

PHYSICS ALUMNI NEWSLETTER

Spring 2002

<http://www.swosu.edu/depts/physics>

Terry Goforth, Editor

SPRING BANQUET 2002



Question: *Where can you find good food, meet old friends, and make new friends all at the same time?*

Answer: *The 2002 Annual Physics Spring Banquet.* This year's Spring Banquet will be held in the **SWOSU Conference Center at 7:00 p.m. on Saturday, April 13.** Alumni, students, faculty, staff, friends, and family are all cordially invited to attend. The evening will include the $\Sigma\Pi\Sigma$ induction ceremony, presentation of scholarships and awards, and a look back at the past year. (And what a year it has been!) Tickets are \$10. To reserve your spot, you may send in the form at the end of the newsletter or call or email either Dr. Robertson or our secretary Vera Williamson. (Contact information is listed at the end of the newsletter.) We look forward to seeing you there!

Scattered through the newsletter are little gems described as "Kids Ideas of Science," gleamed mostly from 5th and 6th grade discussions, essays, and exams.



A FRESH FACE

The Division of Physics welcomes new faculty **Dr. Tony Stein.** He earned a B.S. and a M.S. in Physics at John Carroll University (Cleveland, OH), then attended Kent State University where he earned his Ph.D. and worked as a Physics Instructor. Dr. Stein's wife Anne is a music teacher and is currently a stay-at-home mom with daughters Theresa (age 4 in April) and Maria (age 2 since December) and Jessica (born February 27, 2002—Mom and baby are doing fine). Dr. Stein's research includes the vortex dynamics and magnetic phase diagrams in high transition temperature superconductors.

I am not sure how clouds get formed. But the clouds know how to do it, and that is the important thing.

2001 GRADS

John Cowan
(OKC) -
Lockheed Martin
- Missiles and Fire Control,



Orlando, FL
Joanna Blevins (OKC) -
University of Washington,
School of Engineering
(Mechanical Engineering)
Jami Ward (Memphis, TX) -
Will begin graduate school in
Aeronautical Engineering next
fall.

Tony Riffle (Altus)
Justin Whipple (Woodward)
(December)
Aaron Gilmore (Marlowe)

CHECK US OUT



The Division of Physics web pages are located at www.swosu.edu/depts/physics/index.htm. You can find contact information, program listings, and copies of the alumni newsletter there. You can also keep up with the Physics and Engineering Club activities at www.swosu.edu/stdorgs/physclub/home.htm.

When people run around and around in circles we say they are crazy. When planets do it we say they are orbiting.

YUM YUM YUM



The 2002 Annual Physics Shish Kebab will be held on the traditional mid-finals Saturday. This year that translates to Saturday, May 4. A ton of the best food you ever had will be served up around 6 p.m. at the Robertson's "Manor on the Hill." (1229 Kaiser Rd). Contact Dr. Robertson for directions or other information.



WE OWN THE PRIZE!

The proximity of dates of SWOSU Homecoming and Halloween inspired the winning entry of the Physics and Engineering Club in the Homecoming Campus Decorations contest. Our entry featured the redoubtable Brandy digging up bones, *i.e.* the bones of our past homecoming opponents, including Bronchos, Tigers, Aggies and others. All had been symbolically buried in a small but ominous graveyard on the west side of the CPP building. The theme of last fall's homecoming (for those of you who didn't make it back) was "We Own The Bone!" Many thanks to former student **Jacob**

Weierman, whose ghoulishly refurbished papier-mâché rendition of Brandy added another cool \$300 to our treasury.

When they broke open molecules, they found they were only stuffed with atoms. But when they broke open atoms, they found them stuffed with explosions.

Physics Club Officers

Pres: Susanna Rogers
VP: Amber Weldon
Sec: Justin Whipple (Fall)
Sec: Lucas Weber (Spr)
Treas: Chris Robertson
Publ Rel: Lucas Weber
Historian: Jacob Bass
Spn: Dr. Stan Robertson



GONE BUT NOT GONE.

