ASM Conference for Undergraduate Educators Past Proceedings

1995-2014
Innovative Teaching Strategies, Assessment Strategies, and the Future of Microbiology Education

Sean Ervin - Saba University School of Medicine

The Second Undergraduate Microbiology Education Conference was held 19 to 21 May 1995, at Marymount College in Arlington, Virginia. The conference drew together 120 educators from the continental United States and from other locations, such as Puerto Rico, Finland, England, and Saba. The common theme was to share innovative and alternative teaching methodologies for the large lecture classroom and the undergraduate teaching laboratory.

The conference was organized around three thematic topics--innovative teaching strategies, assessment strategies, and the future of microbiology education. Conference attendees were exposed to capable and innovative instructors who showed the participants how stale recipes for teaching could be revitalized. Jean Douthwright presented an interesting discussion of how to access and to use the Internet in the undergraduate microbiology curriculum. Bob Benoit and Dennis Opheim presented a complex discussion of current assessment strategies (testing strategies) and inquiry-based instruction.

Throughout the conference the planning committee created blocks of time for break-out sessions for participants from similar institutions to share ideas, discuss the day’s meetings, and network. Saturday evening saw a large group discussion on the Core Knowledge, the curriculum guidelines published by the ASM and devised at the First Undergraduate Conference in 1994. In an era when grant awards seem to be few and far between we were pleased to have representatives from the National Science Foundation. The forbidding task of writing and submitting grants was made a little less imposing by their presentation.

We are all looking forward to conference planned for 1996.

Going Beyond Content

Spencer A. Benson, University of Maryland, College Park, MD

At the first ASM Undergraduate Microbiology Education Conference in May 1994 a set of proposed themes and concepts for an introductory Microbiology course was assembled (see ASM News VOL. 60, 1994). At the first conference and again at the second ASM Undergraduate Microbiology Education Conference, May 1995, the participants called for a conference that focused on teaching strategies for this Microbiology Core Curriculum. That call was answered at the third annual ASM Undergraduate Microbiology Education Conference, "Actively Learning Microbiology: Strategies for Incorporating the Core Curriculum", 17-19 May 1996 at Louisiana State University, Baton Rouge, LA. Nearly one hundred educators from community colleges, small liberal arts colleges, four-year colleges and universities, and large comprehensive R1-universities met in a working conference and developed more than thirty different teaching strategies that can be used to help students learn the Microbiology Core concepts. This collection of strategies, entitled Active Learning Strategies for Microbiology Classes, has been distributed to all of the 1996 conference participants to be class-tested and refined. Improvements will be forwarded to the ASM Office of Education and Training. Eventually the strategies will be incorporated into an ASM teaching resource that will be available to all teachers.

Update: January 2003 - Many of the Active Learning Exercises for Microbiology Classes are now published in ASM’s MicrobeLibrary. Search the Curriculum Resources using keyword: "active" or any of the dropdown lists on the search page. For more information, contact MicrobeLibrary@asmusa.org.

On Friday evening participants were welcomed by the conference planning committee that consisted of Spencer Benson (planning committee chair), Rodney Anderson (chair of the planning committee for the May 1997 conference), Dana Boyd, Amy Chang, Marcia Cordts, Betty Eidemiller, Judith Kandel, John Lennox, Jeffery Sich and Marion Socolofsky, who, with Mary Lou Potter, served as the local host. The participants were given the charge of working in concept teams to develop the active learning strategies in the six Microbiology Core theme areas. Participants had been presorted into seventeen concept teams based on their interest and expertise. To help the teams several experts gave presentations. Dr. Bonwell's presentation "Creating Excitement in the Classroom" was a stimulating hands-on presentation that set the tone of the conference. He provided examples of teaching and lecture techniques that could be used in a variety of classroom settings. Drs. Rosa Buxeda and Eileen Gregory described their use of active learning techniques in teaching microbiology. The real players at the conference were the faculty participants who spent many hours working in small groups to develop the collection of Active Learning Strategies. At the Sunday morning session the faculty were able to hear a sample of the strategies developed during the conference.
Beyond the goal of producing a collection of active learning strategies a variety of other microbiology educational issues were integrated into the conference. There was an afternoon session on crosscutting issues such as laboratories, writing, technology-assisted learning, large classes, and simulations. On Saturday evening fourteen participant presented abstracts in two concurrent sessions. The topics ranged from a laboratory demonstration to sessions on classroom diversity, writing, use of computers, and a Microbe Zoo computer learning tool for grades K-16. Three of the abstract presenters received ASM Faculty Travel Grants - Mark Gallo, Niagara University; Rebecca Kapley, Cuyahoga Community College; and Robin Patterson, Butler County Community College- as did Susan Gibson, South Dakota State University, for her poster at the ASM General Meeting in New Orleans. An exit survey of the conference participants showed that more than 85% of the respondents felt that the conference addressed important educational issues and 98% indicated that the conference content had met their needs. The 1998 Conference will again provide a forum in which educators can come together to discuss issues in microbiology education, exchange ideas, present refinements on the Active Learning Strategies developed last year, renew friendships and acquaintances, and build new ones. Members are encouraged to participate in this year’s meeting which will be 2-4 May in Fort Lauderdale, Florida, and focus on the Microbiology Laboratory.

4th Annual ASMCUE Highlights, Broward Comm Coll and Nova Southeastern Univ, Fort Lauderdale, FL

Defining Instructional Goals for the Microbiology Laboratory: Content, Process, Skills, and Safety

Rod Anderson, Ohio Northern University

The fourth ASM Undergraduate Microbiology Education Conference was held May 2 to 4, 1997, at Broward Community College and Nova Southeastern University in Fort Lauderdale, Florida. One hundred and fifty microbiology educators from 38 U.S. states and territories and 3 other countries actively participated in outlining a core curriculum shared by all introductory microbiology labs (presented in the accompanying article) and developing lab activities that integrated the core concepts. Lab activities will be field tested and revised before being made available on ASM’s Web page. In addition, conference participants unanimously agreed that a laboratory be required for every introductory microbiology course.

Those arriving in advance of the conference could attend several early bird sessions that featured a variety of topics on revitalizing lectures with active learning, using the World Wide Web in the classroom, and new CD-ROM material for microbiology educators. On Friday afternoon the conference participants were welcomed by conference chair Rod Anderson on behalf of the planning committee (including Robin Patterson, Tom Terry, Rosa Buxeda, and John Lammert) and Jeff Sich, on behalf of the ASM Undergraduate Education Committee. Dr. Anderson opened with a challenge to work cooperatively to find the common components of an introductory microbiology lab. During working sessions on Friday and Saturday, participants undertook the difficult task. Common features which were essential to teach in every course were discussed to identify core areas in lab safety, lab skills, information processing, and lab content. Working groups initially focused on a single core area, with the discussion groups stratified into those who taught majors or those who taught nonmajors or allied health students. The lab core was then revised by reorganizing groups across lines of teaching emphasis. Finally, all working groups within a core area formed a consensus on the items essential to teach in an introductory course. A panel discussion for all participants was used to formulate the lab core presented with this article. Comments have been solicited over the summer from conference participants, and revisions will be made based on those comments and those received from the Focus on Microbiology Education readers before being disseminated to the ASM membership.

In addition to developing a core curriculum for the microbiology lab, participants also developed investigative lab activities that integrated portions of the lab core. At the end of the conference on Sunday morning, new lab activities were presented in a poster session format. To provide background for these projects, speakers discussed issues in assessment, investigative labs, and lab safety. Virginia Anderson, Towson State University, spoke on "Assessment at 400X." Her microbiology background and expertise in assessment strategies provided valuable ideas for assessing a wide variety of activities associated with labs. Dan Udovic, the plenary speaker from the University of Oregon, discussed "So What Are Investigative Labs, Anyway? And What Do Students Learn from Them?" His experience with systemic change in curriculum with the Workshop Biology project enabled him to discuss the benefits and difficulties of incorporating investigative labs into the curriculum. Diane Fleming, a biosafety consultant, emphasized the importance of running a safe working environment for students in her talk on "Integrating Safety into the Microbiology Teaching Laboratory." Several other speakers presented examples of innovative and effective laboratory instruction. These included Spencer Benson, University of Maryland, "Integrating Assessment and the Virtual Workplace in a Microbial Genetics Laboratory"; Phil Stukus, Denison University, "Benefits and Limitations of Using Investigative Projects in a General Microbiology Laboratory"; and Sarah Lauffer for Jo Handelsman, University of Wisconsin, "Biology Brought to Life: Teaching Microbiology and Scientific Thinking".

Participants were able to review new teaching materials, books, CDs, and software during a session on "What's New in Microbiology and Teaching Resources" and also discussed posters on the themes of (i) classroom testing of active learning strategies; (ii) creative, investigative, and cooperative lab activities; and (iii) teaching ideas to share.
As you can tell from the information above, the conference was filled with activities useful to microbiology educators. The most common complaint I hear about the ASM Undergraduate Education Conferences is that participants have picked up so many great ideas that it is difficult to incorporate them into their courses. The result of getting together 150 microbiology educators is always fun, and I believe each of us is challenged to revise our teaching to better enhance student learning.

5th Annual ASMCUE UE Highlights, Emory University, Atlanta, GA

Frontiers in Microbiology Education: Curriculum Resources, Content Enrichment, and Instructional Technology

Tom Terry and Kim R. Finer, University of Connecticut and Kent State University

The 5th Annual Undergraduate Microbiology Education Conference was held at Emory University in Atlanta Ga., 15 to 17 May 1998. With the theme Frontiers in Microbiology Education driving the program, attendees were treated to three days of seminars, activities, and discussion addressing Frontiers in Content, Technology, and Curriculum Development. All participants were housed in student dormitory suites in one residence hall, conveniently located within a few minutes' walk of all meeting and dining areas. The conference was filled to its capacity of 200. About two-thirds of the participants were attending an ASM undergraduate education conference for the first time, including a few intrepid travelers from as far away as Brazil and New Zealand.

Meeting attendees arriving early had the opportunity to participate in "early bird" workshops on several topics or to tour and lunch at the Centers for Disease Control and Prevention (CDC), located just a block away. The opening session, Content Frontiers, held Friday afternoon at the CDC, included talks by CDC scientists Dr. Stuart Nicoll, Special Pathogens Branch, and Dr. Fred Tenover, Chief, Nosocomial Pathogens Laboratory Branch. Dr. Nicoll presented information on Hanta and Ebola viruses, both of which, he noted, are not newly evolved pathogens but preexisting viruses that appear to have reemerged due to ecological factors. Dr. Tenover discussed emerging problems with antimicrobial resistance, including pneumococcal resistance, selective pressure, and the transfer and genetic nature of extended-spectrum β-lactamases. Participants took full advantage of the speakers' expertise in extensive question-and-answer sessions following each talk.

The Friday evening session, Curriculum Development, began with a review of the wide variety of resource materials that have been developed or are under development through ASM efforts. Despite the unexpected appearance of Dr. Murphy, whose famous law managed to shut down the lecture hall computer system for the evening, participants were treated to an impressive look at what has been accomplished over the past few years by this group. The remainder of Friday evening and Saturday afternoon was devoted to small work group activities. The principal objective of the 1998 conference work groups was to review and refine 24 classroom and 17 laboratory activities that had originally been developed during two previous conferences. In addition, the work groups were to determine each activity's potential for publication on the ASM Web site. The status awarded was "candidate" (an appropriate and safe activity that could enhance the learning of core concepts but that needs further testing and development), "portfolio" (an activity that has been tested and shown to be appropriate and safe and is ready for publication on the World Wide Web [WWW]), or "rejected" (an activity that is not appropriate and/or safe for undergraduate microbiology courses). With the help of an evaluation rubric and field testing data from colleagues, the work groups ultimately arrived at a consensus recommendation on the status of each activity. Two laboratory and six classroom activities were awarded candidate status. Eight laboratory and three classroom activities were rejected, while the remaining seven laboratory and 15 classroom activities were recommended for further development. To continue the activity begun by the work groups, an editorial committee chaired by Tom Terry will be established. This committee will develop procedures for guiding learning/laboratory activities through further revision and ultimate Web publication at ASM. Those interested in participating in further development should contact Tom at terry@uconnvm.uconn.edu.

The Saturday morning session, Technology, began with a plenary lecture on Building Assessment Tools into Educational Technology Learning Environments by Don Buckley, University of Hartford, Hartford, Conn. Don treated us to an impressive look at a variety of multimedia tutorials which he has developed for teaching biology. Unlike most tutorials, whose only focus is to present a scientific concept, Don's efforts include feedback that continually informs the student and the instructor about which learning tasks are completed successfully (see ASM Earns an "A" in Assessment, this issue). Following this lecture, participants chose three of five concurrent sessions on a variety of topics involving technology (e.g., using PCR, scanning probe microscopy, or the Internet in teaching microbiology) and curriculum development (e.g., low-cost biotechnology or how to develop multimedia).

