guided in learning independently the mathematical topics and skills required for completion of their project. Students give oral presentations of their progress to the class and are trained to use a variety of available mathematical software. A main goal is that the students learn to think like researchers who use mathematics. They acquire the research skills to look for the mathematical knowledge and techniques and to apply them to other scientific topics on their own. Topics of the projects range from diffusion models in population genetics to computation of radiation dosages or dynamics of enzyme kinetics. We will present samples of the students' projects and assessment plans.

P12 - PORTLAND BRIDGES TO BACCALAUREATE: PROGRAM SUPPORT THROUGH INNOVATIVE INTER-INSTITUTION COURSE DEVELOPMENT AND DELIVERY.

Carlos Crespo, Shari Rochelle, Liana Winett, Stephanie Farquehar, Susanne Christopher, Christina Dahlstrom, Jane Mercer, Marshall Meyer, Belinda Zeidler
Portland State University and Portland Community College

The Portland Bridges to Baccalaureate (PBTB) program is an NIH funded five-year project between Portland Community College (PCC) and Portland State University (PSU) designed to increase the number of underrepresented students seeking research careers in the biomedical and behavioral sciences.

In the Bridges program, quarterly seminars introduce Bridges students to local biomedical, and behavioral scientists and their research. A new, experimental course titled HE 299 "Seminar: Topics in Biomedical and Behavioral Sciences", developed by PCC and delivered at PSU, further supplements the program by providing PCC students college-credit for attending these and other bioscience seminars. Also, the seminars have been integrated into selected biological, social and health sciences courses at PCC.

HE 299 students attend five on-campus classes at PSU and any three off-campus bioscience seminars each term. Prior to attending seminars, students independently research each seminar topic. Subsequently, students present seminar reviews, researcher biosketches and a paper exploring how one of the seminars informs their academic field of study. Students upload coursework online for peer review and feedback.

HE 299 serves as both a PBTB support course and as a recruitment source for the program. The course also receives and supplies recruits to and from the PCC Student Association for Biomedical and Behavioral Sciences. Portland Community College markets HE 299 through program-specific advising, seminars, flyers, division announcement boards, PBTB list-serv and registration via search terms commonly used to identify biomedical, behavioral and health science courses.

Enrollment history, course evaluation data, student feedback and lessons learned in organizing a shared campus offering will be presented. In particular, we will identify key lessons for success in collaborating across and for recruiting within two large, post-secondary institutions each with differing academic structures, cultures, faculty and student needs.

P13 - SCAFFOLDING LEARNING EXPERIENCES TO ENHANCE STUDENT RESEARCH

Patricia Schneider
Queensborough Community College, CUNY

Queensborough Community College is an open-admission minority institution that enrolls more than 14,000 degree students (29.1% black and 21.6% Hispanic). Engaging these students in authentic research has become an increasing important component of biology education at the College. Students are inspired and prepared to complete meaningful research projects by a carefully designed scaffold of inquiry and problem-based experiences. General Biology lab facilities were updated with networked digital microscopes and computer-based sensors to support a revised curriculum emphasizing inquiry-based exercises with written reports. During Enrichment Workshops, General Biology students work in groups on challenging problems that build content knowledge and cognitive skills. They also attend research seminars by visiting scientists. Workshop students outperform non-Workshop students in combined % A, B, C and mean final grades. Two course-based research options are available to students. Introduction to Biological Research is an integrated lecture/lab course that trains students to read primary literature as well as design and conduct research projects in molecular or cell biology. The Research Laboratory Internship places students in cutting-edge research labs on a senior college campus. Both courses require research reports and offer the opportunity to give presentations. Newly approved courses include the Biology Colloquium in which students will read primary literature in preparation for talks by guest researchers, and Introduction to Biology for Science Majors, designed to develop the science process skills of entering students. The campus Research Coordinator serves as the key contact for information on all student research opportunities. Since 2006, the number of students engaged in biological research has increased from 21 to 47 per year. Limited finances, facilities, and faculty time, hamper efforts to provide all students with research exposure. These barriers will be circumvented through the HHMI of National Genomics Research Initiative by implementing authentic research as part of the general biology curriculum.