Dr. Jones may have retired, but he hasn't really left yet. He has a post-retirement contract with SWOSU to finish up the work he began to "moder-nize" the Modern Physics Lab. (He's teaching that lab this spring.) All the fun of playing with lab equipment, and none of the hassle of faculty meetings, etc.

Retirement can be pretty good!

Back in the Saddle Again

Dr. Blake Sonobe is once again interim chair of Chemistry/Physics. He has accepted the position on a permanent basis, so the "interim" disappears from his title at the end of this academic year. Welcome back Dr. Sonobe!



HELP WANTED

HELP!

We have a few graduates from 2001 who are still searching for jobs. If your company is hiring, or if you know of someone who's hiring, drop us a line.

2001 BANQUET

The SWOSU Ballroom was the site of the 20th Annual Physics Spring Banquet on April 21, 2001. This special evening was a celebration of beginnings and endings. Beginnings were celebrated with the induction of three new Sigma Pi Sigma



members. **Jacob Bass** (Kingfisher), **Susanna Rogers** (Weatherford), and **Jacob Weierman** (Pryor) signed "The Book," bringing the SWOSU Sigma Pi Sigma membership total to 159. Endings were noted with a farewell to **Dr. Ray Jones**, who retired at the end of the Spring 2001 semester. Colleagues and students past and present shared memories from Dr. Jones' 32-year tenure at SWOSU. Student achievements were also noted. Who's Who winner **Jacob Weierman** (Pryor) and Who's Who alternate **Jami Ward** (Memphis, TX) were recognized. Honor medallions to be worn during graduation ceremonies were presented to seniors **Joanna Blevins** (OKC) and **John Cowan** (OKC), both of whom graduated from SWOSU with honors. The award for the Outstanding New Physics and Engineering Club Member was presented to **Aaron Gilmore** (Marlowe), and **Jacob Bass** (Kingfisher) was named the Outstanding Midclassman in Physics. And for the first time in the history of the award, a three-way tie was declared for the J.R. Pratt Outstanding Student in Physics honor. Co-winners were **Joanna Blevins** (OKC), **John Cowan** (OKC), and **Jami Ward** (Memphis, TX).

SCHOLARSHIP SUPPORT



\$3,000 in scholarships were awarded at the 2001 Physics Banquet. Recipients were selected on the basis of need, scholarship, and involvement in the department, on campus, and in the community. This years awardees were **Ross Gible** (Soph., Rocky), \$1,000 J.R. Pratt Scholarship; **Jacob Bass** (Jr, Kingfisher), \$1,000 Benny J. Hill Scholarship; and **R. Lucas Weber** (Soph, Weatherford), \$1,000 Arthur McClelland Memorial Scholarship. We offer our deepest thanks to all the alumni, family, and friends who support the SWOSU Physics funds for making these scholarships possible. Many talented and deserving students have been able to continue their education at SWOSU as a result of your generosity.

If you would like to contribute more, or if you would like to begin contributing for the future, we encourage you to do so. Don't forget to see if your employer has a matching program! If you choose to send a donation, please indicate "PHYSICS UNRESTRICTED" and send it to *SWOSU Foundation, 100 Campus Dr., Weatherford, OK 73096*. By contributing to the unrestricted fund, the money can be used not only for scholarships, but to support other vital functions in the department such as supplementing the university-provided travel expenses for potential new faculty and purchasing the ACT information of prospective students for recruit-

ment purposes. (The cost of these needed activities cannot come from university funds or from the designated scholarship funds.) All contributions are tax-deductible. We thank you for "paying it forward!"

Some people can tell what time it is by looking at the sun. But I have never been able to make out the numbers.

