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November, 2008

Letter From the Chair

Dear Friends of the Department:

It's been a great year for physics. **We're 100 years old and younger than ever!** We have a larger percentage of young faculty than ever before (half of the members of the faculty were hired since 2001!). **Guenter Schneider** is now a full time tenure-track assistant professor, which strengthens our theoretical and computational solid state group greatly, and brings the total instructional faculty to 17. The Physics faculty continues to be recognized for their outstanding work. **Corinne Manogue** received the American Association of Physics Teachers' Excellence in Undergraduate Physics Teaching Award, as well as the Richard M. Bressler Senior Faculty Teaching Award from OSU for excellence in teaching. **Viktor Podolskiy** was honored with the last College of Science Sugihara Young Faculty research award for his work in theoretical optics (see the article on p. 4). Our office staff were also recognized for their excellent service, with **Verna Paullin-Babcock**, our accountant of 20 years, receiving the Association of Office Professionals Merit award in June. And our alumni are award winners, too! **Mike Lampert**, who received his M.S. degree from our department in 1990 and teaches at West Salem High School, was recently named 2008-09 Oregon Teacher of the Year. Our undergraduates are working on an exciting astronomy project to build a radio telescope (details on p. 9), and won SPS recognition for their efforts.

There has been an infusion of new grant money into the department! **Oksana Ostroverkhova** received a prestigious NSF CAREER award to advance her work on organic electronics. Physics continues to receive a good chunk of the money brought in under the ONAMI umbrella. **David McIntyre** is a co-PI on the ONAMI/ONR Nanometrology block grant, \$700,000 this year, and projects involving OSU physics researchers **Guenter Schneider**, **Oksana Ostroverkhova**, **Ethan Minot**, and **David McIntyre** were funded. Approval for a further year of nanometrology funding has been obtained. Long-time friends and donors Ben and Elaine Whiteley recently established an endowed fund in Materials Research, which will greatly benefit researchers in Physics.

We're excited about the renovation of common classroom space in Weniger Hall. This is long-awaited, and long overdue, but we're finally going to have some modern space available. **Dedra Demaree** and **Corinne Manogue** have worked with the OSU classroom committee (on which Dedra now serves) to design a remodel of our big lecture

room, Weniger 151, to include space for interactive learning in lectures and modern projection facilities (and better acoustics!). Our smaller lecture spaces on the second floor have also been remodeled and already the students are having a better experience because of it. An exciting future development is being made possible with generous donations from **Greg** and **Nancy Serrurier** and from **Dr. Joan Suit**. This funding will allow renovation of dedicated Physics space to accommodate "SCALE-UP" interactive instructional activities. Dedra, Corinne and I also secured a \$100,000 grant from the Technology Resource Fee pool to help us put the best technology in this space. I am also a CO-PI on the new grant: Oregon Central Oregon Partnership for Using Technology to Enhance Science and Mathematics Education Grades K-8, with Maggie Niess and Emily van Zee in the Department of Science and Math Education.

On the teaching front, Physics is now offering an Honors Physics course, developed by **Ken Krane**, based on the "Matter and Interactions" text, which takes a hands-on approach to learning physics. The course development was supported by OSU's Renaissance Fund. This year, **David McIntyre** took over the course and is including interactive V-Python programming.

We awarded 28 degrees this year, including 9 Ph.D. degrees, which shows how well research is going. We also welcomed 9 new graduate students who had a great orientation week and who are settling into a new year of classes, teaching and research. This year's class is geographically diverse – we have people from both U.S. coasts, Europe, Asia, and Africa.

The department hosted the 21st Yunker lecture with a huge turnout to hear **Professor Rocky Kolb** of the University of Chicago talk on *Mysteries of the Dark Universe*.

On a sad note, our department lost a dear friend with the passing of **Emeritus Professor Victor Madsen** in July. We pay tribute to him on page 3.

As always, the department welcomes your news, feedback, and support. If you're in town, please come and visit with us to see all the new activities that we're glad to describe in this year's letter.

With very best wishes,

Henri Jansen
Chair of the Physics Department

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Physics

Degrees Awarded

From Fall 2007 to Fall 2008, the Physics department awarded 13 B.S. or B.A. degrees in Physics, Engineering Physics and Computational Physics; 5 M.S. degrees in Physics and Applied Physics, 7 Ph.D. degrees in Physics, and 2 Ph.D. degrees in other disciplines but with the major professor in physics.

Jeremy Danielson, Ph.D. (Physics) to a post-doc at Los Alamos National Lab

Jonathan Day, Ph.D. (Physics) to high school teaching

Skye Dorsett, Ph.D. (Physics) at Affirma Consulting in Seattle, WA

Katrina Hay, Ph.D. (Physics) assistant professor of physics at Pacific Lutheran University, Tacoma, WA

Walter Hurlbut, Ph.D. (Physics) at Microtech Instruments, Eugene, OR

Robert Kykyneshi Ph.D. (Materials Science) courtesy faculty at OSU

Paul Newhouse, Ph.D. (Chemistry)

Robyn Wangberg, Ph.D. (Physics) assistant professor of physics at Saint Mary's University, Winona, MN

Zachary Wiren, Ph.D. (Physics)

Vinsunt Donato, M.S. (Physics)