P14 - MAKING BIOLOGY COUNT: CURRICULUM DEVELOPMENT AT UMBC

Jeff Leips, Eric Anderson, Lili Cui, Phillip Sokolove, Weihong Lin, Michelle Starz-Gaiano, Ivan Erill, Maricel Kann, Brad Peercy, Nagaraj Neerchal, and Lasse Lindahl
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Many undergraduate majors in the biological sciences do not develop sufficient quantitative skills or understanding of physics and mathematics to be prepared for a career in the biological or biomedical sciences. With the help of a curriculum development grant from NIGMS we are developing new strategies and instructional modules designed to correct this situation. First, in connection with a general revision of the biology curriculum, we are introducing quantitative problem solving into mandatory discussion sections in each of our four core courses: BIOL141 Foundations of Biology: Cells, Energy, Organisms; BIOL142 Foundations of Biology: Ecology and Evolution; BIOL302 Molecular and General Genetics; and BIOL303 Cell Biology and Biochemistry. Second, we have developed a new introductory course in Bioinformatics (BIOL313), which is designed for a mixed audience of biology and computer science students. Third, we are redesigning physics (PHYS111-112) and mathematics (MATH155) courses to reinforce overlapping concepts and to help biology majors better develop quantitative reasoning and problem solving skills through integrated examples. Our poster will provide a snapshot of the status of these efforts. As we make progress in the development of new courses and the redesign of existing ones, we also plan to provide new learning and research opportunities for biology students with special interests in integrating biology with mathematics and other sciences. It is our belief that by increasing our students' understanding of the relationships between these disciplines, they will be able to excel in their future careers.

P15 - UW IMSD SUPPLEMENTAL INSTRUCTION: ENHANCING PERFORMANCE IN GATEWAY COURSES

Emile Pitre, Office of Minority Affairs and Diversity Associate Vice President for Assessment; **Bayta Maring**, Research Scientist, Office of Educational Assessment; **Angela Davis-Unger**, Research Scientist, Office of Educational Assessment; **Scott Fung,** Chemistry Instructor; **Steve Anderson**, Math/Physics Instructor; **Patrick Stayton**, Professor, Department of Bioengineering - **University of Washington Initiative for Maximizing Student Diversity (UW IMSD)**
University of Washington, Seattle Campus

Historically, students in under-represented minority (URM) groups at the University of Washington have performed significantly lower than non-URM (Asian and Caucasian) students in "gateway" (gatekeeper) courses. The UW Initiative for Maximizing Student Diversity (IMSD) addressed this challenge by designing innovative, supplementary workshops for these courses. Administered through the UW Office of Minority Affairs and Diversity's (OMA/D) Instructional Center, the workshops are taught by dedicated professional instructors. The workshops involve students studying in small groups, attending weekly review sessions, and using a variety of resources for practice problems.

Data indicate that for URM students, total workshop attendance in chemistry and math was positively correlated with average GPA in both chemistry (.34) and math (.21) (*p*s<.01), respectively. Additional analysis revealed that the average chemistry GPA of URM students with a relatively high level of participation in chemistry workshops (>3/quarter) was 0.25 points higher than students who participated in no workshops and 0.33 points higher than students who attended 1 – 3 workshops per quarter. These differences were not statistically significant; nonetheless, the "high" workshop attendance group had GPA's that were not significantly different than Asian or Caucasian students whereas under-represented students in the "low" and "no" workshop attendance groups did have significantly lower GPA's. Furthermore, separate linear-regression analyses were performed, with average GPA within each discipline as the dependent variables and overall UW GPA, workshop attendance, high school GPA, and math AP credit as independent variables. The results indicated that chemistry workshop attendance was a significant independent predictor of first-year chemistry GPA and, similarly, math workshop attendance was a significant independent predictor of first-year math GPA. In sum, there is evidence that these workshops serve to close the achievement gap in chemistry and math between under-represented students at the UW and their Asian and Caucasian peers.

P16 - UW IMSD SUMMER TEACHING LAB: TEACHING STUDENTS TO THINK LIKE SCIENTISTS

Emile Pitre, Office of Minority Affairs and Diversity Associate Vice President for Assessment; **Bayta Maring**, Research Scientist, Office of Educational Assessment; **Angela Davis-Unger**, Research Scientist, Office of Educational Assessment; **Richard To**, Research Scientist, Department of Engineering; **Patrick Stayton**, Professor, Department of Bioengineering - **University of Washington, Initiative for Maximizing Student Diversity (UW IMSD)**

The Summer Teaching Lab (STL), a program for rising sophomores in the University of Washington's Initiative for Maximizing Student Diversity (IMSD), has three main objectives: 1) To teach students the nature of research and lab skills early in their college careers, 2) To encourage students to pursue careers in research. Data from a mixed-methods evaluation reveal an additional, unexpected program outcome, in that students reported that the experience taught them to think differently.