UNDER NEW MANAGEMENT



On December 5, 2001, **Dr. John Hays** was inaugurated as the 16th president of SWOSU (after assuming the duties of that office on July 1). Of course, Dr. Hays is no stranger to SWOSU. He is a SWOSU alumnus and has served the university in many positions, most recently as Vice President for Administration and Finance. Among Dr. Hays' goals are improving communication and greater faculty involvement in the university decision-making processes. Joining Dr. Hays' administration is **Dr. Bettie Becker** as Provost (formerly the office of the Vice President for Academic Affairs). Dr. Becker also has a long history with SWOSU, most recently serving as Dean of the Sayre Campus. The Division of Physics faculty, students, and staff wish to extend a hearty "Welcome" to the new administration.

Vacuums are nothings. We only mention them to let them know we know they're there.

TETHERS AS A MEANS OF SPACECRAFT PROPULSION



NASA has been testing tethers in space for years (the longest was 20 kilometers in length). A tether is a cable that can be unreeled from an orbiting craft such as the space shuttle. A mass on the far end of the tether will help keep it stable. The tether may be deployed upward by letting centrifugal force carry it further from the Earth, or it may be deployed downward by letting the Earth's gravity gradient guide it downward. A satellite near the Earth orbits within the Earth's magnetic field and through the thin plasma of the Earth's exosphere. A bare conducting tether is an efficient anode able to gather huge numbers of electrons from the plasma, but to keep a current flowing in the cable, and to prevent the buildup of a static charge on the satellite, a plasma contactor must be placed either on the far end, or the near end, of the cable, depending upon the direction of current flow. At its simplest, a plasma contactor is an electron gun that expels

electrons into space so that the circuit is completed through the plasma. The hollow cathode plasma contactor uses a very small flow of ionized xenon in conjunction with an electron gun to make it more efficient.

A conducting tether can be used to convert a satellite's momentum into electrical energy since a conductor moving in the Earth's magnetic field will act like a generator. Using, or dissipating the energy produced by this generator can de-orbit a satellite. This is important because in order to avoid creating too much space junk in the heavily traveled low-Earth orbit region, spent satellites must use about 20% of their original fuel supply to de-orbit. The cost of fuel delivered to orbit by the space shuttle is about twice the cost of an equal mass of gold. ProSEDS is scheduled to fly during the summer of 2002 to demonstrate this technology. Showing their usual creativity, ProSEDS is the NASA acronym for Propulsive Small Expendable Deployer system. ProSEDS will deploy an ultra-thin, 5-kilometer long bare wire attached to a 10-kilometer long non-conducting tether from the second stage of a Delta-II rocket.

A generator system would also work well near Jupiter where its relatively dense plasma and strong magnetic field would allow a 10

kilometer long tether to produce a 50,000 volt potential and a 20 amp current for one megawatt of power. The challenge would be making the tether capable of carrying that much power.

Alternatively, if a current I is caused to flow in the conducting tether of length L moving in the Earth's magnetic field B , a force F will be exerted on the tether and hence on the spacecraft.

$$F = I L \times B$$

Sending the current in the proper direction converts the former generator into a motor that can raise a spacecraft's orbit. For example, because of the air resistance that exists in low-Earth orbit, the International Space Station needs a boost from time to time. If it were boosted with tethers powered by the station's solar panels, up to two billion dollars in fuel costs might be saved over ten years. A space tug system based upon powered tethers could greatly reduce the price of utilizing space. If events proceed as hoped for, we should live to see that.

Charles W. Rogers

Isotherms and isobars are even more important than their names sound.



FOR HE'S A JOLLY GOOD FELLOW...

and a pretty darn good teacher too! Congratulations to **Dr. Stanley Robertson** who has been approved (pending the Board of Regents' final OK) for promotion to full professor. (He made it despite claiming that Black Holes don't exist.) Way to go, Doc!

A vibration is a motion that cannot make up its mind which way it wants to go.

GETTING A FACE LIFT.

At long last, the CPP building is getting a face lift. Reconstruction is being done in phases. The 3rd floor east wing was completed last summer, and the 2nd floor east wing is currently undergoing a complete remodeling. Work is scheduled to begin on the 1st floor east wing next fall. Work on the north wing will be done floor-by-floor after that. We are looking forward to modernizing both the labs and the classrooms, but getting from here to there may tax our patience and our ingenuity for a while. Rest assured, we'll be



here throughout the process. Come by and see how it's going!

