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GUEST EDITORIAL: Making Cinderella Shine Without Magic

By Vivian Incera, University of Texas at El Paso and COM Member



Vivian Incera

A friend of mine likes to say that when somebody tells her, “This is impossible,” she always responds, “Sorry, but ‘impossible’ is not in my dictionary, perhaps you mean ‘difficult’?” I think she has a point. That kind of attitude is particularly helpful when we have to deal with seemingly “impossible” tasks because most of them turn out to be just challenging. If we try hard, we can often figure out a way to deal with, and finally overcome them. Quite often though, we cannot overcome them alone. We need partners who become engaged and committed, and who are willing to work together for some common goal. That is what happened with our physics program at the University of Texas at El Paso (UTEP), and this is the story of how we proved that “impossible” is not, and should not be an acceptable word. Through engagement and caring, careful planning, and a lot of hard work, we managed to turn a Cinderella department into

an energized community of students and faculty.

Let me first introduce our university. UTEP is a doctoral/research-intensive university located on the border between the United States and Mexico. Our students live and study in one of the world’s largest binational metropolitan areas. Not surprisingly, more than 70% of our student population is Mexican-American. The National Science Foundation designated UTEP as a “Model Institution for Excellence” (one of only six in the country) in recognition of the University’s success in creating educational opportunities for non-traditional students. With a mission that focuses on the educational ideals of access, opportunity and excellence, UTEP is internationally known for creating exceptional academic opportunities for a largely first-generation student population, and for its innovative approaches to higher education. It is also ranked among the top three universities in the nation in educating Hispanics.

The Department of Physics at UTEP is a very diverse department with professors from four continents and several cultural backgrounds. At present, we have a total of 17 faculty members, 11 of whom are tenured or

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Cebe Receives Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring

by Mike Lucibella, APS Staff Science Writer

When Peggy Cebe shook hands with the president of the United States, it was the culmination of years of effort to help underserved students excel in science. She had just received the country’s highest award for setting up an enterprising program to help mentor hearing-impaired and deaf students in physics. From a young age, Cebe was always drawn to the sciences. She remembers when she was a kid digging up her neighbor’s driveway, looking for dinosaur bones.

“I knew I’d be a scientist when I was nine years old,” Cebe said. “I didn’t know what kind of scientist, but I knew I would be one.” It was while in high school that she found herself drawn to physics.

After high school, she attended Edinboro State College (now Edinboro University), a small state col-

lege in northwestern Pennsylvania. She graduated with a degree in physics and education, and started teaching high school at the Mercyhurst Preparatory School in Erie, Pennsylvania. After a few years of teaching, she decided she wanted to delve deeper into physics, and applied to Cornell for graduate school.

“Cornell admitting me to grad school at that time had a very significant impact on my career,” Cebe said. “They took a chance on me. I was out of college for seven years before I went to Cornell.”

Cebe was at Cornell at a pivotal time, when women were first starting to make significant inroads into the physical sciences. When she first arrived at the university there were only three women ahead of her

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Guest Editorial *continued from page 1*

tenure-track, and 6 who are full-time lecturers. From the 11 permanent faculty, 4 are female, and 5 are Hispanics.

At the beginning of the 2008-2009 academic year, UTEP's Department of Physics had 15 physics majors. The majority of them had no research experience and, worse, many had no idea what research was about or why it was important for them to pursue it as undergraduates. Moreover, the physics program had not been revised for many years. In addition to the 15 physics majors in the BS program, we had a concentration in applied physics that seldom attracted any students, and a BA in Physics that was even less popular than the Applied Physics concentration. Although several faculty members were research active and had grants, about half of the faculty was neither funded nor actively seeking external funding. Part of the physics faculty was unhappy with this situation, but the general consensus was that not much could be done to change things around.

In 2009, UTEP's upper administration decided to bring new leadership to the department. Things started to change pretty quickly after that because most of the faculty was just waiting for a catalyst to turn things around. The first thing we realized was that we had to do a better job with recruitment. The population of El Paso is about 800,000. The school system is not bad, and there are several early-college high schools that emphasize science and math. How could it be possible that in the entire city, only 15 kids were interested in a career in physics? Obviously, the problem was not the students or the schools; the problem was us.

We started brainstorming to determine what we could do to change this situation and we went on to reinvent the wheel. The first two things we did were to redesign our program brochures and to organize an open house event. These are pretty obvious things, but we did them with a twist. We invited high schools from the El Paso Independent School District to bring their students and physics teachers for a day of activities that we called "Real Physics LIVE." This event started with a show the department had been using as an outreach tool for at least two decades, the "Physics Circus." In the "Circus" we displayed the classic bed of nails act, hair-electrifying with a Van der Graaf generator, the standing-waves on a long spring, and other typical live demonstrations. We continued with a tour of the research laboratories, and a display of interactive physics demonstrations that encouraged visitors to engage with the demonstrations and hear explanations of the displayed phenomenon. The end of the tour was a student poster session. The twist to these activities was that they were all carried out and led by our undergraduate and graduate students. Though we did not have many undergraduates, the few we had were

happy to have been invited to be a part of this recruitment effort and they really did a great job.

Everybody was nervous about that first Physics Live event. We were first-timers and had no idea how many high school students and teachers would be willing to come, whether they would find the event interesting or boring, or whether the organized activities would work as planned. To our amazement, we had about 200 high school kids that first time. When they left the department that day, everybody – faculty, students, and staff – was exhausted, but many visitors said they did not know that physics could be so fun and interesting. Several took copies of the new and improved brochure we had prepared about our department.

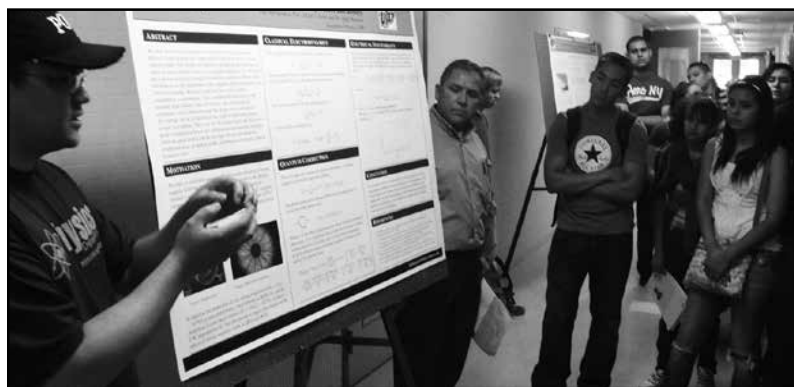
Over time, things started to change. The Physics Live event became a tradition that attracts over 250 students every year and has inspired our majors to come up with new ideas for creative demonstrations to spread the bug of physics among the newest generations.

What nobody anticipated when we planned that first event, was the effect it would have on our own students and faculty. The few undergraduates who were involved in research projects were really glad to be given the opportunity to present their results. Those with no research experience learned what their peers were doing and realized that research could be a cool thing to do. They understood that they, too, could be explaining their results to the visitors next year. The students who presented the labs to the visitors took great pride in explaining the experiments going on there and the role they had in those experiments.

