



Enriching
The Academic Experience of
College Science Students
2008 Conference

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SCIENCE LEARNING CENTER
UNIVERSITY OF MICHIGAN - ANN ARBOR



Welcome!

Welcome to the ***2008 Enriching the Academic Experience of College Science Students*** Conference. Two years of positive feedback from previous conferences has inspired us to once again host the conference for the third and final year.

We decided to create this conference after attending many national and regional conferences where sessions addressing college science students' learning outside of the classroom were limited or even nonexistent. We wanted to bring together professionals from the many learning centers, departments, and programs around the country dedicated to fostering undergraduates' achievement and success in the sciences.

We have been very energized by our own involvement with this conference for the past three years and we know you'll find the next few days invigorating and inspiring too. We also know that you'll have the opportunity to take away some ideas that you can share with colleagues and implement in your own programs. This is why we are so enthusiastic about this year's conference and the opportunity to see old friends and meet many new ones too.

Claire Sandler, Director

Joe Salvatore, Assistant Director

University of Michigan – Science Learning Center

Keynote Speaker: Freeman A. Hrabowski III, Ph.D.

President, University of Maryland
Baltimore County

11:00 AM, Tuesday, June 3rd, 2008

Michigan League Ballroom



Freeman A. Hrabowski, III, has served as President of UMBC (The University of Maryland, Baltimore County) since May, 1992. His research and publications focus on science and math education, with special emphasis on minority participation and performance.

He serves as a consultant to the National Science Foundation, the National Institutes of Health, and universities and school systems nationally. He also sits on several corporate and civic boards. Examples include the Carnegie Foundation for the Advancement of Teaching, Alfred P. Sloan Foundation, Constellation Energy Group, the France-Merrick Foundation, Marguerite Casey Foundation (Chair), McCormick & Company, Inc.; and the Urban Institute.

Recent awards and/or honors conferred upon Dr. Hrabowski include:

- Election to the American Academy of Arts & Sciences and the American Philosophical Society;
- Receiving the prestigious McGraw Prize in Education, the U.S. Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, and the Columbia University Teachers College Medal for Distinguished Service;
- Being named a Fellow of the American Association for the Advancement of Science and Marylander of the Year by the editors of the Baltimore Sun;
- Being listed among Fast Company magazine's first "Fast 50 Champions of Innovation" in business and technology.

Dr. Hrabowski also holds a number of honorary degrees, including most recently from Haverford College, Princeton University, Duke University, the University of Illinois, the University of Alabama-Birmingham, Gallaudet University, Goucher College, the Medical University of South Carolina, and Binghamton University.

He has co-authored two books, *Beating the Odds* and *Overcoming the Odds* (Oxford University Press), focusing on parenting and high-achieving African American males and females in science. Universities, school systems, and community groups around the country use both books.

A child-leader in the Civil Rights Movement, Dr. Hrabowski was prominently featured in Spike Lee's 1997 documentary, *Four Little Girls*, on the racially motivated bombing in 1963 of Birmingham's Sixteenth Street Baptist Church.

Born in 1950 in Birmingham, Alabama, Dr. Hrabowski graduated at 19 from Hampton Institute with highest honors in mathematics. At the University of Illinois at Urbana-Champaign, he received his M.A. (mathematics) and four years later his Ph.D. (higher education administration/statistics) at age 24.

Keynote Event sponsored by the University of Michigan - Science Learning Center with additional funding provided by the U-M Office of the Senior Vice Provost; College of Literature, Science, and the Arts - Office of the Associate Dean for Undergraduate and Graduate Education; College of Engineering - Office of the Associate Dean for Academic Affairs; Comprehensive Studies Program; Multicultural Engineering Programs Office; Women in Science and Engineering Program; and the Undergraduate Research Opportunity Program.

Monday June 2nd & Tuesday, June 3rd 2008

Event: **Welcome Event with Refreshments**
Date: June 2nd
Time: 7:00 - 8:30 PM
Location: Palmer Commons, Outdoor Plaza
(If rain, SLC Satellite Location in 2165 Undergraduate Science Building)

Registration Desk Opens & Continental Breakfast

Date: June 3rd
Time: 8:30 AM
Location: Michigan League - Concourse

Session: **Visualizing Chemistry by Digital Learning Objects**
Date: June 3rd
Time: 9:45 AM
Location: Hussey Room
Speaker: Mohamed Ayoub
University of Wisconsin - Washington County

A team of undergraduate students and their faculty advisor (mentor), using SnagIt® software, a digital pen pad and a microphone, have developed digital interactive learning objects (LOs) for teaching the chemical concepts and physical laws that are often covered in most introductory chemistry courses for majors and non-majors. The LOs they have developed include topics such as balancing chemical equations, acids-bases, oxidation states of elements in chemical compounds, and nuclear chemistry. These topics are targeted in the required PRAXIS exam for middle school educators in the State of Wisconsin. Each LO consists of Problem, Hint, Sand-box, Tutorial, Chalk-Talk, and Self-Check Problems. All these components are compiled together using Flash® and made available to students (users/learners/readers) to be accessed via the Internet. The reader (learner) is taken through a "life-like" demonstration of how to solve the problem. This adds a "Human Element" to the learning process which can help the reader understand the topic as if being taught in a classroom at his/her own pace. This project is funded by a UW System Wisconsin PRAXIS "Remembering Math and Science" grant.

Session: **Multiple Programs for Extra-Scholastic Science Experiences With Similar Missions—Benefits and Challenges Abound**
Date: June 3rd
Time: 9:45 AM
Location: Vandenburg Room
Speakers: Mark Mattson & Kathy Fisher
James Madison University

It is common at many academic institutions to have programs designed to assist students having difficulty in their classes. Often, more than one program exists offering assistance in a particular field. For instance, James Madison

University offers assistance in science courses through the Science and Mathematics Learning Center, through the Supplemental Instruction program, and through tutoring for student-athletes. This session will include a discussion by professionals at one institution who are each engaged in the common endeavor of providing extra-scholastic science education, although offered through different academic programs. The professionals will include the science coordinator of the Science and Mathematics Learning Center and the supervisor of Supplemental Instruction. The focus of the discussion will include the benefits of sharing a mission and having the ability to cater to students with a wide diversity of learning styles, as well as some of the challenges, such as competition for student tutors.

Session: **The Sophomore Challenge: Meeting Academic Needs Through Research**
Date: June 3rd
Time: 9:45 AM
Location: Henderson Room
Speaker: Ann Sprunger
University of Michigan

Colleges and Universities, encouraged by initiatives from organizations such as the American Association of Colleges and Universities and the Reinvention Center, are increasingly offering students hands-on learning experiences through research projects. Often these research experiences come in the senior year through honors programs. Others offer a one-time research experience through an independent study or research course designed to give students an exposure to research being conducted in their major concentration (Biology, Chemistry and Psychology). How can a student be engaged in research earlier in their undergraduate years and how can they continue to pursue research opportunities after having a first research exposure? The Undergraduate Opportunity Research Opportunity Program (UROP) at the University of Michigan offers an academic year-long introductory research experience for first and second year undergraduate students. Since Fall 2001, UROP has developed a Research Scholars Program for students who will have second-year status and who have had one year experience with UROP as a first-year student. This program is designed to address the sophomore year experience and its unique challenges with a research program that offers the student a chance to develop their academic engagement through additional hands-on research experience. This session will provide an overview of how the UROP Research Scholars Program is structured, the components of the program, how students are encouraged to develop their academic and research involvement and how students can benefit from an additional year of mentorship from a research sponsor, a peer advisor and a variety of research related activities.