BE A RECRUITER!

If you know any high school senior or junior (or parents thereof) interested in Engineering and/or Physics, tell them about SWOSU. Send us their contact information (email, phone, snail-mail address, etc.) and we'll be sure to follow up!



One horsepower is the amount of energy it takes to drag a horse 500 feet in 1 second.



THE BLACKOUT OF '02: LESSONS FROM MOTHER NATURE

- 1) Electrical current will not flow in an open circuit.
- 2) Wooden utility poles lack the structural strength to support "ice wires" more than 3 cm in diameter.
- 3) Heat naturally flows from hot to cold. In the absence of a heat source, systems in thermodynamic contact tend to move toward a common temperature. When one of those systems is the great outdoors, the temperature of your house will "lose."
- 4) The Earth rotates on its axis

every 24 hours. When the sun is on the opposite side of the Earth from you, it is DARK.

5) You can't syphon liquids from an underground storage tank.

These are just a few of the lessons Mother Nature provided for us earlier this winter. On January 30, western Oklahoma was hit with a major ice storm. Warm, moist air aloft combined with surface temperatures that hovered just below freezing provided a spectacular example of freezing rain and the power of ice. Many beautiful old trees were destroyed and mile after mile of utility poles were felled by the weight of the ice and falling tree limbs. A large swath of Oklahoma was left without electrical power for a week (and longer in some communities and rural areas). Many homes and towns found themselves without water when the electric pumps shut down, and even folks with generators were left in the dark until area gas stations secured their own generators to operate the pumps. SWOSU was closed for a full week and all but a handful of students were sent home. Power began returning to Weatherford on February 5, and SWOSU reopened on February 7. Things are slowly returning to normal, although the piles of tree limbs won't all be hauled off until the end of March, and it will be at least that long before all of the utility pathways are restored. We've regained a little respect for Mother Nature, and we thank her for the many real-life examples that we can draw on to introduce our students to the wonder and usefulness of physics!

BREAKING NEWS!

We LOVE to hear from you. Let us know what's up. Here's what we've heard about this year...



Bojana Popic Zivanovic ('96) completed a M.Sc. degree from Magill University in Montreal in 1998 and returned to her home in Sarejevo, Bosnia. After almost two years there, she once again moved to Montreal and married Aleksandar Zivanovic. Bojana was recently accepted into the Diploma Program in Computer Science to complete a M.S. at Concordia University in Montreal.

Brian Stephenson ('91) and **Rachelle Cole Stephenson** ('92) attended the shish-ke-bab last May. Brian is a manager for Ebara Technologies in the Dallas area, where he oversees sales of polishing equipment. Rachelle is home taking care of their two children, Lauren and Michael.

Ben Coster ('96) and wife Susan recently built their dream home in the Dallas area. Ben is working for Raytheon.

Wade Phares ('95) attended the 2001 Alumni Banquet. Owen is working for Worldcom as a Telecommunications Engineer on selection and certification of hardware and software in Tulsa.

David Wright ('87) visited the

department on Sept. 20, 2001. He's a computer engineer for the US Navy in Port Hueneme, CA, providing support for ship-board computer systems. He and his wife, Jana, have two children.

Joe Beisel ('97) finished his M.S. in Mechanical Engineering (solid mechanics of a thin film) at Oklahoma State University. During and after his degree, he spent about two years as a volunteer in Africa running a native construction crew that designed, laid-out, and constructed schools, hospitals, and colleges. As of August 2001 he's back at OSU working on his Ph.D. in the same area, mostly stress-strain relationships in thin spans and shells. Welcome home, Joe!

Sarah King ('99) is working on her M.S. in Mechanical Engineering at the University of Oklahoma.