The event also left a positive mark on the faculty, who worked very hard organizing everything in a short time. It gave them back the sense of sharing a common objective. When people passing by expressed admiration for all the activities going on in Physics that day, our faculty started to believe that if they worked together they had the power to create positive changes.

Sometimes it takes new eyes to see people's potential. When I arrived at UTEP, I knew no one there and was able to look at things from an unbiased perspective. What I saw in the faculty and students was potential; I brought a new set of eyes that could reflect back to them the belief that they had something im-

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As part of UTEP's Physics Live event, a physics student presents his research to attendees. UTEP PHYSICS DEPARTMENT

Not all Physicists Follow the Same Path

By Mel Sabella, Department Chair and Professor of Physics, Chicago State University

There are many types of physics students who attend a diverse set of institutions. We often assume a particular narrative for the path a student takes on their physics journey. This phenomenon occurs because there is a certain amount of homogeneity in our field. If you look at the fraction of physics undergraduate degrees when normalized for changes in the US population, it shows that women and students of color remain woefully underrepresented. Thus, their stories aren't often heard. However, teaching at a predominantly black college on the south side of Chicago has provided me the opportunity to hear and experience new stories; stories of students underrepresented in physics who have followed many different paths to their degrees, and have often faced incredible obstacles.

I find that talking to my students about life helps me understand the complexity and diversity of their experiences and helps me understand the support structures that need to be in place for my students. While some students find support in family and friends, others find it in their teachers or in the academic environment at their university. As educators it is important that we become aware of our students' stories and understand and provide the diverse support structures that can meet the needs of all our students. Hearing these stories can help the physics community understand how the culture of science should change in order to invite all students into the field and help them succeed.

Here are two examples of students following a path to a career in physics with stories that are very different from the story most of us have, Angel and Angela...

Angel grew up in a small rural community located in central Mexico. "Less than half of the adult population living in the place where I grew up had completed ninth grade—in fact, both of my parents were only able to complete sixth grade—and no one in the area had gone to college." About four years ago Angel and his family moved to Texas. When Angel moved to Texas, he did not speak English and at first, his teachers and peers treated him as if he had learning difficulties. "After my teachers and peers realized that I was trying my very best in school, they started encouraging me as well." He spent hours on his homework always with his Spanish-English dictionary, first translating his homework into Spanish, responding in Spanish, and then translating his work back into English. Because of his determination and diligence, Angel has consistently done well in school. He was ranked number one in his high school of 245 students and is the first Hispanic student in the history of his high school to be named Valedictorian. He has been a student of the month and has received awards in mathematics, physics, biology, English, social studies, foreign languages and speech. Angel's desire to study physics comes from his passion for knowing how the world works. He sees physics as a science that is involved in all aspects of life from the very small to the very large and his plan is to obtain his PhD in astrophysics and become a research scientist. Angel's par-

ents always supported his education and as we look at students who face obstacles in their academic careers, it is these support structures that often mean the difference. We also find that these support structures come in different forms. In the fall, Angel will be attending Rice University.

Angela is a physics major in the secondary education program at Chicago State University (CSU). For Angela, the university environment was the place where she received her support. Although her mother was a great inspiration to her because of what she accomplished, Angela struggled to balance responsibilities with her extended family and school throughout her academic career. After attending one of the premier high schools in Chicago she began her university studies in 1993 at CSU and is close to finishing her physics bachelors with a certification in science. Angela was part of the PhysTEC Program at Chicago State and is currently a National Science Foundation Robert Noyce Scholar.¹

For Angela, the path to her degree has not been easy. "I was just fighting with myself, fighting with my family ... didn't really have a support system at home - nowhere to do homework - no peace, no quiet. It was always necessary to help somebody else." Angela then moved from Chicago to Edwardsville to attend Southern Illinois University. But commitments from home brought her back to Chicago. "I transferred from CSU to go to Southern, in Edwardsville. I stayed there for two years but I had to come out twice for family problems - my mom was having some medical issues and we thought she was going to pass away. It really hurt because for my entire life I had to deal with so many medical problems and family issues and I got tired of there always being a reason why I couldn't get stuff done."

For Angela, who returned to CSU after Southern, the support system that is allowing her to finish her degree came from the university environment. It is this environment that provides her with a space away from the challenges she faces with family. "I've had at least three professors who have bent over backwards to help me, even providing a location where I can just work. Once I get here I know this environment is safe - I don't have to worry about what critters are crawling through the building - I don't have to worry about someone breaking in ... I'm safe. I don't have to deal with other things; this is my let it go and let's get to work."

Both these students have overcome very challenging obstacles that could have easily derailed their academic careers. Their lives have had very different narratives than many in physics. If the physics community is to increase its diversity, it is important to understand the diversity of the students we serve. Although the majority of my experiences talking to students involves students of color at CSU, it is very important that we don't over generalize. Not all students of color face the same obstacles. In addition, students in all types of environments face challenges in their lives. Listening to the stories of all our students is important and is a necessary step in providing focused support. ■



Angel Tovar Yanez



Angela Moore

Talking to my students about life helps me understand the complexity and diversity of their experiences and helps me understand the support structures that need to be in place.

¹ see www.ptec.org and <http://nsfnoyce.org/>



Dr. Peggy Cebe

Cebe Receives Presidential Award *continued from page 1*

in the science programs. Seven years later, when she graduated with her doctorate, there were 30 women studying the sciences.

Her years at Cornell were also the first time Cebe had firsthand experience working in a lab, and she wasn't sure if she would enjoy research at first. After receiving her PhD in 1984, she moved to California to work at NASA's Jet Propulsion Laboratory in the Los Angeles Area. There she worked on a variety of projects, developing new polymers and materials for an assortment of different space missions, including the Galileo Jupiter probe launched in 1989. Though she enjoyed her work there, there was something missing. She missed teaching and wanted to return to teaching students, so in 1988 she took a faculty position at MIT's materials science department, where she could teach again and take on mentees.

"It's teaching, but one on one," Cebe said. "When you're working with students in a lab, you're working one on one with them, and the experiences they're gaining actually teach them about how nature works." In 1995, she moved across town to accept a faculty position in Tufts University's physics department. While she was taking on students to mentor, things began to happen that would ultimately open her up to a whole new world of underserved students. She began to realize the words people were saying around her were losing their clarity.

"I started to lose my hearing at an early time in my career," Cebe said. "I have a personal connection here." She added that her sister is an audiologist at Gallaudet University, the nation's leading school for deaf and hearing-impaired students. Her sister's husband is hearing-impaired.

In 2002, Cebe traveled to Washington, DC to give a guest lecture at Gallaudet University. The response she received was tremendous, and the next year she partnered with Gallaudet to found the Scientific Boot Camp, a summer program to mentor deaf and hearing-impaired students in materials sciences.