Session: ***Becoming Competitive in Academia: Helping STEM Students Navigate Their Way Towards a Doctorate***
Date: June 3rd
Time: 9:45 AM
Location: **Koessler Room**
Speaker: Heather Tarleton
University of California - Los Angeles

It is unreasonable for anyone to expect a student to "chart their own course" if that student has little or no prior training in "charting". Think about how an infant learns to walk. When the appropriate muscles have developed, then the infant is ready; however, this does not always mean that the infant will walk. A parent or guardian must model this process known as "walking" and must also help the infant go through the motions of standing and putting one foot in front of another. Undergraduate students need the same assistance. Completing a baccalaureate degree does not mean that a student is prepared for the walk towards a graduate degree. It is crucial for undergraduate faculty and administrators to "demystify" graduate education and map out the road to the doctorate. This session will cover the best practices for anyone serving as an official or unofficial mentor to undergraduates in the sciences as well as the key challenges faced by students of all levels of academic skill and proficiency. This session will also include the most common misconceptions that students have with regard to graduate study and ways to effectively communicate with students about graduate education.

Event: **KEYNOTE ADDRESS**
Date: June 3rd
Time: 11:00 AM
Location: **Ballroom**
Speaker: Dr. Freeman Hrabowski, III
University of Maryland, Baltimore County

Event: **Luncheon**
Date: June 3rd
Time: 12:00 PM - 1:00 PM
Location: **Ballroom**

Session: ***Undergraduate Research as an Equalizer: Different Learning and Learning Differently***
Date: June 3rd
Time: 1:15 PM
Location: **Hussey Room**
Speakers: Jason Woods & Henry Biggs
Washington University

Many of us have experienced academically mediocre undergraduate students who excel at research and academically exceptional students who do not. In this session we will explore how students' experiences in research labs can significantly affect their engagement with science and their pursuit of future careers in or out of science. Our experience leads us to believe that positive laboratory research experi-

ences can make a profound, affirmative impact in the way that students approach individual scientific subjects and in their engagement with science in general. Notably, this can be a great equalizer for students from different backgrounds, as real research often requires significantly more sustained, synthetic thought than in the classroom and allows learning and discovery to occur at a pace and in a style unique to each student. At Washington University we have attempted to significantly increase the number of undergraduate students who participate in extended research projects in all of the natural sciences. We will discuss one model of creating an affirmative "culture of research" that has been successful at our institution.

Session: ***Increasing the Percentage of Ethnic Minority Nurses: NCCU Department of Nursing and the Office of Student Support Services***
Date: June 3rd
Time: 1:15 PM
Location: **Vandenburg Room**
Speakers: Melusian Wright & Gail Ricks
North Carolina Central University

The Bureau of Health Professions Division of Nursing and the U.S. Department of Health and Human Services reported in 2000 that only 12.3% of all registered nurses identified themselves as ethnic minorities. When compared with the US Census Bureau 2000 report that 31% of our population is nonwhite, the disparity between minority nurses and the communities they serve is cause for alarm. While the percentage of African Americans attending college is increasing dramatically, the rates of matriculation have not kept pace with enrollments. This is especially true in the field of nursing which has been historically predominated by White females. While African American and other minority nursing students face many barriers regardless of the type of institution they attend, those at Historically Black Colleges and Universities often have additional obstacles to overcome. With these issues in mind, North Carolina Central University's Department of Nursing has instituted an Office of Student Support Services dedicated to assisting pre-nursing students in achieving their goals. The unit takes responsibility for the academic advisement of over 300 pre-nursing majors, and also holds engagement meetings for each class, recruits tutors for problematic coursework and is available for the emotional and professional development of all nursing students.

Tuesday June 3rd, 2008

Session: ***Advising in the Sciences: Cutting a Large Major Down to Size***
Date: June 3rd
Time: 1:15 PM
Location: **Henderson Room**
Speakers: Bonnie Comella & Wendy Aquadro
Cornell University

There are significant challenges associated with meeting diverse student needs in a major with over 1300 students, while facing limited financial and staff resources. Supporting first-year students as they transition to college life and a science major; attracting and maintaining underrepresented students; helping students find meaningful research; connecting students with faculty; and providing career, pre-med and graduate advising are needs that can be effectively addressed through targeted programs. This session will give advisors from large universities the opportunity to share strategies and best practices for supporting students while hearing about programs developed by Cornell University's Office of Undergraduate Biology such as the Biology Scholars Program, Student Advisors, Hughes Scholars Program, Bio Mixers, targeted biology seminars, career networking trips and freshman planning meetings. This session is designed to be informative and interactive with an emphasis on identifying institutional barriers that prevent creative programming while recognizing the strength of incorporating faculty, colleagues and students in program development.

Session: ***Improving Biology Students' Performance with Supplemental Instruction***
Date: June 3rd
Time: 1:15 PM
Location: **Koessler Room**
Speaker: Johanna Dvorak
University of Wisconsin at Milwaukee

This presentation will highlight a collaboration between the University of Wisconsin-Milwaukee's Biology Department and Supplemental Instruction Center to improve student retention. It is based on a study, funded by a University of Wisconsin-System grant, to determine the impact of Supplemental Instruction on students' academic progress in an Anatomy and Physiology course. This effort is part of a course redesign project since first-year students must enroll in the course as a gateway to Nursing, Health Sciences, and Pre-professional programs. In Supplemental Instruction, a former "A" student hired as Supplemental Instruction leader attends all lectures and conducts four review sessions per week. Results have been positive comparing participants' with non-participants' grades. The study is also taking a closer look by comparing changes in student performance on a pre-test at the beginning of the term and post-test of content knowledge at the end of the term. It also compares students' series of short essays about anatomy and physiology to determine improvement in articulating and applying key concepts in the field. This presentation will focus on the methods used in the study, and its outcomes and impact, particularly on first-year students.

Session: ***Implementation of Process-Oriented Guided Inquiry Learning in an Introductory Chemistry Course***
Date: June 3rd
Time: 2:30 PM
Location: **Hussey Room**
Speakers: Craig McClure & Joe March
University of Alabama at Birmingham
Malinda Matney
University of Michigan

The Process-Oriented Guided Inquiry Learning (POGIL) technique is a student-centered approach to instruction, which models the learning cycle in the presentation and exploration of course material. Course topics are presented through printed activities which the students explore to determine the concepts involved, and then apply their new knowledge after acquisition. This collaborative learning model is designed to engage students, and has shown promise in increasing student performance and participation in the science classroom. At the University of Alabama at Birmingham, a Preparatory Chemistry course based on the POGIL model was designed and implemented. Students completing this course were assessed with the 12-item Group Assessment of Logical Thinking (GALT) survey, a student attitudes survey, and the ACS California Chemistry Diagnostic Exam. Results from these assessments were compared to those of students from a traditional lecture-centered format. The POGIL model used in these activities will be presented, along with preliminary results from the classroom assessments, and a discussion of the applicability of this approach to other sciences.

Session: ***Explore, Prepare, Succeed: A Required Career Planning Course for Transitioning Transfer Students***
Date: June 3rd
Time: 2:30 PM
Location: **Vandenburg Room**
Speaker: Jean Underwood
University of Minnesota

A signature feature of the enhanced College of Biological Sciences curriculum is a new career planning course. This one-credit course engages transfer students in a career planning process. Students assess their strengths, interests, values and motivations as related to career choice. In addition, students learn how to research careers, conduct informational interviews, set S.M.A.R.T. goals, make decisions, prepare for their future, take advantage of "planned happenstance", use campus and community resources and develop a personal action plan. Course delivery includes online teaching modules comprised of readings, reflective writings, weekly online discussions, blogs, and journal entries as well as classroom discussions and one-to-one consultations. Throughout the course, students engage in activities designed to help them Explore, Prepare and Succeed. In addition to required activities, students customize their course experience by completing and reflecting on eight Student Choice activities.

