1-1-2010

Arkansas Physics Times, 2010

Society of Physics Students (American Institute of Physics)

Arkansas Physics Times
'THE TRUTH SHALL MAKE YE FRET'

Individual Highlights:

Salute to Dr. Gupta

AJ Salois and Dr. Gupta

Dr. Gupta began working at the University of Arkansas in 1978 after working in Boston, New York City, and Columbia University. Now that Dr. Gupta is retiring we look back on his time here fondly.

What brought you to Arkansas?
"I got the call for an interview, and then I started wondering where on Earth is Arkansas. My post-doc mentor advised me not to turn any place down without looking at it. I liked the faculty. It was April when I came. The Chair of the Department gave me a tour of the city. The flowers were in bloom and I really liked the place."

What is your greatest memory of your first year?
The department only had two telephone lines, one for incoming and one for outgoing calls. We worked on weekends and there was a big ringer in the hallways and whoever first picked up the phone he went around looking for who the call was for."

What is your greatest memory of a class?
"Within a year or so I was given a large class, university physics. After teaching that class for a few years I realized the [grading] system wasn't working...I [decided] to set absolute standards. 40% of the class either withdrew or failed. One student called the NW Arkansas Times and said there was a massacre in the physics department. It came out on the front page of the newspaper and the students were in revolt."

Do you have a favorite memory from a physics picnic?
"For the first ten years or so every [picnic] it rained and it was cold. One year we had a picnic at Eldrige Park and there is a fireplace other there. It was raining and we were looking for wood to burn."

What are you going to miss most?
"I am going to miss this office. I have had it for 32 years. I am going to miss the students, and the other thing is research. You don't understand it and you try and try and you spend maybe a week or ten days and finally it clicks and you understand it. It is euphoria, it feels so good. Finally, you understand what is going on."

Do you have any advice for the students and faculty?
"Follow your passion. Don't go into a field you don't have passion for."

Daring Guerrilla Raid Liberates SPS Lounge

Dr. John Stewart

Brave SPS members Adam Barito, Clint Mash, John Conley, and Rachel Lee staged a daring midnight raid (actually Sunday afternoon) and took back PHYS 230 for the SPS lounge. This room had been the location of the lounge for a decade before the lounge was cruelly moved to PHYS 244. Disassembling and moving the surprisingly heavy cubical furniture, the lounge once again sports that early sixties look that we all find so charming. A key to the lounge is available to all SPS members.

Sigma Pi Sigma Induction

Dr. John Stewart

In the second year after inductions were resumed, a very accomplished group of physics students were inducted into Sigma Pi Sigma, the national physics honors society. This honor is extended for high academic achievement and for exceptional service to the department and to the community. Sigma Pi Sigma was founded in 1921 to recognize scholarship in physics and to promote fellowship among physicists. The University of Arkansas-Fayetteville Sigma Pi Sigma chapter is number 57 and has been inducting members since 1946.

(Front row) Christine Audo, Kristin Watson, Holly Jackson
(Back row) Zach Coats, Andrew Blanchard, Marshall Scott, Nathan Culbertson, Keith Cassidy, John Conley, Adam Barito
(Not Shown) Jazmin Berlanga Medina, Matt McKnight

Year One

Josiah Walton – Alumnus

After completing my first year in graduate school, I am very satisfied in my decision to pursue a Ph.D. in physics. It has been a very interesting journey transitioning from being an undergraduate to being a graduate student. In graduate school, there is a different feeling to your studies compared to your undergrad years: you now have the freedom to solely take graduate physics courses and engage in cutting-edge research without the formal obligations of being an undergraduate; your peers are from the top of their class, so you are surrounded by people who are truly passionate and very knowledgeable about the subject they are studying; and you now have to really learn your physics by preparing for and passing a rigorous qualifying examination along with beginning to become a world-leader in your chosen field.

The physics department at the University of Illinois is phenomenal. I've already made many friends whom I know I'll stay in contact with for the rest of my life. There is a wealth of awesome colloquiums each week during the school year and the courses are both challenging and very rewarding. Much to the contrary, this is not a place where everyone is competing with each other; the department is a very collaborative environment and supportive of the needs of the graduate students.