Students' survey and focus group feedback indicate strong evidence for the first objective, in that students learned lab techniques and, generally, became more confident in the lab. With regards to the second objective, data indicated that the STL plays an important role in clarifying students' career goals, with those students who are already interested in research becoming increasingly confident in their ability to pursue scientific work. Even those students who report little interest in research careers note that the STL enhanced their understanding of the role of research in broader society.

When asked whether the experience in the STL had changed them in any way, students reported changes in their cognitive processes, reflecting an increase in metacognitive skills. Specifically, students cited weekly "question assignments," involving in-class discussions and debates as contributing to their ability to "think like scientists." Regarding her/his transformation, one student said, "…you just start thinking so much more in depth on your own, challenging what you've always known as fact. I just become a lot more aware that we don't have all the answers." Another student said, "[The instructor] told us a lot about how to question every side…not to just listen to the teacher but to question why that's the answer." The STL represents significant innovation in not only in affecting students' skills, knowledge, and attitudes, but their capacity for critical thinking.

P17 - ADVANTAGES OF MARC AND RISE PROGRAMS WORKING COOPERATIVELY

Herbert B. Silber and Karen A. Singmaster
San Jose State University

SJSU has had both MARC and MBRS funded programs for over twenty years and one of the strengths of our biomedical sciences minority programs has been that the programs have never competed with each other, rather they have supported each other. Our goal is to support the students in the way that best increases each student's success. It also provides the student with access and mentoring from two program directors. We are starting our third year of the RISE Grant and we are completing the third year of the current MARC Grant. There are similarities and differences between both programs, including the research and curricula components. Minority students often start out as NSF LSAMP students who are involved in the Academic Excellence Workshops, supported by MARC and RISE. These workshops raise the student GPA's in gatekeeper courses an average of half a letter grade and increase the pass rates. The programs share summer workshops for pre-freshman chemistry and pre-calculus courses, as well advanced biomedical techniques and bioinformatics courses. It is not uncommon that research students start in RISE, move on to MARC for their junior/senior years and may even return to RISE if their graduation is delayed. We offer a biomedical/graduate school preparation semester courses for all RISE and MARC students, as well as other interested students. MARC has teamed with the Howard Hughes Program to modernize the biology program and make their courses more quantitative. The whole has been much greater than the sum of the parts and these activities would not be as successful if only one of the programs developed them.

P18 - DEVELOPING URM BIOMEDICAL RESEARCHERS: IT TAKES A LOT MORE THAN A VILLAGE

Louise Hainline and Peter Lipke
Brooklyn College, CUNY

Developing a research scientist from an entering college student (URM or majority) is a complex task of social engineering and education. There are many places where students can fall or step off the track. The Expectancy Value Theory of achievement motivation argues that people's choices of goals, and the motivation and persistence to pursue them, stem from several factors which need to be in place for successful long-term goal attainment. This poster discusses the factors of choice, performance, and persistence in URM science programs and how activities and components can foster the development of researchers. We contend that these should include institutionalizing academic practices and pedagogies that engage students in deep and active learning; supporting students' development of a sense of self efficacy in accomplishing these goals; and helping students articulate career goals they value enough to invest years in accomplishing.

The poster describes specific program components and efforts that Brooklyn College has tried, plans to try, or in some cases has institutionalized as supports for student engagement and increased URM success in biomedical research careers. These include efforts to:

- Encourage faculty to experiment with engaged pedagogies and to abandon ineffective methods of teaching
- Create and institutionalize social and academic supports in a community that helps all STEM students be successful, so that URM students will not feel stigmatized in "special" programs
- Help students explore information on science careers that make research careers seem both attractive and attainable
- Build students' sense of efficacy in achieving these desirable ends
- Desensitize students to stereotype threat connected with high levels of academic success for URM students, including the doubly-stigmatized URM women.
- Address problems of disruption of students' relationships with their families and home communities as they pursue goals for higher education and research careers

P19 - HOW DO YOU BECOME A SCIENTIST?

Edward J. Smith[1]*, Xiaojing Guan[1], Jill Sible[2], and Daniel Wubah[3]

