

ASU Physics

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You're invited!!!!...

The ASU Physics [Awards & Recognition Ceremony](#) will be held May 6th at 3:30pm in the Carson Ballroom, Old Main Building. This annual event celebrates the many successes of the past academic year. Special recognition is given to seniors, master's, and doctoral candidates who have or will complete their studies this year. ASU Physics chair Robert Nemanich will also recognize scholarship recipients as well as individual achievements in teaching and service.

The department is pleased to host **Wally Stoelzel as the Awards & Recognition Ceremony guest of honor**. A former graduate of the Masters of Natural Science program at ASU, Mr. Stoelzel generously funds two scholarships for outstanding physics student achievement at ASU. His interests focus on supporting the development of quality K-12 science teachers.

ASU Physics community, family and friends are invited to join in the celebration. Refreshments will be provided. **Attendees should RSVP via the department's webpage at** <http://physics.asu.edu/>.



Old Main Building—site of the ASU Physics Awards & Recognition Ceremony

Remembering Howard Voss

Career marked by dedicated service, unparalleled teaching

On March 29, 2010, ASU professor emeritus Howard Voss passed away. Richard Jacob, former ASU Physics Chair and founding Dean of the Emeritus College, remembers his friend and colleague who helped shape physics at ASU in countless ways.

Howard Voss came to Arizona State University as a student in 1962. Having already established an award-winning physics program at Scottsdale High School, he was accepted into the Academic Year Institute, an NSF-sponsored opportunity for secondary school teachers to do graduate work. Two years later, he graduated with a Master of Natural Science (MNS) degree, and concurrently received an MS in physics from Purdue University. His abilities were so apparent that ASU Physics vigorously recruited him as an Instructor, the rank he assumed in 1964 without expectation of tenure or promotion.

The strength of his contributions in teaching, mentoring and service became so important to the department that he was advanced to a tenure-track position in 1969 as assistant professor. At the same time, he was appointed by Dick Stoner as Assistant Department Chair, a position in which he continued in under Clem Kevane.

Howard was awarded tenure and promoted to associate professor in 1976.

By this time, he had assumed full responsibility for that portion of the department's curriculum which served the pre-medical and life science majors, as well as others who required introductory physics at the non-calculus level. He became a valuable mentor for pre-med students, and success in his rigorous course was a strong indicator for success in admission to medical school. Throughout his entire career, Howard never lost belief in the efficacy of a well organized and presented lecture, and he was unexcelled in the art

At about the same time, Howard became active in the [American Association of Physics Teachers](#) (AAPT), first holding leadership positions in the Arizona Section and then, as time went on, becoming elected to national positions and finally, in 1994, serving as President.

Promotion to professor was considered improbable, even by some of his greatest supporters, because he lacked a doctoral degree. But university rules prohibited



Howard Voss

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Graphene grabs the spotlight at APS March Meeting

ASU physicist John Shumway returns from Portland where graphene was a hot topic.

At this year's March Meeting of the American Physical Society in Portland, Oregon, there were five hundred talks on graphene, with graphene-themed sessions running from Monday morning through Friday afternoon. Even accounting for hype and a bandwagon effect, it is clear that this two-dimensional crystal has captured the attention and imagination of the condensed matter physics community.

Graphene is simply a single layer of graphite, with sp_2 -bonded carbon atoms arranged in a honeycomb lattice. While such flakes may occur whenever graphite is cleaved—such as when writing with a pencil—the isolation and identification of single-layers was only recently discovered. In 2004, researchers at Manchester isolated single layers of graphene using scotch tape and identified them on a surface using optical interference. The experimental realization of graphene prompted immediate attention from theoretical physicists, as single carbon sheets had been studied theoretically, but were not believed to be physically stable. Over the past five years, there has been much experimental work to grow and characterize clean single- and double-layer samples and to selectively extract shapes from graphene sheets, such as nano-ribbons, for potential use as wires or transistors in nanoelectronics.

Graphene is a cousin to two other nanomaterials made from sp_2 -bonded carbon: fullerenes and carbon nanotubes. Fullerenes, such as the famous C_{60} buckyball, are carbon cages and have been studied by [John Page](#) and [Gary Adams](#) at ASU since the early 1990's. Carbon nanotubes can be thought of as nano-ribbons with their two long edges reattached and have been a research interest of [Michael Treacy](#) at ASU, who has studied their mechanical prop-

erties using electron microscopy. While [Robert Nemanich](#), ASU Physics' Department Chair, has seen evidence of graphene on silicon carbide surfaces in his laboratory, most interest in graphene at ASU has come from theoretical research groups and the ASU bioelectronics lab of [Nongjian Tao](#).