Students from Gallaudet could travel to Massachusetts for the summer to intern in her lab at Tufts. When setting up her program, she found to her surprise, there were few existing science programs aimed at students with hearing disabilities. Over the last nine years, 34 students have come to her lab as part of the mentorship.

The students get firsthand experience working in a lab setting developing new materials. Since the beginning of the program, her students have helped develop polymer-based nanocomposites, and nanomaterials that can be used in fuel cells.

"The polymers we were looking at have the ability to be used at higher temperatures," Cebe said.

Together, Cebe and her hearing-impaired students have published five papers based on their work. She added that 69 other non-hearing impaired students have studied in her lab, helping to publish an additional eight papers.

"While the goal was not specifically to put out publications, the goal was to educate the students, publications were a nice side benefit," Cebe said.

Her work did not go unnoticed. In 2009 the university provost nominated her for the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, the nation's highest honor for mentoring. The National Science Foundation deliberated and in November of 2010 informed her that she had been selected as one of its winners for 2009. They would fly her down to Washington, DC to receive the award at the Eisenhower Executive Office Building next door to the White House and meet the president.

"We didn't know for sure that we would get to meet him because his schedule is so busy, but it's something we hoped for," Cebe said. "I think everyone was in shock at the thrill of getting to meet the president, who has been a big supporter of STEM disciplines since he became president."

Despite the accolades, Cebe is still dedicated to her research. At this year's March meeting she presented her research into using a synthetic polymer inspired by spider silk to create hollow nano-sized nodules that could be used to deliver drugs. Other research at her lab ranges from investigations of the properties of semi-crystalline solids to the silk of silkworms.

"I love it, it's my dream job," Cebe said. "I can't believe someone pays me to do this every day." ■



Dr. Peggy Cebe with Dr. Subra Suresh, Director of the National Science Foundation (shown at left) and Dr. John Holdren, Science Adviser to President Obama. Credit: National Science Foundation.

Do you know a female physicist who deserves recognition for her contributions?

Contact women@aps.org!

APS/AAPT Workshops Address Diversity Issues

By Bushraa Khatib, APS Bridge Program Coordinator

APS and the American Association of Physics Teachers (AAPT) jointly held back-to-back conferences at the American Center for Physics that highlighted the importance of promoting diversity in physics education. The Physics Department Chairs Conference and the Building a Thriving Undergraduate Physics Program Workshop, held June 8-12, were designed to bring physics department chairs and faculty up-to-date on trends in physics research and education, and address building thriving physics programs with sustainable, healthy physics enrollments. The Chairs Conference featured a panel session on diversity issues, and the Thriving Physics Program workshop had impressive involvement of minority-serving institutions.

“The biennial Physics Department Chairs Conference, co-sponsored by AAPT and APS, had over 120 people registered, making this one of the largest, if not the largest, Chairs Conference,” said Bob Hilborn, AAPT Associate Executive Officer and a key organizer of both conferences.

The Chairs Conference featured an insightful panel on “Developing an Inclusive Diversity Climate,” moderated by University of Texas at El Paso Physics Department Chair Vivian Incera, in which panelists shared their experiences and advice on creating a welcoming climate.

Laird Kramer gave an overview of Florida International University, a Hispanic-serving research university in Miami ranked number one in the nation in awarding bachelor’s and master’s degrees to Hispanic students. He presented workshop participants with the following scenario: today, one in three new entrants to the workforce are Hispanic or Latino; this number is expected to rise to one in two entrants by 2025. Kramer described the situation as a unique challenge or opportunity, and a reason to make sure that educational practices support all learners. He emphasized that a diverse workforce equates to larger recruitment and experience pools.

Kevin Pitts, University of Illinois at Urbana-Champaign, offered observations from a personal perspective. “As a white male, I will never know what it’s like to be an underrepresented minority,” he said. He also noted that a lot of people are simply not interested in diversity. “They are not necessarily openly hostile, but they are not interested in doing anything either,” he said. Roy Clarke, University of Michigan, discussed good practices, also based on personal experience. He suggested choosing program staff with care.

Jesus Pando, DePaul University, pointed to the lack of exposure to science-like activities, lack of college life awareness, and a “digital divide” that students in underperforming schools frequently experience. Wouter Deconinck, College of William and Mary, addressed gender and sexual diversity issues in physics. He mentioned little things that people can do, such as using inclusive language (e.g. using the term “partner”

instead of “wife”), in order to create a welcoming environment for all.

As the Chairs Conference wound down to a close on Sunday, the workshop on Building a Thriving Undergraduate Physics Program, which focused on the challenge of ensuring sustainable, healthy physics enrollments and thriving physics programs in times of budgetary crisis, was just beginning. Representatives from fifty-five institutions attended the sold-out workshop, which was sponsored by APS, AAPT, the Physics Teacher Education Coalition, and the National Science Foundation.

David Garrison, Associate Professor and Chair of Physics at the University of Houston-Clear Lake, a Hispanic-serving Institution in the upper Gulf Coast of Texas, attended both conferences. “I found this a very valuable experience which occurred at just the right time for our program. We recently started an undergraduate physics program and are in the process of adding lower-level courses to our university so the advice gained on how to better design introductory courses was very useful,” he said.

The workshop had an impressive turnout of minority-serving institutions (MSIs). A total of twenty MSIs including Historically Black Colleges and Universities (HBCUs), Hispanic-serving Institutions, and Predominantly Black Institutions attended. “The issues that most physics departments are facing are usually magnified at minority-serving institutions,” said Theodore Hodapp, APS Director of Education and Diversity, and a conference co-organizer. For example, if the recently enacted standards closing undergraduate physics programs in Texas were applied throughout the country, all public HBCU physics programs would be closed.

“Many physics departments are threatened with extinction and we are glad to have APS and AAPT facilitate discussions on building thriving physics programs,” said Peter Muhoro, APS Bridge Program Manager and one of the conference organizers. ■



Antonio Martinez from the University of Puerto Rico, Rio Piedras contributes to a discussion during the workshop.

For info, links, resources and case studies of thriving programs, visit aps.org/link/recruitingmajors

For more information on the conferences, visit:
aapt.org/Conferences/deptchairsconf.cfm &
www.ptec.org/conferences/enrollment/

APS Announces the 2012/2013 Minority Scholars

The APS Committee on Minorities is happy to announce that 39 Minority Scholarships were awarded this year – 18 renewals and 21 new recipients. The goal of this minority scholarship is to increase the number of under-represented minorities obtaining degrees in physics. It provides funding and mentoring to minority physics students to enhance their education and help them prepare for success in various careers.