Doug Watson ('92) dropped by for a visit on February 27, 2002. He's looking into a career in education.

We bid a fond farewell to **Jacob Weierman** (Pryor) who transferred to OSU. He accompanied his wife Amy, who's doing her pro-practice for pharmacy in OKC. The Weiermans are splitting the distance between obligations and living in Guthrie.

Stephen Russell ('99) visited the department on September 6, 2001. He's in graduate school at Oregon State University in Corvallis, OR.

Diane Samuelson ('85) got in touch with us last spring. She works for NASA in Huntsville, AL.

John Cowan ('01) was hired by Lockheed Martin - Missiles and Fire Control, Orlando FL. His official title is Research Engineer Asc. Last summer John told us "From what I understand I will be working on multiple projects, I've only been here for 3 days so I've yet to see the big picture. I think most of it will have to do with targeting and pilotage systems on the Apache and Comanche helicopters."

Jim McClune ('83) stopped by to visit in May. He is a senior engineer at Lockheed Martin-M&DS RS in Phoenix, AZ working on synthetic aperture radar.

Missy (DuBiel) Gard, ('89) is in Houston, TX working at NASA.

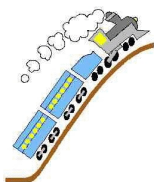
James Bates ('62) is NASA Project Manager for the Alpha Magnetic Spectrometer program. This is an international undertaking including particle physicists from 16 nations led by Nobel laureate Prof. Samuel C.C. Ting from MIT. Their mission is to search the universe for anti-matter, dark matter, and very high energy cosmic rays.

Kevin Johnson ('93) is practicing family medicine at a community health center in Asheboro, NC.

Eric Brown ('95) is working for Worldcom in the Dallas area. He's developing metapath software for wireless products and managing tech support.

Terry Cox ('86) is a Sr. Application Software Engineer for Alstom Transport Information Solutions (formerly General Railway Signal which was acquired by Alstom in '98). He's currently transitioning into a Configuration Management Engineer position to support efforts with the ISO 9001 and SEI CMM software improvement processes.

Scott Taylor ('97) was in Weatherford in June, 2001. Scott is a Senior Technical Professional with Halliburton's Gulf Coast Offshore operations.



THE ROAD LEADS UPWARD

Nine members of the Physics and Engineering Club and professors Jones and Robertson moved up in the world last spring, with a trip to the Rocky Mountains to tour the National Renewable Energy Resources Laboratory (NREL) in Golden, Colorado and the National Center for Atmospheric Research (NCAR) in Boulder Colorado. NREL sports the latest in photovoltaic conversion technology. Solar energy conversion efficiencies approaching twenty percent are now being achieved, which represents a tremendous

improvement during the last decade. Energy storage, needed to complement an intermittent source is still a problem. Better and cheaper batteries are still needed before solar power usage can contribute significantly to electrical power supply. NREL is also working on production of fuel alcohol from crop waste, such as corn stalks. While it is easy enough to produce alcohol from grain, the process is still endothermic, though useful for oxygenating gasoline. Using waste biomass material is much more difficult and messy as it leaves a great deal of fibrous waste. NREL and NCAR leave decidedly different impressions than Argonne and Fermilab, which we have visited in recent years - less glamour, but engaged in thorny problems nevertheless.

As usual, our road warriors took the time to get lost and to sample the local cuisine and customs. Meals at Café Odyssey and The Radizio Grill in Denver were great fun. Projections of a surrounding rain forest provided an atmosphere for Café Odyssey, while The Radizio Grill provided multiple South American shish kebab entrees, including alligator, steak, turkey, quail eggs, buffalo, rattlesnake, and hump-of-the-brahma bull-after which we waddled back to our vehicle.

You can listen to thunder after lightning and tell how close you came to getting hit. If you don't hear it you got hit, so never mind.