Highlights of Sunday's program included opportunities for attendees to contribute to the development of a case study on Hanta virus and to participate in roundtable discussions of various classroom- and faculty-centered issues (e.g., teaching virology and immunology, assessment, safety, teaching as scholarship, student projects, and diverse student populations). The final afternoon session included introductions of Jeff Sich, Robin Patterson, and Jean Douthwright as chairs of next year's Gordon Conference on Undergraduate Microbiology Education, to be held at Connecticut College in New London. We also celebrated the wonderful work that Betty Eidemiller has done in coordinating the last three conferences and wished her well as she leaves ASM for a new job with an hour-shorter commute.
Even though participants worked hard throughout the meeting, there was ample opportunity for networking, socializing, and commiserating. A guitar appeared, and songs were sung by a small group on both evenings; a few paper airplanes arrived from higher floors with such helpful messages as "Don't give up your day job!" Hopefully, all participants left Atlanta with a renewed enthusiasm for teaching, as well as some tools and resources to bring into the classroom. While the physical portion of the meeting ended on 17 May, all participants are now linked electronically via the discussion list, which will provide a forum for continuation of the exchange of ideas, tips, and resources throughout the coming year.

6th Annual ASMCUE (Gordon Conference-no report available)

Please note: The Sixth Undergraduate Microbiology Education Conference was held as a Gordon Conference in 1999. A final report not available.

7th Annual ASMCUE Highlights, California Polytechnic State University, Pomona, CA

The Cutting Edge of Microbiology Education

Erica Suchman, Colorado State University

Approximately 189 microbiology educators attended the Seventh Annual ASM Undergraduate Microbiology Education Conference held May 19-21, 2000, at the California Polytechnic State University, Pomona. Titled "The Cutting Edge of Microbiology Education," this meeting was designed to prepare participants for the new millennium by providing information on important, recent advances in both microbiology and education. The conference opened with Mark Goldsmith of the Gladstone Institute and David Relman of Stanford, who gave interesting and informative reviews titled "HIV and the Immune System: Emerging Concepts in Pathogenesis of AIDS" and "Searching for Previously Unrecognized Microbial Pathogens", respectively. Mark Gallo (Niagara University) and Chris Woolverton (Kent State University) followed with demonstrations of how they teach bioinformatics using active learning strategies.

Keeping with the tradition of past conferences, this too was a working conference. This year participants worked to develop active learning strategies designed to teach either immunology or bioinformatics. After a wonderful session on assessment given by Virginia Anderson (Towson State University), participants prepared assessments of the active learning strategies they had developed. The final task taken on by the participants was to develop tentative curricular guidelines for (1) undergraduate programs leading to degrees in microbiology, (2) inclusion of microbiology in undergraduate programs in biology, and (3) inclusion of microbiology in courses for nonscience majors. The products of all groups were shared with the entire conference. The activities and curricular guidelines will be further refined and developed for eventual electronic publication in ASM's digital library (http://www.microbelibrary.org/).

In addition to the plenary and working sessions, there was a poster session, and there were presentations about teaching scholarship, the publication of education-related articles, the training of students for the biotechnology workforce, active learning, and bioinformatics.

The committee extends our heartfelt thanks to all the people who took time out of their busy schedules to prepare and present the interesting, useful, and informative sessions given at this year’s meeting. As co-chair I thank Janet Fulks for all of her hard work, as well as the rest of the committee (Sam Fan, Chris Woolverton, and Mark Gallo) and everyone on the ASM staff, with special thanks to Amy Chang for making this a pleasurable experience.

8th Annual ASMCUE Highlights, University of Central Florida, Orlando

The Spectrum of Microbiology Education

Chris Woolverton and Peggy Johnson; Kent State University, OH, and Mesa Community College, AZ

The 8th ASM Undergraduate Microbiology Education Conference entitled “The Spectrum of Microbiology Education” was held on May 18-20, 2001, hosted by the Department of Molecular Biology and Microbiology at the University of Central Florida in Orlando.

This year’s conference was attended by 203 educators (including 90 first time attendees). There were five conference exhibitors (four publishers and one scientific equipment supplier) who also participated in the conference. Forty-two abstracts were submitted for review and 36 of them were selected for presentation at the evening poster/social hour. Twelve conference travel grants were awarded to poster presenters. Four attendees received awards from the Faculty Enhancement Program.
The Conference was preceded by three workshops designed to provide educators with hands-on teaching techniques for the classroom. This year John Lennox and Bill Costerton taught "Biofilms in Undergraduate Teaching," Lewis Tomalty taught "Using ASM Resources in Powerpoint Presentations," "Designing and Conducting Research in Science Education" was taught by Rosa Buxeda and Deborah Moore.

This year's scientific presentations included plenary sessions by Bill Costerton (on Biofilms) and Joan Rose (on Coastal Water Quality). The curriculum and instruction presentations included The Scholarship of Undergraduate Education (Brain Coppola), Writing Successful NSF Grants (Jeff Pommerville and Terry Woodin), Including Microbiology in the General Biology Curriculum (Jo Handelsman and Carol Pollock) and Keeping Microbiology Visible (Martin Dworkin). Concurrent sessions gave insight and recommendations for preparing successful submissions to ASM education resources (Neil Baker, Terrance Johnson, Linda Sherwood, Kristine Snow, Kim Finer, Tom Terry and Amy Vollmer). An additional session provided classroom examples of active learning strategies (Sue Merkel). A panel discussion was held on using the ASM video series "Unseen Life on Earth." The panel was chaired by Spencer Benson and included Bill Coleman, Linda Fisher, Dixie Kullman and Karen Nakaoka. In addition to the scientific and pedagogical sessions, George Boggs, Roger Casey and Robert Gennaro presented administrators' viewpoints on scholarship in undergraduate education. A highlight of this year's conference was the small-group sharing of "best practices" by all conference attendees. Building on previous conference workgroups, editing and approval of core curricular recommendations for microbiology courses for programs in biology, microbiology, allied health, biotechnology and general education were completed.

The evening social gatherings were rewarding as they provided opportunities for relaxed conversation and networking. (At least one of the conference co-chairs was even more relaxed when an unnamed ASM official tossed him in the pool.) Special thanks go to Tom Terry for leading us in song by the pool's edge.

On a personal note, we wish to thank Neil Baker and the Committee on Undergraduate Education for the opportunity to serve ASM and our colleagues in our capacity as co-chairs of the conference. It has been a humbling and rewarding event. The success of the conference is certainly a comment on the dedication of microbiology educators who continue to support the mission of excellent undergraduate education. We especially acknowledge and thank our fellow committee members Linda Fisher, Frances Hite and Paul Tomasek. We also thank the ASM staff for their impressive expertise, enthusiasm and competence. We certainly congratulate them on a job well done. The only thing left to say is "See you in Utah."

9th Annual ASMCUE Highlights, University of Utah-Salt Lake, UT

Emerging Issues in Microbiology: Expanding Educational Horizons

Indiren Pillay and Frances Hite; Southwest Tennessee Community College and Louisiana State University Health Sciences Center

Amidst the beautiful backdrop of snow-capped mountains and the Great Salt Lake, the 2002 Undergraduate Microbiology Education Conference was held on the University of Utah campus, sponsored by the University of Utah's Health Sciences Department. Many of the 175 attendees, including 65 first time participants, stayed in the same dorms that housed Olympic athletes a few months earlier! Seven exhibitors, including Benjamin Cummings who again sponsored our Saturday night reception, supported the conference. This year's conference was entitled "Emerging Issues in Microbiology: Expanding Educational Horizons," and that is exactly what we did over our three intense days—we expanded our horizons!

Prior to the opening session, three workshops were offered to attendees: Bioinformatics, Active Learning in the Classroom, and National Science Foundation and National Institutes of Health Grant Writing. Julian Davies (University of British Columbia) gave the opening plenary with a session on Emerging Issues in Microbial Biodiversity. Together with Anna Louise Reysenbach's (Portland State University) session Saturday on Life in Extreme Environments, these sessions provided an excellent overview of the magnificent diversity found amongst organisms in the microbial world. Ron Atlas (University of Louisville) followed the opening plenary with a session on Bioterrorism and captivated attendees with the latest information and developments regarding regulations and the position of the ASM on bioterrorism issues. His session was so well received that it stimulated our attendees to begin developing curriculum guidelines for teaching bioterrorism. Breakout groups, sorted according to teaching discipline, developed recommendations that will be edited and disseminated later this year.

Friday afternoon's breakout sharing sessions, jokingly nicknamed "Group Therapy," facilitated the exchange of Best Teaching Practices and provided encouragement and solutions for members' Worst Teaching Problems. We are in the process of deciding the best way to distribute these Best Practice descriptions to all members. Additionally, due to the overwhelming success of this session, participants were encouraged to submit their best practices to the ASM MicrobeLibrary. Good job on your "homework" gang!!

In addition to the excellent music and songs we usually have in the evenings, the Friday evening session by Helen Davies (University of Pennsylvania) using songs as a creative teaching strategy was so well received that she
obliged us with a double encore, once that evening and again at our closing on Sunday! As we joined her in singing microbiology songs, her enthusiasm and creativity was contagious. This session was truly incredible.

Plenary sessions on Saturday morning focused on science teaching reform methods. First, Jeffrey Pommerville and Maria Harper-Marinick (Maricopa Community Colleges) encouraged us to develop and implement strategies to facilitate active learning in the classroom. Next, Eugene Judson (Arizona State University) demonstrated ways to evaluate instruction methods and assess the impacts of teaching reform. These two sessions were quite thought provoking, causing the audience to begin pondering ways to use information on emerging issues from this conference in their classrooms.

At the Saturday evening poster session, 27 posters were presented in the Fort Douglas Officers’ Club; a total of 28 abstracts were submitted and 27 were accepted. Eight of the poster presenters were awarded Travel Grants. Additionally, there was one successful application for the Faculty Enhancement Award. The awardees were recognized at the Saturday evening dinner banquet.

Charles Bonwell (Active Learning Workshops) gave our final plenary on Sunday morning entitled “Extending our Understanding of Active Learning: a Focus on Critical Thinking.” His reliance on audience participation, along with his animated style, truly motivated and challenged us to contemplate new ways to use active learning in our classrooms. This forum allowed us to share active learning and critical thinking methods currently being used and build on these approaches.

The experience of contributing to this meeting has been a unique and extremely rewarding one. We are convinced that there is no better group of people to work alongside! As co-chairs of the 9th ASM Undergraduate Microbiology Education Conference, we would like to express our sincere appreciation to the ASM Education Staff members who made this conference such a success. Susan Musante, Carlos Pelham, Kristen Catlin, and Amy Chang are certainly treasured resources and also made this experience enjoyable and fun. In addition, we owe much gratitude to our other Planning Committee members, whose contributions were essential: Bruce Alexander and Russ Nordeen, our abstract reviewers, and Becky Buxton, our site coordinator at the University of Utah. Finally, our appreciation is extended to Neil Baker and the Undergraduate Education Committee for allowing us the opportunity to co-chair this event.

The 2003 conference will be held in Washington, D.C. This 10th ASM Undergraduate Microbiology Education Conference is going to be an extraordinary celebration of a full decade of supporting, improving, and intensifying Microbiology Education. It is going to be very exciting; we hope to see you all there!

10th Annual ASMCUE Highlights, University of Maryland at College Park

Focused on the Future

Lorraine A. Findlay and Mark A. Gallo; Nassau Community College/Medical Center and Niagara University

At the Tenth Anniversary of the Undergraduate Microbiology Education Conference, we reflected on an astonishing decade of development in the fields of microbiology and microbiology education. As we “Focused on the Future,” the theme of our conference, our fellow conference participants were provided an opportunity to interact personally and exchange ideas and information, as well as to explore, design, and impact on the future course of these fields. Our host campus was the beautiful University of Maryland at College Park.

We were able to offer four pre-conference workshops: "Using Online Bioinformatics Tools and Databases in the Undergraduate Biology Curriculum"; "Integration of Molecular Biology Techniques in the Undergraduate Laboratory"; "Biofilms in the Undergraduate Laboratory"; and "Designing Your Project in the Scholarship of Teaching and Learning."