New Recipients



Andrew Peterson



Karla Guardado



Jorge Chavez-Saab



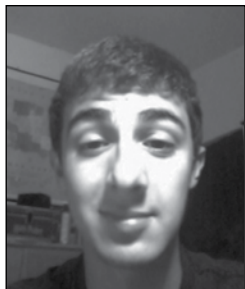
Aria Hamann



Alejandro Diaz



Anthony Lutz



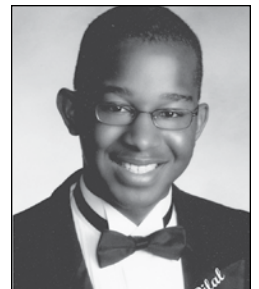
Ricardo Garcia



Matthew Acosta



Marianna Agudelo



Bilal Jones



Angel Tovar Yanez



Sebastian Gomez



Stephanie Carnell



Maya Carter



Calib Lanier



Jamelle Watson-Daniels



Reece Rivera

Additional new recipients (not pictured) include:

*Josue Lopez
Sergio Mundo
Catherine Saladrigas
Odessa Winter*

Renewals



Stephanie Lona



Daniel Bulhosa-Solorzano



Haris Durrani



Ryan O'Donnell



Victor Rodriguez



Lucas Orona



Michael Medina



Marcus Levine



Sabrina Rosa

Additional recipients (not pictured) include:
 Michael Brannan
 Daniel Contreras
 Carlos Del-Castillo-Negrete
 Jason Chaves
 Aaron Sharpe
 Natalia Guerrero
 Xavier Hubbard
 Mario Morales
 Ashli Nieves

SCHOLARSHIPS FOR MINORITY PHYSICS MAJORS

AWARDS

- \$2,000–\$3,000 towards tuition, room, board, or educational materials
- Recipients matched with two physicist mentors

ELIGIBILITY

- African-American, Hispanic-American or Native American U.S. citizens or legal permanent residents
- Physics majors or students committed to majoring in physics
- High school seniors, college freshmen or sophomores applying for the following academic year



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FEBRUARY 1, 2013

www.minoritiesinphysics.org

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The award recognizes distinguished minority physicists who have made significant contributions to physics research. Recipients are invited to visit and lecture at institutions where the impact on minority students is significant.

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For the next 6 months, all donations will be matched one-to-one by APS Minority Speaker Program funds!

To learn more about the Bouchet Award, visit: <http://www.aps.org/programs/honors/awards/bouchet.cfm>

*Student
Testimonials:*

“Because of my [Mount Holyoke] research and the connections I have made because of it, I now know that there are many, equally appealing career paths out there, and that with my educational research background I can follow any of them and be just as successful.”
— Amelia Plunk

“[My experience at Mount Holyoke] helped me develop a true passion for scientific exploration, which ultimately led me to pursue a PhD... The mentorship and support from the Mount Holyoke physics department was a major driving force in helping me to be successful in my career as a scientist.”
— Moureen Kemei

Mount Holyoke Physics Department Receives Award for Improving Undergraduate Physics Education

by Deanna Ratnikova, APS Women & Education Programs Administrator

Mount Holyoke College, a highly selective, non-denominational, residential, research liberal arts college for women, is among the recipients from the first selection cycle of the American Physical Society Committee on Education’s (COE) new Award for Improving Undergraduate Physics Education. The award recognizes physics departments and/or undergraduate-serving programs in physics that support best practices in education at the undergraduate level.

About the Department

The Mount Holyoke physics department is an active, friendly, reform-minded community of female undergraduates and dedicated faculty and staff. The department averages seven majors per year, more than three times the national median for bachelor’s-degree granting institutions. All of the physics majors are women, many of whom stay in STEM fields, whether they continue on to a PhD, teach at the K-12 level, or work in industry.

The department stands out in its commitment to outstanding teaching, in the classroom and in undergraduate research. They have three active experimental labs on campus and a theory group, in which undergraduate physics students engage in cutting edge, publishable research. Both students and faculty have won awards for their research endeavors, including Goldwater Scholarships, Fulbrights, Gates, Churchill, an Apker Award, NSF and DOE Graduate Fellowships, NSF CAREER awards, and PECASE awards.

Emphasis on Teaching and Research

Mount Holyoke College has a strong culture of integrating teaching and research, and as physics faculty member Janice Hudgings notes, “The physics department views undergraduate research as central to our academic curriculum.” Hudgings, along with physics faculty member Kathy Aidala are recipients of NSF CAREER awards which focus on the integration of cutting edge research with teaching.

In 2012, 14 members of the Mount Holyoke faculty were named by the Princeton Review to a list of the nation’s best 300 undergraduate professors—the greatest number from any one U.S. college or university. One could argue that the emphasis on both education and scholarship is the top reason Mount Holyoke attracts the best professors in the country. According to Aidala, a major factor in deciding to join the Mount Holyoke Physics Department was “the number of scientists who perform high quality research, winning grants and awards, demonstrating that it is possible to maintain scholarship while focusing on education.”

This emphasis is also a primary reason the physics department attracts so many students to its program. Student Katie Greenberg recalled that “the combination of [teaching and research] is what really makes the department special” and was a major factor in her decision to pursue physics at Mount Holyoke. Katie

conducted research in Hudgings’ lab her first summer and was hooked. She worked in the lab for the remainder of her time at Mount Holyoke and because of how much she enjoyed the experience she decided to attend graduate school studying applied physics.

Innovative Classrooms

Mount Holyoke’s Physics Department is deeply committed to classroom teaching, using best practices as determined by physics education research, including peer instruction with concept questions and preclass questions, while also developing new general interest science courses.

Hudgings uses preclass questions, combined with in-class discussion of the questions in all of her courses, and “it transforms the class from a one-sided lecture into a two-way discussion.” This approach is another way the physics department is attracting students to its program. Student Alyssa McKenna recalls that the strong camaraderie in her introductory physics course convinced her to switch her major to physics. “The professors and fellow majors worked hard to welcome any and all students studying physics and to encourage collaboration and discussion about homework sets, concepts, and lectures.”

Concept questions and peer mentoring are another success factor for the department’s classrooms. When asked about the effectiveness of concept questions, Aidala notes, “[T he students] immediately begin to discuss as soon as I ask them to, and the energy level of the classroom goes up. Students who answered the question wrong after they talked to their neighbors and don’t fully understand the explanation will ask questions about why their reasoning didn’t work. Others will volunteer the way they thought about it, if different than the first student’s explanation. The students are clearly more engaged.”

The department has made significant changes to curriculum in order to focus on emerging fields and support student career interests. Aidala teaches a new general science course—Science in the Media—which includes guests like an editor of *Science* magazine and a producer of NOVA. Student questionnaires from the course show that non-science students change their perceptions of scientists over the semester. As one student noted, “Knowing science will help me earn a living.”