Session: ***Enhancing Persistence in the Sciences (STEM-based fields)***
Date: June 3rd
Time: 2:30 PM
Location: **Henderson Room**
Speakers: T. Carter Gilmer & Angelo D. Brown
Bowling Green State University

Nationally, approximately 50% of incoming Science, Technology, Engineering and Math (STEM) based majors abandon these disciplines before year three of college. Key strategies to significantly improve retention and to improve academic achievement in STEM areas include: 1) emphasizing the importance of success (achieving A's and B's) in math and chemistry courses; 2) making students aware of courses, curriculums and associated grades that assure they are positioning themselves for certain careers; 3) giving students concrete information about the effects of changing curriculums and career goals; and 4) exposing students to professionals and mentors who will help them choose the (hopefully, STEM-based) careers that they are most suited for. New outcomes from the Bowling Green State University (BGSU) Academic Investment in Math and Science (AIMS) program will be covered, which accent improved grades, retention, graduation rates and continuation toward post-baccalaureate study. Specific outcomes will be covered including: 1) a 71% four-year graduation rate for AIMS participants versus about 35% for control cohort members; and 2) among the AIMS graduates about 50% are attending graduate school or professional school (i.e., medical, dental). We will attempt to delineate the very specific four-year AIMS program components, such as, the summer bridge program, Experience Critiques and GRE/MCAT exam preparation, which have led to better academic skills, recruitment, retention, graduation rates and continuation toward advanced degrees. Recent assessments via surveys of students, faculty and staff have substantiated most of our conclusions and are leading us to news ways of upgrading STEM education at BGSU and beyond.

Session: ***Using an Honors Program Approach to Build Community and Prepare Students for Research***
Date: June 3rd
Time: 2:30 PM
Location: **Koessler Room**
Speakers: Joe March, Diane Tucker, Michele Gould & Alan Eberhardt
University of Alabama at Birmingham

The Science and Technology Honors Program (STHP) was established to help students develop the critical thinking and research skills to participate in the large research enterprise at the University of Alabama at Birmingham (UAB), with a goal of their advancement to graduate or professional school. This session will describe how students are recruited to the program, how they are prepared and trained to begin research as early as the end of their freshman year, how they are matched with faculty mentors, and how students

have successfully transitioned to the research environment. Program components to be described include establishing a thematic learning community during the freshman year, interdisciplinary courses that supplement traditional majors, laboratory training courses, training in scientific and technical communication, and examples of research experiences that have led to publications.

Session: ***Creating Campus Cultures for Undergraduate Success***
Date: June 3rd
Time: 3:45 PM
Location: **Hussey Room**
Speaker: Cinda-Sue Davis
University of Michigan

While the importance of campus culture is widely recognized, too many colleges and universities believe that a series of unrelated courses, services, and programs are sufficient to foster the success and retention of undergraduate students. This presentation will discuss various models found both at the University of Michigan and elsewhere that attempt to create interrelated and integrated efforts involving all university constituents to promote student learning and growth. Examples to be discussed include residential living-learning programs, interactive theater presentations, undergraduate research opportunities, integrated high-school to college transition programs, and faculty-led workshops to provide mentoring and climate best practices.

Session: ***Keeping Underrepresented Students in the Sciences using Research, Counseling and Seminars***
Date: June 3rd
Time: 3:45 PM
Location: **Vandenburg Room**
Speakers: Tama Hasson & Linda DeAngelo
University of California-Los Angeles

The Program for Excellence in Education and Research in the Sciences (PEERS) is a two-year freshman/sophomore program for students at University of California-Los Angeles (UCLA). All PEERS students are underrepresented physical and life science majors that have had more than typical life challenge hurdles to overcome to reach UCLA. PEERS' goal is to bring these students into the scientific community by helping them maintain a science major and encouraging them to try undergraduate science research. The PEERS program involves individualized academic and career counseling, "Pathways in Science" seminars tailored to freshman and sophomore needs, collaborative learning workshops, research seminars by UCLA professors, and the opportunity to both be exposed to and to be deeply involved in undergraduate research. In this presentation we will share the program components such as: our freshman seminar focused on adjustment to a Research I institution, our sophomore seminar focused on choosing a major and a career, our counseling system, and our pipeline to get PEERS students

Tuesday June 3rd & Wednesday 4th, 2008

both exposed to and involved in research. In addition, we will discuss how we have used student assessment to improve the program to better address students' needs.

Session: ***Use of Clickers and Immediate Feedback Scratch-off Forms to Reveal Misconceptions, Stimulate Student Interest, and Prompt Peer Instruction in Introductory Biology***
Date: June 3rd
Time: 3:45 PM
Location: **Henderson Room**
Speaker: Sue Wick
University of Minnesota

Even bright students can bring misconceptions to their college courses. A key step in guiding students to learn new material is to be sure that students' foundational grasp of concepts is correct. A combination of clickers (student response system) and Immediate Feedback Assessment Technique scratch-off forms (IF-AT, Epstein Educational Enterprises) were used in a large, lecture-based introductory biology course for non-majors to achieve several goals: to identify student misconceptions; to challenge students to revise their concepts; to stimulate students to learn from each other; and to help students prepare for exams. Both with the IF-AT and clicker methods, students committed to their answers in permanent groups of about four students. Student groups were asked to explain their choices, and based on the percentage of groups that answered correctly, students could be asked to re-explain, explain the concept in their own words, or move on to more complex material based on the concepts under consideration. Students appreciated the immediate feedback that both techniques provided, and acknowledged that group use of the technology helped them to learn from each other.

Session: ***Facilitated Study Groups for Introductory Biomedical Engineering: Practice and Evaluation***
Date: June 3rd
Time: 3:45 PM
Location: **Koessler Room**
Speakers: Larry Handlin & LaShawnda Fields
Washington University

Cornerstone: The Center for Advanced Learning and the School of Engineering at Washington University in Saint Louis have designed and implemented a facilitated study group program for the introductory course in Biomedical Engineering, BME 140. The program involves professors in the design and techniques utilized, creating a program tied directly to the curriculum. Cornerstone provides the necessary infrastructure to run the program with the approval, hiring, and training of mentors appropriate for the study groups. The presentation will outline the key features and the benefits derived from the initiative and two years of evaluation data will be presented to demonstrate the effect of the program on student outcomes. The evaluation includes background

demographic information and student scores and high school performance. Initial evaluation demonstrated an improvement of 1/2 of a letter grade for those students taking part in the program held constant for background and previous academic performance. Cornerstone: The Center for Advanced Learning helps ensure that all WU undergraduates succeed and persist to graduation in their chosen fields and has developed a series of interventions to improve student performance and retention in STEM fields.

Event: ***Tour of the Science Learning Center***
Date: June 3rd
Time: 5:00 PM
Location: **Meet at Michigan League - Concourse**

Join us for a tour of the Science Learning Center and its satellite location. Meet at 5:00 PM in the Concourse of the Michigan League on the second floor.

Registration Opens & Continental Breakfast

Date: June 4th
Time: 8:30 AM
Location: **Michigan League - Concourse**

Session: ***Pit Stops without Penalties: Preparing First-Year Students for Success***
Date: June 4th
Time: 9:30 AM
Location: **Hussey Room**
Speakers: Mitsue Wiggs, Keith Harmon & Taifa Hibbert
University of Maryland, Baltimore County

The Meyerhoff Scholarship Program model of Summer Bridge creates an environment that enables students to successfully transition into college through an intense academic "boot camp" that stretches students' ability, challenges ineffective habits, and reveals the necessity of collaborations. Through this process, scholars recognize the value of utilizing support networks offered by peers, staff, faculty and institutional resources. Summer Bridge is a particularly optimal time for students to experience collegiate demands and learn from their mistakes without lasting penalties. The resulting effort reflects nearly a 95% retention and graduation rate, well above the national and institutional trends in the sciences. In this presentation, we will discuss the components of the model and their incorporation of diverse advising practices, model evolution and suggestions for adaptation.

Wednesday June 4th, 2008

Session: ***Measuring the Magnitude of the Health Career Pipeline Leakage***
Date: June 4th
Time: 9:30 AM
Location: **Vandenburg Room**
Speaker: Charles Alexander
University of California - Los Angeles

This study focuses specifically on the college stage of the health professions educational pipeline, examining the "leakage" of Underrepresented Minority (URM) students at this stage. One possible explanation for the leakage is that many URM students enter college with a strong interest in careers in a health profession and therefore pursue a curriculum in pre-health "gateway" math and science courses. However, some may not succeed academically in these courses and therefore abandon their pursuit of a health profession. Although it is known that URM college students in general have lower grade point averages than their non-URM counterparts, prior research has not investigated in detail URM academic achievement in specific pre-health gateway courses. While gateway courses such as chemistry and calculus carry the reputation of being courses that "weed out" non-competitive students in pre-health pathways, previous studies have not investigated whether particular courses in the gateway course series pose unique challenges to URM students. Moreover, prior research has not systematically investigated whether receiving low grades in initial gateway courses deters URM students from persisting in the pre-health curricular pathway. To examine these issues, we investigated the academic achievement of undergraduate students enrolled in pre-health gateway courses at several University of California and California State University campuses.