It was exciting to enjoy four plenary sessions by prestigious speakers. Rita Colwell, Director of the National Science Foundation, offered "Biocomplexity's Spiral." Lee Shulman, President of the Carnegie Foundation for the Advancement of Teaching, offered "Learning from Experience Through a Scholarship of Teaching." Eric Green, Scientific Director of the National Human Genome Research Institute, presented "Beyond the Human Genome Project." Finally, Kenneth Nealson, Wrigley Professor of Geobiology at the University of Southern California and previously Senior Research Scientist of the Jet Propulsion Laboratory, took us to Mars with "Searching For Life on Earth and Off."

On Friday afternoon, an interactive group sharing session was conducted using our participants’ contributions of their Best Practices and Biggest Challenges in Assessment. This Best Practice Sharing Session has become one the most enjoyed and valuable aspects of the Undergraduate Microbiology Education Conferences.

On Friday evening, participants were treated to an Imagination Stage Theater Presentation. This was a thought provoking play, presented by a local theater company, on the ethics and controversies concerning cloning. After the play, the performers encouraged audience participation and feedback. This theater production was well received and made for a unique evening. The entertaining theater was then followed by a wonderful reception.
Saturday’s schedule prodded participants to “put on their thinking caps” and engage in Group Working Sessions, wherein critical thinking exercises were developed. These exercises were later posted during the afternoon Exhibit Showcase, providing all attendees an opportunity for feedback, and were adopted by participants volunteering to bring the exercises to fruitful publication in the Microbe Library.

Saturday’s agenda also provided the first round of Concurrent Sessions, many of which were then repeated on Sunday morning. These sessions offered a wide variety of topics, and, as always, everyone had to make hard choices on which session to attend. Among some of the topics that these sessions included were: safety, bioethics, scholarship of teaching, active learning, case studies, service to ASM, online learning, bacterial unknowns, and assessment.

Of course, the traditional poster session was conducted with a record number of forty abstracts having been submitted this year. Thirty-five posters were presented and six poster contributors received travel awards to attend the conference. The posters remained displayed throughout the early evening Exhibit Showcase. The Exhibit Showcase enabled a variety (about a dozen) of exhibitors to introduce and share their products with attendees; this portion of the agenda is always enjoyed as an opportunity for everyone to meet, network, share, and interact.

A special dinner and reception in the atrium of the campus Art Building capped off Saturday’s activities. To celebrate the Tenth Anniversary, attendees were asked to come dressed as their favorite microbe. The evening unfolded as an event of ingenuity, imagination, and sheer fun, as the costumed group formed a dance line and snaked their way around the atrium as “Microbes on Parade.” Benjamin Cummings graciously provided sponsorship for the reception.

Another feature that was newly added to the conference agenda this year was an opportunity for attendees to attend a Homeroom session each morning. This session enabled groups to discuss prior sessions, hear important announcements, and again share and interact.

Judith Kandel and Jeff Sich, two of the original “founders” of the Undergraduate Microbiology Education Conference, brought the conference to a close on Sunday morning with a special plenary session. Jeff and Judy not only provided a nostalgic tour of the past, but then helped us plan the future with “New Directions for Microbiology Education.” The audience participated with their thoughts and comments on the direction that the conference should take for the future.

This year, at the University of Maryland, there were 207 registered participants, with 84 first-time attendees, and 4 from countries outside the United States. The weather was rainy but this did not dampen the enthusiasm and steadfast commitment of all conference participants to the present and future of microbiology education. We look forward in great anticipation to the 11th Conference for Undergraduate Teachers.

11th Annual ASMCUE Highlights and Proceedings, Xavier University, New Orleans, LA

Facilitating Student Learning in Diverse Environments

Jeffrey Pommerville and Lucy Kluckhohn Jones; Glendale Community College and Santa Monica College

In New Orleans – the Big Easy – the 2004 ASM Conference for Undergraduate Educators was held on the campus of Xavier University of Louisiana. This year’s conference was the largest yet; 247 registrants participated, including 137 first-time attendees. In addition, a record thirteen exhibitors helped support the conference. The conference theme – “Facilitating Student Learning in Diverse Environments” – provided opportunities for all attendees to connect with friends and colleagues, to assist in the development of new microbiology laboratory exercises, and to find solutions to some of our biggest teaching challenges.

Three pre-conference workshops were held on Friday morning. These included: “Behind Closed Doors: The Clinical Microbiology Laboratory and What REALLY Goes on in There,” “Creating Positive Learning Environments for Your Students: Strategies for Teaching the Psychology of Learning,” and “Electronic Classrooms: Instant Feedback to Bioinformatics.”

We had four fascinating and noteworthy plenary speakers. ASM President-elect James Tiedje from Michigan State University presented the opening plenary entitled “Microbes at Work in Nature.” Saturday’s two plenary sessions dealt with student learning. The morning plenary “The Latest Research on the Biological Basis of Thinking and Learning” was given by Kenneth Wesson, Education Consultant in Neuroscience. Barbara Millis of the United States Air Force Academy spoke on “Moving from Research to Practice” A Focus on Learning in Biology Courses” in the afternoon plenary. The Sunday morning plenary was given by John Roth from the University of California, Davis. His talk was entitled: “Adaptive Mutation: Selection Can Speed Appearance of Mutants without Changing the Mutation Rate.”

The Friday afternoon breakouts were devoted to “Best Laboratory Exercises.” Organized and run by Erica Suchman and Mark Martin, Erica first described the procedures to follow so the exercises could be submitted to the ASM MicrobeLibrary. Then, the author of each exercise met with the breakout group assigned that exercise as
“homework” prior to the conference. After the author provided an overview, the group leader facilitated discussion of the exercise and its development into the MicrobeLibrary format. The outcome is that all 15 exercises will be put into a final form by the author and submitted to the MicrobeLibrary.

On Friday evening, Helen Davies of the University of Pennsylvania led us in an encore performance of “Creative Best Practices.” As in Salt Lake City two years ago, she used familiar melodies with novel lyrics to demonstrate a teaching strategy that permits her students to learn infectious disease characteristics easily. Everyone joined with Dr. Davies in the singing of wonderful microbiological songs. This was followed by a pleasant reception sponsored by Benjamin Cummings Publishers.

On Saturday, after Kenneth Wesson’s plenary talk, the Concurrent Sessions began. As always, they covered a wide variety of topics. To help alleviate the difficult decision as to which topics to attend, only six topics were offered during any one concurrent session. Two cycles of sessions were offered on Saturday morning, with a third on Sunday. Between the three sessions, each topic was offered twice. The topics of the sessions concerned: biofilms, virtual labs, field bacteriology, student incivilities, math and chemistry in microbiology, active learning, undergraduate research, extreme halophiles, and lab biosafety.

Following Barbara Millis’ plenary, breakout sessions composed of the same faculty leaders and group members reconvened for: “Finding Solutions to Biggest Challenges.” From their “homework assignment,” group members identified a teaching challenge in need of a solution. After all challenges were presented, the group selected one or more challenges for solutions development. At the report out, each group presented the challenge and solution(s) to the entire group of attendees. The challenges and solutions can be found on this web site.

At the Saturday night dinner, Neil Baker, Chair of the ASM Committee on Undergraduate Education, presented the Travel and Faculty Enhancement awards. Congratulations to all the 2004 Winners!

Early-Career Travel Grant Awardees:
Jean Cardinale, Alfred University, Alfred, NY
Josephine Ebomoyi, University of North Colorado, Greeley, CO
Mary Farone, Middle Tennessee State University, Murfreesboro, TN
Janelle Hare, Morehead State University, Morehead, KY
Steven Lipson, St. Francis College, Brooklyn, NY
Iruka Okeke, Haverford College, Haverford, PA
Teri Shors, University of Wisconsin, Oshkosh, WI
Elise Sullivan, University of New Hampshire, Durham, NH
Sattiraju Sundari, Jaypee Institute of Information Technology, Uttar Pradesh, India
Davis Treves, Indiana University Southeast, New Albany, IN

Faculty Enhancement Program Awardees:
Connie Chow, Simmons College, Boston, MA
Marc Daniels, William Carey College, New Orleans, LA
Alenka Hlousek-Radojcic, Richard Bland College, Petersburg, VA
Veronica Neumann, Milwaukee Area Technical College, Milwaukee, WI
Randy Strobel, Metropolitan State University, St. Paul, MN
Joel Stryker, Evergreen Valley College, San Jose, CA

Not only was this the largest attended conference, it also had the largest number of posters (56). The poster session along with the exhibit showcase allowed attendees to chat with the poster presenters and visit with the 13 exhibiting institutions who introduced and displayed their products. It provided the perfect venue to network, share ideas, and socialize, since the reception overlapped with the poster session and exhibit showcase.

On Sunday morning, attendees heard John Roth’s plenary lecture, then dispersed to participate in the third cycle of concurrent sessions. This was followed by the conference wrap-up. Sue Merkel and Christine Snow were introduced as the co-chairs for the 2005 conference. Sue helped us solicit conference topics from the attendees for next year’s meeting.

The ability to design, organize, and manage a conference of this magnitude takes a team effort. We would like to thank Neil Baker and the Undergraduate Education Committee for the honor to co-chair this conference. We also want to thank the poster abstract reviewers: Bruce Alexander, Min-Ken Liao, and David Westenberg. The efficient running of the facilities at Xavier University of Louisiana would not have been possible without our hosts, Todd Stanislav, the on-site coordinator, and Bill Whalen. As co-chairs, our work was made much easier (and actually fun!) by working with a magnificent and very talented ASM Education staff. We are deeply indebted to Kelly Gull, Kristen Catlin-LeBaron, and Amy Chang. You are simply the best!

Cheers to all – we look forward to seeing everyone at the twelfth ASM Conference for Undergraduate Educators, which will be held in Atlanta, Georgia from June 3-5, 2005.
Southern Hospitality
Emory University served as our host institution and opened classrooms, labs, and beautiful dorm rooms for our 248 registrants (229 attendees and 19 exhibitors). Several Emory University science departments sponsored our Saturday night reception and we appreciated their southern hospitality! Fifteen sponsors and exhibitors also helped sponsor events during the week-end. “Action packed” is the best description for our week-end at Emory.

Pre-conference workshops
Six pre-conference workshops highlighted the start of our week-end: Calibrated Peer Review, Arlene Russell; Immunology Labs, Jon Lammert; Investigative Case Based Learning, Margaret Waterman and Ethel Stanley; Making Student Learning Outcomes and Assessment Work for Your Microbiology Class, Janet Fulks; Symbiosis in the Lab: Microbes as Symbionts, Benjamin Wise, Larraine Olendzenski, Betsey Dyer and Teaching Bioinformatics and Structural Genomics, J. Ellis Bell. All workshops were well attended and enjoyed by all.

Plenary speakers
Four incredible plenary speakers highlighted our week-end. We began with Norman Pace speaking on Emerging Themes in Microbial Evolution and Diversity. He provided us with new ideas about the microbial world. Following our Friday dinner, Hazel Barton gave us a fascinating look at Amazing Caves: Amazing Microbes. We all found ourselves wondering how she could do that! Saturday morning Venkatachalam Udhayakumar from CDC provided us with an incredible overview of the status of Malaria Pathogenesis. Sunday morning Harvey Holmes from CDC spoke on Smallpox: From Ancient to Modern History – a fascinating survey of history and microbiology.

The format of our meeting took a new twist this year. We parted from the “product oriented” meeting and moved to new ways to teach: Try Something New! AND updates in microbiology: Learn Something New! We found that our colleagues have incredible ideas and incredible knowledge.

Try Something New! – Many new and long-time ASMCUE participants lead our sessions on developing new teaching approaches. All sessions focused on techniques that could be used immediately in the classroom with all microbiology students. The sessions included: Authentic Assessment Techniques in Microbiology, Janet Fulks; Active Teaching: Helping Students Put Their Entire Brain To Work, Robin Wright; Investigative Case Based Learning, Margaret Waterman and Ethel Stanley; Just-in-Time Teaching, Kelly Cowan; MicrobeLibrary Atlas and Protocol Project, Ann Smith; Uncooking the Lab: How to Convert a Traditional, Cookbook Lab into an Inquiry-based Lab, Sarah Lauffer; Using Web-based Learning Objects for the Instruction of Both Traditional and Online Microbiology Students, Gary Kaiser; Writing in the Life Science Classes Using Calibrated Peer Review, Arlene Russell.

Learn Something New! These sessions focused on what’s new and what students need to know. All sessions were 45 minutes and participants left with new, up-to-date, classroom information. The sessions included: Bioterrorism, Jeffrey Pommerville; Extremophiles: An update on Their Biology and What Students Need to Know, Michael Madigan; Immunology, John Lammert; Symbiosis in the classroom: A New Paradigm for the Biology Curriculum, Benjamin Wise, Lorraine Olendzenski, Betsey Dyers; Teaching Bioinformatics and Structural Genomics, J. Ellis Bell; Virology, Erica Suchman.