After arriving at the physics department last fall, I began working with Dr. Jon Thaler in observational cosmology, specifically dark energy. I am working with the Dark Energy Survey (DES) collaboration (Abbott et al. 2005), a near-term dark energy experiment designed to map the three-dimensional distribution of galaxies, galaxy clusters, and supernovae out to a distance when the universe was approximately half its current age, when dark energy became a dominant force. The DES will cover 5000 square-degrees of the southern night sky, over a 5-year period beginning in the fall of 2011. The DES will use a massive 570-megapixel CCD camera, known as DECam, with a 3 square-degree field of view, mounted on the 4 meter Blanco telescope at the Cerro Tololo Inter-American Observatory (CTIO) in Chile. Hopefully this will all lead to a nice trip to Chile.

Shawn Ballard and Josiah Walton, two graduates of the Arkansas Physics department in 2009 were recently married. They are both finishing their first year of graduate school at the University of Illinois, Urbana-Champaign

What to Read when You're not Studying:

AJ Salois

I have just finished the book, *The Man Who Sold the Milky Way: A Biography of Bart Bok.* Dr. Malcolm Smith of Cerro Tololo Inter-American Observatory (CTIO) recommended it to me. He knew Bok while he was still alive which means I heard a number of exciting and interesting anecdotes from my mentor. Bok was truly an amazing astronomer, and so was his wife Priscilla.

This book caught my attention one day while I was sitting in my mentor's office discussing the Unified Model with him. Out of the corner of my eye I picked up some lime green and orange. Anyone who knows me well could tell you about how I just love bright colors! So my eyes were immediately drawn to the cover of this book. Seeing my distracted attention, my mentor smiled and handed me the book. Then, the first anecdote of Bart Bok, his bushy eyebrows, and deep voice began.

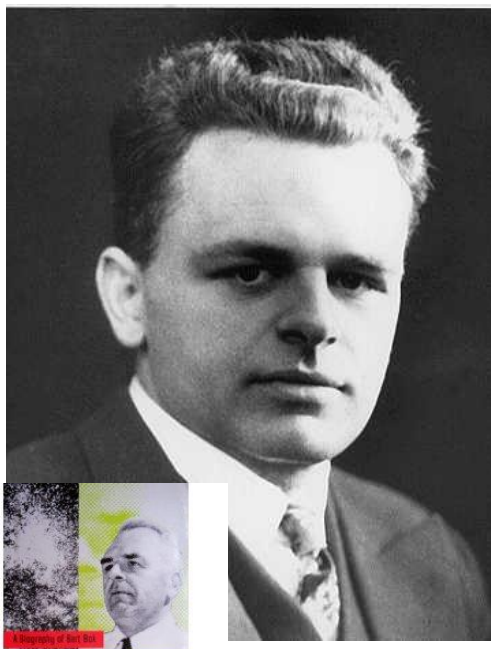
The book was immediately intriguing. The title just catches your interest and forces you to begin reading! What do they mean, "The man who sold the Milky Way"? I must find out! So, I did!

I could not believe that I had not previously learned of such an influential man in Astronomy!

Of course, I will not tell you very much about the book because that would be taking all the fun out of reading it! But what I will tell you are these things:

- Bart and Priscilla were really neat people.
- They affected many people's lives, in and out of Astronomy.
- You cannot buy the Milky Way from a Bart Bok Foundation.
- Magpies are really neat as well.
- This book makes me want to live in the Eta Carinae Region so that I can meet Priscilla!
- The last sentence of the book is my favorite.

Now you have to go read the book to find out what I mean by these statements! What would the world be without the beautiful Milky Way streaking across our skies? It is men and women like the Bok's that helped the world see the importance of studying and understanding our own galaxy.



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Supernovae "Echoes": A Window to the Universes' Past

Aisha Mahmoud

Four hundred years ago the flamboyant Danish astronomer Tycho Brahe observed a striking event in the sky. An event he regarded as a "new" star. Brahe noted that this star was so bright that even during daylight time it was clearly visible and then eventually faded away. This sole event was Tycho's inspiration to study the captivating starry skies. Thirty years later, Tycho's privileged student, the Polish astronomer, Johannes Kepler, noted a similar event – a star that shined greatly for some time before fading away. Today, we know those events are the explosions of the most massive stars, supernovae. Below is an artist representation of what these fellows would have seen over their night skies.

Unfortunately, such an event is rare; the astronomical life expectancy of these celestial objects is out of our scope. But, could there be a way to observe these ancient supernovae? About 5 years ago, astronomer Armin Rest discovered filaments of light in the Large Magellanic Cloud (LMC) that appeared to be moving away from three former ancient supernovae. Further analysis showed that this light was an echo, or reflection, of light released in supernovae explosions hundreds of years ago. The light started off moving away from the explosion in random directions, and then it hit a cloud of dust, which reflected the light toward the Earth.