Moving Forward

The department is in a period of growth, currently experiencing a 38% jump in introductory enrollments and increasing numbers of majors. An early count of majors indicates 9 graduates for 2012 and 11 for 2013. The emphasis on quality teaching and research and the increasing focus on green energy solutions and general interest courses positions the department to continue its track record of attracting female undergraduates and dedicated faculty and staff. ■

Conferences on Undergraduate Women in Physics: A Student's Perspective

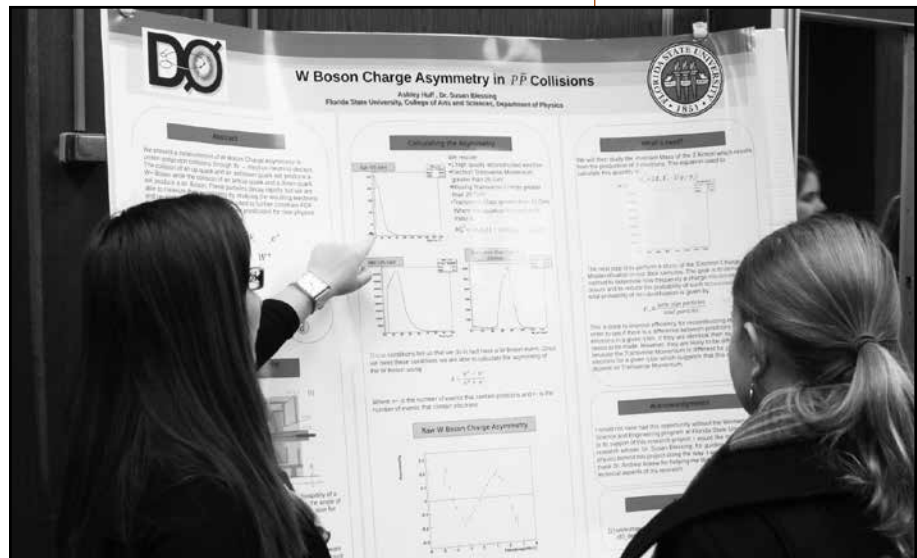
By Ashley Huff, Florida State University

I am a physics major at Florida State University and will be starting my senior year in the fall. I have been working with Professor Susan Blessing for the past year and a half to measure the electron asymmetry from W boson decays using data from the D0 experiment at the Fermilab Tevatron Collider. In Summer 2011, I participated in the Research Experience for Undergraduates (REU) program at the National High Magnetic Field Laboratory in Tallahassee and decided that condensed matter physics isn't for me.

The Southeastern Conference for Undergraduate Women in Physics was the first conference I have attended. The conference ran from January 12–15, 2012, and included lab tours, student talks, and panel discussions with various groups of women in the field of physics. I left the conference with a whole new outlook on my role in the physics community. I had been a physics major for two and a half years by that point, and I had been conducting my own research for a year, but it wasn't until I spent those four days with a really great group of women that I truly felt like I belonged in the world of physics. The Southeastern section of the conference got a special treat in that we had the chance to visit Oak Ridge National Laboratory. I must have sent a picture of the Jaguar supercomputer to ten of my friends because I was so excited about how cool it is.

I really decided to go to this conference because I was going to have to figure out what to do with my life with just an undergraduate degree in physics. I was quite sure that there was no way I would get into graduate school. I will say that there were indeed many women there who showed me what I could do without graduate school (teaching, industry jobs, etc.), but it was actually all the women there who did go to graduate school who showed me that I could do that as well. I was stuck in this mindset that if I wanted to go far with physics that it just all needed to come to me very easily. It was the reassurance of total strangers that it honestly is difficult for everyone that convinced me I was wrong. I never understood why my research advisor seemed to have so much faith in me, but now I realize I'm not as bad off as I thought I was. I felt quite empowered by the end of the conference. Through the panel discussions I was not only given the encouragement to continue on in the field, but I was also told about many tools and techniques that would help me get through graduate school.

The questions that my fellow physicists asked during the panel discussions were the most interesting part of the panel discussions. The women at this conference were all from different universities, but we weren't all that different, and many of the women had the same questions as I did. During the panel discussions we learned how to apply for graduate school and how to survive it. We also got a clearer picture of what we could do in industry with a physics degree. But



mostly, we all had the same desire to spread awareness of science to a younger generation of girls. The various outreach programs that are being conducted in the Southeast gave me some great ideas for my own outreach. Since the conference, I have spoken to three high school classes in Miami, Florida through Skype about my research. I hope that alerting these kids about the cutting edge work being done gave them the push they needed to follow their scientific dreams. I also spent time in a fourth grade class in Tallahassee, Florida answering questions like “How long would it take to get to Pluto?” and “Is there life on other planets?” After talking with many of the women at the conference, I truly realized if I wanted the word about science to spread, I would have to get out there.

The poster session was the best part of the conference for me. I had presented my research once before, and I've presented it twice since then. It gets a little bit easier every time. After about four or five groups of people had come up to me, I realized that I really loved teaching people about what I've discovered. I had been questioning whether high energy physics (HEP) is really the right path for me but that is the moment I realized it is. During the poster session, Dr. Ayana Arce from Duke University stopped by my poster. She let me present my work and asked me a few questions at the end. Then she explained to me that she was a high energy physicist and told me about the REU program at Duke. The students who were accepted to the HEP part of the program would get to spend five weeks working at CERN. I had a list of about ten REUs that I wanted to apply for and somehow I never even looked at Duke's program. Working at CERN has been my ultimate dream from the get-go, so I added it to the list. In my application I wrote about this conference and how the experiences I had changed my perspective entirely. And now I am at CERN this summer! ■

Ashley Huff (left) presents her research to another attendee at the Southeastern Conference for Undergraduate Women in Physics.

See announcement on page 13 for info on the 2013 conferences.

Fostering Collaboration and Advancement: APS Professional Skills Development for Women Physicists

by Kiyomi D Deards, Assistant Professor, University of Nebraska-Lincoln



Kiyomi D Deards

In late March it was my privilege and pleasure to attend the American Physical Society Professional Skills Development Workshops for Women Physicists. The workshop was sponsored by the National Science Foundation, and scholarships were available to offset the cost of attendance. Throughout the workshop we were challenged to improve our skills in negotiation, communication, and leadership, but more importantly, we forged relationships that will benefit each other for years to come.

Attendees of the workshop came from a variety of professional backgrounds ranging from grant-funded freelancers to post-doctoral researchers or associates at major laboratories, and educators from community colleges and universities, and in my case, a tenure-track physics librarian with a heavy science background. This diversity of viewpoints was one of the greatest strengths of the workshops. None of the participants knew each other before the workshops began. By bringing together individuals who were not intimately familiar with each other, participants were able to be more open when sharing their strengths, weaknesses, advice, and problems without fear of retribution. In addition, when problems were shared, it was often the individuals who were on a different career path who were able to examine the facts and provide unique and effective solutions.

After a light breakfast and some opening remarks, attendees were split into two groups, post-docs in one, and early-career and pre-tenure scientists in the other. I was intrigued to see that the first session, *Strong Women / Strategic Performance*, would be led by Nancy Houfek and Lee Warren, as I had previously participated in one of their workshops through the NSF ADVANCE program at the University of Nebraska-Lincoln. Nancy and Lee were effective and gracious workshop leaders; what I had not anticipated was the exponential increase in the impact of the workshop due to its neutral setting. As the Head of Voice and Speech for the American Repertory Theater at Harvard University, Nancy Houfek is a master of physical and verbal presentation and communication. Her practical advice and solid presence set us at ease and made it clear that all of us were capable of becoming thoughtful and effective communicators and leaders. Lee Warren, Director Emerita of Professional Pedagogy for the Kennedy School of Government at Harvard University, used her wealth of experience to demonstrate the need for strategic planning of negotiations. The workbook provided with this workshop included detailed exercises designed to mentally prepare participants for important meetings, and prepare the voice and body so that our physicality did not detract from the presentation of our work.