Listserv Lunch, Munch and Talk a Bunch – Another new addition to the teaching conference, these sessions allowed Listserv participants to meet face-to-face with others with similar interests. Participants discussed issues over lunch and proposed next steps. The tables included discussions on: Curriculum issues of microbiology majors, non-majors/ general education, allied health/ nursing, and biology/ biotechnology; preparing precollege teachers, mentoring undergraduate students and addressing cultural diversity in the curriculum, and quantitative approaches to teaching microbiology, safety updates and a MicrobeLibrary (www.MicrobeLibrary.org) curriculum collection review opportunity. A good time was had by all!

Meet the Author! ASMCUE participants also write! Several textbook authors took this opportunity to show their textbooks and discuss ideas with participants.
The Poster Sessions were held Saturday afternoon with amazing work presented. There were 37 posters presented in two sessions. Saturday evening found us viewing posters, relaxing and enjoying a reception sponsored by several departments at Emory University.

Congratulations to all Awardees!

**Faculty Enhancement Program Awardees:** Sanjay Kapoor, Haryana Agricultural University, Hisar, India; Rene Kratz, Everett Community College, Everett, WA; Dora Som-PimPong, North Carolina A&T State University, Greensboro, NC; Litu Yu Ursuline College, Pepper Pike, OH

**Early-Career Travel Grant Awardees:** Toye Ekunsanmi, University of Wisconsin, Washington, County, West Bend, WI; Willian Huddleston, University of Calgary, Calgary, Canada; Lee Hughes, University of North Texas, Denton, TX; Jeanne Kagle, Mansfield University of Pennsylvania, Mansfield, PA; Nathalie Kuldell, Massachusetts Institute of Technology, Cambridge, MA; David Kushner, Dickinson College, Carlisle, PA; Caroline O’Farrell, Oral Roberts University, Tulsa, OK; Amy Reese, Cedar Crest College, Allentown, PA; Michele Shuster, New Mexico State University, Las Cruces, NM

A special thanks to Kelly Gull and Amy Chang for their hard work and their organizational talents. They make volunteering for ASM activities a pleasure! Thanks to Neil Baker, Chair of the Undergraduate Committee, for asking us to co-chair the 2005 conference. It was great fun.

We would also like to thank the poster reviewers Min-Ken Liao, Department of Biology, Furman University, Greenville, SC; Donald Breakwell, Department of Microbiology, Brigham Young University, Provo UT; and Janelle Hare, Department of Biological and Environmental Science, Morehead State University, Morehead, KY. Great work – we couldn’t have done it without you.

We look forward to seeing everyone at ASMCUE in 2006!

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**13th Annual ASMCUE Highlights and Proceedings, University of Central Florida, Orlando**

**Recombination of Ideas in Teaching Microbiology**

**Conference Co-Chairs:**
Donald Breakwell
Brigham Young University
Provo, Utah

Jackie Reynolds
Richland College
Dallas, Texas

**Highlights by Donald Breakwell and Jackie Reynolds**

ASMCUE returned to the campus of the University of Central Florida for its 13th annual meeting. Our theme was "Recombination of Ideas in Teaching Microbiology." The program drew on a variety of sources to allow the approximately 275 participants to draw from each other's strengths and experiences and recombine them to improve their teaching of microbiology.

**Pre-conference workshops** were well attended. Jack G. Chirijian from Edvotek, Inc. sponsored and presented hands-on applications of molecular biology methods to clinical sciences and medical. Mary Allen and Mary Dominiecki joined to discuss the use of case studies in microbiology teaching. Karen Klyczek and Mark Bergland engaged participants in computer simulations of protein and DNA analysis of infectious diseases. Brad Goodner helped us grapple with the explosion of genomic sequencing and how to incorporate undergraduates into bioinformatics research. We were also pleased to have Jeanne Rudzki Small join us from the National Science Foundation to help participants prepare to write successful grant proposals.

To add our knowledge of current topics in microbiology, we heard from outstanding plenary lecturers. Joan W. Bennett, an outspoken advocate of undergraduate education, spoke on "Molds and Mycotoxins, Genes and Genomes." Not only was she able to use her career-long work in mycology, but she also drew from her recent personal experience with mold infesting her home following the floods in New Orleans. Derek Lovely fascinated us with his work on metal reduction and particularly with his development of microbial fuel cells. On Saturday, Edward DeLong examined the application of genomics to the study of microbial ecology and biogeochemistry. His presentation provided another view to how microbes, particularly the **Archaea**, harvest energy using proteorhodopsin, a novel light-driven proton pump. Our final plenary speaker was Terrence Tumpey, whose presentation focused on the virulence of Influenza A H5N1 and its relationship to the 1918 influenza pandemic.

During 2006 ASMCUE we continued the successful "Learn Something New, Try Something New" concurrent sessions. A diverse array of topics and approaches to teaching and learning were presented by enthusiastic experts and well-engaged participants.

**Learn Something New** sessions included, Biology Curriculum, Graham Walker; Giving Your Course the Genomics Touch, Brad Goodner; Going for the Gold: Using the Enrichment Culture in an Introductory Microbiology Course, Mark Martin; Identification of Microorganisms in a Clinical Setting Based on Molecular and Genetics Testing—PCR, DNA Probes, RNA analysis, etc., David Hillyard; Microbiology NSF Funding Updates, Jeanne Rudzki Small; Scientific
Underpinning for Professional Practice: The Essentials of Baccalaureate Education for Professional Nursing Practice, Jean D. Leuner; Teaching Microbiology Without Teaching Microbiology: The Dual Use Debate, Chris Woolverton; Using History to Teach Microbiology, Joan W. Bennett.

Try Something New sessions included, Case-based Learning Using Protein and DNA Simulations to Analyze Cases Based on Infectious Diseases, Karen Klyczek and Mark Bergland; Is It Possible To Teach Metabolism Interactively? Amy Cheng Vollmer; Pathways to Scientific Teaching: Active Learning and Assessment, Diane Ebert-May; Using Concept Maps as a Creative Tool for Teaching and Assessment of Learning, Clarissa Dirks; Applying the Scholarship of Teaching and Learning: Research on Students’ Concept Mastery, Attitudes, Beliefs, and Interest, Steven Pollock; Mathematical Modules in Biology, Meghan Burke; Searches on DNA Sequences: Another Tool in the Active Learning Tool Kit, Marcia Cordts; Using Clickers Wisely, Erica Suchman.

From MicrobeLibrary, Ann Smith and Jean Cardinale also led very helpful sessions on the Atlas-Protocol Project and Curriculum Activity Development.

We would like to thank our abstract reviewers for the time they have spent. Because of the increasing number of applicants (61 posters were accepted) at this year’s meeting, we drew on the expertise of more reviewers. This year the reviewers were Janelle Hare, Lee Hughes, Don Lehman, Sue Merkel, and Gail Goodman Snitkoff. Their efforts certainly contributed to the quality of this conference.

The poster sessions at this year’s meetings were very successful. Our observation is that the degree of scholarship of teaching and learning is increasing, with creative and rigorous assessment being conducted.

In this year's lunch work session, entitled, “Lunch, Munch, Talk and Plan a Bunch: Branching Out 2010,” regional groups met and planned how they can add an educational focus to ASM branch meetings. Participants were also encouraged to be involved in their respective ASM Branch meetings.

Several textbook authors were available between sessions for “Meet The Author” Book Corners. As always ASMCUE appreciates the support of corporate sponsors, such as Benjamin Cummings (co-sponsoring the Litserv Lunch and a refreshment break) and McGraw-Hill (sponsoring a refreshment break Saturday morning.)

Our congratulations are again extended to all the Faculty Enhancement Program and Early Career Travel Grant Awardees: Cliff K. Grimsley, Gaston College, Saron Z. Henry, Milwaukee Area Technical College, Johanna Melendez, Hillsborough County Community College, Madhura M. Pradhan, The Ohio State University, T.G. Thomas, Bakersfield College, Mary N. Boyle, Vermont Technical College, Jennifer Renee Brigati, University of Tennessee, Paul Dean Brown, University of the West Indies, Naowarat Cheeptham, Thompson Rivers University, Ciraj Ali Mohammed, Melaka Manipal Medical College, Jennifer Ann Herzog, Herkimer County Community College, Himgauri K. Kulkarni, MiraCosta Community College, Jennifer Kraft Leavey, Georgia Institute of Technology, Emily L. Lilly, University of Massachusetts Dartmouth, Tracey Meilander, Kent State University, Stephanie S. Strand, Washington University, Anh-Hue Thi Tu, Georgia Southwestern State University, and Debra Lynn VanHouten, Chemeketa Community College.

We greatly appreciated all the help given to us by our host institution, The University of Central Florida. Particularly, we thank Robert Gennaro, Professor Emeritus and former chair of the UCF Molecular Biology and Microbiology Department, who was a very gracious host and coordinated the scheduling of facilities at UCF.

Finally, our sincere thanks are extended to Kelly Gull and Amy Chang for the administrative expertise and organizational skills that make an annual success of ASMCUE. Neil Baker, Chair of the Undergraduate Committee continues to provide the much-needed support and humor from the ASM Board of Education. At his request, we were honored for the opportunity to co-chair the 2006 conference.

We look forward to meeting everyone again at ASMCUE 2007 in or nearby Toronto, Canada!
Highlights by Aaron Best and Jennifer Herzog

Although the ASM General Meeting was held in Toronto, ASMCUE made the decision to keep this year's meeting stateside at SUNY at Buffalo. Several economic factors led to the decision to keep ASMCUE "across the border." First, the meeting is heavily subsidized by ASM (i.e. operates at a loss to the Society) and it would have been difficult keeping attendee costs in line with previous years if the meeting was held in Canada on a holiday weekend (Victoria's Day). Also, polls of previous attendees indicated that most faculty would have difficulty securing funding to attend an "international" meeting as many institutes do not authorize professional development travel outside the US. Evidenced by the fact that we had a record number of attendees, this was a very pivotal decision made by the ASM Education Board. Their efforts to make a smooth transition from our meeting to Toronto were also well received, as nearly 25% of the attendees used the complimentary bus service to make the trip from Buffalo to the ASM General Meeting on Monday morning.

In light of ASM's new focus to reach out to all branches of the biological sciences, the theme of this year's meeting was “Microbiology: Diversity of Life, Diversity in Learning, Connecting Disciplines.” As a committee, we felt that this best exemplified ASMCUE's dedication to gathering educators for the purpose of learning effective techniques for teaching microbiological concepts in a variety of biology courses. The entire program was developed with this theme in mind, and based upon initial feedback we found that participants found it every timely, engaging and useful.

The following is a breakdown summary of each of the major sessions offered at ASMCUE 2007:

**Pre-Conference Workshops: Friday, 6-9:30pm**

Three Pre-Conference Workshops were organized for ASMCUE 2007 (we had a 4th cancel that we could not reschedule). Gary Kaiser, of The Community College of Baltimore County, presented a session on using Flash Animation software in the classroom, focusing on the implementation and the creation of animation for beginners. Steve Rechous from the National Center for Biomedical Informatics of the National Institutes of Health held a session giving participants an overview of microbial genomes and how to employ bioinformatics into a course. Finally, Stephen Nold, of the University of Wisconsin, presented a workshop on writing effective case studies for the classroom.

The schedule for the Pre-Conference Workshop and ASMCUE was very different this year due to the ASM General Meeting beginning on Monday evening instead of the typical Sunday evening start. Workshops were offered Friday evening and 53 attendees participated in the three workshops.

**First-Timers Breakfast: Saturday, 7-8am**

This year, the Committee decided to make a big change in the format of the opening day breakfast. Attendees were separated into two groups: first-timers and returning participants. This new grouping was done to facilitate a planned activity (a "treasure hunt"!) for the first-timers group which represented 42% of ASMCUE attendees. As Co-chairs, we presented nine individuals who graciously volunteered to be "interviewed" by first-time participants throughout the Conference. The volunteers represented the various faculty professional development offerings from ASM including members of the Education Board, individuals serving on the various editorial boards of MicrobeLibrary and Chairpersons of various Education Committees. The first-timers heard a few "words of wisdom" from the volunteers, saw their faces, and then were off to have their cards signed by at least 6 of the 9 individuals. On Sunday, all completed cards were eligible for a variety of prizes generously donated by ASMCUE exhibitors and ASM. In all 45 cards were collected and 20 prizes were awarded during the final wrap-up session on Sunday. Initial feedback at the conference was overwhelmingly positive and we hope to conduct similar activities to welcome the "newbies" at future conferences.