Jeffrey Hazboun, M.S. (Physics) to doctoral program in physics at OSU

Michael Low, M.S. (Physics)

Matthew Neel, M.S. (Physics)

Sukosin Thongrattanasiri, M.S. (Physics) to doctoral program in physics at OSU

Tyler Backman, B.S. (Physics) at the University of California Riverside Institute for Integrative Genome Biology (IIGB)

Mark Blanding, B.S. (Physics) double degree in ECE; free lance web design

Scott Clark, B.S. (Computational Physics) Graduate school at the Center for Applied Mathematics at Cornell

Scott Griffiths, B.S. (Physics, honors) to Cornerstone School of Ministry, Corvallis, OR

Drew Haven, B.S. (Physics, Engineering Physics) to graduate school in physics at Washington State University

Alden Jurling, B.S. (Physics) to graduate school at the Institute of Optics at the University of Rochester

Kenneth Lett, B.S. (Physics) working for OSU and applying to graduate school

Henry Priest, B.S. (Physics) to graduate school in Molecular & Cellular Biology at OSU

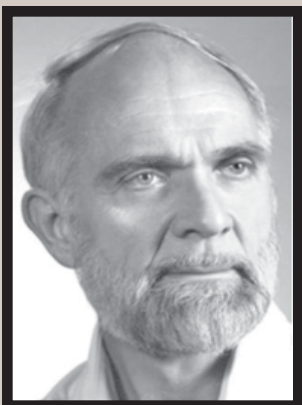
Daniel Schwartz, B.S. (Physics)

Ken Takahashi, B.S. (Physics)

Curtis Taylor, B.S. (Physics)

Drew Watson, B.S. (Physics, honors) to graduate school in Science and Mathematics Education at OSU

Physics



VICTOR MADSEN

February 14, 1931 –
July 24, 2008

Professor Emeritus Victor Madsen passed away in Corvallis on July 24, 2008 after a brave two-year battle with Alzheimer's disease.

Victor completed his bachelor's degree in physics at the University of Washington in

1953. He continued his research in theoretical nuclear physics with Professor Ernest Henley at UW, earning his Ph.D. degree in 1961. He spent his summers working at the China Lake Naval Air Station and the Los Alamos National Laboratory. Victor's Ph.D. work on the emission of deuterons from nuclei following bombardment with photons set the tone that would characterize his research throughout his career – it provided theoretical guidance that was of direct application to experimenters. Many experimenters immediately used the 1962 paper published by Madsen and Henley to assist them in analyzing their results, and the paper received numerous citations.

After two years of postdoctoral work at Case Institute, Victor joined the OSU Physics Department in 1963. His research was initially supported through a federal grant held by the group of experimental nuclear physicists working on the OSU cyclotron, which offers further testimony to his success in working with experimentalists. During his career, he continued to collaborate on research projects with theorists and experimentalists all over the world. He consulted frequently at LANL and the LBL, and could often be found during the summers either at Livermore or at

the Kernforschungsanlage in Julich, Germany. He spent sabbatical leaves in Julich, Livermore, Oak Ridge, and at the Niels Bohr Institute in Copenhagen.

Victor published more than 80 papers on nuclear physics. Particularly noteworthy was a 1966 paper presenting a new formalism for analyzing inelastic scattering and charge-exchange reactions, which has garnered more than 100 citations and continues to be cited more than 40 years after its publication. In 1975, in collaboration with Virginia Brown and John Anderson, he published a paper challenging the traditional view of a single nuclear distortion parameter. Victor's paper pointed out that the experimental data favored two different distortion parameters, one for protons and another for neutrons, and that different probes of the nucleus could reveal different values of the distortion parameters. This paper also had a huge impact on the field.

In recognition of his research, Victor was elected a Fellow of the American Physical Society. In 1985, he received the Milton Harris Award in Basic Research, OSU's highest honor for scientific research. OSU hosted a conference on nuclear physics in honor of that award, at which Victor's colleagues from throughout the world gathered in Corvallis to celebrate his accomplishments.

Victor was a successful teacher at all levels. He pioneered the use of participatory student projects in his advanced undergraduate course in mathematical physics. After his retirement in 1997, he often returned to the department to teach courses. As evidence of the respect of his colleagues, he was

repeatedly elected to serve on the departmental advisory council, and he was also elected by the College of Science faculty to serve on the OSU Faculty Senate.

As the director of the Department's undergraduate program, Victor oversaw the undergraduate curriculum and advising. He successfully led the efforts that allowed our Engineering Physics undergraduates to participate in the cooperative internship program of the College of Engineering. He was very pleased at how the chance to serve in an industrial environment proved to be a career-altering experience for many of them. He enhanced contacts with our departmental alumni and also developed recruiting contacts with community college teachers. He initiated a program of exit interviews with graduating seniors; this information proved very helpful in strengthening our undergraduate program.

Victor was a dedicated athlete, participating at various times in boxing, jogging, yoga, volleyball, and basketball (with a very accurate hook shot). At our annual softball games, he was appreciated both for his tape-measure home runs and his patience in pitching to the small children who attended the departmental picnics. He was a master of languages, fluent in Spanish, German, and Danish, and was studying Italian up until the time of his death. Victor is survived by his wife Carolyn, by two children and two step-children, their spouses/partners, and four grandchildren, all of whom (along with his former students and colleagues) will miss his gentle and caring nature.