One of my favorite moments was when Nancy and Lee talked about being “pushy with grace” or “relentlessly pleasant.” Their main idea was that we never have control over how others will act, but we

can be firmly and relentlessly cordial in how we react, allowing us to stand our ground while being pleasant and respectful of others. This technique is handy not only when others are being unpleasant, but also when we need to say no to others. Other important takeaways included: be present and take up space, ask for what you need and for what you want, take care of yourself, and have allies. The final piece of advice we were given was that we should always have a confidant outside of our work setting who can be trusted to keep what we share private and tell us truthfully if they think we are right or wrong.

During the lunch hour there was a brief presentation on the status of women in physics and STEM as a whole. One of the most surprising statistics was that about 50% of K-12 students who take physics are women. It drops to ~20% at the undergraduate level and is lowest at the full professor level, with women making up ~8% of fully promoted professors. Women do slightly better at the Assistant Professor level, making up ~22% of the work force, but given the number of bachelors degrees and full professors, many participants speculated that women who pursued physics at the college and university level were getting stuck at the assistant professor level and not advancing to the associate and full professor levels. In addition to the workshops I attended, APS has created Women In Physics.org (www.WomenInPhysics.org) to educate people about gender issues in physics by providing information on current statistics, opportunities, and resources about women in physics.

The afternoon session focused on negotiating skills and was led by Ernestine Taylor, Consultant in Human Resources, and Adjunct Faculty/Certified coach, at the Center for Creative Leadership, and Jane Tucker, President of Jane W. Tucker & Associates. This session’s content centered on the concepts of staying focused on what’s most important to us and packaging our arguments so that they show the value of our proposal to those with whom we are negotiating. Part of staying focused is looking and speaking professionally, wearing clothes that do not need to be adjusted, eliminating negative physical movements such as clutching our hands, and speaking with strong positive statements. When instructors write learning outcomes they do not state “The student may,” they state “The student will.” The change of a single word takes the statement from sounding unsure and timid to confident and powerful. Our discussion about the need to find common ground resonated with me; common ground may be personal or work-related, but the importance of forging a personal connection before asking for what we need stood out as an imperative first step in successful negotiation. We also talked about asking for help when we need it, which can be extremely difficult to do. Sometimes we do not realize we need help, or by the time we realize that we

Throughout the workshop we were challenged to improve our skills in negotiation, communication, and leadership, but more importantly, we forged relationships that will benefit each other for years to come.

need help we can feel it is too late to ask for it. Giving ourselves permission not to be perfect and to ask others for the same type of help we often provide should be simple; sadly, it is not. The desire to always be the helper and not the helpee is part of why so many women struggle with overcommitment, which leads to the concept of walking away from a situation. Stepping back for a time may be necessary to gain a clear perspective, and sometimes the best thing to do is walk away. The ability to let something go for a day, or forever, takes practice, which is where support networks can help provide the perspective that we lack. In reality the world will not end if you take a couple of days to think over a situation that is troubling you, but we feel this pressure to respond immediately, as if taking the time to be thoughtful in our consideration is a sign

of weakness. The message I took from this session was: don't be afraid to be strong and show it, take time to be thoughtful, and no one succeeds alone.

The day concluded with a networking reception for attendees, facilitators, and other interested parties. The opening breakfast and evening reception were a study in contrast. Earlier in the day people were quiet and polite, with only a gentle murmur of conversation moving throughout the room. By the evening people were seeking each other out to ask for advice, share a resource or opportunity for research, pass along job leads, and exchange information so that they could collaborate in the future. Voices were louder, faces were more animated, and in the end everyone left with more future collaborators, mentors, and friends than we arrived with. ■

New Program Recognizes Women Physicists

By Deanna Ratnikova, APS Women & Education Programs Administrator

The APS Committee on the Status of Women in Physics (CSWP) began a program to highlight exceptional female physicists in January 2012. Each month a new woman is the face of www.WomenInPhysics.org and a short bio is featured on the website showcasing the amazing talents of female physicists.

The CSWP Woman Physicist of the Month award recognizes female physicists who have positively impacted other individuals' lives and careers. The award is not restricted to just research physicists, but open to students, teachers or any woman doing physics-related work. Nominations are accepting on a rolling basis.

To nominate someone, the name, institution/facility/company, and email of both the nominee and nominator should be emailed to women@aps.org. The nominee's CV and a nomination statement up to three paragraphs should also be included in the email as attachments.

The first physicists to receive the recognition include (in order of feature):



Helen Caines
Yale University



Elizabeth Simmons
Michigan State University



Sherry Yennello
Texas A&M University



Kathleen Stebe
University of Pennsylvania



Christine Natrass
University of Tennessee at Knoxville



Ana Maria Rey
JILA and University of Colorado at Boulder



Ann Heinson
University of California, Riverside



Marianna Safronova
University of Delaware


**"I am delighted to have been selected as one of these women of the month role models. I have spent my career as a researcher and not as a professor, so this shows young women there is more than one route to being able to do physics research."
— Ann Heinson**

Announcements

2012 PhysCon

2012 Quadrennial Physics Congress
Hosted by Sigma Pi Sigma, the physics honor society
NOVEMBER 8-10 • ORLANDO, FL

PhysCon



Join hundreds of the brightest minds in the physical sciences!

Workshops on diversity in the profession and the role of physicists in society.

SPEAKERS INCLUDE:
Jocelyn Bell Burnell • Freeman Dyson • John Mather
John Grunsfeld • John Johnson • Mercedes Richards

Details on speakers, poster sessions, NASA tours, workshops, art contest & more at:
www.spscongress.org

Connecting WORLDS 2012
through science & service

Once every four years Sigma Pi Sigma, the physics honor society, hosts the Quadrennial Physics Congress (PhysCon—a unique meeting that brings together undergraduate and graduate students, practicing physicists, and physics alumni for a conference packed with cutting edge science and reflection. The 2012 PhysCon combines round-table discussions, distinguished speakers, and tours of NASA's Kennedy Space Center. It will be held in Orlando, FL, November 8-10, 2012.

The 2012 PhysCon will feature speakers like John Mather, Freeman Dyson, Jocelyn Bell-Burnell, and many other renowned physicists. Attendees will discuss such topics as Scientists & Science Policy, Communicating with the Public, Students & Careers. In addition to workshops and plenary lectures, PhysCon features a forum for presenting research and art, as well as networking opportunities like *Breakfast with the Scientists* and an Exhibit Hall.