**Plenary Lectures: Saturday and Sunday**

This year, three plenary sessions were presented. They covered a wide array of topics in the discipline of microbiology. Dr. Robert Doms, University of Pennsylvania School of Medicine, started off our conference with a lecture on HIV/AIDS at 25 years. His clinical experience combined with his research expertise allowed him to tell a very informative, engaging story of the virus and moreover illustrated how easy it is to employ the HIV/AIDS model in teaching undergraduate students. Dr. Durand Fish, Yale Center for EcoEpidemiology, spoke on Saturday evening regarding the topic of "ecoepidemiology". His talk reinforced the idea that microbiology today is not a stand alone discipline, but overlaps with many other areas of the biological sciences (i.e. ecology, genetics, evolution, etc.). Finally, our last speaker was Dr. Naomi Ward, T.I.G.R., who spoke about her work in microbial genomics. Her real-life examples of how bioinformatics and genomics have been successfully employed in microbiology gave our educators concrete and fascinating examples to employ in their classrooms.

**Learn Something New/Try Something New Sessions: Saturday and Sunday**

As indicated below, a variety of topics and approaches to teaching and learning were presented during these sessions at ASMCUE 2007:

**Learn Effective Materials to Teach Microbiology to Pre-College Students (Leslie Miller and Liliana Rodriguez); How to Get Service-Learning into Microbiology Courses (Cynthia Cooper); Microbiology Food Safety Issues-Real World Problems that Get Undergrads Excited About Microbiology (Martin Wiedmann); Microbiology in the Nursing Curriculum (Carolyn Holcroft Burns); Preparing for the Future of Biology (and Microbiology) Education at NSF (Daniel Udovic); Teaching Evolution and the Nature of Science: Pitfalls and Opportunities (Ross Nehm).**

**Try Something New:**

Exploring Active Teaching: How Not to be a Talking Head (Sue Merkel); Integrating Research into Your Classroom: What Works? (Stephen Nold); Integration of Math and Micro Across the Curriculum (John Jungck and Anthony Weisstein); Microbial Ecology: Opportunities for Inquiry-Based Learning (Mary Puterbaugh Mulcahy and Harry Edenborn); Podcasting in Education (Rita Alisauskas and Chris Condayan) and Rubrics Cube: Development of Six Rubrics to Aid with Student Performance Assessment (Marcy Kelly).

**MicrobeLibrary Sessions: Saturday, Lunch and Sunday, 9-10:30am**

Members of the MicrobeLibrary led two very well-attended sessions at this year’s meeting. In response to comments from ASMCUE 2006, the committee decided to alter the format of the Saturday lunch session. Attendees to the lunch session were divided into 7
groups, and each group had the task of reviewing the 2007 MicrobeLibrary Atlas-Protocol projects. Initial feedback from the lunch indicated that this format was a great success.

In addition to the above event, the Curriculum Editorial Board Committee of the MicrobeLibrary sponsored a session on “Half-fermented Ideas” on Sunday morning. Participants were asked to complete a homework assignment discussing a class/lab activity that they successfully employ in their courses. During the session, these activities were shared and built upon as a means of potentially submitting them for review into the Curriculum Collection.

**Poster Sessions: Saturday and Sunday**

We had 46 posters accepted and presented at this year’s conference. It was wonderful having all of the posters displayed in one area amongst the rooms used for all of the sessions during the conference. It greatly increased the traffic at all of the poster sessions throughout the weekend. We also noticed an increase in the use of effective assessment tools in many of the posters presented, which supports our commitment to continuing Try Something New sessions on this topic.

We would like to thank our abstract reviewers for the time and efforts: Janelle Hare, Lee Hughes, Marcy Kelly, Jeanne Kagle and Michele Shuster.

**Author Corners: Saturday and Sunday**

Five publishing companies sponsoring eight Author Corners a time set aside for meeting textbook authors and discussing their work. We recognize and appreciate the support of this year’s corporate sponsors: John Wiley & Sons (Friday reception co-sponsor), ASM Press (Saturday pre-dinner reception sponsor), and Benjamin Cummings (Sunday Lunch sponsor). As the exhibit and sponsorship program grows, we earnestly look forward to the day when the conference will be self-supporting or at least “less subsidized” by ASM.

**Exhibit Showcase: Sunday, 9am-1pm**

This year, we had 11 companies participate in the Exhibit Showcase. The effort of the Committee to arrange such a variety of vendors paid off and ASMCUE participants were able to network with publishers, biotechnology companies and government agencies alike.

**Travel Grants:**

Our congratulations are again extended to all the [Faculty Enhancement Program and Early Career Travel Grant Awardees](#): Julius Afolabi, Savannah State University; Anthony Arment, Central State University; Sagarka Dash, Glendale Community College; Mireya Macias, Merced College; Peggy Ann Mason, Brookhaven College; Jennifer Bennett, Juniata College; Cheryl Blake, Pima Community College; Jorge Gomez-Moreno, University of Florida; Maria Guerrero, Miami Dade College; Troy Jesse, Broome County Community College; Joanna Klein, Northwestern College; Tamara McNealy, Clemson University; Michelle Parent, University of Delaware; Srebrenka Robic, Agnes Scott College; Rachel Robson, Morningside College and Audra Swarthout, Delta College.

**“Thank You’s”:**

We greatly appreciate the assistance of our host institution, SUNY at Buffalo. We thank Dr. Michael E. Ryan, Vice Provost and Dean of Undergraduate Education, for taking the time to speak at our opening “Welcome” session on Saturday morning. The efforts of Dr. Gerald B. Koudelka, Professor and Chair, Department of Biological Sciences, were invaluable in making this conference a success including making copies, moving boxes and making a quick dash to the local hardware to buy wingnuts and bolts for the poster stands donated by the Department of Chemistry! His willingness to work with ASMCUE staff in planning this conference and during the event itself went over and above any expectations of our hosts. Another huge thank you is due to Joseph Helfer, Executive Officer in Department of Biological Sciences. Joe worked hard on scheduling the classrooms, a/v services and even managed to wake up his two teenage daughters VERY early on Sunday morning to help lug even more boxes out to the exhibitor tables. The food service, technical and all other associated staff at SUNY at Buffalo were top-notch and their hard work appreciated as well.

Thank you as well to Neil Baker, Chair of the ASM Education Board and Marjorie Kelly Cowan, Chair of the Undergraduate Education Committee which oversees ASMCUE for their continued support of our efforts in planning the Conference. Their attendance at the conference was appreciated and their feedback is always useful in making this the most effective conference for microbiology educators.

Finally, our most sincere thanks are extended to the ASMCUE staff: Amy Chang, Kelly Gull, Michelle Godinez, Veronica Dove and Jean Kayira. They were tireless in the planning and execution of ASMCUE 2007, and their efforts were recognized by every participant at this conference. THANK YOU, LADIES!

In closing, we hope you found ASMCUE 2007 to be a worthwhile experience. Planning has already begun on ASMCUE 2008 and we hope to see you (and maybe a coworker!) in Boston!

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**15th Annual ASMCUE Highlights and Proceedings, Endicott College, Beverly, MA**

**Fifteen Years of Teaching Excellence**

Conference Steering Committee
Donald P. Breakwell, Ph.D. Brigham Young University; Jennifer Herzog, Ph.D. Herkimer County Community College; Donald Lehman, Ed.D. University of Delaware

An ocean side setting was ideal for celebrating “Fifteen Years of Teaching Excellence” at the 2008 American Society for Microbiology Conference for Undergraduate Educators (ASMCUE). Beautiful Endicott College in Beverly, Massachusetts is set among woods,
This year’s conference was particularly well attended with 327 attendees, an almost 25% increase over last year’s meeting. Having the conference at the end of May might have contributed to that because most colleges and universities have finished spring semester. Approximately 42% participants were first timers with eight international visitors also in attendance. We were particularly pleased to have representatives of the American Society of Human Genetics at the conference.

The Microbrew sessions broke new ground. These sessions were a great start to the academic part of the conference. Designed to have educators bring their ideas for and about successful teaching strategies in microbiology and biology education; nine sessions covered topics from course development and research pedagogy to inexpensive labs and service learning. Thank you to all participants for making this a resounding success. The steering committee received many positive comments about these sessions, and we will be addressing requests to increase the number of these sessions.

Our plenary speakers bridged wide-ranging topics from basic science to pedagogical approaches. Stuart Levy (Tufts University School of Medicine) discussed adaptation to and genetics of drug resistance. Colleen Cavanaugh (Harvard University) shared the fascinating chemosynthetic ecology of oceanic volcanic vents. This year’s meeting also saw a panel presentation of genomics initiatives in education. Brad Goodner (Hiram College) spoke about involving undergraduates in genome annotation, Tuajuanda Jordan (Howard Hughes Medical Institute) discussed a phage genome project through HHMI, and Cheryl Kerfeld (Joint Genome Institute) shared “Adopt a (microbial) Genome” project. Ricki Lewis, Alden March Bioethics Institute, and widely published author of life science texts, gave pointed examples of how the media mangles genetics.

In response to feedback from previous participants, this year’s “Learn Something New” sessions focused on updates in microbiology and related disciplines. Larry Aaronson (Utica College) drew from his vast experience on encouraging and mentoring undergraduate researchers. TJ Bliss (University of Nebraska) discussed inquiry-based labs using nematodes and their bacterial symbionts. Charlie Calisher (Colorado State University) made us uneasy with his presentation of emerging viruses and bats. Kathleen Jagger (Transylvania University) and Jeffrey Sich (Maryville University) presented not only topics in current immunology but ways to teach them. Judy Daly (University of Utah) gave us an update on careers in clinical microbiology. Two leaders in genomics education initiatives, Tuajuanda Jordan (Howard Hughes Medical Institute), and Cheryl Kerfeld (Joint Genome Institute) presented forthcoming projects available through their institutions.

The “Try Something New” sessions at ASMCUE are designed to showcase current pedagogical approaches and how to implement them. Using microbial ecology as their model, Mary Allen (Hartwick College) and Ruth Gyuere (Western Connecticut State University) presented how to teach experimental design and sampling methods. Dave Baumler (Genome Center of Wisconsin) shared the vast number of genomics tools and resources available to educators. Spencer Benson (University of Maryland) and Alix Darden (The Citadel) enhanced our scholarship of teaching and learning by sharing appropriate rubrics, surveys, and taxonomies in assessment. An application of these ideas, specifically on Bloom’s Taxonomy, was made by Clarissa Dirks (The Evergreen State University). Diane O’Dowd (University of California, Irvine) presented how physical demonstrations and cognitive exercises can be used to engage students in large classes. Ricki Lewis also shared how writing a news release can help students learn genetics. Technological tools for teaching and learning were also presented: Sandra Burnett (Brigham Young University) lead participants through the creation of iLectures, a form of podcasts. Laura Tuhela-Reuning (Ohio Wesleyan University) and Michele Shuster (New Mexico State University) discussed how clickers may be used effectively in different student populations.

This year there were a record number of posters in three sessions. The scholarship of teaching and learning was well exhibited as an increasing number of submissions had appropriate assessment and demonstrable outcomes. Our sincere thanks to those who participated as abstract reviewers and on the travel award committee.

Congratulations to this year’s travel award winners. The ASMCUE Textbook Travel Award, generously donated by several text book authors, was awarded to Paul Lepp (Minot State University). Faculty Enhancement Program Awardees were Ruth Negley (Harrisburg Area Community College), Angela NewMyer (St. Louis Community College at Forest Park) and Sherrie Sprangers (University of Maine – Machias). Early-Career Travel Awardees were Min Cao (Clemson University), Sylvia Franke (Skidmore College), Elizabeth Joyce (Stanford University), Samantha Kerry (St. Mary’s College of Maryland), Barbara May (St. John’s University/College of St. Benedict), Kimberly Metera (Durham Technical Community College), Amy Miller (University of Cincinnati), Kimberly Murphy (Waldorf College), Traci Ness (Armstrong Atlantic State University), and Michele Zwolinski (Weber State University). Travel awards were also generously granted by the Northeast Branch of ASM and the American Society for Human Genetics.

Our sincere appreciation goes to President Richard Wylie of Endicott College who literally opened doors for our visit to Beverly, MA and made a gracious host. We also thank the local planning committee Dr. Peter Eden, Dean of Arts and Sciences, and our own Joyce Shaw who initially suggested Endicott College.

As always we are indebted to the following for their continuing support of this conference: Neil Baker (Chair of ASM Education Board); Kelly Cowan (Chair of Undergraduate Education); and Amy Chang, Kelly Gull, Michelle Godinez, Leslie Robinson and Jean Kayira of the ASM Education Department.
Congratulations to this year’s travel award winners!

Contamination in Water Samples (MUG test).