An editorial entitled “On Becoming a Scientist” by Dr. Bruce Alberts (Science, 13 November 2009) described primarily conventional paths that a graduate student should take to pursue a career in the sciences. The role of the mentor could be described, according to that editorial, as either “helicopter” or “aloof” approaches to mentoring. While the former mentor hovers over your every gel photo, the latter lets you “make your own mistakes.” Though both approaches work well for a majority of “traditional” graduate students, including international ones, a more nuanced approach may be needed for others, including most minority students (URMs) who are woefully underrepresented in the biomedical sciences and engineering. We believe that the approaches described may not apply well to URMs because of the history of personal attention as they move from K-16. A URM-centric approach could be borne out of the need for minorities to develop other skills needed to secure a career in academia skills that are in addition to the innovation and risk-taking in experimental design that were aptly raised by Dr. Alberts. Beyond these, we suggest development of a mentoring culture that cultivates, in the words of the great trail philosopher Russell Meller, “hires that I can go to lunch with.” Since 2003, with funding from the NIGMS MORE program that supports two training grants at Virginia Tech, we have had about 30 scientists and engineers from every background and in different stages of their career provide a “Retrospective: getting into and succeeding in science.”, We have found that it takes a little bit more for URMs to get into science than what the editorial suggests. From the scientists to whom we have listened, including three members of the National Academy of Sciences, the consensus is that “love of science” ranks at the top for “getting into and succeeding in science.” The question of course is whether this perception of itself is sufficient. When you get in and you have the right mentor(s), what keeps you in it and motivates you enough to make the “big” breakthroughs that warrant “Science’s “Breakthrough of the year” or a Nobel prize? Can you really succeed at something that, even given the outcome in Andre Agassi’s case in tennis (1), in which your heart is not? Thus, while there are different paths one can take “on becoming a scientist”, the one URMs take that will enable them to stay in science and become successful, including being hired by search committees because others can “go to lunch with them”, requires a hybrid approach..We therefore propose that training programs include a seminar course involving various speakers focused on “How to get into and succeed in science.”

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Reference 1.A. Agass1, Open an Autobiography. (2009).

P20 - INTEGRATION OF QUANTITATIVE AND COMPUTATIONAL KNOWLEDGE THROUGHOUT THE UNDERGRADUATE SCIENCE CURRICULUM AT CSU SAN MARCOS

Charles De Leone, Denise Garcia, Marie Thomas, Keith Trujillo, Victor Rocha, and Richard Bray
California State University San Marcos

Cutting edge biomedical research is flourishing at the intersections of mathematics, computer science, and the biological and physical sciences. Effective training of 21st century biologists depends on students becoming more quantitative (Q) and more computational (C). CSU San Marcos is completing its second year of a 5-year MARC Curriculum Improvement "Q&C" grant. Over this period, we will modify 23 existing and develop 7 new courses. Our project is based on the philosophy that Q&C skills are best mastered when they are introduced early and used repeatedly in different contexts of biological and physical sciences. We have just completed modification of 12 lower-division science and math courses, which had cumulative enrollments of over 1800 students since Fall 2008. Our poster will show how Q&C is now a common thread woven throughout these courses. Mathematics courses now have biological examples and incorporate web-based diagnostics and tutorials, biology and chemistry courses incorporate more mathematics, and several courses strengthen students' Excel skills. Beginning in Fall 2010 we will integrate Q&C into upper division core courses. One of our ongoing challenges is to develop a valid holistic way to evaluate cumulative Q&C changes. Deep collaboration among faculty across departments and courses through a Q&C Wiki and frequent meetings has been crucial to the coordinated integration of Q&C across the curriculum. In addition, we are fostering interdisciplinary research through development of the Q&C Science Hub. The Hub recently procured a server that will bring faculty across disciplines together to conduct collaborative research in computationally-intensive areas and to establish an undergraduate minor in bioinformatics. By the end of the grant, approximately 1500 majors/year will benefit from the Q&C enhancements that have been institutionalized across the curriculum.

P21 - TRANSITION TO THE DOCTORATE: ENHANCEMENT OF THE 1ST YEAR BIOCHEMISTRY COURSE WITH A SUMMER TRANSITION COURSE AND GROUP LEARNING SESSIONS

Kristen M. Sterba, Ph.D., Anna Radominska-Pandya, Ph.D., Robert McGehee, Ph.D. and Billy Thomas, M.D.
University of Arkansas for Medical Sciences

The University of Arkansas for Medical Sciences (UAMS) Initiative for Maximizing Student Diversity (IMSD) program was implemented in June 2009. The overall goal of the program is to increase the recruitment and graduation rates of URM students in UAMS doctoral-level biomedical science programs. The UAMS Graduate School contains 7 biomedical science graduate programs that participate in the IMSD program. Targeted students include those that meet the specific biomedical program requirements and are accepted into the UAMS Graduate School. All biomedical science doctoral students are required to take biochemistry, and many of the courses cover similar areas of study. Because of this, the UAMS IMSD program offers a summer transition course that reviews biochemistry topics prior to the first semester of graduate school. This course lasts approximately six weeks and meets three mornings a week. IMSD students also complete a research rotation throughout the summer that runs concurrently with the transition course. To provide additional support during the first semester Biochemistry course, four group learning sessions facilitated by faculty were added in fall 2009. Each session focused on material for the upcoming test. Prior to each session, students submitted a list of topics they wanted to review. All students enrolled in the Biochemistry course were encouraged to attend the group learning sessions, and over 90% of the class and all of the IMSD students attended. After implementation of these initiatives, the number of students withdrawing from the biochemistry course decreased with no IMSD students withdrawing or receiving below a “B”. In summary, due to the enhanced efforts both of the teaching faculty as well as the summer transition course, visible improvement was demonstrated in the biochemistry course. Experience from the activities of 2009 will be applied to future courses