Session: ***Digital Research in the Natural Sciences: Critical Concepts and Strategies for Undergraduates***
Date: June 4th
Time: 9:30 AM
Location: **Henderson Room**
Speaker: Patricia B. Yocum
University of Michigan

Digital resources, core to contemporary research, are plentiful, complex and changeable. Few students early in their studies are likely to be sufficiently prepared to use such resources effectively to conduct quality research. Yet undergraduate curricula increasingly view research as a fundamental part of undergraduate study. How then can educators help students learn to identify, select and navigate scholarly resources in digital form and use them appropriately? Credit-bearing courses which develop such skills can be found in many places. Courses focusing on science resources and designed for first and second year undergraduates, however, are not very common. "Digital Research in the Natural Sciences: Critical Concepts and Strategies" is such a course. Currently piloted at the University of Michigan, the one-credit course is a joint initiative between the College of Literature, Science and the Arts and the University

Library. Recognizing that technology empowers and also challenges, the course seeks to lay a foundation for academic research and life-long learning. Through a variety of methods, the course explores new concepts, techniques and discovery tools, as well as search strategies, evaluation of digital sources and academic integrity.

Session: ***Evening Study Group Program Enhances First-year Success***
Date: June 4th
Time: 9:30 AM
Location: **Koessler Room**
Speakers: Ruth Buskirk & Lisa Wyatt
University of Texas at Austin

A three-year-old study group program at The University of Texas at Austin enhances academic communities, encourages collaborative learning, helps develop peer mentors, and increases office hour visitation. Through the cooperation of the College of Natural Sciences and the Division of Housing and Food Service, group study resources for introductory science and mathematics courses are free and available Sunday through Thursday evenings at two openly accessible areas of the University residence halls. Courses with the greatest clientele include calculus and chemistry, and many students are in the habit of studying at these centers regularly. Paid staff include graduate student managers and undergraduate student facilitators. Graduate Teaching Assistants for target introductory courses hold weekly office hours there. Based on teaching techniques employed by the College's successful Emerging Scholars Program, all personnel are trained to help students solve problems in groups and to facilitate the study process rather than just provide answers. We note that honors students tend to form their own study groups and students who need extensive individual tutoring for a course must be referred to the University Learning Center. These study group communities are an economical and attractive way to help the large number of students in between.

Schedule at-a-Glance

June 2nd-5th, 2008

Monday, June 2nd

Welcome Event With Refreshments

7:00 PM - 8:30 PM, Palmer Commons Outdoor Plaza

Tuesday, June 3rd

Registration Opens & Continental Breakfast 8:30 AM, Michigan League - Concourse

Visualizing Chemistry by Digital Learning Objects

9:45 AM, Hussey Room

Multiple Programs for Extra-Scholastic Science Experiences with Similar Missions - Benefits and Challenges Abound

9:45 AM, Vandenburg Room

The Sophomore Challenge: Meeting Academic Needs Through Research

9:45 AM, Henderson Room

Becoming Competitive in Academia: Helping STEM Students Navigate Their Way Towards a Doctorate

9:45 AM, Koessler Room

Keynote Speaker

Dr. Freeman Hrabowski, III

President, University of Maryland, Baltimore County

11:00 AM, Ballroom

Luncheon

12:00 PM, Ballroom

Undergraduate Research as an Equalizer: Different Learning and Learning Differently

1:15 PM, Hussey Room

Increasing the Percentage of Ethnic Minority Nurses: NCCU Department of Nursing and the Office of Student Support Services

1:15 PM, Vandenburg Room

Advising in the Sciences: Cutting a Large Major Down to Size

1:15 PM, Henderson Room

Improving Biology Students' Performance with Supplemental Instruction

1:15 PM, Koessler Room

Implementation of Process-Oriented Guided Inquiry Learning in an Introductory Chemistry Course

2:30 PM, Hussey Room

Explore, Prepare, Succeed: A Required Career Planning Course for Transitioning Transfer Students

2:30 PM, Vandenburg Room

Enhancing Persistence in the Sciences (STEM-based fields)

2:30 PM, Henderson Room

Using an Honors Program Approach to Build Community and Prepare Students for Research

2:30 PM, Koessler Room

Creating Campus Cultures for Undergraduate Success

3:45 PM, Hussey Room

Keeping Underrepresented Students in the Sciences using Research, Counseling and Seminars

3:45 PM, Vandenburg Room

Use of Clickers and Immediate Feedback Scratch-off Forms to Reveal Misconceptions, Stimulate Student Interest and Prompt Peer Instruction in Introductory Biology

3:45 PM, Henderson Room

Facilitated Study Groups for Introductory Biomedical Engineering: Practice and Evaluation

3:45 PM, Koessler Room

Tour of Science Learning Center

5:00-6:00 PM, Meet at Michigan League - Concourse

Dinner on Your Own

Wednesday, June 4th

Registration Opens & Continental Breakfast 8:30 AM, Michigan League - Concourse

Pit Stops Without Penalties: Preparing First-Year Students for Success

9:30 AM, Hussey Room

Measuring the Magnitude of the Health Career Pipeline Leakage

9:30 AM, Vandenburg Room

Digital Research in the Natural Sciences: Critical Concepts and Strategies for Undergraduates

9:30 AM, Henderson Room

Evening Study Group Program Enhances First-Year Success

9:30 AM, Koessler Room

Critical Components for Increasing Academic Performance in STEM: The Evolution and Sustainability of the Gateway Science Workshop Program

10:45 AM, Hussey Room

Computational Science as an Organizing Principle for Cross-disciplinary, Multi-Institutional, and Student-Faculty Collaborations

10:45 AM, Vandenburg Room

Creating a Successful and Diverse Pre-Health Learning Community at the University of Michigan

10:45 AM, Henderson Room

The Use of Multi-Disciplinary Fields to Train Undergraduates and for High School Outreach: Radio Astronomy as a Teaching and Research Tool

10:45 AM, Koessler Room

Boxed Lunch

**12:00 PM, SLC Satellite Location
2165 Undergraduate Science Building**

The CSTEP/LSAMP Four-Year Curriculum at Stony Brook University

1:15 PM, Hussey Room

Engaging Undergraduate Interns in an Interdisciplinary Research Collaboration

1:15 PM, Vandenburg Room

Enabling Note-taking and Active Learning Through the Use of Laptops in the Classroom

1:15 PM, Henderson Room

Assessment of Undergraduate Courses in the Sciences: A National Study

1:15 PM, Koessler Room

Integrating Research into the Undergraduate Science Curriculum - Encouraging Students to Learn Science as Scientists Do

2:30 PM, Hussey Room

An Overview of the Midwest Conference for Undergraduate Women in Physics at University of Michigan

2:30 PM, Vandenburg Room

Learning in Large Courses: Supplemental Workshops for Enhancing the Transition to a University

2:30 PM, Henderson Room

Developing a Robust Peer-Led Team Learning Program

3:45 PM, Hussey Room

Win-Win Outreach Solutions: How Community Service Can Build Leaders in Science and Education

3:45 PM, Vandenburg Room

Helping Low-income, Minority, and First-generation College Students in Nevada Attain Biomedical Careers

3:45 PM, Henderson Room

Undergraduate Research as Career Exploration Experience

3:45 PM, Koessler Room

Dinner on Your Own

Dessert Reception

7:30 - 9:30 PM, Exhibit Museum of Natural History

Thursday, June 5th

Continental Breakfast

8:00 AM, Michigan League - Concourse

Tools for Personal Statement Writing and Critiquing

9:00 AM, Michigan Room

G.E.N.E.S.I.S. II: From Beyond Campus to Community and Corporate Partners for Success. A Recruitment and Retention Project to Reach Underrepresented Groups for Careers in the Nursing Sciences

9:00 AM, Vandenburg Room

Experiencing Collaborative and Constructivist Teaching to Engender Pedagogical Change

9:00 AM, Henderson Room

Using the College Library to Enrich Science Learning

9:00 AM, Koessler Room

Learning the Process and Nature of Science in the Context of Cutting-edge Plant Biotechnology Research: Assessing a Research Experience for Undergraduates

10:15 AM, Henderson Room

Reality-based Advising of Pre-medical Students

10:15 AM, Koessler Room

Effectively Training a New Generation of Undergraduate Science Educators Through Peer-Teaching

10:15 AM, Vandenburg Room

Engaging Students in the Introductory Physics Sequence at the University of Michigan

11:30 AM, Michigan Room

AMSTEMM - Appalachian and Minority STEM (Science, Technology, Engineering, and Mathematics) Majors

11:30 AM, Vandenburg Room

What Should We Be Telling Students About How People Learn?