Ken Krane

Physics

Truly Surface Optics

Viktor Podolskiy

Viktor joined the OSU faculty in 2004. In 2008, he was awarded the College of Science's Thomas T. Sugihara Young Faculty Research Award for his work in theoretical optics.

There has been much written in the popular science literature recently about such exotic optical effects as negative refraction of light, super-imaging, and optical "cloaking". These phenomena are made possible by surface plasmon polaritons (SPPs), which are surface electromagnetic waves that result from an interplay of light and free electrons confined near the surface of a material. SPPs are already widely used in biosensing and optical characterization.

SPPs are able to confine light to the nanoscale. This is important because light wavelengths are thousands of nanometers and conventional optics is diffraction-limited on the nanometer scale. With SPPs, we effectively eliminate the diffraction limit and it is then possible to think about an optical link between conventional telecom devices (which operate at 1500 nm) and the 50-nm-sized components of modern electronic circuits.

My group has developed an approach to design the surface analogs of lenses, prisms, and other optical elements to steer and reshape SPPs so that they can be controlled just like ordinary optical beams. We think this development may resolve the communication bottleneck in modern electronics, which would be very exciting!

The ideal SPP-based circuit would be a planar surface-guiding layer coupled to the underlying electronic chip. The surface

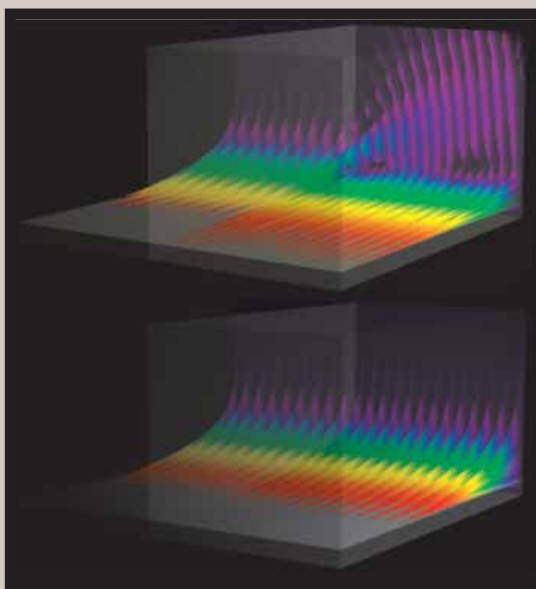
waves in such a circuit would provide ultrafast optical on-chip processing, and would be used to for controlled coupling between nanoscale electronics and microscale optical fibers, providing inter-chip communications. Unfortunately, in conventional **isotropic** media the "height" of the surface wave strongly depends on the material properties. Every attempt to modulate the propagation of SPPs results in a "splash" that is depicted in the top panel of the accompanying figure: out-of-plane scattering of electromagnetic energy, reaching 10-30% in typical SPP systems. This strong scattering not only decreases the signal intensity, but it also results an uncontrolled communication channel between the information carried by SPPs and parasitic "optical noise" always present in the room.

In work recently published in *Physical Review Letters*, graduate student Justin Elser and I demonstrated that it is possible to use carefully designed combinations of **anisotropic** media to perfectly match the profile of SPPs across the system, completely eliminating the parasitic scattering, as seen in the bottom panel of the figure. We showed that the laws of ideal surface optics are identical to the well-known laws of 3D optics. The formalism we developed can therefore be used as a recipe to design complicated SPP circuits that would include lenses, mirrors, and even Bragg reflectors.

A very promising class of applications would take advantage of electro-optical materials where electric field is used to control the optical anisotropy. In these

devices, a layer of electro-optical material would be deposited between the metallic contact and the electronic control circuit. The nanoscale electronics would then be used to dynamically create or destroy surface lenses, prisms, and other optical elements, steering SPPs along the chip. This opens extraordinary potential for a merger of optics and nanoelectronics, and an entirely new range of products based on such technology.

My group is currently developing a generalization of our technique to achieve better control of light propagation in all-dielectric planar waveguides. We have also started a collaboration with Miriam Deutsch and her experimental team at the University of Oregon to test our theoretical predictions. Our work is sponsored by the National Science Foundation and the Office of Naval Research through a block grant from ONAMI.



(top) out-of-plane scattering of surface waves at the interface between two conventional plasmonic elements;

(bottom) the scattering is completely eliminated in anisotropic structures

Physics

Spotlight on OSU physics grads: teaching as a career

Three of our spring Ph.D. graduates obtained faculty positions, and two of our senior doctoral students, both recent winners of the Graduate Teaching Assistant (GTA) award, obtained visiting faculty positions while concurrently completing their theses. While we have many graduates who have gone on to successful teaching careers, this is a larger number than usual. It's difficult to obtain a faculty position, especially straight out of a PhD program, so congratulations are in order for these current and former OSU students!