P22 - CURRICULUM REDESIGN ACROSS THE DISCIPLINES: AN HOLISTIC APPROACH TO IMPROVING QUANTITATIVE SKILLS AND PERCEPTIONS IN BIOMEDICAL STUDENTS

Stephen B. Aley, Ann Darnell, Elizabeth Walsh, Joan Staniswalis, and Martine Ceberio
University of Texas at El Paso

Quantitative skills, including statistics, mathematical modeling, and database design and usage, are becoming increasingly important in Biomedical Research. In order to better prepare students for careers in this area, we are systematically redesigning key courses in the undergraduate biomedical curriculum to emphasize the need and application of mathematical and computational approaches to biological sciences. This includes courses housed within departments of Mathematics, Computer Science, Chemistry and Biology. We present here the initial changes and evolution of three such modified courses, including initial assessment on change in attitudes and approaches of the participating students.

Collaboration between Biology and Statistics faculty has resulted in a redesigned Statistics course that is now incorporated in the Biology and Microbiology degree programs. This course develops a foundation in classical statistical analysis through a semester long hands on experience analyzing biological data. In addition, we have added an upper division statistics elective course also tailored to biology students.

Computer Science faculty members have redesigned the curriculum and laboratories of their elective introductory programming course to include real-world examples and projects or applications in Biology and Biomedicine. This course not only serves to train biomedical and bioinformatics students but also to expose future engineers and computer scientists to biomedical applications of programming. Within the Biology core curriculum, we have redesigned the introductory Organismal Biology laboratory, building a cohesive laboratory program emphasizing statistical analyses and quantitative skills. Examples of modules from each of these courses will be presented.

Our experience with these courses indicates that optimal redesign requires four steps, a comprehensive design, an initial implementation, and at least two cycles of assessment, modification and reoffering. We present the formative assessment used with these courses that have completed all four stages. In addition, we will discuss preliminary results with four other courses currently being designed or implemented.

P23 - USING PEDAGOGY WORKSHOPS AS A CATALYST FOR CURRICULAR CHANGE AT 2-YEAR COLLEGES

Karen Singer-Freeman, Joseph Skrivanek, Ronnie Halperin
Purchase College, State University of New York

In 2006 Purchase College initiated a series of pedagogy workshops for community college faculty who teach in STEM fields. The goal of these workshops has been to provide a supportive framework in which faculty who teach STEM courses can learn about innovative pedagogy and share ideas with colleagues who teach similar courses. Over the past 4 years, 8 day-long workshops have been offered on topics such as: *Approaches for Better Learning by Majors and Non-Majors*, *Peer Led Team Learning*, *Effective Assessment*, *Re-design of Introductory STEM Courses*, *GIS-Based Resources for the Classroom*, and *Strategies for Teaching Math in the Sciences*. The pedagogy workshops have been well attended, generally attracting between 20 and 25 participants from 6 local community colleges. Of these participants, 60% report that they have made changes to their classes as a result of their attendance at the workshops. To understand the ways in which participants felt the pedagogy workshops had an impact on their teaching, we held a conference in which faculty presented the changes they made to their courses, and conducted two focus groups at participating community colleges. What emerged can be classified into three categories: substantive information that has enriched curriculum, pedagogical techniques and other learning support processes, and personal/professional enrichment that faculty felt improved their teaching. In this poster we describe some of the most effective workshops and summarize the ways in which they have served as a catalyst for curricular changes at 2-year colleges.

P24 - IMSD-MORE AND PREPARE AT UNTHSC: JEWELS OF THE INSTITUTION'S COMMITMENT TO IMPROVING THE PIPELINE FOR UNDERREPRESENTED MINORITIES (URMS) IN BIOMEDICAL SCIENCES

Harlan P. Jones, Thomas Yorio, Jerry Alexander, Robert Kaman and Jamboor K. Vishwanatha
Graduate School of Biomedical Sciences, University of North Texas Health Science Center, Fort Worth, TX 76107

The University of North Texas Health Science Center (UNTHSC) continues to maintain as a priority, increasing the diversity of students seeking Ph.D.s in Biomedical Sciences. Our success stems from the "UNTHSC Coordinated Plan for Outreach," which creates a systematic flow of resources, programs, and activities from K-12 through college, into graduate level science education and faculty appointments. Our goal is to initiate innovative pedagogy that accelerates learning proficiencies upon entering the educational pipeline and improve student performance throughout their program.