Much of the excitement over graphene comes from its peculiar band structure: rather than having two parabolic bands separated by a band-gap as in most semiconductors, the valence and con-

duction bands of graphene meet at the point of two cones in momentum space. Thus, the low energy excitations of graphene behave like two-dimensional Dirac (relativistic) fermions. ASU Professor Igor Shvokovoy has studied the effect of this relativistic bandstructure on the fractional quantum hall effect. In my own theoretical research group, we are exploring the way another phenomenon of two-dimensional semiconductors—Bose condensation of excitons—may be observed in bilayer graphene. Both Dirac physics and the small (atomistically flat) dimensions of graphene affect the possible realization of an excitonic condensate.

The so-called Dirac points in graphene were even more broadly present at the March Meeting, as several sessions featured an exciting new class of materials known as topological insulators. Electronic surface states on topological insulators are predicted to have one or more Dirac cones. If such materials become widely used, the legacy of graphene may be as a prototype for understanding emergent Dirac physics in a whole host of condensed matter systems.

[Click here](#) to learn more about John Shumway's research in ASU Physics.

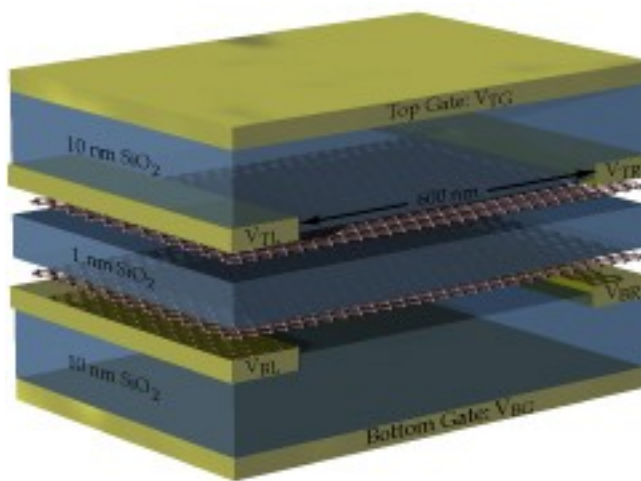


Figure caption: Illustration of a device for exploring excitonic condensates in bilayer graphene. The top and bottom gates separate electrons and holes into the top and bottom graphene layer, while left and right gates probe transport. From Gilbert and Shumway, *J. Comput. Electron* **8**, 51-59 (2009).

PHYSICS FLASH
WANTS TO HEAR FROM YOU

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phyflash@asu.edu.

ASU Physics takes top prize in 2nd Annual Spaghetti Cook-Off!

You can add “Spaghetti Master” to the list of talents ASU Physics academic advisor Jessica Pauls now possesses. Pauls, along with colleagues Karly Green from the School for Mathematical and Statistical Sciences and Becca Dial from the School of Earth and Space Exploration (SESE), hosted the **2nd Annual Spaghetti Cook-Off** on April 22 for all physics, math, and SESE majors. The cook-off at-

tracted over 50 students and, through a blind taste test, students chose Pauls’ dish as the prize pasta! The Spaghetti Cook-off and its sister event in the Fall—the Chili Cook-off—are a great way for students to take a break from their studies and enjoy time with their peers. ASU Physics looks forward to defending its title in future semesters. Congrats Jessica!



(left) Jessica Pauls and Karly Green in the kitchen; (center) Students sampling the fare; (right) The cooks: Becca Dial, Pauls, and Green.

Remembering Howard Voss

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him from earning a doctorate at ASU while holding a faculty position. Nor could he pursue the degree elsewhere since his wife Helen’s medical issues made living in any climate other than Phoenix difficult. But it became increasingly clear that Howard’s experi-

“Howard was beloved by everyone in all his spheres of influence.”

ence, his wise and incisive judgment, his mastery of teaching physics, his work ethic and his leadership abilities outweighed the doctoral requirement. In a demonstration that it was mature and self-confident enough to recognize and do the right thing for its own benefit, the (then) Department of Physics & Astronomy promoted Howard Voss to full professorial rank in 1984.