Fig. 1 Artistic representation of Kepler's supernova

The light ended up having to travel a few hundred light-years further than the original light from the supernova, so it is just now arriving at the Earth. What this means is that we can see the original light from those explosions and study it as if the supernova were happening now. Most recently, Dr. Rest and his collaborators have now found light echoes from both Tycho's supernova and Kepler's supernova. Using modern telescopes, Rest has managed to study the light from the same explosions that Kepler and Tycho saw and reconstruct the entire event. He's been able to confirm what kind of supernova Kepler and Tycho saw – Tycho saw a Type Ia supernova (an exploding white dwarf) while Kepler saw a Type IIL supernova (a rare type of exploding massive star). One of the exciting things about this research is that not only can we study the explosions themselves 400 years later, but we also do not have to wait to look at the final supernova remnant – we already see those!

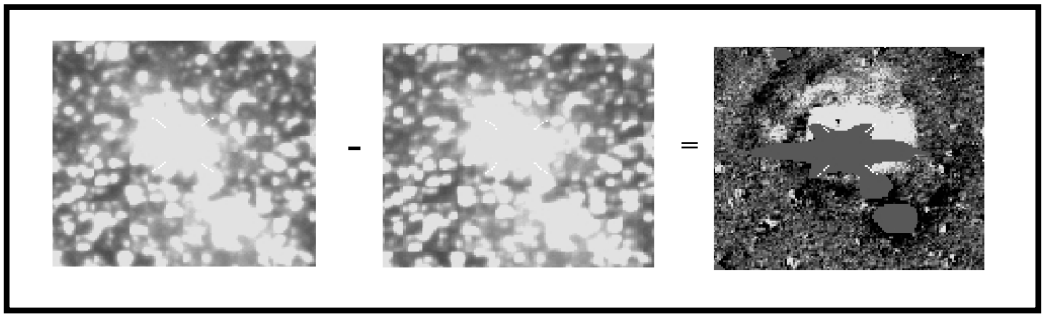
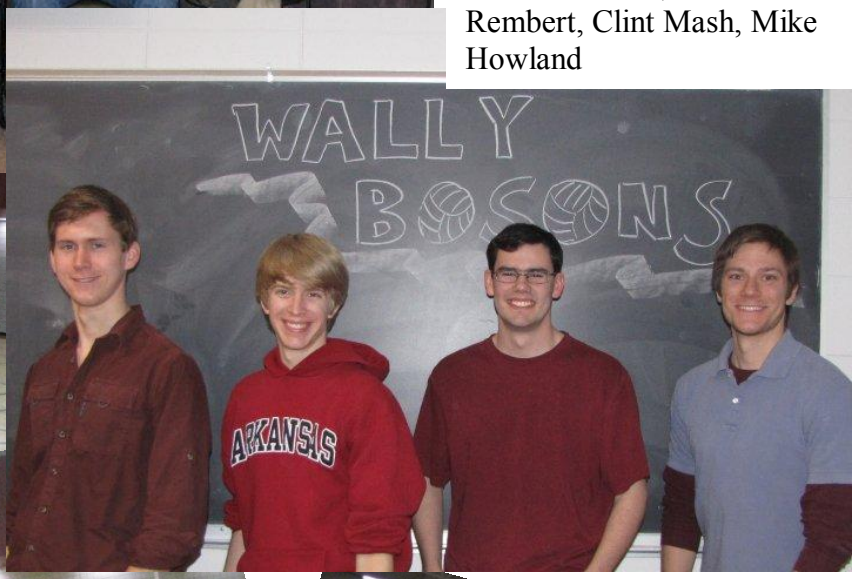