This year’s conference was marked with almost unbridled enthusiasm! It may well have been the thin mountain air! We wish to thank participants and presenters alike for their thoughtful and inspiring comments and speeches. ASMCUE is a conference for and by educators and it would never be successful without the seemingly endless numbers of volunteers, including abstract reviewers and moderators. Thank you to each for sharing your abilities and talents.

The theme for ASMCUE 2009 was drawn from the topics presented by five plenary speakers who addressed current topics from across the discipline of microbiology. Caroline (Carrie) Harwood (University of Washington) spoke of ways by which microbes can be used to provide hydrogen as biofuel. Her work has focused on Rhodopseudomonas palustris, a phototrophic purple non-sulfur bacterium, and how the ecology, molecular genetics, transcriptionics, and metabolic flux analysis of this organism can define webs of reactions needed for hydrogen production. Thomas Schmidt (Michigan State University) explained the microbial basis for life on Earth. Specifically, he discussed trade-offs microbes may make between metabolic power and efficiency, and how these trade-offs might alter the structure of microbial communities. Ian Orme (Colorado State University) suggested it might be time to leave the planet, given the rise of XDR tuberculosis cases. His dry British humor kept us earth-bound, however. We were intrigued by his discussion of the advances being made regarding TB vaccines. Speaking about the role of unculturable persistser microbes in biofilms was Kim Lewis (Northeastern University). One of the problems with these persisters, we learned, is that their presence limits the discovery of antibiotics. His group has developed a bioassay to identify compounds that act as growth factors for uncultured bacteria. Our final plenary was a reprise of the 2008 Carski Foundation Distinguished Undergraduate Teaching award address by Jeff Pommerville. Jeff encouraged us to become classroom educators by sharing personal examples. His students’ creative project on HIV-AIDS in Africa left a lasting effect on all of us.

This year’s “Learn Something New” sessions were focused on updates from the discipline of microbiology. Lawrence Goodridge (Colorado State University) discussed how phages are being used as reporters in bacterial disease diagnosis. Joel Griffitts (Brigham Young University) married the classical and contemporary in microbial genetics. Rupa Iyer (University of Houston) described a novel interdisciplinary approach being used at her university centered in a pesticide-degrading bacterium, Pseudomonas dimunita. Matt Mulvey prompted us to exPEC the unexpected when it comes to understanding the virulence mechanisms of extraintestinal pathogenic Escherichia coli. Ann Powers (Centers for Disease Control and Prevention) led participants on the adventure of investigating vector-borne outbreaks of viral diseases. Chris Woolverton (Kent State University) shared his expertise of federal regulations to discuss safety in the teaching laboratory. Mark Zabel (Colorado State University) presented how to introduce prions to undergraduates and have them think creatively about these infectious agents.

“Try something new” sessions focused on pedagogical approaches that can be used in microbiology. Mark Bergland and Karen Klyczek (University of Wisconsin-River Falls) shared how an NSF-funded project called “Case It!” integrates molecular biology and bioinformatics to learn about infectious diseases. Have you ever wondered how to get students to wrap their minds around the spatially varied nature of biomolecules? Tim Herman (Milwaukee School of Engineering) brought models and had participants work at activities designed to do just that. He had us engaged! Jennifer Herzog (Herkimer County Community College) examined best practices in internet-based education. Don Lehman (University of Delaware) presented the use of wikis, forums, blogs, RSS feeds, and podcasts as tools for teaching. Erica Suchman proposed that mid-term course evaluations can improve our teaching and can lead students to think more deeply about their own learning. Michelle Withers (West Virginia University) explained how Bloom’s taxonomy is used in formative and summative assessment. Robin Wright shared her innovative approach to teaching introductory biology using an active learning, team-based strategy.

Conference attendees were able to participate directly in Microbrew and poster sessions. There were 12 Microbrew sessions, with 30 presentations. These popular 15-minute “chalk-talk” presentations allow participants to present a variety of ideas for teaching microbiology and to receive feedback. In three poster sessions, there were 47 posters covering the gamut of ideas in teaching microbiology. We thank all presenters of these sessions and encourage all future participants to evaluate and assess their own teaching and present their hypothesis-driven classroom research at ASMCUE.

MicrobeLibrary review sessions gave participants, over a lunch hour, to peer review projects that were recently submitted to the teaching database. Projects reviewed were Biochemical Differentiation of Bacteria via Methyl Red and Voges-Proskauer (MVRP), Citrate Test, Identification of Unknown Bacteria by 16S rDNA Sequencing, Indole Test, Kirby Bauer Disk Diffusion Susceptibility Test, and Use of Escherichia coli Broth and Agar Media with 4-Methylumbelliferonyl-ß-D Glucuronide to Confirm Escherichia coli Contamination in Water Samples (MUG test).

Congratulations to this year’s travel award winners!

- Textbook travel awardee: Andrew V. Greene (Ashland University).
Faculty Enhancement Program awardees: Donna Hazelwood (Dakota State University), Yolanda Serrano-Núñez (Inter American University of Puerto Rico), Janie Sigmon (York Technical College) and Robert Thornton (Georgia Perimeter College).

Early-Career Travel awardees: Melanie DiClaudio (University of Tennessee, Knoxville), Adrienne Dolberry (Salem State College), Julienne Grose (Brigham Young University), Rachel Horak (Georgia Institute of Technology), Kai Hung (Eastern Illinois University), Daniel Isaac (United States Naval Academy), Kara Lukin (National Jewish Health), Heather Seitl (Johnson County Community College), Amy Siegsmund (Pacific Lutheran University), and Wei Wu (William Jewell College).

ASM/CUE/GM Travel Assistance Program awardees: Patricia Baynham (St. Edward’s University), Sue Katz (Rogers State University), and Betsy Martinez-Vaz (Hamline University).

ASM Undergraduate Teaching Fellowship awardees: Katie Busch (Davidson College), Jordan Frisch (Dakota State University), Kristen Ruckman (Colorado State University), Ashley Scott (University of Arkansas at Little Rock), and Jessica Thibeault (Western Connecticut State University).

ASM-UNESCO Train-the-Trainers Scholarship for International Educators awardees: Vivien Amonkar (St. Xavier’s College, Mumbai, India), Uchechi N. Ekwenny (Michael Okpara University of Agriculture, Umudike, Nigeria), Erum Khan (The Aga Khan University, Karachi, Pakistan), Juta Kroica (Riga Stradinš University, Riga, Latvia), Juana Orellano-Lanasa (Universidad Nacional de Asunción, Asuncion, Paraguay), Verónica Beatrix Rajal (Universidad Nacional de Salta, Salta, Argentina), Armen Trchounian (Yerevan State University and Russian-Armenian State University, Yerevan, Armenia) and Sylvia Uzochukwu (University of Agriculture, Abeokuta, Nigeria).

The steering committee sincerely thanks Neil Baker (Chair of ASM Education Board), Kelly Cowan (Chair of Undergraduate Education), and Amy Chang, Kelly Gull, Michelle Slone, and Leslie Robinson (ASM Education Office) for their continuing support of ASM/CUE.

17th Annual ASM/CUE Highlights and Proceedings, Town & Country Resort and Convention Center, San Diego, CA

Conference Steering Committee
Jennifer Herzog, Ph.D. Herkimer County Community College, Lee Hughes, University of North Texas, Donald Lehman, Ed.D. University of Delaware

The Town & Country Resort provided an excellent venue for the 17th Annual ASM Conference for Undergraduate Educators. Over 300 participants made their way to sunny San Diego, 45% of which were first-time attendees and many traveling internationally from distant countries.

First and foremost, the success of this year’s meeting is due to the all of the individuals who dedicated their time to creating such an amazing program this year. A big thank you to the ASM/CUE staff, comprised of Amy Chang, Kelly Gull, Michelle Slone, and KaRyn Daley, who did a tremendous job guiding us the organizing committee as we solidified the speakers and made changes to improve the overall format of the meeting. We also greatly appreciate the continued support of Kelly Cowan (Chair of Undergraduate Education) and Neil Baker (Chair of ASM Education Board). As we made clear during the meeting, our Local Organizing Chair, Dr. Stanley Maloy, was instrumental in multiple ways and we cannot thank him enough for all of his time and efforts. This year found an increase in support from our participating vendors and publishing companies as well, for which we are truly grateful. Finally, to everyone who served as a volunteer this year, we say thank you for your time as well and we hope that you see that working together is what really makes this conference a success each year!

"One Health, One Earth: A Sustainable Future". Our theme this year encompassed not only the diversity of presentations from our invited plenary lecturers, but also our desire to strengthen the educational link between traditional areas of microbiology and the general sciences. We invited a series of plenary lecturers who have all made significant contributions to microbiology education and wide-ranging areas of microbiological research. We decided to start the meeting in earnest on Thursday evening, and Dr. Stanley Maloy’s lecture set the tone for CUE with his informative, reflective and humorous lecture. Forest Rohwer’s talk on the microbiology of coral reefs had everyone busy Tweeting and posting on Facebook at an early morning hour! Then Margaret McFall-Ngai reinforced the idea that we can effectively use microbiology to address many of the challenges in biology that will face us as educators and researchers in years to come. Amy Cheng Vollmer’s lecture was very well received by all, as we were yet again got to see (and be amazed by!) in person what truly makes a deserving Carski Award winner. Closing out the conference, Charles Gerba’s talk on hygiene for the 21st century opened everyone’s eyes to just how we should be going about living with and fighting against the microorganisms that live in and around us every day.

Our “Learn Something New (LSN)” sessions were bolstered by the participation of our plenary lecturers, Dr. Stanley Maloy and Dr. Margaret McFall-Ngai. In addition to their presentations, attendees were given updates on many areas of microbiology-related fields of research such as metagenomics, clinical microbiology, virology and immunology among many others. This year’s “Try Something New (TSN)” sessions provided attendees with the chance to actively learn how to implement mathematics, case studies, rubrics and assessment techniques into their courses. We truly thank all of our presenters for their hard work and dedication to advancing the knowledge of our participants here at ASM/CUE! New this year were some great collaborations with several national NSF-funded biology education projects including two funded by RCN-UBE grants; the Introductory Biology Project headed by Gordon Uno and Concept Assessments in Biology led by Kathleen Fisher. Another collaborator was Sam Donovan, PI for an NSDL/DUE grant on the topic of Cyberlearning for Community College Faculty. Leaders in these groups held pre-conference focus groups and presented sessions and posters in order to disseminate their activities and solicit and create opportunities for communities of practice around these subjects.

Also debuting at the Conference was the newly expanded Journal of Microbiology & Biology Education (JMBE) “2.0.” The journal now includes several sections previously hosted in ASM’s MicrobeLibrary (www.microbelibrary.org). Authors were encouraged to submit articles and serve as reviewers for the journal and a special demonstration room during exhibits at which attendees could sign up...
for and learn how to submit to the new open-access website (http://jmbe.asm.org). Perhaps most exciting is the new decision to include the ASMCUE abstracts in the journal so authors can showcase and site their contribution to the Conference. Finally, this year we continued the highly successful Microbrew and Nuts & Bolts sessions, allowing educators to learn more about best practices and professional development issues. We had a record number of Microbrew sessions, which in turn caused an upswing in the number of poster presentations we had this year as well. Kudos to you all who presented! MicrobeLibrary review sessions continued during our lunch on Friday, which provided participants to peer review projects that were submitted to the teaching database this year.

We hope that you had an engaging, enlightening and exciting time at ASMCUE 2010. If you were not able to attend, however, please note that the entire opening lecture of the meeting will be available online soon! In addition, many of the plenary speakers (as well as presenters from TSN, LSN, Microbrew, and Nuts & Bolts sessions) have made their presentation Powerpoints and/or hand-outs available to us this year. We hope that these will be useful to you in your classes and research!

In closing, we say congratulations to this year’s travel award winners and hope to see you all (and a friend you’ve recruited!) at ASMCUE 2011 (June 2-5, Location TBD)!