Howard’s service was endless. His many roles included founder and director of the Physics Service Course Facility, department chair, advisor, mentor, lecturer and countless other university roles too extensive to detail here. His service to national scientific societies in addition to AAPT is also storied and brought him into close personal friendships with many Nobel Prize winning physi-

cists. Although not a research physicist himself, Howard gave valuable service to the American Institute of Physics, on its governing Board, Publishing Policy Committee and many other boards and committees. He was presented the prestigious Melba Phillips Award by AAPT in 1999, particularly meaningful to him because of his close friendship with Phillips.

Howard was beloved by everyone in all his spheres of influence. But no more than by his family and close colleagues and associates. Howard Voss was first and foremost a husband, a father and grandfather, a dear and true friend, and a man of deep faith. We did not expect to lose him: not so soon, not so quickly.

Keep in touch and
**MAKE A
DIFFERENCE**
with ASU Physics

Please consider supporting ASU Physics students, research, and programs.

For more information, visit [our website](#) or call **480.965.6794**.



From the Chair...

The position players of higher education

April marks the start of baseball season. So, being a baseball fan and reflecting on this essay, the sport seemed as good a source as any from which to draw an analogy about how we work in higher education.

This month, ASU Physics hosted the Denise Jackson Staff Appreciation Luncheon. The luncheon was established in memory of Denise Jackson—a long-time ASU Physics staff member who worked in the department for 21 years. She was dedicated, hard-working, and forward-thinking. And although we remember her for these qualities, she is best remembered as a kind, humorous, witty person who made ASU Physics a great place to work. We were honored to have her mother Mary Jackson and her brother Tom Jackson join us during the luncheon. It is always such a pleasure to talk with Mary and Tom, and listen to the many stories about Denise's time in the department.

This annual event is held to honor and celebrate the contribution staff make to the success of the department and the university as a whole. The luncheon was attended by ASU Physics staff who support administrative, business, technology, and instructional support operations. It was so nice to share the afternoon with them.

And this is where I start thinking about baseball...

Our staff are a wonderful group dedicated to helping advance the study of physics through the support of research and teaching. But it's no secret that they get less attention than some of the higher profile 'stars' on the university team.

There are the home-run hitters—our terrific high-achieving students, National Merit Scholars, masters and doctoral students advancing the forefront of knowledge. We are so fortunate to have so many home-run hitters in ASU Physics.

And, of course, there are the star pitchers—faculty committed to a very high standard of teaching and research. They guide the rest of the team and are the game's ultimate strategists and tacticians. The game is won or lost on the mound and great pitchers are the envy of every team.

But there are other team members equally essential to the game—the position players. Position players come to the field and do their job for nine innings, 162 games a year. They have to think on their feet and consider every possible batting scenario. Position players are all about teamwork.

Without good position players, it wouldn't matter how many home runs your team scored or how well the game was pitched.

A team with deficits in any position or that doesn't play as a team won't have sustained success.

Staff are the position players of higher education. They contribute to the success of the university in so many critical ways—ways which are often taken for granted. They are asked to provide a variety of services in an ever-changing environment twelve months a year. It's not an easy job—especially as the *game* becomes more complex and they are asked to do more with less.

I am so appreciative of the way our staff have worked together during the past year. They are creative, resourceful, and enthusiastic in the face of many challenges.

They help shape and grow our academic programs through advising and student service. They create and maintain an infrastructure of technology support that enhances lab courses and research. They work to provide lab experiences that engage and challenge our students every day. We are very thankful for their efforts not just on occasions like the Denise Jackson luncheon, but every day.

In addition to the luncheon, the Denise Jackson endowment recognizes individual staff achievement through the Denise Jackson Staff Award. This award is given to a staff member who has exhibited consistent outstanding service beyond the requirements of their position. The spirit of the award recognizes sustained excellence similar to that demonstrated by Denise herself throughout her career at ASU.

This year the Denise Jackson Staff Award is presented to Margaret 'Peg' Stuart. Peg has been with the department for seven years first with the Center for Biological Physics and now as Department Manager. She has been instrumental in guiding department operations and managing administrative and business staff. She has gone far beyond the expectations of her position in numerous ways, showing a rare combination of leadership and willingness to work hard—almost to a fault. She works tirelessly and is deeply committed to the success of the students, faculty, and staff in ASU Physics.

It is an honor to recognize Peg and the entire staff for all they do for higher education. We congratulate them all on another productive year in ASU Physics.



Peg Stuart