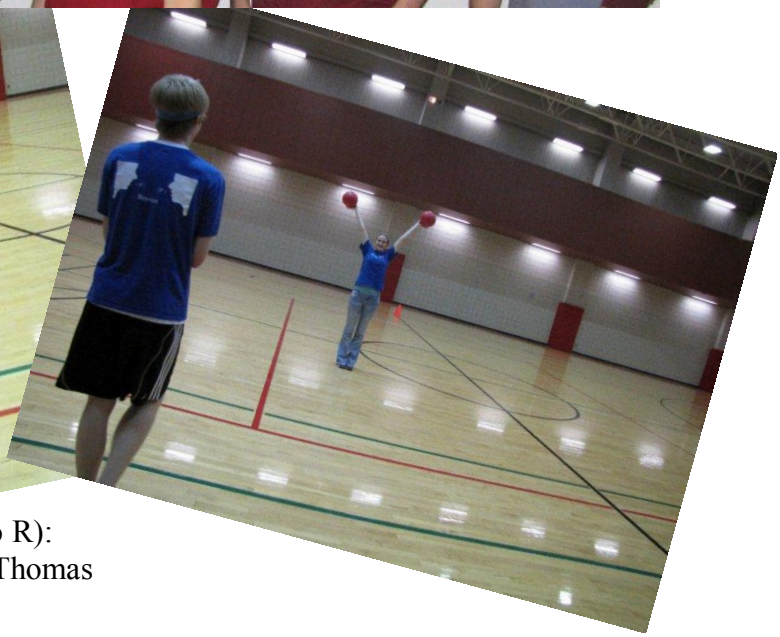
Fig.2 Difference Imaging Technique

Fig.3 A pretty picture of one of the most spectacular light echoes discovered so far, V838 Monocerotis.

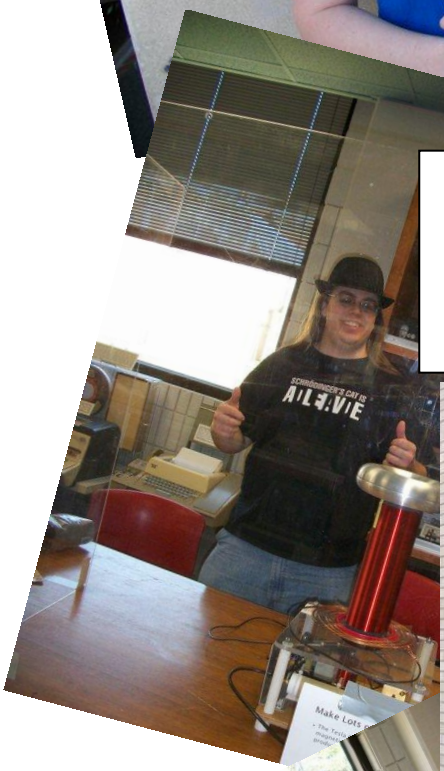
Left: The SPS Yearbook Photo (Left to Right):
Back Row: Clint Mash, Cameron Cook, Johnathan Conley, Zeke Lancaster, Adam Barito, Front Row: Nathan Willems, Holly Jackson, Rachel Lee, Andrew Bobel, Robert Adams

Below: The Wally Bosons, Wally Ball Team (L to R): Cameron Cook, Thomas Rembert, Clint Mash, Mike Howland

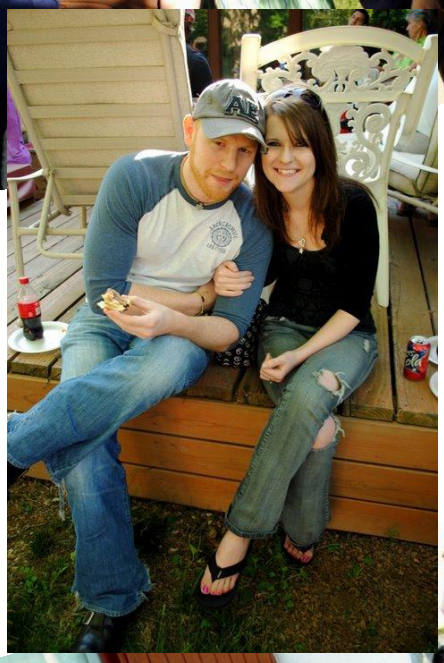




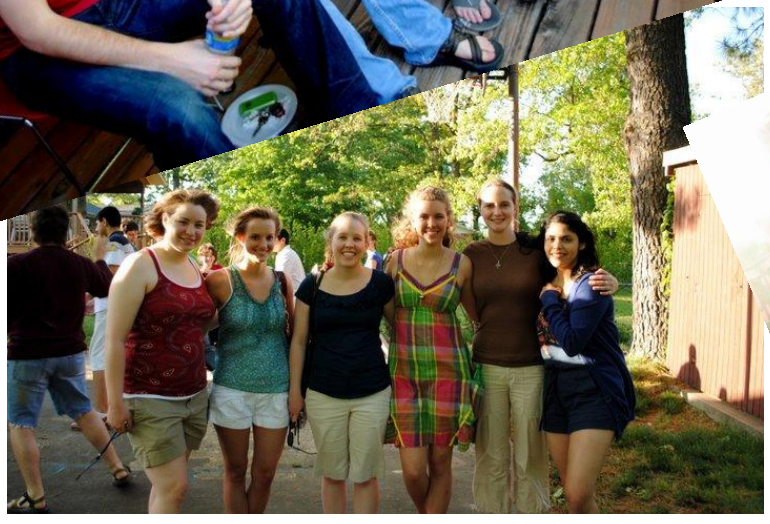
The Particle Colliders, Dodge Ball Team (L to R): Rachel Lee, Kristin Watson, Cameron Cook, Thomas Rembert, Holly Jackson, Adam Barito



Physics Fun and Follies Fair!