The NIH sponsored MORE and PREP programs are currently benefiting from UNTHSCs focus on curricular improvement. As of 2007, the retention rate of 69% was reported of our MORE participants. In 2010, UNTHSC initiated a Quality Enhancement Plan (QEP) that provides an institutional commitment fostering Higher Order Thinking (HOT). This program promotes collaborative learning strategies and offers curriculum development to students and faculty. We are introducing HOT strategies within the MORE and PREP programs. Examples include: a preparatory advanced Biochemistry course required of participants entering our graduate CORE Basic Biomedical Science courses, a Biotechnologies course in which students experience experimental techniques and analytical skills in a laboratory setting, and a Scientific Communication course in which students participate in peer-evaluation exercises.

Toward achieving our goals, UNTHSC's Center for Academic Performance (CAP) provides resources designed to enhance all levels of academic performance through academic learning assessments, tutoring, and self-management. In addition, we have initiated a complementary program, "The CORE Forum" to reinforce MORE students' understanding of course material. The forum provides a group learning experience in a supportive environment.

Peer support is encouraged through our Pair-a-MORE program, minority student organizations and our PREP and MORE alumni. Furthermore, partnerships with minority serving institutions provide URM faculty role models. In summary, our coordinated plan supports the "PIPELINE" for increasing diversity in the Biomedical Sciences.

P25 - INCORPORATING STUDENT INTERACTIVE TECHNIQUES INTO IMMUNOLOGY LECTURES

Jill Adler-Moore
California State Polytechnic University, Pomona

The principles of immunology can be difficult to teach and students can benefit by participating in interactive exercises to stimulate their understanding of the major concepts of this complex biological system. At selected times throughout the lecture course, students are divided into small working groups (n=6-8) to discuss a given topic for 15 minutes, culminating in their presenting their results to the class. On the very first day of class, each group is asked to compile a list of items for a given immunological category (e.g. immune cells, organs, non-cellular by-products). This information is shared on the board, and then the students are asked to show which components in their list might possibly interact with components from another list. In this way, the students are able to see for themselves how interconnected and how far-reaching the immune response can be. In discussing vaccines later in the course, the class is asked three questions: 1)Are vaccines safe? 2) If there were an AIDS vaccine, who should be vaccinated? 3)Should schools require students to be vaccinated? The class discusses these issues in groups, and then each group reports their findings to the whole class generating interesting dialogue on important questions which focus on both ethical and scientific questions. Toward the end of the quarter, groups of students write up exam questions on assigned journal readings, along with the answers. During the class discussion, each group poses their questions to the rest of the groups which have to come up with the correct answers. These are just a few examples of what can be done to enhance the student's learning experience by demonstrating how to make the material relevant, to stimulate student interest in the subject, and to help students learn how to work productively in groups.

P26 - ENHANCING THE ACADEMIC SKILLS OF PREP SCHOLARS

D.W. Niesel, N.K. Herzog, D. H. Coppenhaver and C.W. Cooper.
University of Texas Medical Branch

The UTMB PREP program is designed to provide underrepresented minority students who have an aptitude for science with the motivation, academic tools, research skills, and self-confidence to pursue a PhD in biomedical science. Students are recruited to the program by working closely with faculty advisors from partner schools in Texas that have a significant minority student enrollment. Students enter the PREP for a year experience that provides extensive laboratory research training and special learning opportunities that build not only knowledge but also analytical and thinking skills. A major part of this experience is the ability to earn a graduate certificate. This PREP certificate program offers the Post-Baccalaureate Research Training Curriculum. This curriculum provides critical biosafety (BBSC 6217) and Scientific Ethics (MEHU 6101) training as well as exposure to research seminars. Two critical courses – BBSC 6103 Introduction to the Study of Biological Systems and BBSC 6104 Critical Reading of Scientific Literature are also available. There is also exposure to current research across the breadth of biomedical science through BBSC 6195, the Frontiers of Science Seminar course. This provides a total of 7 hours of instruction at the graduate level to enhance the background of these PREP students and to build their confidence as they consider doctoral training in the biomedical sciences. Immersion of the student in the PREP curriculum complements laboratory, departmental, and social and other enrichment activities that will promote the scholar's motivation for a PhD. Upon successful completion of the PREP the enrollee will receive a Post-Baccalaureate Research Training Certificate and which is reflected on their official university transcript.

