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Quadrennial Congress of Sigma Pi Sigma 2008

SCIENTIFIC CITIZENSHIP
CONNECTING PHYSICS AND SOCIETY

NOVEMBER 6-8, 2008

FERMILAB, BATAVIA, IL

This report will highlight the Quadrennial National Congress of Sigma Pi Sigma through the students' eyes. We had a great time and would like to share our experience with you. There were numerous activities that we took part in and you will hear from each one of our reporters. —Chicago State University SPS

Through the Eyes of the Students!

Four excited individuals: (left to right in picture) Erica Watkins, Chaan Thomas, Melissa Rangel, and Sean Gallardo, woke up on the morning of November 6, 2008 with nothing on their minds other than the SPS Congress— This was the first SPS Congress for all of us. Seeing that the congress was held at Fermilab in Batavia, IL and we were in Chicago, IL; we decided to carpool. The ride was less than 2 hours and the weather cooperated just up until we arrived at the Holiday Inn®- rain began to pour. We could not believe it— by the time we made it to our rooms, we were soaked!

At the conference, we saw many familiar faces as well as made new acquaintances. It was very beneficial that Sigma Pi Sigma provided a session of exhibitors from schools and corporations. In addition to the workshops and plenary talks, the poster sessions were interesting. Erica Watkins and Sean Gallardo both presented their research and received positive feedback. Everything was well organized and the activities kept us busy. Everyone at Fermilab was hospitable and it was a pleasure to have gotten the opportunity to spend a weekend at a high energy physics lab. Not many can say this. We enjoyed ourselves greatly.



What We Saw at Fermilab...

During our conference at Fermilab, all the workshops and plenary talks were held in Wilson Hall. It was named after Dr. Robert Rathbun Wilson— the first director of Fermilab. The picture to the left is of the laboratory taken from the top floor. Wilson Hall was inspired by a Gothic cathedral in France. It somewhat mimics the Eiffel Tower. The Wilson Hall also contains one of the world's largest atriums. Throughout the laboratory there are sculptures that Dr. Wilson designed himself. These sculptures include the Mobius Strip, Tractricious, Broken Symmetry, and Hyperbolic Obelisk. Broken Symmetry is at one of the laboratory entrances. It straddles the road and seems to be perfectly symmetric when standing under it. However, it is asymmetric at any other view. It's pretty cool!



Einstein as Citizen: Addressing Race and Racism



Sean Gallardo is a senior in the traditional physics option and is planning to pursue a career in High School Teaching. Sean has been working on Physics Education Research for a number of years at CSU and had presented his work at the American Association of Physics Teachers' Meeting. Sean works closely with CSU's NSF project as a liaison between CSU and the City Colleges of Chicago. Sean is very active in department outreach and is now developing instructional materials for use in our introductory physics classes.

Fred Jerome and Rodger Taylor are the authors of the book "Einstein on Race and Racism". They gave an exciting talk titled "Einstein as Citizen-Addressing Race and Racism." In it, the two discuss the time when Einstein lived in Princeton, New Jersey and they provided insight into Einstein's contributions to the civil rights movement. From working with actor/activist Paul Robeson, to speaking about the evils of the race relations of the time, Einstein was a vital part of the civil rights movement. Jerome and Taylor explained how nearly all of Einstein's civil rights contributions are all but forgotten. Almost none of his biographies document any of his social work.

The presence of Jerome and Taylor at the conference was very beneficial because their message was that, as the future faces of physics,

we will be trying to solve our energy crisis, discover the Higgs boson, find a planet with the same properties as ours, in addition to many other scientific advances – but we need to remember that physics is also a social endeavor. Just as Einstein made discoveries that changed the face of physics, he also made it out of the lab, to not only enjoy life, but to fight for those who were persecuted. We need to remember this and once again let Einstein lead the way.



Who are the Future Faces of Physics?

Melissa Rangel (Left) and Erica Watkins (Right) share the experience of being "double minorities" in the Physics department at CSU. Melissa is enrolled in the traditional Physics option and minors in Chemistry. Her major will prepare her for admissions to a graduate program in Material Science. Melissa is currently involved in Solar Cell and High Energy Physics research at CSU. She is the current secretary of CSU's SPS chapter. Her interests include art, philosophy, and the application of physics to other STEM disciplines. Learn more about Erica in the following segment.

Rachel Ivie works at the American Institute of Physics, as the Assistant Director of the Statistical Research Center. Dr. Ivie carries out research that produces statistics on minority and women participation in physics. Not only does her research focus on the students in physics departments but also the faculty. According to Dr. Ivie's statistics, the overall number of women obtaining physics degrees has increased in the past 30 years; where the percentage of women earning PhDs went from 5% in 1970 to 18% in 2003. Even though, these statistics support that the "future faces of physics" are becoming more female, women still remain underrepresented in physics departments. Dr. Ivie found that women account for only 10% of the faculty members in physics departments that offer degrees. As for minorities, Hispanics and African-Americans are greatly underrepresented where the overall percentage of degree holding Hispanics is 15% and African-Americans is 13%. These numbers are also lacking when it comes to minority faculty.