11:30 AM, Henderson Room

Using a Critical Inquiry Class Pairing to Support Students in Introductory Discipline-based Courses

11:30 AM, Koessler Room

Wednesday June 4th, 2008

Session: ***Critical Components for Increasing Academic Performance in STEM: The Evolution and Sustainability of the Gateway Science Workshop Program***
Date: June 4th
Time: 10:45 AM
Location: **Hussey Room**
Speakers: Louie Lainez & Amy Knife Gould
Northwestern University

Peer-led learning continues to have a positive impact on the success of undergraduate students in many science disciplines. The Gateway Science Workshop (GSW) program has played a critical role in achieving Northwestern University's goal of enhancing the educational outcomes of students in the STEM disciplines. Since its inception in 1997, the GSW program has grown significantly from a single pilot effort in biology, with just 30 students and five peer facilitators, to a program that covers five STEM disciplines with over 600 students participating each year. Through the years, we have gained valuable information in understanding what is needed to successfully run a peer-led program. In this presentation, we will discuss the development of GSW over the past decade and address potential barriers that may be encountered by other colleges/universities interested in implementing a similar peer-led program. We will also discuss the use of evaluation data for program improvement and research.

Session: ***Computational Science as an Organizing Principle for Cross-disciplinary, Multi-Institutional, and Student-Faculty Collaborations***
Date: June 4th
Time: 10:45 AM
Location: **Vandenburg Room**
Speakers: Terry Lahm, Andrea Karkowski, Alissa Douglas & Sheryl Hemkin
Capital University

Computational science is the use of computer visualization and mathematical modeling to solve problems in the sciences, engineering, economics and finance. Computational science presents an opportunity to demonstrate for students the value of partnerships across disciplines. This session will: (1) provide an overview of undergraduate curricula in computational science and identify resources for developing project-based undergraduate computational science experiences; (2) highlight unique features of educational materials developed to teach undergraduate computational science, such as cooperative learning, an emphasis on oral and written communication, and a focus on the creative nature of science; and (3) explore specific projects across the broad spectrum of computational science. The session will end with a student's perspective on studying computational science which includes collaborating with two faculty members to develop models within environmental science and economics. The environmental science project employed STELLA® in the development of a mass balance model of the hydrologic cycle model of

Mono Lake, CA. For the economics project, Python™ was used to model dynamic pricing of electricity utilities for residential customers.

Session: ***Creating a Successful and Diverse Pre-Health Learning Community at the University of Michigan***
Date: June 4th
Time: 10:45 AM
Location: **Henderson Room**
Speakers: Wallace Genser & Joyce Sutton
University of Michigan

The Health Sciences Scholars Program (HSSP) is a diverse pre-health learning community for undergraduate students enrolling over 50% Students of Color and over 30% Under-represented Minorities exploring the health sciences at the University of Michigan. A collaborative effort between University of Michigan's College of Literature, Science, and the Arts and its Health Schools, HSSP fosters exploration of a wide range of academic and health careers, encourages student understanding of and engagement in UM's diverse community, and supports students in their transition to the University of Michigan. This presentation will provide an overview of HSSP, emphasizing how the program combines the personal attention of a small college environment with the resources of a large research university. HSSP supports students' transition from high school to college through collaborative academic advising and by sponsoring programs emphasizing academic support, career exploration, community service, health and wellness, health disparities, and multicultural and social issues that engage first-year students as participants and advanced students as leaders. HSSP provides transformative intellectual experiences inside and outside the classroom by challenging students to understand themselves and the world around them in new ways. The presentation will present successful strategies and highlight continuing challenges using institutional data, survey results, and case studies.

Session: ***The Use of Multi-Disciplinary Fields to Train Undergraduates and for High School Outreach: Radio Astronomy as a Teaching and Research Tool***
Date: June 4th
Time: 10:45 AM
Location: **Koessler Room**
Speaker: Preethi Pratap
*Massachusetts Institute of Technology
Haystack Observatory*

At the Massachusetts Institute of Technology Haystack Observatory, scientists have developed a program to introduce radio astronomy into the undergraduate curriculum. Radio astronomy - a multi-disciplinary field that includes concepts in astronomy, physics, chemistry, math and engineering - can be used to provide students with diverse and effective laboratory and research experiences. The program has resulted in the development of hands-on introductory

instrumentation and teaching materials for radio astronomy and the remote use of a research instrument. The program is national in scope and has included training workshops for college faculty. With the success of the undergraduate program, Haystack Observatory experimented with the migration of instrumentation and materials to high schools through its Research Experiences for Teachers program for local high school teachers. This synergy is providing a way to bring the excitement of astronomy to high school students as well as undergraduates – potentially influencing more students to enter the STEM fields in college. This session will discuss the role of using multi-disciplinary fields in the training of undergraduate science students and the efficacy of using remote instrumentation. Discussions will include ways to reach down into high schools to create a greater interest in STEM as students move toward their undergraduate experience.

Event: **Boxed Luncheon**
Date: June 4th
Time: 12:00 PM
Location: **SLC Satellite Location**
2165 Undergraduate Science Building

Session: **The CSTEP/LSAMP Four-Year Curriculum at Stony Brook University**
Date: June 4th
Time: 1:15 PM
Location: **Hussey Room**
Speakers: Paul Siegel & Christine Veloso
Stony Brook University

The College Science and Technology Entry Program (CSTEP) and Louis Stokes Alliance for Minority Participation (LSAMP) program provide opportunities for student advancement in the science, technology, engineering and health fields. CSTEP/LSAMP Four-Year Curriculum is a series of programmatic activities that are based upon the observation that CSTEP and LSAMP students adapt to university studies with varying degrees of success. Some students who were high achievers in high school perform poorly, and some students with low high school test scores perform extremely well. The question we face is how our CSTEP and LSAMP programs can best serve students who exhibit varying levels of academic achievement and how we can best accommodate a broad and diverse range of academic interests. Our intent is to give our students the foundational skills to succeed in their first two years of study followed by providing programs that will strengthen the specific skills they will need upon graduation to succeed on their chosen path. The four-year curriculum is designed to expose students to a full range of academic survival skills and to also give students research skills that will serve them well throughout their undergraduate years and provide them with experiences that will enhance their graduate school and/or employment applications. The four-year curriculum lays out specific year-by-year programmatic activities to address the needs of our students. By stressing a regimen of study and career building skills, we are able to help our students early in their

academic careers to explore options that make the most sense for them and/or to reinforce the academic choices that they made originally.