- Textbook Travel awardee: Enid Gonzalez (California State University)
- Early-Career Travel awardees: Russell Cossaboom (University of Michigan-Flint), Linsey Donner (University of Nebraska Medical Center), Jean Huang (Franklin W. Olin College of Engineering), Jeffrey Olimpo (University of Maryland), Jennifer Powell (Gettysburg College), Melissa Schreiber (Valencia Community College), Heidi Smith (Front Range Community College), and Julie Torruellas Garcia (Nova Southeastern University)
- Faculty Enhancement Program awardees: Gina Cano-Monreal (Texas State Technical College), Stella Doyungan (Texas A&M University-Corpus Christi), Gary Patterson (College of the Marshall Islands), Ann Stewart-Akers (South University), Jacqueline Washington (Nyack College), and Maureen Whitehurst (Trident Technical College)
- ASM Undergraduate Teaching Fellowship awardee: Andrew Mo (The Johns Hopkins University)
- ASM-UNESCO Train-the-Trainers Scholarship for International Educators awardees: Jane-Francis Akoachere (University of Buea), Maria Julia Amoroso (Universidad Nacional de Tucumán), Maria Tersita Bertoli Avella (Universidad Dr. José Matías Delgado), Esperanza C. Cabrera (De La Salle University), Ousman Diagne (Institut Sénégalais de Recherches Agricoles), Uchechi Ekwenye (Michael Okpara University of Agriculture), Uzoamaka Ogechi George-Okafor (Enugu State University of Science and Technology), Hygia Maria Nunes Guerreiro (Escola Bahiana de Medicina e Saúde Pública), and Debananda S. Ningthoujam (Manipur University)

18th Annual ASMCUE Highlights and Proceedings, Johns Hopkins University Homewood Campus, Baltimore, MD

Conference Steering Committee

Lee Hughes, University of North Texas; Jacqueline Washington, Nyack College, and Min-Ken Liao, Furman University

Local Organizing Committee

Kristina Obom, Johns Hopkins University, Beverly Wendland, Johns Hopkins University, Patrick Cummings, Johns Hopkins University, and Bob Lessick, Johns Hopkins University

The weather in Baltimore was beautiful for the 18th annual ASM Conference for Undergraduate Educators held on the Homewood Campus of Johns Hopkins University. Over 350 participants, an ASMCUE record, attended the meeting, with 41% "first-timers" and 21 international attendees. Also 45 Biology Scholars which includes the Research, Transitions, and Assessment Scholars and 8 scholarship recipients from the ASM-UNESCO Leadership Grant for International Educators attended the meeting.

As always, the success of the meeting is due to the all of the individuals who dedicate their time to creating such an amazing program. A big thank you to the ASMCUE staff, including of Amy Chang, Kelly Gull, Michelle Slone, Leslie Robinson, and Kari Sherwood, who did a tremendous job guiding the organizing committee as we selected speakers and made tweaks to improve the format of the meeting. We also greatly appreciate the continued support of Kelly Cowan (Chair of Undergraduate Education) and Neil Baker (Chair of ASM Education Board). We also must once again express our sincere appreciation to the local organizing committee of Beverly Wendland, Kristina Obom, Patrick Cummings, and Bob Lessick for their tremendous help in not only providing us with excellent facilities for the meeting, but for all their hard work in helping us secure amazing speakers for our program. The conference also benefited from the growing number of vendors and publishing companies who support and enrich the meeting.
Finally, to everyone who served as a volunteer this year, from abstract reviewers to microbrew facilitators, we say thank you for your time as well and thank you for helping to keep ASMCUE great!

Our theme this year, Blending Science and Education, was embraced by all our presenters. We were fortunate to be able to host award-winning plenary lecturers who have all made significant contributions to microbiology and biology education and research. The first plenary by Teresa Balser on the topic of “Teaching as if Learning Mattered” on Thursday evening really struck a chord with the participants who continued to reflect back on her points throughout the weekend (view Bassler’s presentation [video on YouTube]). On Saturday morning, we were treated to Jo Handelsman’s lecture discussing research related to scientific teaching. At noon on Saturday, Sue Merkel introduced us to the work of the ASM Task Force on Curriculum Guidelines for Undergraduate Microbiology Education revisiting the microbiology curriculum guidelines and gave participants the opportunity to comment on the committees work during breakout sessions. Saturday’s trio of plenary lectures was wrapped up by the amazing presentation by outgoing ASM President Bonnie Bassler about her work on cell-cell communication in bacteria (view Bassler’s presentation [video on YouTube]). The closing plenary of the conference was held on Sunday morning where Bert Vogelstein described his fascinating work with bacterial-based treatment of cancers (view Vogelstein’s presentation [video on YouTube]). These wonderful plenary talks were complimented by the outstanding concurrent resource sessions covering topics including classroom-based research experiences, lab safety, online education, biology education research, K-12 outreach, and the Vision and Change report. Our concurrent pedagogy sessions offered topics at levels from beginning to advanced such as Active Learning 101 and Connecting Brain Research with Effective Teaching. We also had an outstanding set of scientific sessions a wide range of topics including synthetic biology, virology, parasitology, genomics, and others. All of our presenters served as wonderful resources for our attendees, and we would like to thank them once again for all their hard work.

Our participants also shared their knowledge through the popular Microbrew sessions and the fantastic poster presentations. MicrobeLibrary review sessions continued during our lunch on Friday providing participants the opportunity to comment on protocol projects. This year’s abstracts are featured in Volume 12, Issue 1 of the Journal of Microbiology & Biology Education.

We hope that you had an engaging, enlightening and exciting time at ASMCUE 2011. Many of the plenary speakers and presenters have made their presentations and/or hand-outs available to us on the ASMCUE website. We hope that these will be useful to you in your classes and research!

In closing, we say congratulations to this year’s travel award winners and hope to see you all (and a friend you’ve recruited!) at ASMCUE 2012 in San Mateo, California - June 14-17!

19th Annual ASMCUE Highlights and Proceedings, San Mateo Marriott, San Mateo, CA

“Blending Science and Education”

Conference Steering Committee
Jacqueline Washington, Nyack College, Todd Primm, Sam Houston State University and Min-Ken Liao, Furman University

Local Organizing Committee
Brinda Govindan and Kimberly Tanner, San Francisco State University

San Mateo proved to be a beautiful setting for the 19th annual ASM Conference for Undergraduate Educators held at the San Mateo Marriott. The conference drew 337 participants from across the US and overseas and included 41% first time attendees and 16 international attendees from 9 countries.

The conference was a great success, due to the dedication and professionalism of many individuals who spent countless hours creating and executing the amazing program. A special thank you to the ASMCUE staff comprised of Amy Chang, Kelly Gull, Kari Sherwood and Michelle Slone, who guided the conference committee and took care of all the logistical details. We also greatly appreciate the continued support of Neil Baker (Chair of ASM Education Board) and Kelly Cowan (Chair of Undergraduate Education). A special thanks to Kelly Cowan for her dedication and years of support as she completes her term as Chair of the Undergraduate Education Board. We also must once again express our sincere appreciation to the local organizing committee members Brinda Govindan and Kimberly Tanner for all their hard work in helping us secure amazing local speakers for our program. We are also truly grateful to our sponsors and exhibitors for their support and generosity. Finally, to everyone who served as a volunteer this year, from abstract reviewers to microbrew facilitators, we say thank you for your time as well and thank you for helping to keep ASMCUE great!

Our conference theme, “Blending Science and Education”, seeks to blur the dividing line between science research and education. ASMCUE is fortunate to attract many participants who desire to be excellent educators while keeping current with scientific knowledge. To this end, we had several excellent plenary speakers, on cutting edge science and the latest research in science education. Our first plenary speaker on Thursday night, Michael Snyder, opened with a very interesting and timely scientific talk on personal genomics and whole omics profiling. On Friday morning, we had an excellent presentation by Elizabeth Emmerm and Cristina Bressler on the newly proposed ASM laboratory Biosafety Guidelines. This was followed up on Friday evening with Spencer Benson’s inspiring plenary on teaching effectively, with less time preparing. That certainly hit home for many conference attendees. Melanie Ott’s lecture on Saturday morning on host-virus interactions opened our eyes to the role of fat droplets in the life cycle of
several RNA viruses. Our final plenary speaker on Sunday morning, Kimberly Tanner, delivered an engaging, interactive presentation on approaches to understanding and measuring biological expertise. A number of us discovered whether we were considered superhero novices or experts from the fun card sorting activity.

On Friday evening, during the Exhibit Hall Opening, we were able to wander through the streets of San Francisco to visit places such as Fisherman’s Wharf, Chinatown and Ghirardelli Square without stepping foot out of the hotel in San Mateo. We visited and welcomed our Exhibitors and Sponsors as we enjoyed a delightful selection of hors d’oeuvres and drinks. Attendees also got a sneak preview of the posters before the official Poster sessions.

Our plenary sessions were complimented by 25 concurrent sessions, and 42 microbrew symposia throughout the 4-day conference. Attendees could attend any of the hour long concurrent sessions on scientific research, pedagogy, or resource. In general, topics were offered twice during the meeting. Topics ranged from effective online education, using games to teach microbiology, to emerging pathogens. This year ASMCU Education Board and the American Academy of Microbiology (AAM) presented on two topics aimed at delving more deeply into the microbiology behind events in the news - E. coli: Good, Bad and Deadly and Microbes and Oil Spills, during 2 concurrent sessions. The New Multiple Choice Critical Thinking Question Bank Collection – MicroLibrary 3.0 was presented during a concurrent resource session and educators given the opportunity to contribute questions with a minimum level three (application) to the new collection. Microbrew sessions were 15-minute “chalk talk” oral presentations with an additional 5 minutes allowed from questions or discussion. Topics ranged from using blog discussions, inquiry based microbiology, post exam analysis to transforming science labs using technology.

The Exhibit Showcase and Poster Sessions took place on Saturday, where attendees could both visit exhibitors and wander by the posters. The two Poster Sessions included 34 accepted posters. Abstracts for the ASMCUE poster sessions are featured in Volume 13, Issue 1 of the Journal of Microbiology & Biology Education. Our sincere thanks go to those who participated or served as abstract reviewers under the leadership of Min-Ken Liao, Abstract Chair. This year, 13 exhibitors participated in the Exhibit Showcase, including 2 new companies. Four companies sponsored 4 Author Corners and/or 5 Product Corners, a time set aside for meeting textbook authors or product demonstrations.

There were many opportunities for conference attendees to network with fellow educators and contribute to several initiatives throughout the conference. The networking breakfasts on Friday, Saturday and Sunday each with a different theme proved to be very successful. Participants were able to sit with educators with similar interests, by geographical areas and with newly found, old friends or just a friendly face on each of those days. In addition, educators had the opportunity to review the ASM Lab Biosafety Guidelines at one of several breakout sessions during lunch on Friday. On Saturday during lunch, attendees had the opportunity to contribute to one of the three MicroLibrary protocols for review this year. Peer reviewed protocols this year were Carbohydrate Fermentation, Gelatin Hydrolysis Test and Starch Agar.

This year, ASMCUE met in conjunction with the ASM General Meeting. On Saturday afternoon, attendees who registered in advance were bused 20 miles to and from asm2012 held at the Moscone Convention Center in San Francisco to attend the opening session, “Harnessing the Power of Microbes for Biomedicine”. There were three very interesting presentations. The first lecture by Scott O’Neill was a dynamic, animated presentation by on Wolbachia infections of insects and possible role in reducing the transmission of Dengue. This was followed by Dianne Newman who spoke about iron oxides and infections, linking geo- and medical microbiology. The final talk was by James Collins on synthetic biology. After the opening session, attendees were able to enjoy light hors d’oeuvres and drinks before departing for San Mateo. ASMCUE participants also had the opportunity to review the ASM Lab Biosafety Guidelines at one of several breakout sessions during lunch on Friday. On Saturday during lunch, attendees had the opportunity to contribute to one of the three MicroLibrary protocols for review this year. Peer reviewed protocols this year were Carbohydrate Fermentation, Gelatin Hydrolysis Test and Starch Agar.

We hope that you had an engaging, enlightening and exciting time at ASMCUE 2012. Many of the plenary speakers and presenters have made their presentations and/or hand-outs available to us on the ASMCUE website. We hope that these will be useful to you in your classes and research.

Congratulations to this year’s travel award winners!