Where they are now and what they are teaching this year:



Katrina Hay

- **Katrina Hay:** Assistant Professor of Physics, Pacific Lutheran University, teaching Introductory Physics with Calculus and labs, and Electromagnetism.
- **Robyn Wangberg:** Assistant Professor of Physics at Saint Mary's University, teaching Quantum Mechanics, labs for Introductory Physics, Foundations of Physics, and senior research projects.
- **Matthew Price:** Assistant Professor of Physics and Astronomy Education at Ithaca College, teaching a solar system astronomy course, an activity-based astronomy course, and labs.

- **Vincent Rossi:** Visiting Assistant Professor at Pacific University, teaching The Physics of Everyday Phenomena, Workshop Physics, Thermodynamics, Energy & the Environment, and Geometric Optics Labs for Optometry.
- **Kenneth Walsh:** Visiting assistant professor, Western Oregon University, teaching introductory physics and labs.

Katy, Robyn, Matt, Vince, and KC answered questions about their teaching influences, what prepared them to teach, and what they hope students learn from their courses beyond content. They also offered advice to graduate students who are interested in a career in teaching. A sample of their responses is given below, and their full responses can be viewed at: http://physics.oregonstate.edu/~demareed/OSU_grads_teaching_full_article.doc

1. What motivated you to teach?

- **Katy:** I struggled with physics so I know how to bring the students to understanding from "the ground up," helping me explain complex concepts clearly. I bring no pretension to the classroom, which is an example I want to set for the scientific community, and teaching is my way of serving.
- **Robyn:** After working as a computer programmer for just one year, I knew I wanted a career where I interacted more with people. I went to graduate school with the goal of teaching at a small liberal arts college as I truly valued my undergraduate experience at Luther College.

2. How did your graduate studies at OSU prepare you for teaching, and what prior experience gives you practical help while you are in the classroom?

- **Katy:** Being a GTA helped me think on my feet, be relaxed, confident, and enjoy being in front of a classroom; my students laugh with me during class. I learned about classroom presence mentoring with Chris Coffin and Matt Price and learned the value of an interactive environment from Corinne Manogue and Janet Tate while helping with Paradigms. I appreciated the environment in undergrad and at OSU where I felt the faculty sincerely believed in me and cared about my learning; it motivated me to work hard.
- **Vince:** A deeper understanding and appreciation of mathematics and physics gives greater knowledge to draw from when presenting, responding to questions, and drawing connections between different disciplines within physics. I spent 5 years as a GTA including being a Paradigms student and GTA. I worked at Texas A&M incorporating Paradigms materials into lower-division lecture courses, and taught part-time at LBCC for 1.5 years, giving me the opportunity to learn how to develop my own curriculum and materials.
- **KC:** Being a GTA for almost every possible physics course prepared me tremendously for teaching. In addition, Ken Krane gave me an opportunity to do a teaching practicum under his skilled guidance. I also learned a lot from experiencing active

Physics

The Baden-Württemberg Exchange Program

Many physics alumni have fond memories of the Baden-Württemberg (BW) exchange program, which brings about 40 German graduate students (spread across all disciplines) to Oregon every year. In the 1990s, the physics graduate program at OSU was home to as many as 10 German students on this one-year exchange. One of them, Guenter Schneider, is now an assistant professor in our department. Several years in the last decade have seen no exchange students. Factors that contributed to this drop include the growth of competing exchange programs, the retirement of Prof. Weidlich from the University of Stuttgart, who was an enthusiastic supporter of the exchange of physics students with OSU, and a decline in numbers in the department in the mid-nineties. Happily, today we are again welcoming talented BW physics students to a re-energized OSU physics department. Jörg Bochterle belongs to this new generation of students. His experience in 2007-2008 illustrates the fantastic opportunities our department has to offer.

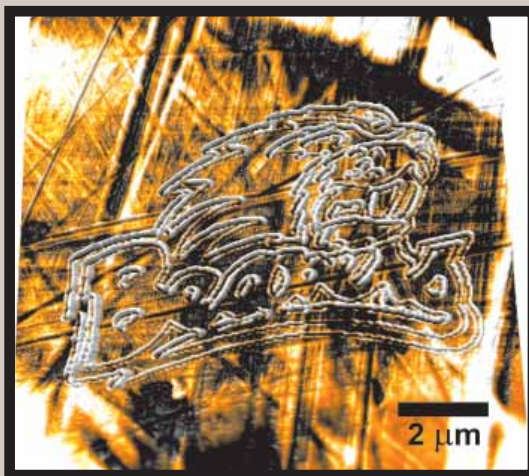
Students from Baden-Württemberg (a state in the southwestern part of Germany, next to Bavaria) looking for a reciprocal-tuition exchange programs with North America can choose between more than 50 campuses. Jörg had a clear explanation for choosing Oregon, "the quality of skiing beats everywhere else!" Jörg didn't discover the quality of the OSU Physics program until after he arrived. "I thought I would mostly be snowboarding and having a good time, but the physics classes are so great. I didn't understand quantum mechanics until I took Oksana's classes at OSU. My German professors are not easy to approach, we don't interact in lectures, and we just study for the exam in the last week of term. The OSU classes are totally different. I learned so much." While we can be thankful that outdoor opportunities in Oregon are well known, new contacts with BW

universities being established by Guenter Schneider will be critical for informing BW students about the quality of our physics program.