P27 - IMPROVING THE SCIENCE CURRICULUM FOR MARC TRAINEES AT BARRY UNIVERSITY

Flona Redway, Sr. John Karen Frei
Barry University

Student participation in the MARC U* STAR Program at Barry University involves enrollment in a rigorous, advanced curriculum, which provides state-of-the-art training above and beyond their degree requirements. This curriculum is considerably more demanding than the traditional curriculum of non-MARC trainees. It begins with a 4-week Introduction to Research summer course (3 credits) team-taught by faculty in biology, chemistry, and mathematics & computer science departments. This course includes instruction on basic concepts, principles and guidelines of conducting research, responsible conduct of research, and review of fundamental mathematics concepts. During the fall and spring semesters, trainees carry out intramural research with faculty mentors in biology, chemistry, psychology and mathematics & computer science (3 credits per semester; 10 hour/week). The hands-on research opportunities allow trainees to use these skills to integrate discipline-based knowledge with practical experience, while learning portable research skills which they apply to their graduate research careers. The Three Pillars (1 credit/semester) and Bioinformatics (3 credits, second semester) courses are both team-taught. Three Pillars is aimed at improving time management, as well as basic and scientific writing skills. Bioinformatics incorporates quantitative concepts, and computational skills to better understand complex biological phenomena. This presentation will provide a breakdown of the elements of this enriched curriculum and their implementation across disciplines.

P28 - IMSD SKILL-BASED TRAINING MODULES: INTERVENTION & PREPARATORY TOOLS FOR MAXIMIZING ACADEMIC AND SCIENTIFIC SUCCESS

Nancy L. Thompson and Andrew G. Campbell
Division of Biology & Medicine, Brown University, Providence, RI

Brown University's Graduate IMSD Training Program spans the nine PhD training programs within the Division of Biology & Medicine. Its goals are to a) increase the success of under-represented trainees, especially historically under-represented minority students, at the graduate level, b) develop strategic partnerships with institutions serving under-represented students and c) transform institutional culture regarding the need to train a diverse future workforce. Cutting across these goals are efforts to enhance graduate success through improved pedagogy and androgogy.

Brown's IMSD program offers skill-based, 'not-for-credit', training modules that complement and serve as preludes to regular academic graduate coursework and training. Each module, led by a faculty member and advanced PhD student (Senior Scholar), provides intensive developmental training over ~10-12 contact hours. Each of the 11 modules provides substantive learning without detracting from regular graduate training. Module topics range from 'Demystifying the PhD Training Experience' to 'Experimental Design & Critical Analysis' to 'The Etiquette of Science: How to Present, Interview, and Network'. IMSD trainee placement in selected modules is based on the need to address pre-graduate training gaps that might negatively affect graduate academic performance, and placement is also determined by requirements of the students' specific PhD program. Trainees receive certificates upon completion of each module.

Annually, module participants, Brown faculty and partner institution faculty evaluations help to enhance module quality, and effectiveness. As reported by evaluations, the modules have been successful in meeting student needs. Finally, in addition to enrolling IMSD trainees, modules have shown increasing enrollment by non-URM graduate trainees and postdoctoral fellows. To date, ~ 25% of graduate students in the Division have taken modules and an increasing number of fellows have expressed interest. These outcomes speak to the success of our modules in providing valued training to under-represented students and of their broader value to the larger academic community.

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P29 - GETTING THE 'RIGHT ANSWER' IN INTRODUCTORY BIOLOGY LABS

Tiffany Plantan, David Janos, Michael S. Gaines
University of Miami

Traditional 'cookbook' introductory biology laboratories can perpetuate a misapprehension of science among students. Prescriptive exercises have an expected outcome (= 'right answer') that students work to obtain. In inquiry-based labs in which hypotheses are tested, prior experiences with cookbook labs lead students to want to 'prove' their hypothesis regardless of what their data suggest. At the University of Miami (UM), our antidote has been to test and to subsequently institutionalize inquiry-based introductory biology laboratories. Second-year scholars in our *Bridge to the Baccalaureate Program* between Miami Dade College (MDC) and UM are required to enroll in the Howard Hughes Medical Institute (HHMI) research-based Introductory Biology Laboratories at UM. In these labs, teams comprised of MDC Bridge scholars and UM undergraduates plan, conduct and report original research guided by research faculty, graduate students and undergraduate peer facilitators. Students learn about research design, data collection and analysis, and all modalities of science reporting (slide talks, scientific papers, posters) – skills they use in subsequent courses and in their own research. Research teams work with a broad range of fundamental biological concepts reflecting faculty expertise. They are more demanding than traditional labs but students value them. Ninety percent of student participants agreed that their presentation skills had improved, and 88% reported an improved understanding of research.