Session: **Engaging Undergraduate Interns in an Interdisciplinary Research Collaboration**
Date: June 4th
Time: 1:15 PM
Location: **Vandenburg Room**
Speaker: Martin Smith
University of California - Davis

The University of California-Davis, School of Veterinary Medicine, Veterinary Medicine Extension, and Tony LaRussa Animal Rescue Foundation have partnered to investigate the influence of the All Ears Reading Program. The program provides opportunities for third grade students to read aloud to registered therapy dogs, while the program's principal investigators and undergraduate interns study the program's impact on reading skills, self-esteem, and empathy. The undergraduate interns, majoring in animal science, work as data collectors and project collaborators. This session will describe the interns roles, the structure of their internship, strategies used for their recruitment and training, and reports on peer and collaborative learning. The All Ears Reading Program is based on research that shows that working with therapy dogs can help people build motivation, maintain focus, and increase time on task.

Session: **Enabling Note-taking and Active Learning through the Use of Laptops in the Classroom**
Date: June 4th
Time: 1:15 PM
Location: **Henderson Room**
Speaker: Perry Samson
University of Michigan

For three years LectureTools (<http://www.lecturetools.org>) has been used in a variety of courses at the University of Michigan with the goal of exploring best practices for using Internet technology in large classes. LectureTools provides a system for students to 1) take notes synchronized to lecture slides, 2) ask questions electronically during class that are answered by a GSI for the class to see without knowing the senders identity (to encourage the 'dumb' question many are thinking but fearful to ask), 3) self-assess their understanding to identify areas for reflection later and to provide the instructor with guidance for review, 4) draw on and save instructor's slides for review and 5) respond interactively to questions with a wider range of options than traditionally available with hand-held clickers. This talk offers a demonstration of this system (IF POSSIBLE, BRING A LAPTOP) and discusses how students and faculty have responded to a range of surveys to assess usability, functionality and effects on student learning. Moreover, we address the concern that students will be distracted by having access to the Internet during class. Our research suggests students do not see a shift in their level of distraction from similar courses that do

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not use technology. Moreover, students report they feel the technology is enabling better note taking and opportunities for active learning.

Session: ***Assessment of Undergraduate Courses in the Sciences: A National Study***
Date: June 4th
Time: 1:15 PM
Location: **Koessler Room**
Speakers: Dennis Sunal, & Cynthia Sunal
University of Alabama
Cheryl Mason
San Diego State University
Dean Zollman
Kansas State University

The NSF-supported multiyear National Study of Education in Undergraduate Science (NSEUS) project focuses on critical needs in teaching undergraduate science to diverse majors with emphasis on the preparation and long-term development of pre-service undergraduate K-6 teachers of science. The goal of the national study is to investigate the impact of undergraduate standards-based, reform entry-level science courses that have been developed by teaching faculty that differ from traditional courses. Thirty reform and 30 comparison undergraduate science courses from a national population of 103 diverse institutions, stratified by institutional type, were selected and compared in a professional development impact design model. Data were collected using multiple quantitative and qualitative instruments and analyzed using comparative and relational studies at multiple points in the impact design model. Criteria for success of the NSF project was determined by conclusions drawn from the research questions that included: evidence and effects of short-term impacts on all undergraduate students and long-term effects on graduated in-service teachers in their own classroom science teaching; identification of characteristics of reform courses that produce significant impacts; and identification of characteristics of effective faculty.

Session: ***Integrating Research into the Undergraduate Science Curriculum - Encouraging Students to Learn Science As Scientists Do***
Date: June 4th
Time: 2:30 PM
Location: **Hussey Room**
Speaker: Kerry Cheesman
Capital University

To encourage students to understand that the science they are learning is rooted in research, we have built a curriculum that encourages all majors to become involved in research experiences. Early courses refer to historic research, a careers course looks at research based careers, and a research methods course is required. In Research Methods, students learn how research is done and communicated by actually doing a research project. This whets the appetite of many students who then seek additional research opportu-

nities either in-house or at other schools during the summer. All research that is completed is shared during an annual scholarship symposium on campus, and science students are always well represented at that event. The increased understanding of science that is a result of doing research has been reflected in an increase in the number of students attending graduate programs in all areas (both research and clinical programs). The design and implementation of the program, along with results over the past six years, will be shared.

Session: ***An Overview of the Midwest Conference For Undergraduate Women in Physics at University of Michigan***
Date: June 4th
Time: 2:30 PM
Location: **Vandenburg Room**
Speaker: Alejandra Castro
University of Michigan

The disparate participation of women in physics is an issue of international concern and has been highlighted by events, such as the recent 2nd International Union of Pure and Applied Physics (IUPAP) International Conference on Women in Physics. In response to the underrepresentation, a two-day conference was held at the University of Michigan that focused on the critical transition from undergraduate to graduate study. The overarching aim was to give young women the confidence, motivation and resources to apply to graduate school and successfully complete a PhD. The conference was modeled on the Conference for Undergraduate Women in Physics, held for the past two years at the University of Southern California. The primary objectives of this movement include the fostering of an undergraduate culture in which women are encouraged and supported to pursue and succeed in higher education in physics. To strengthen the network and voice of women physicists across the country, we are charged with increasing awareness of current research and career options, enhancing familiarity with the graduate school experience, and making available resources that are pertinent to the graduate school application process.

Session: ***Learning in Large Courses: Supplemental Workshops for Enhancing the Transition to a University***
Date: June 4th
Time: 2:30 PM
Location: **Henderson Room**
Speaker: Joannah O'Hatnick
University of Guelph

At the University of Guelph in Guelph, Ontario, over 1600 first-year students enroll each year in a two-semester sequence of Introductory Biology, required for almost all Bachelor of Science students. The large student enrollment necessitates that students adjust to a style of teaching and learning which can be quite different from that of their high school biology courses. At Guelph, Learning Services and the Biology Course Coordinator have paired together to create two

course-specific workshops: Preparing for Multiple Choice in Biology I; and Preparing Effective Poster Presentations in Biology II. Essential to this collaboration are Peer Helpers, upper-year science students who lead the workshops and act as a point of academic contact to first-year students. The workshops provide students with a venue for exploring how to learn in their courses and address students' needs at two critical, high-anxiety points in the semester. Using an overview of the two workshops as a basis for discussion, participants will explore the challenges specific to introductory courses with large enrollments and the role of collaboration between departments and learning support services.

Session: ***Developing a Robust Peer-Led Team Learning Program***
Date: June 4th
Time: 3:45 PM
Location: **Hussey Room**
Speaker: Lisa Kuehne
Washington University

Peer-Led Team Learning (PLTL) is a group learning program that was originally developed by a consortium of schools, including City College of New York, New York City Technical College, St. Xavier University in Chicago, and the University of Rochester. The basic model has been adapted and put into use at Washington University for first-year courses in Chemistry since Fall 2002, and in Physics and Calculus since Fall 2004. One of the major adaptations is that participation in the program is optional. An individual student may wish not to participate in PLTL, or to participate in a PLTL group in one subject, or groups in all three subjects, or any combination of the three. On average, grades for students in PLTL are one-third of a letter grade higher than the non-PLTL students in each course. While this is an encouraging result, it does not speak to the other ways in which we suspect participation in PLTL affects a student's performance in other first-year courses and beyond. During observations of the groups over the past years, we have been struck by the students' level of dialogue and engagement with the subject and the task at hand. Responses from surveys and evaluation forms suggest that many students feel that the benefits of PLTL include learning new study skills and problem-solving methods. Group leaders balance a demanding class schedule with the responsibilities of the position, and it would be useful to be able to measure the benefits of participation for those individuals as well. Topics to be discussed will include: mastery of skills as shown on written exam problems and multiple-choice exams; measuring success in other first-year premed/engineering courses for which PLTL is not offered; adaptations of the program for students with learning disabilities; migration of PLTL "drop-outs" and non-participants out of STEM majors; and benefits unique to being a PLTL leader. We are also interested in discovering what makes a student choose to participate in PLTL, and how to use that knowledge to improve the program as well as develop alternative programs for those who decide not to participate in group learning.