Research also made Jörg's academic experience at OSU exciting and memorable. Jörg worked for 8 months on a nanoelectronics project in Ethan Minot's research group. Some of Jörg's work was featured on the cover of *The Daily Barometer*: "Using nanotechnology tools, a team of OSU students and faculty have created the world's smallest image of the fighting beaver logo." Jörg created the image to test the control of the atomic force microscope (AFM), a tool used to view and create nanoelectronic devices in Minot's lab. After successfully etching the fighting beaver onto a plastic surface, Jörg began patterning graphene – a carbon-based electronic material that is one atom thick. The long-term goal of this work is to create electronic circuitry that takes advantage of nanoscale dimensions – Jörg's passion for the project took the group several steps closer to achieving this goal.

The spirit of the BW exchange program is alive and well. Johannes Zeman joins us this year, and we look forward to welcoming more BW exchange students in 2009. With word-of-mouth, new contacts between OSU Physics and BW universities, and "Benny the fighting nanobeaver" (who graces the accompanying figure) hanging on Jörg Bochterle's apartment wall – we know that BW and other exchange students will be drawn to our department both by its academic reputation and the great life-style it offers. For info on the BW exchange go to:

<http://oregonabroad.ous.edu/countries/germany/bw/bw.html>



Jörg etched Benny the Beaver onto a CD!



Powder hound!

Physics

TAMU APPEAL: Texas A&M adaptation of the Paradigms in Physics

Vincent Rossi

Vince is a graduate student in Physics. In 2007, he won the departmental TA Award. He spent Fall term working with the TAMU APPEAL program (Texas A&M University Adaptation of the Paradigms in Physics Education Approach in Lectures).

During the Fall Semester of 2007, I worked as a visiting instructor at Texas A&M University (TAMU), adapting curricular materials and techniques developed by the *OSU Paradigms in Physics team*. Professor Jairo Sinova and I team-taught *Thermal Physics, Waves and Optics*, the third semester of the TAMU introductory physics sequence, with 28 sophomore physics majors. I also assisted Jairo and Professor Peter McIntyre with TAMU's Advanced Mechanics course, a junior level course with 25 majors. Tracy Rossi, MEd, was an educational consultant and impartial liaison between the teachers and students, helping collect feedback. The TAMU Center for Teaching Excellence was also supportive of this project.



Vince Rossi helps Texas A&M students study OSU Paradigms in Physics materials.

The *Paradigms* combine an innovative restructuring of junior-level physics courses with a multi-faceted curriculum that incorporates an active learning environment. Although the *Paradigms* 3-week modular structure is unique to OSU, the subject matter is common to all physics curricula. Particular elements and activities from the *Paradigms* were easily incorporated into the TAMU courses. In the Waves and Optics segment, we found that *Paradigms* activities that employed group work where students could check their reasoning against computational results were particularly successful, like the Fourier analysis of square, triangular, and other waveforms. OSU

Paradigms students will recognize other examples: averages of harmonic functions, the geometric meaning of $\mathbf{k} \cdot \mathbf{r}$, and finding the coefficients of the terms in a waveform from particular initial conditions. Since the curriculum at TAMU is arranged differently than that of the *Paradigms*, I worked to fill in any holes by developing a variety of activities that stayed true to the *Paradigms* philosophy.

Sharing the engaging curriculum that I appreciated as an undergraduate student and as a GTA was a wonderful experience for me, and it created a good deal of excitement around TAMU's physics department. Students were enthusiastic about the courses, and many of the upper division students told me that they wished they had experienced such activities in their introductory courses. On one occasion, Tracy and I happened to meet a non-physics student who started talking about an exciting physics course her friend was taking - it turned out her friend was in Jairo's course! The faculty were excited, too. Jairo and I spent many afternoons in discussion with faculty members, often giving impromptu demonstrations or asking them to try the activities themselves.

Based upon student performance and responses, incorporating the *Paradigms* into TAMU courses was a success. In particular, the introductory students were enthusiastic about the new curriculum and expended incredible effort. The *Paradigms* materials exposed introductory students to advanced topics like Fourier theory that are normally saved for upper-division courses, and I think this triggered the enthusiasm and effort. Ultimately, we

hope that the added exposure to more advanced topics within a supportive pedagogical approach should lead to further success as students progress toward their degrees. More details about this project can be found on the TAMU APPEAL website: <http://appeal.physics.tamu.edu>

Physics

Weniger room remodel:

In last year's newsletter, we announced the planned remodel of the public classrooms in Weniger. Through collaboration with the university's classroom committee, a complete remodel of the small 2nd floor classrooms was completed to make those rooms more suitable for active-engagement including fully upgraded technology. Following suggestions made by the physics department and the Center for Teaching and Learning, the largest lecture hall in Weniger, room 151, underwent a radical re-design that will serve as a model room on campus for testing innovative teaching ideas. This lecture hall now includes state of the art technology along with new tiering and seating that are explicitly designed to support interactive-engagement. These classrooms were ready for use at the start of fall term 2008, though swivel chairs and new lighting will be installed over winter break. The renovation of the remaining Weniger lecture halls is slated for next summer. The construction of a new teaching space dedicated to physics is now in a concrete planning phase thanks to the generous gifts

Spotlight on OSU physics grads: teaching as a career (continued from page 5)

engagement as a student in OSU's undergraduate classrooms.