P30 - DESIGN AND IMPLEMENTATION OF NEW BIOINFORMATICS CURRICULA IN FIVE SCIENCE MAJORS IN HUNTER COLLEGE

Adrienne Alaie, Dana Draghicescu, Akira Kawamura, Saad Mneimneh, Weigang Qiu, Makram Talih, Virginia Teller
Hunter College of the City University of New York

Background

Biomedical research is becoming a data-intensive science, as a result of the ongoing explosive growth of new biological information such as genome sequences, gene expression profiles, and protein structures. Several national surveys have predicted an impending shortage of biomedical researchers who are versed in both molecular biology and computational and statistical sciences (*Bio 2010*, by National Research Council, 2003; *Math & Bio 2010*, a report by Mathematical Association of America, 2005). Implementing bioinformatics education in undergraduate curricula, however, faces challenges and even resistances from deeply rooted curricular traditions (Pevzner and Shamir, 2009, "Computing has changed biology – biology education must catch up", *Science*, 325:541).

Curricular Innovations

In promoting bioinformatics education in Hunter College of the City University of New York, a minority-serving MARC institution, an interdisciplinary team of faculty from four science departments (Biology, Computer Science, Chemistry, and Math/Statistics) has designed and implemented a two-phased curricular strategy. In Phase I, which was completed between 2005 and 2008, we designed and won approval for new Bioinformatics Concentrations in five existing science majors. Also during Phase I, we designed and implemented five new bioinformatics courses (Introductory UNIX Programming, Practical Relational Database and SQL, Chemical Genomics, Bayesian Statistics in Sciences, and Computational Molecular Biology). In Phase II, which began in Fall 2008, we started to introduce revisions and new modules reflecting cutting-edge bioinformatics contents in over twenty existing science courses. These curricular activities are supplemented by new bioinformatics-learning labs and facilities, a scholarship program offered by the Provost's Office, monthly Quantitative Biology Colloquium, a Summer Bioinformatics Workshop, and faculty-training workshops.

Results and Assessments

We have seen steady increase in the enrollment into the new bioinformatics courses since their implementation in 2006. Over twenty students have graduated or are currently enrolled in the Bioinformatics Concentrations. We are more successful in attracting computer science majors than biology majors. Assessment by internal and external experts identified that biology majors had the greatest difficulties in the UNIX programming courses while the computer science majors found Organic Chemistry the most challenging. Our new bioinformatics courses, new course modules, as well as the bioinformatics concentrations are in course to be self-sustaining in 2-5 years.

Program Support - NIH/NIGMS T36G078001 and a grant from the HHMI Undergraduate Science Education Program

P31 - INTEGRATIVE APPROACH TO LEARNING FOR STEM

Hendrick Delcham, John Bihn
LaGuardia Community College (CUNY)

The electronic Portfolio (ePortfolio) is an initiative of LaGuardia Community College. It is a tool that allows students to manage their work in all their courses:

1. To use critical thinking skills to analyze their work
2. To reflect on their learning and,
3. To make connections between the acquired skills and the real-world

This tool has been incorporated into all academic programs at LaGuardia.

We recently incorporated this tool into the Bridges Program at LaGuardia. Bridges students engage in mentored research in biology, chemistry, and bioengineering. They also take workshops on senior college transfer, time management, report-writing, oral PowerPoint presentation, literature search, and the use of sophisticated research instruments. On a monthly basis, students report on their research during a group seminar. They also work with an academic counselor, who helps them plan ahead their transfer applications and personal statements.

Using an integrative pedagogical model, Bridges students are required to tie together the key learning objectives from workshops, their career interests and their personal experiences at LaGuardia. They are asked to reflect on past key courses they have taken at LaGuardia and how these courses and the workshops and seminars help them complete their guided research and achieve both their short-term and long-term goals. Theoretical skills acquired through different classes over the years and individual responses to practical, real world applications and newly acquired knowledge through their research become parts of the synthesis through ePortfolio.

In 2008-2009, eight of 18 students in the Bridges Program at LaGuardia have transferred and are pursuing bachelor degrees in a STEM-related discipline. The others will transfer in the fall of 2010. The preliminary data indicate that the ePortfolio activities have enhanced Bridges students' learning and made an impact on them by motivating their process of transfer and career choice in the STEM disciplines