Session: ***Win-Win Outreach Solutions: How Community Service Can Build Leaders in Science and Education***
Date: June 4th
Time: 3:45 PM
Location: **Vandenburg Room**
Speakers: Sarah Thompson & Kira Berman
University of Michigan

The University of Michigan Exhibit Museum of Natural History serves 20,000 school children every year, teaching basic science and helping K-12 students learn about U-M research. As such, we have a need for skilled and enthusiastic teachers for science topics. While we could find retiree volunteers or hire part-time professional staff as most museums do, we hire students. Students from a wide variety of academic disciplines within the University come together with a common goal – educating children about science. The large number of students we employ enables them to work with small groups of children, increasing program quality. Students have an on-campus, 5-10 hour/week job, receive extensive training, acquire leadership skills, work as part of a team (often with students they might never encounter in the classroom) and share science with children and families – hopefully inspiring the next generation along the way. Often the experience sparks (attraction) and/or supports (retention) an interest in science, education, or both. Important factors in student success include opportunities for social interaction, reflection and continued learning, career counseling, and placement assistance. This session outlines the key elements that make our program a success, and provides recommendations for applications of our practices at other sites.

Session: ***Helping Low-income, Minority, and First-generation College Students in Nevada Attain Biomedical Careers***
Date: June 4th
Time: 3:45 PM
Location: **Henderson Room**
Speakers: Julie Ellsworth, Kiev Denby & Tarah Seachris
Truckee Meadows Community College

The goal of the Nevada Biomedical Student Pipeline Program is to increase the number of low-income and under-represented minority undergraduates interested in and successfully working toward biomedical careers. The strategy is to employ an intensive recruitment program to expose targeted students to the excitement of biomedical discovery and potential career opportunities. Selected students receive a stipend to participate in the Summer Bridge Workshop prior to their freshman year at community college. The Bridge Workshop is designed to remedy math and language skill deficiencies, and improve general science literacy, career awareness, study skills, and overall college preparedness. Program participants receive mentoring, personal advising, and free tutoring during the academic year and return for a second workshop experience the summer prior to their sophomore year. The BioPrep Workshop is

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designed to prepare students for long-term success as life science majors by focusing on specific content knowledge, and laboratory and critical thinking skills needed for mastery of Introduction to Cell and Molecular Biology, a crucial pre-requisite course in the major. The Program is funded by an NIH IDEA Network of Biomedical Research Excellence Grant (NIH NCRR Grant #2P20RR016464) and the first cohort of students has completed the program (<http://www.unr.edu/inbre/pipeline/>).

Session: ***Undergraduate Research as Career Exploration Experience***

Date: June 4th
Time: 3:45 PM
Location: **Koessler Room**
Speaker: Richard Weibl
American Association for the Advancement of Science (AAAS)

The evidence is clear that participation in undergraduate research has a positive effect on students' aspirations towards advanced education and careers in science, mathematics, engineering and technology. Drawing on faculty experiences in the Merck / AAAS Undergraduate Science Research Program (USRP), this session will explore specific activities that, when folded into undergraduate research experiences, encourage students to pursue a science career. The Merck/AAAS USRP supports research experiences that emphasize the interrelationship between chemistry and biology, encourage students to pursue graduate education in chemistry and life sciences, and foster undergraduate programs and activities that bridge chemistry and biology. Awardees create authentic research opportunities for students to actively participate in the work of academic scientists, to acquire new knowledge and skills critical to research at the boundaries of chemistry and biology, and to demonstrate this new knowledge and skill in professional settings. Panelists will be asked to briefly describe their research project and the specific ways in which they engage students as learners and the learning outcomes they observe as a result of the research opportunities they are creating.

Event: ***Evening Dessert Reception***
Date: June 4th
Time: 7:30 - 9:30 PM
Location: **University of Michigan Exhibit Museum of Natural History**

Join us for delicious desserts among Michigan's largest display of prehistoric life, including fossils of dinosaurs, prehistoric whales and mastodons. Other exhibits include anthropology displays on Native Americans and other cultures and over 700 rock and mineral specimens in the Geology section. The Museum is located less than two blocks from the Michigan League.

Continental Breakfast

Date: June 5th
Time: 8:00 AM
Location: **Michigan League - Concourse**

Session: ***Tools for Personal Statement Writing and Critiquing***

Date: June 5th
Time: 9:00 AM
Location: **Michigan Room**
Speaker: Mariella Mecozzi
University of Michigan

Often students approach us for help with brainstorming ideas for their graduate or professional school personal statement or for assistance with the editing process. In this session, after discussing how personal statements fit within the overall application effort, we will share ideas on how to facilitate programmatic initiatives as well as how to assist individuals on a one-on-one basis. We will illustrate how to write under the framework of "reflection vs. description," caution against common pitfalls, and attempt to dispel some myths. In an effort to promote student self-efficacy, we will also distribute instruments to promote self-assessment (prior to the writing process) and self-critiquing (prior to an external review).

Session: ***G.E.N.E.S.I.S. II: From Beyond Campus to Community and Corporate Partners for Success. A Recruitment and Retention Project to Reach Underrepresented Groups for Careers in the Nursing Sciences***

Date: June 5th
Time: 9:00 AM
Location: **Vandenburg Room**
Speakers: Patricia Coleman-Burns, Catherine Felder, Shantelle Cavin, Colleen Devoe, Mary Miller, & Sarah Fulgenzi
University of Michigan

The G.E.N.E.S.I.S. II Project at the University of Michigan (UM) offers a two-pronged approach for recruiting and retaining underrepresented groups for careers in health care from middle school to graduation with a Bachelor of Science degree in nursing. The Project reaches out to middle and high school students and teachers to improve science and math skills by partnering with community and corporate volunteers to encourage success. In one component, students are introduced to health careers and informed about the importance of success in science and math courses. The second component is a recruitment and retention project for underrepresented students enrolled in a baccalaureate nursing program. Project participants participate in peer facilitated study groups and compete for scholarships and stipends. This session will consist of a panel presentation. Panelists will include UM peer study group facilitators and participants, corporate and community partners and volunteers, and middle and high school student and teacher project participants.

Session: ***Experiencing Collaborative and Constructivist Teaching to Engender Pedagogical Change***
Date: June 5th
Time: 9:00 AM
Location: **Henderson Room**
Speaker: John Peters
College of Charleston

Student conceptions about how to learn are strongly influenced by pedagogies employed in their courses. Not surprisingly, how instructors teach is also strongly influenced by how they were taught as students. Simply telling students and instructors about different models of teaching and learning seems to do little to engender change. As such, getting instructors to employ active and collaborative models of teaching, and students to be receptive to these methods can be a struggle if they've had few prior experiences with them. This fun and interactive session will provide instructors, and academic assistance program coordinators with activities that can be used to demonstrate the value of collaborative and constructivist models of teaching and learning.

Session: ***Using the College Library to Enrich Science Learning***
Date: June 5th
Time: 9:00 AM
Location: **Koessler Room**
Speaker: Karen Swetland
University of South Carolina Upstate

This session will look at the role of a college library to enrich the learning experience of non-science majors making sense of science topics. In the digital world with Internet search engines readily available, can the library offer anything unique that supports students studying chemistry and biology? What library tools, resources and services enrich undergraduate science courses and support long term science success? What challenges and misperceptions do students have about using the library for science information? Are there any advantages or value added reasons for professors to encourage students to consult with a science librarian? Is it possible to gauge the level of information literacy skills among undergraduate students? Thoughts around these questions will be presented by a librarian who over the last eight years has had the opportunity to work with hundreds of non-science majors, as they explore finding information about science topics through trials and tribulations.

Session: ***Learning the Process and Nature of Science in the Context of Cutting-edge Plant Biotechnology Research: Assessing a Research Experience for Undergraduates***
Date: June 5th
Time: 10:15 AM
Location: **Henderson Room**
Speakers: Maya Patel & Barbara Crawford
Cornell University

This study explored the nature of the learning that occurred in a 10-week summer research experience for undergraduates at the forefront of plant biotechnology and genomics. We were interested in how the authentic research laboratory context contributed towards undergraduates' understandings of contemporary science and their development into science practitioners. The overall research questions covered the extent to which interns develop understandings of: 1) plant biotechnology and cutting-edge techniques; 2) the practice of science; and 3) the nature of science. Many aspects of this research experience aligned with authentic scientific practice. Findings indicate that interns developed flexible, in-depth knowledge of current issues and techniques in plant biotechnology/genomics specific to their research project. The extent to which interns progressed along the novice-expert trajectory correlated with prior research, project ownership and aspects of mentoring. Interns also developed several understandings about the nature of science, particularly the socio-cultural aspects of the scientific enterprise (Lederman et al., 2002). Finally, interns reported gains in their personal development (Seymour et al., 2004) as an important result of participation in this research experience.