Physics Picnic



State and National Awards Winners

Dr. John Stewart

The department was extremely successful at the state and national level this year and was well represented at the State and National Awards Ceremony. Adam Barito and Rachel Lee won National Science Foundation Graduate Fellowships with Colin Paul receiving an honorable mention. Kristin Watson won a Goldwater Scholarship. Cameron Cook, Aisha Mohmoud, Kristin Watson, Amee Salois, Thomas Rembert, Tunji Thomas, Jim Sloan, and Aaron Berkowitz won admission to Research Experiences for Undergraduates Programs. Lorie Hess, Brittany Johnson, and Tiffany Redding won PhysTEC Noyce scholarships to support their interest in teaching. Adam Barito, Holly Jackson, Amee Salois, Kristin Watson, and Sid Winford won State Undergraduate Research Fellowship grants. Note, Dr. Salamo's picture is obscured to conceal his ons.

Honors Graduation

Dr. John Stewart

It was the most successful year for honors students in the physics program ever.
Andrew Blanchard, Adam Barito, Rachel Lee, Holly Jackson, and Nathan Culberson received Summa Cum Laude honors. Sid Winford, Zach Coates, and Scotty Bobbitt received Magna Cum Laude. Jazmin Berlanga Medina received Cum Laude. Marshall Scott, Clint Riley, and Keith Cassidy will defend in the summer.

Back Row - Dr. Greg Salamo, Dr. Eitan Gross, Nathan Culberson, Adam Barito, Dr. Gay Stewart, Scotty Bobbitt, Sid Winford, Zach Coats, Andrew Blanchard, and Dr. Lin Oliver.
Front Row - Dr. Jiali Li, Jazmin Berlanga Medina, Rachel Lee, and Holly Jackson.

Our Graduates

Many old friends are leaving this year and going on to exciting new opportunities. Adam Barito: Adam graduated Summa Cum Laude and will attend graduate school in mechanical engineering at the University of Michigan. Adam won the NSF Graduate Fellowship. Jazmin Berlinda Medina: Jazmin graduated Cum Laude and will pursue a career as a high school teacher. Andrew Blanchard: Andrew graduated Summa Cum Laude and will attend graduate school in physics at the University of Illinois. Scotty Bobbitt: Scotty graduated Magna Cum Laude and will attend graduate school in chemical engineering at UT-Austin. Keith Cassidy: Keith will attend graduate school in physics at the University of Illinois. John Carson: John will spend a year working with inner city youth in Houston before entering seminary school. Zach Coats: Zach graduated Magna Cum Laude and will attend graduate school in physics at the University of Arizona. Nathan Culberson: Nathan graduated Summa Cum Laude and will attend medical school at UAMS. Holly Jackson: Holly graduated Summa Cum Laude and will attend physical therapy school at the Mayo Clinic. Alex Kareev: Alex will attend graduate school in the microEP program at the University of Arkansas. Rachel Lee: Rachel graduated Summa Cum Laude and will attend graduate school in physics at the University of Maryland Rachel won the Goldwater and an NSF Graduate Fellowship. She was recognized as the Outstanding Departmental Honors student through the Harold D. Hantz award. Matt McKnight: Matt will attend graduate school in chemical engineering at the University of Arkansas. Matt Naglak: Matt graduates Summa Cum Laude in Classical Studies and will attend graduate school in the classics at the University of Kansas. Matt won the Goldwater Scholarship. Colin Paul: Colin received an Honorable Mention in both the Goldwater and NSF Graduate Scholarship competitions. He will attend graduate school in chemical engineering at John Hopkins. Clint Riley: Clint will apply to medical school this August. Joseph Snow: Joseph will attend graduate school at Louisiana Tech in an interdisciplinary program combining physics and computer science. Marshall Scott: Marshall will enter the Master of Arts in Teaching program with a Noyce Scholarship and will enter a career teaching high school physics. Ricardo Urquidi: Ricardo is not sure what he is doing yet, but should be hearing from schools soon. Tiffany Redding: Tiffany will pursue a career as a high school teacher. Sid Winford: Sid graduated Magna Cum Laude and will attend medical school at UAMS. The picture shows Tiffany, Jazmin, Marshall, and Keith at graduation.

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