During Dr. Ivie's talk she offers ways that we can change the

"future faces of Physics" to obtain more diversity and increase the number of minorities pursuing physics and science in general. She spoke on how everyone has social identities such as age, race and sex. These social identities generate expectations or contingencies that affect the physics classrooms because the social identities of minorities are salient to everyone. Dr. Ivie suggests that more minority students should be recruited and more minority scientists should be invited as speakers at different venues. The goal is to make everyone feel like they belong in physics she explained. This would reduce the saliency of minorities and provide a welcoming atmosphere to prospective students.



Where Can Physics Lead You?

Interview with Gary White



Erica Watkins is a Junior in the Physics for Bioscience option at Chicago State University. Erica has been to many conferences including the American Association of Physics Teachers Conference and the Alliance for Minority Participation Conference. Erica is involved in Physics Education Research and has presented her research at the 2008 Physics Education Research Conference (PERC) in Edmonton, Canada. Erica also had a paper published in the 2008 PERC proceedings. Once Erica graduates, she hopes to enter Optometry school and eventually become a doctor. Erica is currently the President of CSU's Society of Physics Student's chapter.

Dr. Gary White is presently the director of the Society of Physics Students and Sigma Pi Sigma. He has accomplished much beginning with his bachelor's in physics which he received from Northeast Louisiana University (NLU). Dr. White then went on to study nuclear theory at Texas A & M University (TAMU) where he received his Ph.D. in 1986. He has had a wide range of experiences throughout his career. He has taught mathematics, physics, and astronomy, was elected SPS Zone 10 counselor, served as president of the National SPS council, and has also reviewed publications for the American Institute of Physics in addition to publishing his own articles. He has embraced the many opportunities that physics can provide. Those who become acquainted with Dr. White can see a part of themselves in him- because, like many of us – he didn't follow a straight path.

When Dr. White began his undergraduate work at NLU his dream was to play basketball. He soon gave up on that dream when he noticed that his rare height and stature in high school was not so rare in college. Dr. White went into college without any prior knowledge of physics. He took his first physics course when he was a sophomore: introductory physics I with calculus. Dr. White said after two weeks of being in the class he knew physics was for him. He became amazed at how mathematics and physics paired up to prove that the shape of the path of a projectile is a parabola. He was even more sure about physics when he realized that he was not interested in biology and chemistry as much as physics. Even though Dr. White did not play basketball on NLU's team, it did not stop him from playing intramural basketball and volleyball. When I asked him what he did to remove stress at school, he said it helped having three cousins that were the same age as him and attended the same school. He mentioned they would meet up for lunch and participate in sports tournaments on the weekends. Dr. White said he was never too concerned with having the highest grades - just good grades.

As Dr. White's undergraduate career began to come to an end, he was forced to think of what his next step would be. Both of his parents graduated from college but no others before them did. His mother wanted him to be a doctor, and because he had so many relatives that were teachers he did not consider teaching. Therefore, Dr. White did what suited him best and went on to graduate school. This would give him some more time to make a decision. Ironically enough, after saying he would not teach- Dr. White took a position where he taught four to five physics courses a semester after receiving his Ph.D. During graduate school Dr. White conducted research in nuclear physics. Even though it is a great achievement to understand nuclear physics, Dr. White had many other physics interests that drew his attention. He wanted to be involved in something that the general public could relate to. Nuclear physics is not something he could go home and talk to his mother about. One of the reasons we went into nuclear physics was because he appreciated his research professor's teaching methods. Dr. White found that he was interested in researching "quirky topics" that are not in books- such as how spandex stretches, or how dice land. Dr. White plans on writing at least three more papers on experiments that he has not seen anyone else conduct research on.

All in all, Dr. White is an inspiration to anyone who marches to the beat of their own drum. He never took a linear path to the accomplishments he has made (it wasn't even a parabola). However, through Dr. White's open-mindedness and passion for physics- limitless opportunities and experiences have led him to a career where he is a teacher, a researcher, a mentor, and a motivator. Dr. White says, "I never imagined to be doing what I am doing right now, I have exceeded my goals and expectations." If this is not a pure example of how physics can lead you anywhere, I don't know what is.

For more information on Dr. Gary White please visit the national SPS website:
<http://www.spsnational.org>



Diminished Sight, Perfect Vision

Interview with Aziza Baccouche



Chaan Thomas is a senior in the traditional physics option. Chaan is interested in studying acoustics and is hoping graduate work will help him, "Find the Perfect Beat." In addition to physics, Chaan is also pursuing a major in mathematics. Chaan has held leadership positions in both the Society of Physics Students and the Math Club. Chaan also competes regularly in a quiz bowl called the Honda Challenge. In the summer of 2006, Chaan traveled to Arizona to help build the VERITAS gamma ray telescope array.