Session: ***Reality-based Advising of Pre-medical Students***
Date: June 5th
Time: 10:15 AM
Location: **Koessler Room**
Speaker: Peggy Zitek
University of Michigan

Advisors must choose from a variety of approaches when helping pre-medical students determine how they might enhance their application or re-application to medical school in academic and/or non-academic ways. Such conversations range from counseling the perceptive student who is ready to hear what you have to say to the student who feels "entitled" but is actually not completely prepared. The earlier these conversations can commence, the more likely a student's perception will come closer to matching reality for what constitutes a "competitive" applicant. The guidance can be as "simple" as encouraging students to write a more reflective personal statement and insightful description of activities and as complicated as tactfully asking "Why medicine?" at the application or reapplication stage. Additionally, sometimes the desire to become a physician does not dovetail with the student's current academic aptitude in the sciences at the college level. This is when very challenging

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conversations can ensue, requiring the advisor to keep in mind the student's emotional needs.

Session: ***Effectively Training a New Generation of Undergraduate Science Educators Through Peer-Teaching***
Date: June 5th
Time: 10:15 AM
Location: **Vandenburg Room**
Speakers: Audrey Heppleston & Sonja Huntgeburth
McGill University

The benefits of interactive engagement in science education are well documented, but its integration within traditionally-rooted institutions of today's higher-level education remains challenging. To foster the development of effective science educators, the Tomlinson Project in University-Level Science Education at McGill University offers teaching workshops to science graduate students, these workshops focus on learner-centered strategies, their effects and how they may be implemented in a traditional context. Here, we document perceived gains from workshop participants and facilitators. Following the workshop, participants report greater self-assurance in their teaching and increasing involvement in education research and professional goals and approaches, and increasing involvement in education research and development. This peer-teaching system therefore benefits a large body of science educators by introducing learner-centered practices and generates a group of researchers who are intensively involved in changing how undergraduate science is taught.

Session: ***Engaging Students in the Introductory Physics Sequence at the University of Michigan***
Date: June 5th
Time: 11:30 AM
Location: **Michigan Room**
Speakers: James Liu, David Gerdes & Andrew Tomasch
University of Michigan

Over the last decade, the University of Michigan Physics Department has taken multiple initiatives to engage students in the large introductory physics courses. Our large lectures are currently taught in an interactive manner using student response systems (clickers). These clickers allow instant feedback to the instructor, who can then tailor the lecture to the concepts that the students are having the most difficulty with. Interactive lectures, along with peer instruction in discussion groups and online homework assignments, keep students engaged and provide an enriching environment for physics instruction at the University of Michigan. Our introductory physics labs have also been recently updated to make the experiments more intuitive and the physics concepts easier to understand. Unlike in a traditional setting, where students mainly take data in the lab and perform the analysis outside of the lab, here emphasis is placed on both taking and analyzing the data within the same lab session. This more fully engages the students in the labs, as they see

directly how the data they have taken reinforces the physical concepts behind the experiment without having to wait to perform the analysis at a later time.

Session: ***AMSTEMM - Appalachian and Minority STEM (Science, Technology, Engineering, and Mathematics) Majors***
Date: June 5th
Time: 11:30 AM
Location: **Vandenburg**
Speakers: Suzanne Scheff & Robert Tannenbaum
University of Kentucky

Appalachian and Minority students are significantly under-represented in the STEM disciplines. The primary objective of AMSTEMM, funded in part by an NSF STEP grant, is increasing the number of STEM majors enrolled at and graduating from the University of Kentucky (UK). The AMSTEMM program recruits, retains, and graduates STEM majors from Appalachian and minority populations by means of a number of related activities: summer science camps on-campus; visits to schools; teacher support; programs for parents, and Saturday events. Furthermore, AMSTEMM provides some students with financial assistance (in the form of fellowships for participating in mentored research experiences and serving as peer mentors) to allow them to realistically afford to attend UK. The retention phase includes: dedicated professional advising; faculty mentoring; increased support for the Mathematics Excel and Chemistry Excel programs; at least one first-year, place-based Discovery Seminar; mentored research experiences; a peer mentoring program; and bi-weekly research colloquia (available also as a one-credit course). All activities are specifically tailored with the particular needs of Appalachian and Minority students guiding decisions. During our presentation we will discuss the AMSTEMM program, its components, its results to date, and some of the lessons we have learned.

Session: ***What Should We Be Telling Students About How People Learn?***
Date: June 5th
Time: 11:30 AM
Location: **Henderson Room**
Speaker: Mary Ball
Carson - Newman College

The emerging field of educational neuroscience is attempting to bridge the gap between research in neuroscience and educational practice. Are current findings only useful in determining pedagogy, or are there things that college students need to know about how people learn in order to reach their potential? The prevalence of certain "neuromyths" suggests that we should be proactive in dispelling myths about learning and replacing them with a more accurate, albeit somewhat incomplete, picture of how people learn. In this session, we will review the history of "brain biology" and examine some of its most exciting new techniques. We will also consider how neuromyths related to gender differences, racial differences, and learning style differences

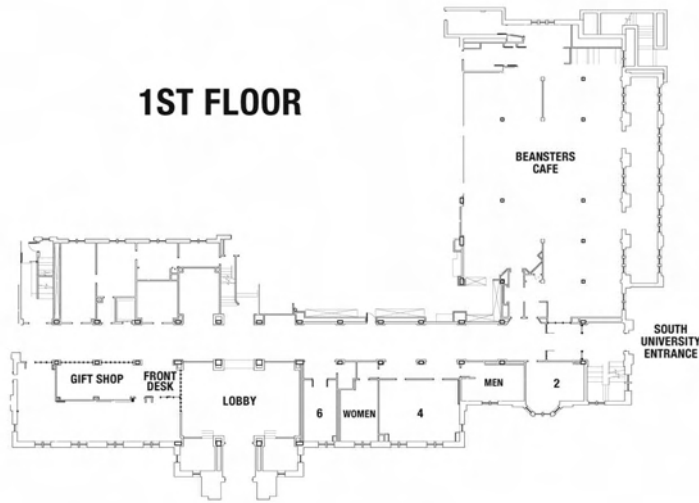
may be handicapping women, blacks, and latinos in college science courses and causing them to shy away from majoring in science.

Session: ***Using a Critical Inquiry Class Pairing to Support Students in Introductory Discipline-based Courses***
June 5th
Time: 11:30 AM
Location: **Koessler Room**
Speakers: Barbara Kirkwood & Leslie Miller
*Indiana University Purdue University
Indianapolis*

More students are entering college without the ability to critically read and master information from collegiate texts. To help students to succeed in course work while developing the ability to read, analyze and annotate texts along with other key skills, two Indiana universities are offering a paired course approach with Critical Inquiry (CI) and a variety of introductory discipline-based courses often taken by first year students. CI is commonly linked with science, math and social science courses. Rather than teach low level skill building, this approach focuses on higher-order cognitive skills that facilitate the transition from high school to college. Each CI course varies depending on the subject link, but all CI courses have common learning outcomes consisting of skills that are transferable to all college courses. Indiana University - Purdue University Indianapolis (IUPUI) designed the CI program after examination of national best practices for building skills of developmental learners. Indiana University - Purdue University Fort Wayne (IPFW) has adopted and adapted the program for its campus. This presentation will focus on the course design including the Critical Inquiry process, adjustments for different subjects, assessment of student satisfaction, and the effectiveness of the approach.

MICHIGAN LEAGUE

1ST FLOOR



2ND FLOOR



3RD FLOOR





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