3. *What is one of the main things you hope students will come away with after taking a course with you, and what influenced this to be one of your course goals?*

- **Robyn:** I aim to challenge students while encouraging them and promoting their self esteem. From teaching the Making Connections course and lab GTA experience, I learned that having students work in groups improves their communication skills and forces them to think about problems from more than one perspective and debate strategies. Working with Corinne Manogue, I realized the importance of subtle, effective questioning and patiently waiting for answers.
- **Matt:** Students need to know not only content but also how that content came to be accepted as scientific knowledge; knowing about testing and confirming Newton's laws is as important as knowing Newton's laws. If you want students to know the processes that make up science, you have to explicitly discuss them at every opportunity.

to the department from the Serrurier family and Dr. Joan Suit. Along with the \$100,000 in TRF funding awarded to the department for technology in this room, we will continue to serve as a model for interactive-engagement in undergraduate courses.



Weniger 151 in Fall 2008 has better lighting, acoustics and room for instructors to walk among the students.



Weniger 151 in 2007

- **KC:** I try to encourage students to enjoy learning about the physical universe and not be afraid to try the challenging problems that may arise.
- 4. *What advice would you give graduate students who want a career in teaching?*
 - **Matt:** Consider what kind of teaching environment would be a good fit for you. An R1 school will have different job descriptions from a liberal arts school and will require different preparation. Get involved with leading a classroom beyond being a GTA - volunteer to come to a local school, teach at the local community colleges, get involved with Saturday Academy, Adventures in Learning, Outside the Box, and Discovery Days at OSU.
 - **Vince:** Teach in as many different capacities as possible. Get involved with courses that are using PER to develop or promote new pedagogies. Be familiar with Workshop Physics, Just in Time Teaching, Interactive Lecture Demonstrations, Paradigms in Physics, SCALE-UP, and the like. Learn how to use interactive tools such as white boards, "clickers", and LoggerPro, including how to ask and manage interactive questions.

Physics

Other Department News:

Faculty, Staff, and Visitors:

Astronomy is revitalized! **Bill Hetherington** has been working with **Rozi Nystrom**, **Guy Cutting**, **Troy Ansell** and **Daniel Schwartz** to build a radio telescope on the roof of Weniger Hall. Physics has received a generous gift of computing equipment from the HP Employee Product Gift Giving Program to support this project. Observation of 1.4 GHz emission from atomic hydrogen can be made at any time, day or night, even when it is raining. Currently, hydrogen distributed throughout the plane of the galaxy can be detected. Much lies ahead to improve the sensitivity, angular resolution and tracking ability. "Developing reduced noise electronics for a gigahertz radio telescope and implementing a real time web interface," submitted by **Daniel Schwartz** was selected as a 2007-2008 Undergraduate Research Award winner by the national SPS organization.

Ken Krane was named Eminent Professor of the University Honors College for 2008 in recognition of outstanding instruction to the university's honors students at the Honors awards ceremony in June, he also received the Outstanding Prof award, which is selected by the students. Read more at <http://oregonstate.edu/events/newsevents/krane.html>

Janet Tate received new funding from NSF for work on n- and p-type doping of wide gap semiconductors.

Corinne Manogue and Math professor **Tevian Dray** have a new grant from FOXI to study octonions.

David McIntyre was elected to the faculty Senate.

Yun-Shik Lee returned from a year's sabbatical leave in Marburg, Germany, where he conducted a terahertz research program as a Humboldt research fellow and wrote an introductory book on terahertz science and technology, to be published by Springer in 2008. His research group has demonstrated extreme nonlinear transients in semiconductors for the first time, and published the results in Physical Review Letters.

Rubin Landau's fifth book: *A Survey of Computational Physics: Introductory Computational Science* with **Manuel José Páez** (Ph.D. 1982) & **Cristian C. Bordeianu** will be receiving the DOE Undergraduate Computational Engineering & Science award in November at SuperComputing 2008 in Austin.

Guenter Schneider and **David Roundy** have set up a new computing cluster consisting of ten nodes and gigabit interconnects. Each node has 2 high-end processors (quad-core Xeon running at 3GHz) and 16 GB of RAM for a total of 80 processor cores. Simulations currently running on the cluster investigate the properties of ferroelectrics, interfaces and defects of wide bandgap semiconductors, and mechanical properties of carbon nanotubes.

Liz Gire has been working on Paradigms Portfolios, a wiki that disseminates the teaching strategies employed in the Paradigms program. Look for it at <http://physics.oregonstate.edu/portfolioswiki/>

We're pleased to welcome **Dr. Honglyou Ju** and his graduate student **Joon-Chul Moon** from Yonsei University in Korea who are visiting Janet Tate's group for 6 months.

All that work in the physics machine shop paid off! The OSU solar vehicle team participated in the 2008 North American Solar Challenge! The team used our machine shop facilities under the guidance of machinist **Bob Boyer** to build their car (read more about their exploits at <http://oregonstate.edu/groups/solar/>).

Graduate students:

Pete Sprunger received the departmental Graduate Research Award and **KC Walsh** garnered the Graduate Teaching Award – well done both of you!