HOLEY WAR CONTINUES

The latest red flags attached to the black hole

bandwagon by **Dr. Robertson** can be found in the January 20, 2002 issue of The Astrophysical Journal. Robertson presented the same information at the April 2001 meeting of the American Physical Society in Washington, D.C. In the article, Robertson and co-author Darryl Leiter, STIS, Charlottesville, VA. show that the quiescent x-ray luminosities of both neutron stars and stellar mass black hole candidates can be accurately calculated as magnetic dipole emissions. (Magnetic moments are forbidden attributes for black holes.) The necessary spin rates and magnetic moments were calculated from luminosity changes that occur upon transition to a low emission rate state with a harder x-ray spectrum. This state is still several thousand times more luminous than quiescence. Robertson and Leiter attribute this spectral state transition that has been observed in both neutron star and black hole systems to a magnetic propeller effect. This is widely, though not universally, accepted as the mechanism of the spectral state switch in neutron star binary systems. It is not known how a black hole might produce the same phenomenon, though some theorists think that it might arise from an instability in an accretion disk.



SHISH KEBAB A REAL BLOW-OUT!

The Jones' Country Estate was the site of the 2001 annual Physics Shish kebab. As usual, a hungry crowd devoured more than enough delicious delicacies to delight, disarm, and defeat even the most demanding appetites. Prior to the "Alternative Physics Awards" ceremony, **Dr. Jones, Aaron Gilmore, and Tony Riffle** entertained us with a driving demonstration (golf balls, not cars). We'll never know who had the longest

drive since Dr. Jones' second ball exploded when he hit it! (We won't speculate about his "competitors" fixing the contest.)

BUT WHERE WAS WILLARD SCOTT?



March 8, 2001 was a rainy day in Weatherford, but it couldn't dampen the spirits of the thousand or so celebrants who turned out to mark SWOSU's Centennial in style. Yep, that's right. The old Blue & White turned 100 years

old. Highlights of the day were a parade of students, faculty, staff, and administrators from downtown to campus and a once-in-a-century picture of the whole group.

THE NEWS-LETTER IS ON-LINE!



To get the on-line version of the newsletter just go to the Physics Division page at www.swosu.edu/depts/physics and follow the links.

Rain is saved up in cloud banks.

WE'RE WAITING TO HEAR FROM YOU!!!

Drop us a line at 100 Campus Drive, Weatherford, OK 73096-3098, or email or call us at

Dr. Terry Goforth	(580) 774-3109	gofortt@swosu.edu
Dr. Ray Jones	(580) 774-3106	jonesr@swosu.edu
Dr. Stanley Robertson	(580) 774-3124	roberts@swosu.edu
Dr. Charles Rogers	(580) 774-3108	rogersc@swosu.edu
Dr. Tony Stein	(580) 774-3107	steint@swosu.edu
Vera Williamson (Secretary, Department of Chemistry & Physics)	(580) 774-3264	williav@swosu.edu

Don't want to keep track of all that? Just send your email to physics@swosu.edu and we'll see that it gets to the right person(s).

ALUMNI EMAIL ADDRESSES



If you are a SWOSU Physics Alumnus, drop us an email at physics@swosu.edu and we'll send you the complete list of alumni email addresses that we have on file.

Most books now say our sun is a star. But it still knows how to change back into a sun in the daytime.

PHYSICS ALUMNI BANQUET 2002

Saturday, April 13, 2002 7:00 p.m. SWOSU Conference Center \$10/person

Name_____ No. Persons Attending_____

Address_____ Phone_____

Email_____

----- Please return to: Dr. Stan Robertson ✧ 100 Campus Drive ✧ Weatherford, OK 73096 -----

SHISH KEBAB 2002

Saturday, May 4, 2002 6:00 p.m. \$5/person
Dr. Robertson's Manor 1229 Kaiser Rd Weatherford, OK

Name_____ No. Persons Attending_____

Address_____ Phone_____

Email_____

----- Please return to: Dr. Stan Robertson ✧ 100 Campus Drive ✧ Weatherford, OK 73096 -----

Or... just give us a call or email us to confirm for either/both event(s).