To learn more about PhysCon, visit www.spscongress.org. Early Registration Deadline is September 17 (final registration deadline is October 15)! ■

2013 Professional Skills Development Workshops for Women Physicists



With support from the National Science Foundation, APS will continue to offer Professional Skills Development Workshops for Women Physicists one day prior to the APS March and April Meetings. In 2013, the workshops will be offered March 17 in Baltimore, MD and April 12 in Denver, CO.

The all-day workshops are conducted by professional facilitators. Participants separate into two groups (postdocs/students and faculty/scientists) for the day's activities to allow them to interact with each

other and with the facilitators. Participants discuss a variety of case studies and are encouraged to bring their own experiences for discussion as well.

March 17th Workshop in Baltimore is open to female postdoctoral associates and early-career women physicists. (Senior-level graduate students may apply, but priority is given to postdoctoral associates.) The workshop will focus on strengthening communications skills of the participants and negotiating strategies for career advancement.

April 12th Workshop in Denver is open to female postdoctoral associates and senior-level women physicists. (Senior-level graduate students may also apply, but priority is given to postdoctoral associates.) Postdocs will learn communication and negotiation skills, while senior-level physicists will learn leadership skills. This is the first time the leadership workshop has been offered, so any previous senior-level attendees may apply again to take advantage of this new offering.

The online application is at www.WomenInPhysics.org. The deadlines to apply are December 7, 2012 (for Baltimore) & January 11, 2013 (for Denver). ■

Professional Skills Development Workshops

FOR WOMEN PHYSICISTS



WHEN:
March 17, 2013 - Baltimore, MD
April 12, 2013 - Denver, CO

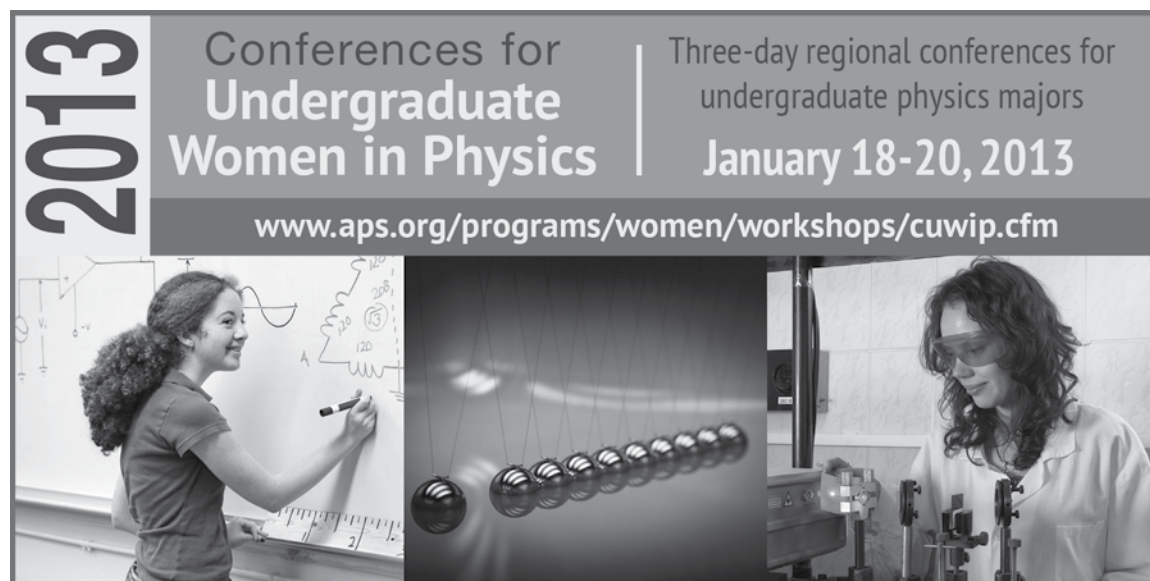
DEADLINES TO APPLY:
December 7, 2012 (for Baltimore)
January 11, 2013 (for Denver)

See <http://www.aps.org/programs/women/workshops/skills/>

Announcements

Conferences for Undergraduate Women in Physics

The 2013 Conferences for Undergraduate Women in Physics will be held January 18-20, 2013. The locations include: California Institute of Technology, Colorado School of Mines, Cornell University, University of Central Florida, University of Illinois at Urbana-Champaign, and University of Texas at Austin. Students must apply by November 15, 2012 for consideration. More info is at www.WomenInPhysics.org. ■



Remembering Dr. Sallie Ann Watkins

Longtime education advocate Dr. Sallie Ann Watkins, of Pueblo West, Colo., died Dec. 21, 2011. Watkins was a professor at the University of Southern Colorado (now Colorado State University-Pueblo), retiring as dean of the College of Science and Mathematics in 1989. After her retirement, she helped to establish a scholarship for physics majors at the university. Watkins received the Outstanding Service to the University Award in 2000. Watkins graduated from Notre Dame College in 1946 and became a chemistry teacher at Notre Dame Academy in Cleveland, Ohio. She earned her doctorate in physics from Catholic University in 1958.

In 2001, she received the Robert A. Milliken Award from the American Association of Physics Teachers for her lifetime contribution to teaching. She also served on the Governor's Science and Technology Advisory Council, the Governor's Math, Science, and Technology Commission, and the Colorado Teacher's Award Committee. Watkins was a lifelong advocate promoting the need to attract and keep women and minorities in the sciences. She directly oversaw the Pueblo Project, a program designed to improve science teaching and curriculum in Pueblo's District 60 schools. ■

Remembering Dr. Susan Niebur

Susan Niebur passed away in February 2012. She recently spent five years at NASA Headquarters. Her major role was as Discovery Program Scientist in the Planetary Science Division. She co-founded the first-ever Early Career Workshops for Planetary Scientists, and led the first three workshops, at annual meetings of the American Astronomical Society's Division for Planetary Scientists (2004) and the Lunar and Planetary Science Conference (2004 and 2005). Before coming to NASA, she founded the American Physical Society's Forum on Graduate Student Affairs and served as its first President; founded and led the first peer mentoring group at Washington University; co-created and administered the first National Doctoral Program Survey; and served as President, Vice President, Regional Coordinator, and first Alumni Affairs Coordinator for the National Association of Graduate-Professional Students while completing her Ph.D. in Physics at Washington University McDonnell Center for Space Sciences. ■

Please Update Your Address

Dear Gazette Reader,

The APS Roster of Women and Minorities is also used as the Gazette mailing list.

If your address has changed and you wish to continue receiving the Gazette, please visit www.aps.org/programs/roster/enroll.cfm to re-register and select The Gazette Mailing List as your Roster group.

Questions? Contact Arlene Modeste Knowles at roster@aps.org.

Keep reading the Gazette!


Announcements

Women & Minority Speakers List

Need a speaker? Consider consulting the American Physical Society's Speakers List, an online list of physicists who are willing to give colloquium or seminar talks to various audiences. This list serves as a wonderful resource for colleges, universities, and general audiences. It has been especially useful for colloquium chairs and for those taking advantage of the Travel Grant Program for Women and Minority Speakers. The online list is searchable by state, field of physics, or speakers' last names.