ASMCUE Textbook Travel Award Winner
- Courtney Robinson, Howard University, Washington, DC

Faculty Enhancement Program Awardees
- Danielle Dusold, Bryant and Stratton College, Glendale, WI
- Kristy Henscheid, Columbia Basin College, Pasco, WA
- Norrenna Hubbard, Hondros College School of Nursing, West Chester, OH
- Sheela Huddle, Harrisburg Area Community College, Lancaster, PA
- Jeff Novack, Bellevue College, Bellevue, WA
- Elizabeth Szymczak, Bunker Hill Community College, Boston, MA
- Naomi Wernick, University of Massachusetts Lowell, Lowell, MA

Early-Career Travel Awardees
- Blythe Janowiak, Saint Louis University, Saint Louis, MO
- Zachary Pratt, University of Wisconsin-Madison, Madison, WI
- Julia Schmitz, Piedmont College, Athens, GA
- Priscilla Van Wynsberge, Colgate University, Hamilton, NY
- Sara Volk de Garcia, Our Lady of the Lake University, San Antonio, TX
- Cuc Kim Vu, St. Catherine University, Minneapolis, MN

ASM-UNESCO Leadership Grant for International Educators
- Ketema Bedanie, Jimma University, Ethiopia
- Joel Cornista, Miriam College, Philippines
- Erika Nagle, Riga Stradins University, Latvia
- Martha Vives, Universidad de los Andes, Colombia

The Vision and Change report published by AAAS in 2011, has recognized the contributions of ASMCUE in making a positive impact on the advancement of undergraduate education. The report states that ASMCUE serves "as a venue that advances the scholarship of teaching and learning in biology”. This is only possible because of wonderful community of people like you who strive for excellence, who are unselfish in sharing and willing to work together to reach a common goal. Keep up the great work! We hope to see you all next year as we celebrate our 20th anniversary May 16-19 in Denver, CO.
"20 Years of Vision, Change, and Leadership"

Conference Steering Committee
Todd Primm, Sam Houston State University, Mary Mawn, SUNY Empire State College, Robyn Puffenbarger, Bridgewater College, and Jennifer Herzog, Herkimer County Community College

Local Organizing Committee
Aimee Bernard and Timberley Roane, University of Colorado

Conference Statistics
There are 395 participants, compared to 337 in 2012. Of those registered, there are:
- 350 conference attendees and 45 exhibitors
- 286 ASM Members and 64 nonmembers (among the faculty participants)
- 45% first-time attendees
- 22 international attendees representing 15 countries
- 35 conference attendees registered for the Microbes are Fun 5K Run
- 173 conference attendees registered for the asm2013 field trip on Saturday
- 215 conference attendees registered for the asm2013 one-day pass on Sunday

The Inverness offered a beautiful and relaxing setting for our historic twentieth annual meeting. What a spectacular view of the Rocky Mountains (just beyond the IKEA). This was our largest ASMCUE to date, with almost 400 participants! It is exciting to see our community growing so much. Typical for an ASMCUE meeting, 45% of our attendees were first-timers. Their contributions mean so much. As you are all aware, a great conference results from a great community so tremendous thanks goes to all in the community who planned this meeting, who presented, and contributed in other ways. A special thanks to all of our exhibitors and sponsors for their critical support.

Our conference theme of “Twenty Years of Vision, Change, and Leadership” was well suited to both reflect the past and project into the future. Vision and Change comes from the seminal report from AAAS and NSF (and endorsed by HHMI, NIH/NIGMS, and the USDA) on how undergraduate education in the life sciences needs to be transformed to reflect what is known about the science of learning. Please continue to download (www.visionandchange.org) and share this document with other educators and administrators. Not only did this report mention the educational efforts of ASM as exemplary, so did the more recent 2012 report on ”The Role of Scientific Societies in STEM Faculty Workshops,” from the National Science Foundation, the Council of Scientific Society Presidents, and the American Association of Physics Teachers, which includes a full chapter on ASMCUE. Clearly, recognition of our community is spreading.

The first plenary lecture by Joseph Petrosino, Baylor College of Medicine, on metagenomics was a fascinating look at current work related to the human microbiome project. How impressive the diversity of the human gut is in that despite many years of research, 43% of DNA sequence reads from the Human Microbiome Project can’t be mapped to an existing database. We have so much more discovery ahead of us in microbiology. The talk ended with a surprise proposal of a crowdsourcing project involving ASMCUE attendees, the Alkek Center for Metagenomics and Microbiome Research, and the American Gut Project. More information on this exciting opportunity soon! We then learned about many of the ASM educational initiatives from Amy Chang, ASM Education Director, including Biology Scholars, Faculty Training Institutes, LINK (Leaders Inspiring Networks and Knowledge), Undergraduate Curriculum Guidelines, IMRF, Laboratory Biosafety Guidelines, MicrobeLibrary, and Science Teaching Careers. ASM staff coordinate over 300 volunteers annually in carrying out these activities. Please join in and volunteer. Following this, attendees had their first chance to learn about resources. Choices included effective crowdsourcing, involving students in curriculum design in Project BETA, service learning, and the Science Case Network. The evening ended with a look at our new assessment sessions, and then a reception and t-shirt fashion show, generously provided by Pearson. Thank you to our 12 participants who walked down the runway in their microbial inspired t-shirts. The audience voted and we congratulate winner Dave Westenberg, Missouri University of Science and Technology.
hypothesis (immunological entertainment at its best), the lung microbiome in HIV patients, yeast in beer (from the American Academy of Microbiology), epidemiology around pertussis resurgence in the US, current use of microbiology in forensics, and microbial whole-genome sequencing (were you aware that 400 million parallel sequencing reads is typical now?). A hallmark of ASMCUE is involvement of participants in community-driven projects (yes, with active learning, we practice what we preach). This was carried out as participants were updated on the ASM Curriculum Guidelines, and then worked over lunch in applying these to the next step: developing learning objectives tied to the core concepts. After more pedagogy and scientific sessions, a plenary lecture on the microbial communities on young igneous ocean crust was presented by Katrina Edwards, University of Southern California. The day ended with a walk down memory lane reception. What an impressive amount of work has been done by members of this community in the past to set the stage for where we are today. Input was collected from all on a poster and Google form on what our future vision is.

Saturday started at bright and early for 26 attendees who participated in the Microbes are Fun 5K Run. Thank you to our cheer committee “Sally Monella” and “Neutro-Phil” and others that motivated the runners and Mark Martin, University of Puget Sound, for staffing the water station and acting as race photographer. A special thank you goes out to our 5K race sponsors John Wiley & Sons, Inc. (t-shirt), W.H. Freeman (prize for the top race finishers), and Imagineering (race logo).

**WINNERS**

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<tr>
<th>First place winner</th>
<th>Second place winner</th>
<th>Third place winner</th>
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<tr>
<td>Tor Gjoen, University of Oslo</td>
<td>David Wessner, Davidson College</td>
<td>Laura MacDonald, University of Arkansas for Medical Sciences</td>
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Sessions then kicked off with an ASM-NSF LINK plenary panel presentation. Bruce Jackson, MassBay Community College, inspired us about how research involvement has transformed students at MassBay Community College, and Jenifer Alonzo, Old Dominion University, explained how we can become involved in the LINK program. For much of the day, attendees shared excellent posters.
and numerous educational products were showcased by the exhibitors. This year, all posters were linked to one of more concepts in the ASM Guidelines and tagged with one or more pedagogical categories. Microbrew sessions also filled the day with instructors sharing valuable ideas on teaching and learning. Once again there was a working lunch following a session, this time focused on the PULSE initiative. The goal of PULSE, led for 40 national Fellows and supported by NSF, NIH, and HHMI, is to help life science departments across the nation implement the recommendations in Vision and Change. Participants gave valuable feedback on rubrics to assess where departments lie on the implementation scale being developed. Hopefully, each of you took back an idea on how you can promote and encourage change within your own academic unit. The evening activity was a field trip to the asm2013 keynote session in Denver, to hear some fascinating cutting-edge science on spatial organization inside bacteria, global sequencing of viruses from wild animals in hotspots to predict new zoonotic events, and using cycles of error-prone PCR and high throughput sequencing for directed protein evolution.

Our last day began with the final plenary lecture from this year's Carski Award winner, Graham Hatfull, University of Pittsburgh. After amazing us with the vastness (estimated 10^{23} bacterial infections per second globally) and diversity (estimated 20-30 phage strains for each bacterial strain in existence) of the phage world, he described how getting students involved in authentic research of phage hunting and genome annotation at all levels has been a tremendous national success. Many of those involved in his brainchild, the HHMI SEA-PHAGES Program, were in the audience. This was followed by our traditional conference wrap-up to input from the participants on the meeting, and the "passing of the torch" (really strings of beads and a questionable hula shirt) to next year's Chair, Mary Mawn, SUNY Empire State College. We hope to see you (and others that you invite) at next year's conference at the DoubleTree by Hilton Boston North Shore in Danvers, MA on May 15-18, 2014.

21st Annual ASMCUE Highlights and Proceedings, DoubleTree by Hilton Boston North Shore, Danvers, MA

"NEXTGEN Microedu: Engage, Construct, Connect"

Conference Steering Committee
Mary Mawn, SUNY Empire State College, Laura Regassa, Georgia Southern University, Robyn Puffenbarger, Bridgewater College, and Ned Barden, MCPHS University

Local Organizing Committee
Gail Begley, Northeastern University and Naomi Wernick, University of Massachusetts, Lowell

Conference Statistics

There are 397 participants, compared to 395 in 2013. Of those registered, there are:

- 353 conference attendees and 44 exhibitors
- 281ASM Members and 72 nonmembers (among the faculty participants)
- 43% first-time attendees
- 27 international attendees representing 15 countries
- 126 conference attendees registered for the asm2014 field trip on Saturday
- 44 conference attendees registered for the asm2014 one-day pass on Sunday

This year's 21st annual meeting in Danvers, MA, "NEXTGen Microedu: Engage, Construct, Connect," provided us with multiple opportunities to explore scientific and pedagogical advances for the 21st century. We engaged with colleagues, constructed new understandings, and made connections between theory and practice. We hope that all attendees left feeling energized and brimming with new ideas, and that these conversations and interactions will continue beyond the "walls" of the conference.

Building on the conference theme, ASMCUE held several excellent plenary sessions on cutting-edge science and the latest research in science education:

- Katherine P. Lemon (The Forsyth Institute, Boston Children's Hospital, and Harvard Medical School) opened the conference with her presentation, "Picking for Progress: Mining Nostril Microbiota for New Insights into Pathobionts." Dr. Lemon's research on nasal microbiota highlighted the many molecular interactions that can occur between benign and pathogenic bacteria. Her work has implications for the development of new therapeutics to control infection.

- Juliette N. Rooney-Varga (University of Massachusetts-Lowell) presented her work during the presentation, "Bringing Role-Playing Exercises, Interactive Simulations, and Climate Change Science Together for Transformative STEM Education." Through the use of simulations, Dr. Rooney-Varga actively engaged audience members in a role-playing exercise where they served as "delegates" in UN climate negotiation. This experience highlighted how immersive environments can engage students in climate change discussions.

- Carl E. Wieman (Stanford University) led a timely and relevant presentation, "Taking a Scientific Approach to Science Education." Dr. Wieman summarized the research on how people learn and how this information can inform educators, and he challenged attendees to consider new ways to effectively teach and evaluate these approaches. This highlighted how educational environments need to respond to needs of the 21st century learner.

- In addition, two cutting-edge presentations were sponsored by the American Academy of Microbiology (AAM): "The Human Microbiome" by Curtis Huttenhower and "How Microbes Can Help Feed the World" by Gwyn Beattie. Both topics were very timely and relevant to microbiologists, students, and the public alike.

The plenary and AAM-sponsored sessions were complemented by concurrent pedagogy and scientific sessions, microbrew symposia, and poster presentations. As has been the case in previous years, these sessions were designed "by faculty, for faculty" to provide opportunities to share resources and approaches, to showcase one's work, to share best practices or a favorite activity, and to present one's scholarship in microbiology and biology education. To this end, 81% of concurrent presentations were submitted by the community. Session themes this year included assessment tools and techniques, broadening participation, course-integrated undergraduate research, distance learning, facilitating active learning, professional development, and teaching resources. In addition, poster presentations were organized by content and pedagogy themes, with abstracts being published in the Journal of Microbiology & Biology Education (v15:1).
In addition to scheduled presentations, there were multiple, informal ways to interact with colleagues. These included breakout groups based on the ASM Curriculum Guidelines, where colleagues reviewed learning objectives and drafted relevant assessment questions. There were opportunities to network with colleagues during receptions, the exhibitor showcase and poster presentations, and during breakfasts organized by themes. Additionally, attendees were asked to “dress for microbial success” by wearing items based on their school colors or institution type.

Finally, there was time to interact with colleagues during a field trip to the asm2014 opening keynote session in Boston. In addition, this year premiered the first joint interactive plenary session, “NextGen Microbiologist,” which was streamed live from Boston to Danvers. asm2014 presenters gave multiple “shout-outs” to remote ASMCUE attendees, who in turn asked questions and interacted with presenters through the use of social media. Related to technology, the Guidebook mobile app provided attendees with a convenient way to connect with each other and access conference information. Attendees created personal schedules, provided conference and session feedback, accessed Twitter feeds, and shared conference photos.

In closing, we thank all those who supported ASMCUE 2014, including ASM Education Department staff, Steering and Local Organizing Committee members, abstract and microbrew reviewers, Education Board representatives, microbrew facilitators and conference volunteers, exhibitors and sponsors, and presenters and attendees. Their efforts were much appreciated and greatly contributed towards the success of this year’s conference.

See you next year at the 22nd annual ASMCUE!