Andriy Zakutayev and **Paul Newhouse** both received College of Science travel awards to present their research at international conferences this year. Andriy presented his work on excitons in wide-gap semiconductors at the American Physical Society March meeting in New Orleans and Paul gave a talk on Cu_3TaS_4 at the European Materials Society meeting in Strassbourg, France in April.

Mark Kendrick and **Andy Platt** presented their research at CLEO in May in San Jose, CA. Mark's work was on optical tweezer forces, and Andy's on luminescence & photoconductance. Andy also presented his work at the American Chemical Society meeting in Philadelphia in August, as did **Whitney Shepherd**, whose presentation was on luminescence, and single molecule fluorescence.

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Other Department News: (continued from page 9)

Tristan DeBorde, undergrad Caleb Joiner, and Matt Leyden (and of course faculty advisor Ethan Minot!) published their work on carbon nanotubes in the journal Nano Letters.

Whitney Shepherd, Andy Platt, Josh Russell, Andriy Zakutayev, along with Engineering Physics sophomore Dustin Quandt attended the Oregon Center for Optics retreat in Cottage Grove in September.

Undergraduates:

Scott Clark graduated with a B.S. in Computational Physics, and received a Department of Energy Computational Science Graduate Fellowship to enter graduate school at the Center for Applied Mathematics.

Howard Hui is one of five summer interns associated with NASA's Goddard Space Flight Center who have been selected as a "John Mather Nobel Scholar 2008".

Alumni update:

We're always pleased to hear news of your careers and activities. Drop an email to individual faculty members or update us via our alumni page at the departmental website and check out our new alumni spotlight page. Please keep your address current with the OSU alumni office, so we can mail you a copy of the newsletter.

Undergraduates:

Doug Buettner (B.S. 1991) just completed his Ph.D. in Astronautical Engineering with a minor in Computer Science from USC while working full time as a Systems Director for space flight software for the Space Based Surveillance Division of The Aerospace Corporation.

David Ohm (B.S. 2000) graduated from OSU with a PhD in Electrical Engineering. He is working for a consulting company that specializes in image reconstruction.

Frank Oliver (B.S. 2001) is on the Robotics Technology Consortium Technology Advisory Board, which is working with the Joint Ground Robotics Enterprise in the Office of the Secretary of Defense to help push the development of ground robotics technology. He will be advising the DOD on development of robotics systems, performing program reviews, and advising on R&D funding allocation.

Chris Holmes-Parker leads an undergraduate group working with Prof. Bill Hetherington to establish the OSU Pico-Satellite Project. A picosatellite, or cubesat, will be launched into low earth orbit and perform a significant experiment, such as studying the near earth space environment, the atmosphere of the earth or energetic particles from space. Faculty and undergraduates from other science and engineering departments are also involved, and collaborations with groups at other universities are anticipated. The immediate focus is to write proposals for funding, build a communications ground station on the roof of Weniger Hall and prepare a test launch using a high altitude balloon.

SPS is looking forward to a new year of exciting activities. The 2008-2009 SPS officers are Jeff Macklem, president, Paul Weitzman, vice president, and Michael Paul, treasurer, Bill Hetherington is the faculty advisor. Check out the SPS webpage at <http://physics.oregonstate.edu/SPS>

Alex Linden-Levy (B.S. 2001) earned his PhD in Physics from the University of Illinois (Urbana Champaign) and is now a postdoc on the PHENIX experiment at the University of Colorado. He credits the Paradigms program as pivotal in his success!

Winston Burbank (B.S. EP 2004) received his Master's degree in Mechanical Engineering from U. Alaska (Fairbanks). He is working towards the PhD degree continuing his Master's research on computer modeling the thermodynamics of a fuel cell/turbine hybrid engine.

James "JC" Saunders (B.S. 2006) is pursuing a graduate degree in the Physics department of the University of Texas at Austin under Prof. Mike Downer. His field of study is plasma-optics interactions.

Joe Kinney (B.S. 2007) is en route to a PhD in Physics at the University of Minnesota. He passed the comp exam this year!

Ben Weston (B.S. 2008) has taken a job at FLIR, a world leader in thermal imaging systems

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Alumni update: (continued from page 10)

Graduate Students:

Mike Lampert (M.S. 1990) was chosen as Oregon Teacher of the Year for 2008-09. Mike teaches physics at West Salem High School. The October 3 issue of the Oregonian carries the full story.

Paul Stanley (Ph.D. 1995) is Physics Department head at Beloit College, and was one of three co-directors of the US high school team that competed in the International Physics Olympiad in Vietnam.

Shannon Mayer (Ph. D. 1997) was promoted to Associate Professor of Physics with tenure in the department of Chemistry & Physics at the University of Portland.

Matt des Voignes (M.S. 1999) is a computational science educator at Shodor Education Foundation.

Bodhi Rogers (Ph.D. 2003) is an assistant professor at Ithaca College. He specializes in ground-based remote sensing and physics education research. He'll be collaborating with the Paradigms Project on a thermodynamics project this year.

Dara Easley (M.S. 2005) is working for a law firm that deals with intellectual property issues in Portland, Oregon.

Jim Ketter (M.S. 2005) is an instructor in our very own department! He oversees all the

labs and course demonstrations, and is involved with TA training and mentorship. This term he's also teaching introductory Astronomy.