To search the list to find a woman speaker, go to: www.aps.org/programs/women/speakers/

To search the list to find a minority speaker, go to: www.aps.org/programs/minorities/speakers/




Childcare Grants Available

What: Small grants of up to \$400

Who is eligible: parents/caregivers who plan to attend the APS March or April meeting with their small children or who incur extra costs to bring them along or leave them at home. Preference is given to early career applicants.

Deadline:
January 4, 2013 (for March)
February 1, 2013 (for April)



Details at www.womeninphysics.org

JUMP START *Your Search for a great science job or hire!*



The American Physical Society (APS) Job Center is the best niche employment site for physics and engineering jobs, with hundreds of jobs viewed by thousands of the finest scientists each month.

- Physics Faculty
- Postdoctoral Fellowship
- National Lab Research
- Science Program Administration
- High School Physics Teacher
- Biomedical Engineering
- Computational Astrophysics
- Accelerator Physics

The APS Job Center is part of the *Physics Today* Career Network, a niche job board network operated for the physical science, engineering, and computing disciplines. PTCN is comprised of the *Physics Today* print magazine classifieds and online job board, as well as the online job sites of the American Association of Physics Teachers (AAPT), American Physical Society (APS), AVS: Science and Technology of Materials, Interfaces, and Processing, IEEE Computer Society, and the Society of Physics Students and Sigma Pi Sigma (SPS).

<http://careers.aps.org>



Guest Editorial *continued from page 2*

portant to contribute. I saw it then, and I still see the potential in this department. The identification of this department with UTEP's mission permeates the majority of the current faculty, including the lecturers. We have a lot of "champions" without whom things cannot progress. Some people are outstanding in outreach, others are extraordinary teachers, and others excel as researchers and research mentors. While we all have to perform as teachers, researchers and mentors, it is this diversity of strengths that makes us stronger and has allowed us to accomplish so much in such a short time.

Appreciating and recognizing the things people do well is an important element of building a sense of community and engaging the faculty to work for the common good. The sense of community is also contagious. Everybody wants to belong to a group whose members are enthusiastic and passionate about what they do. Certainly, our students must have seen that in us since our numbers have increased dramatically during the last three years. This past semester, there were 80 physics majors enrolled in our B.S. program. Now we have new majors signing up almost every week.

We did many other things to revamp our enrollments and to improve our program. Since we were not sure which of these initiatives were going to work, we tried them all. Our efforts included:

- Revising the program to make it stronger and easy to combine with various concentrations.
- Placing the best teachers in key introductory courses
- Strengthening research and research mentoring
- Paying a lot of attention to quality advising and mentoring
- Emphasizing undergraduate student research
- Implementing a comprehensive plan of outreach activities with significant participation of UTEP's SPS chapter
- Recognizing student excellence through departmental awards
- Organizing departmental get-togethers to encourage interactions between students, faculty and staff in a less formal setting.
- Designating a special room for the majors to gather, study, and do research

The measures we took to revamp the physics program at UTEP were guided by our common sense. Little did we know that most of the initiatives we were implementing were similar to those implemented by other programs experiencing comparable problems. In three years we went from 15 to 80 majors; from 33% to 96% of faculty mentoring student research; from a graduate program that was less than 10% female to 52% currently; and from 50% to 82% externally-funded faculty. This year we graduated 7 undergraduates, up from the 4 or less that were graduating in the last 5 years. Several more are in the pipeline for next year.

Overall, our students have responded remarkably to all of our efforts. I have never seen kids so passionate about physics and so engaged in spreading

the word about physics as a great career choice. They constantly volunteer for the Physics Circus; they go to the Insights Science museum of El Paso to put together physics demonstrations for visitors; and they volunteer to tutor other majors taking physics classes. We sent an all-female team to the USA Science & Engineering Festival in Washington, DC this Spring. The exhibit they developed was on the "Physics of Jewelry" and it attracted people of all ages and genders. Our young women enjoyed sharing their passion for physics and how it can be a great career option for women.

Since over 70% of our physics majors are Hispanic, it is obvious that the implications of the positive changes taking place in our program go beyond our department, and even our university. We have the opportunity to make a difference in the number of Hispanic students obtaining a BS in physics on a national level. Many of these students continue toward master's or doctorate degrees. We are working to increase options for them through the development of bridge programs with top research universities.

Starting this year, we will implement new initiatives. We plan to create a freshman seminar where students who are not yet taking any physics courses can learn about career options, our latest research results, what research is being done by our juniors and seniors, etc. We plan to review the way we teach introductory physics with the goal of promoting a more active-learning style, which has been proven by physics education research to be much more effective. These measures should strengthen our retention rates.

Although we are happy with our results, we are aware that their sustainability depends on our continued commitment and work. We must maintain a humble attitude of constant assessment and self-evaluation.

The main message to take away from our experience is that things can be turned around completely. If we could do it, others can do it too. If I had to summarize the key to our transformation with two words, I would simply say engaging and caring. Engaging faculty, staff, and students in a shared project motivated us to work together toward a common goal. Caring about the students, the department and the university inspired and energized us to put in the work to overcome a seemingly "impossible" task. As a result, our department is not a Cinderella anymore; it learned how to shine on its own. No magic here, just commitment and lot of hard work. ■

Dr. Vivian Incera is professor and chair of the department of physics at the University of Texas at El Paso (UTEP). She earned her PhD at the P.N. Lebedev Physical Institute, in Moscow, Russia. As a well-known expert in the field of quantum field theories under extreme conditions, Dr. Incera's research has been continuously funded by NSF or DOE grants. Dr. Incera became the UTEP physics department chair in 2009. Under her leadership, the department has undergone a significant revamping of its major enrollment, external funding, and research mentoring and productivity.



Two students from UTEP's team to the USA Science & Engineering Festival explain the physics of jewelry.

UTEP PHYSICS DEPARTMENT

**In three years UTEP
went from:**

15 to 80 physics majors;

**less than
10% to a 52% female
graduate program**

**50% to 82% externally-
funded faculty.**

▶ *Connect with*
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Physics and Minorities in Physics

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email-lists/](http://www.aps.org/programs/women/email-lists/)



Follow **@APSDiversity** on Twitter
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www.facebook.com/groups/APSMinorities.



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American Physical Society Travel Grant Programs

Travel Grants are available for Physics Departments at U.S. institutions to host Women and Minority Speakers!

The Women and Minorities Speakers Programs are intended to expand the opportunity for physics departments to invite women and minority colloquium/seminar speakers who can serve as role models for undergraduates, graduate students and faculty.

The program also recognizes the scientific accomplishments and contributions of these physicists.

For more information and to complete an online application, please visit:

Women Speakers Program Travel Grants:

www.aps.org/programs/women/speakers/travel-grants.cfm

Minority Speakers Program Travel Grants:

www.aps.org/programs/minorities/speakers/travel-grants.cfm