Dr. Aziza Baccouche, who often goes by Dr. Aziza, is the President and CEO of AZIZA Productions, her own company which "specializes in the production of science-based multi-media products." As a producer, she has had her work aired on networks such as CNN, Discovery, and PBS. Before becoming a producer Dr. Aziza received her Ph.D. in theoretical nuclear physics from the University of Maryland at College Park.

Dr. Aziza was interested in science at a very young age. When asked why she chose physics she said, "Because it is the perfect linear combination of Math and Science,"- *the answer of a true physicist*. While Physics is a universally challenging subject, Dr. Aziza faces challenges that would seem daunting to anyone. Due to a tumor in her third ventricle, her optic nerve was damaged and caused her to become legally blind at the age of eight. This however, did nothing to impair her "vision." She makes a definitive distinction between "sight" and "vision." Sight is one of the five senses. Vision is your outlook on life; your ability to imagine and pursue your goals. For Dr. Aziza her vision is something that her medical affliction cannot tarnish.

From the 6th to the 8th grade, Dr. Aziza attended a school for the blind in Tunisia. She learned to read Braille at age 12 in approximately a month and a half. She credits her high school teacher for not trying to deter her from her goal to become a physicist. When she asked if he thought she'd be able to go on to become a physicist he said "**Yes you can!**" which she has since taken and used as a rallying slogan for all of her pursuits. Her undergraduate work was done at the College of William and Mary. Next, she received her master's degree at Hampton University, and finally received her Ph.D. in Theoretical Nuclear physics from the University of Maryland at College Park.

When asked how she was able to understand and solve problems, Dr. Aziza replied with the following, "[you] have the benefit of flipping through your notes and turning [to a particular page]. I was blessed to have good readers [of audio text books]." Consider the following equation: $e^{(x+y)^2}$. Careful distinction has to be made between saying, "E to the x+y squared," "E to the x... + y squared," "or the correctly said: "E to the quantity x+y squared". By studying and doing work without the benefit of 20/20 sight, her retention is greatly enhanced and she's gained the ability to handle complex algebra problems without always having to resort to recording her steps.

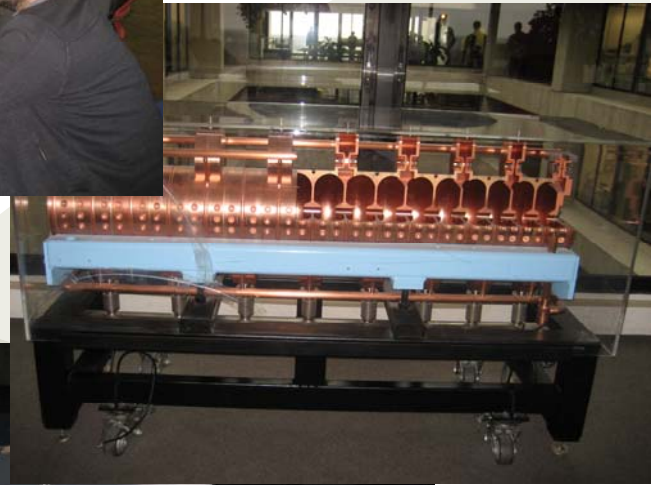
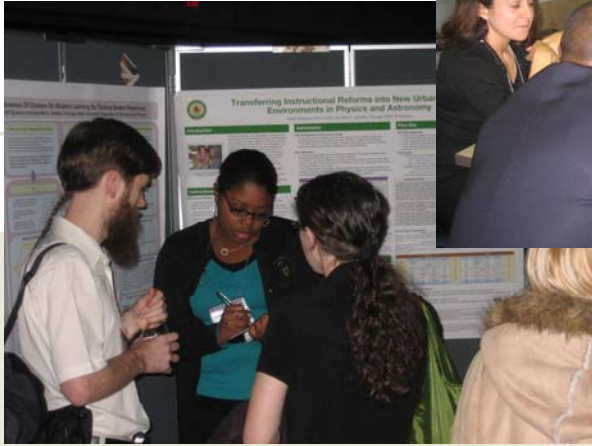
One of Dr. Aziza's passions and a function of her production company is to make science more accessible and better understood to the lay public. Interested parties of any level, ranging from grade school teachers to television networks can contact her company and they will customize a production. From script writing to film work, the production will be arranged to suit the customer's need. When asked what members of the scientific community, most notably students, can do to bridge the gaps of knowledge and misunderstanding she replied, "Get engaged, promote dialogues. You can start with something such as college radio communications- but you have to start small." As the slogan goes: **Yes you can!**- because she has.

For further information on Dr. Baccouche visit <http://www.draziza.com/>

For information on her production company visit <http://azizaproductions.com/index.html>



Photos



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