Matt Price (M.S. 2005) obtained a PhD from OSU's Science & Math Education department in 2008 and has begun his new position as Assistant Professor of Physics at Ithaca College, NY. His specialty is Physics and Astronomy education.

Dona Hertel (M.S. 2007) is a part-time Physics instructor at Portland Community College and studying Computer Science at PSU.

Sasha Govyadinov (Ph.D. 2007) is a postdoc at U. Penn.

Contributions to the Physics Department, October 2, 2007 to September 30, 2008

We are grateful for the generous support of our donors. Your philanthropy allows us to establish scholarships and fellowships for graduate and undergraduate students, to support faculty and student travel to conferences, to host visiting speakers, and to seed new teaching innovations like space redesign.

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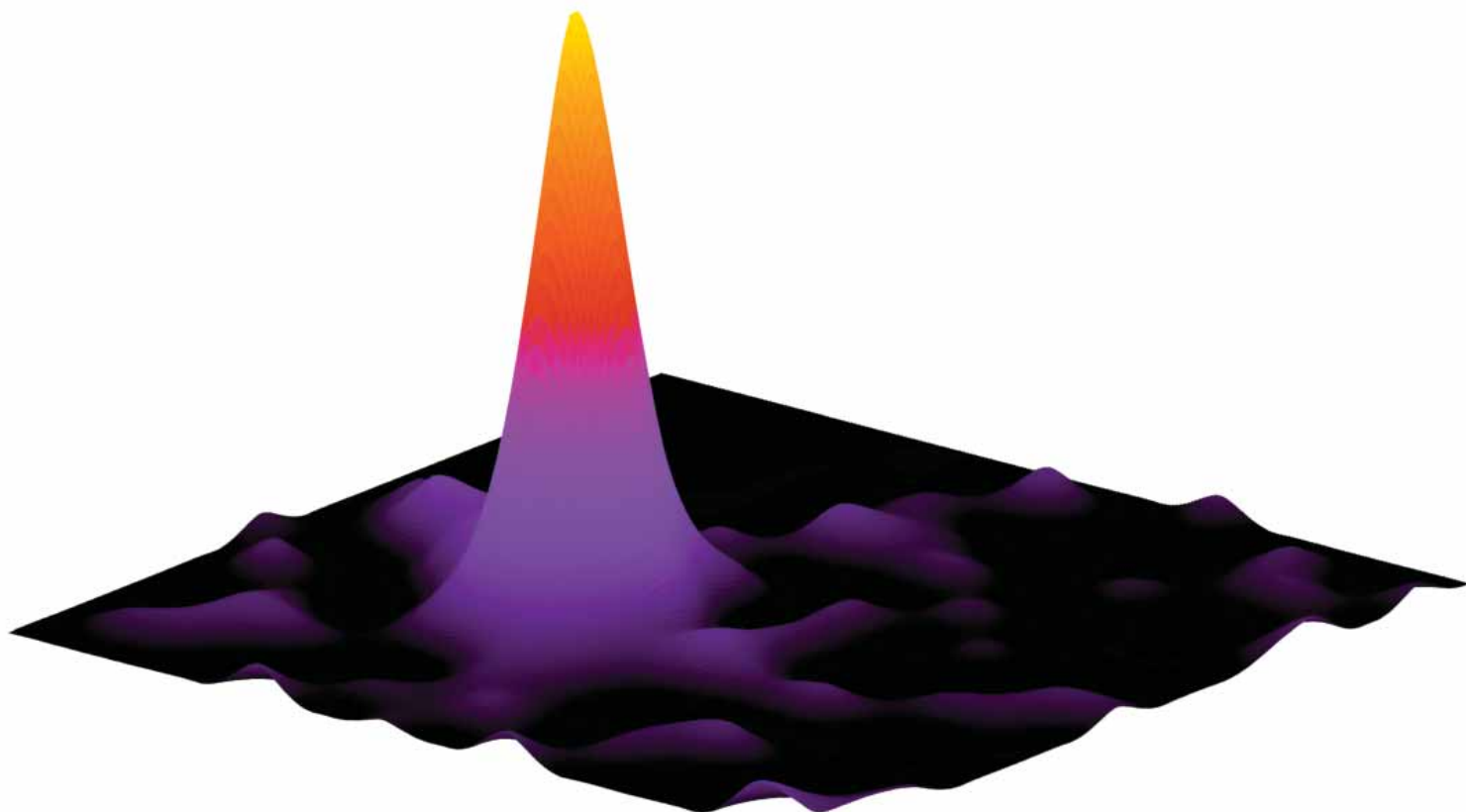
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or contact

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Henri Jansen: 541-737-4631; Physics.Chair@science.oregonstate.edu

Thanks so much for your support!



From Oksana Ostroverkhova's lab: a $2\ \mu\text{m} \times 2\ \mu\text{m}$ image of one single molecule of an organic photoconductive fluorescent functionalized anthradithiophene molecule in a thin polymer film poly(methyl)methacrylate. Data were taken by Whitney Buchanan and Andy Platt with an EMCCD camera (DU897E from Andor Technologies) recently added to the state-of-the-art facility that combines wide-field and time-resolved confocal imaging capabilities, and also enables simultaneous optical tweezer trapping and single-molecule fluorescence detection.