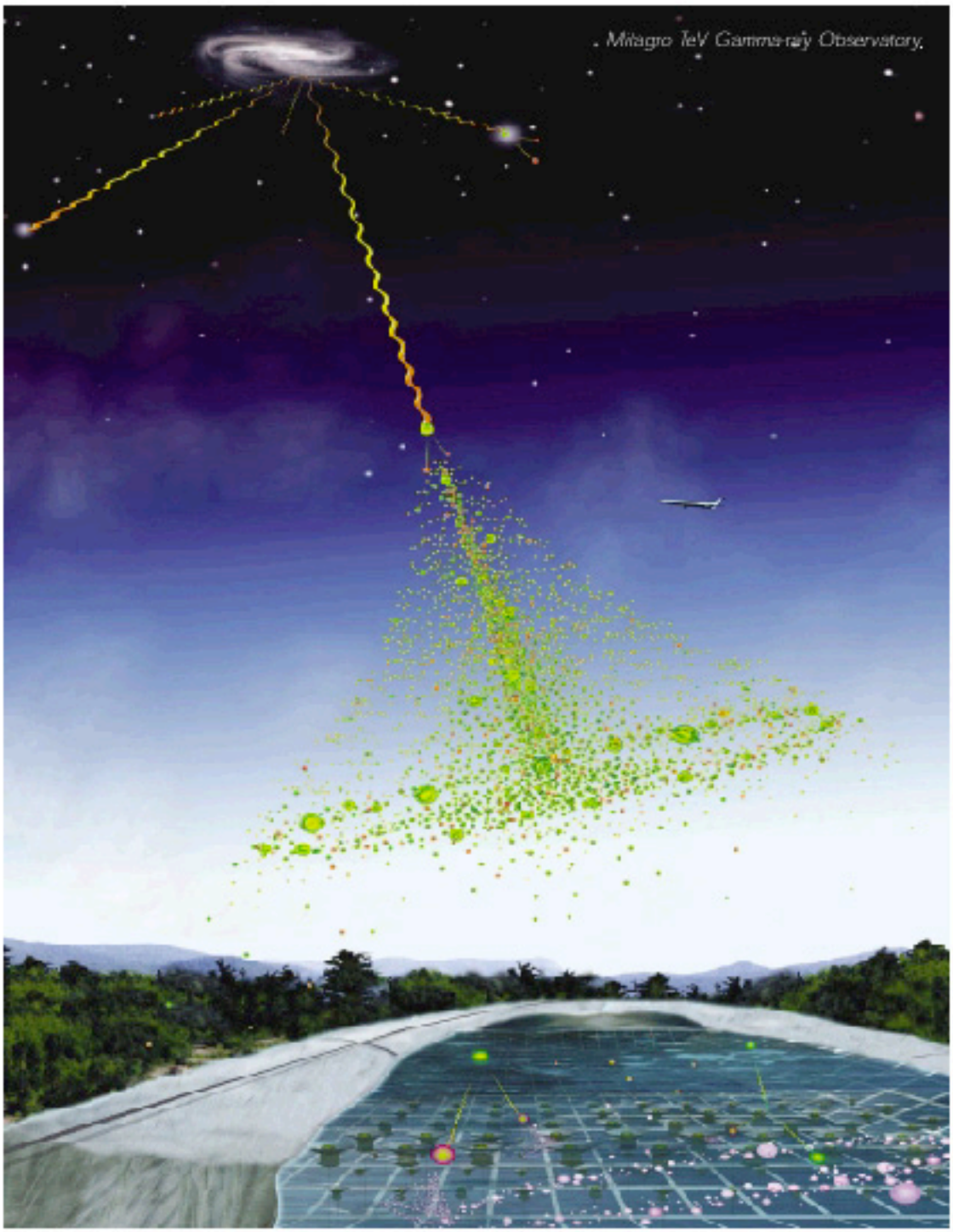
THE WISCONSIN PHYSICIST

VOL. 8 NO. 1 A NEWSLETTER FOR UNIVERSITY OF WISCONSIN PHYSICS ALUMNI FALL/WINTER 2001-02



UNIVERSITY OF WISCONSIN–MADISON

FEATURES

Cover Illustration: The picture on the front cover depicts the operation of the Milagro TeV gamma-ray observatory. A high energy gamma-ray is emitted from a distant active galaxy and upon hitting the Earth's atmosphere creates a shower of energetic particles. Some of the particles in the shower land on the Milagro detector which is a 5,000 square meter by 8 meters deep pond shown at the bottom of the picture. The pond is enclosed in a black, light-tight cover that is peeled back in the picture to expose the grid of 737 photomultiplier tubes. When the shower hits the pond, the particles create Cherenkov light in the water that can be detected by the photomultiplier tubes. The particles in the shower are moving at nearly the speed of light and form a pancake which is perpendicular to the direction of the initial gamma ray. By recording the time that each photomultiplier tube is hit, the Milagro detector is able to determine the orientation of the pancake and hence the direction to the active galaxy to approximately half of a degree. This angular resolution, as well as other characteristics of the distribution of the particles in the shower, are essential to observing TeV gamma-ray sources over the plentiful isotropic background of cosmic rays.

The Milagro observatory is located in the mountains above Los Alamos, New Mexico, and it's operation is a collaborative effort involving Prof. Brenda Dingus of the University of Wisconsin — Madison as well as Los Alamos National Lab, University of Maryland, University of California Santa Cruz, University of California Irvine, University of California Riverside, New York University, George Mason University, and the University of New Hampshire. The project is jointly funded by NSF and DOE.

The artwork was done by Aurore Simonnet • aurore.simonnet@sonoma.ed • www.imaginearts.com/simonnet

Greetings to Physics Alums

Hello again. Our last issue of The Wisconsin Physicist was so full of news, I wasn't sure that there would be any left for this, our eighth issue. I was wrong. As always, things are moving close to the speed of light here in Madison, Wisconsin. As usual, when you are in the "thick" of activity, you fail to notice the real progress you are making at the time. I've decided to take a step "outside the box" and check on our activities.


Jean Buehlman, Editor

I'm actually referring to the many small but significant changes that have been put into place during the past year by a physics "team effort." Some of these changes come as a result of internal and external department reviews, discussions and just plain good ideas. Let me give you some examples:

Physics had its first Town Meeting this past spring. The Chair met with current graduate students to hear about their issues and concerns.

When the remodeling plans for Chamberlin Hall came to the forefront, we asked for both undergraduate and graduate student input on issues that concerned them. The result was that one graduate student, Kyle Cranmer, even created a website to collect the input.

This fall, 2001, was to mark the first time that the American Physical Society Climate Team had ever been invited to visit our department. Unfortunately, September 11 events postponed this visit until April, 2002. The goal will be to find out how our climate feels to both undergraduate and graduate students and to improve it in any way possible.

New questions were added to both the teaching assistant and instructor/course evaluation forms during the spring semester. We asked, "How effective was this TA or instructor in creating a comfortable learning environment?" In addition, we have kept two staff members busy during the semester working to develop and test the idea of using electronic course and instructor evaluations.

The newly-formed Women Entrepreneurs in Science and Industry (WEST) was invited to create their initial pilot program in our department. As you will read later in this issue, this group brings professional development information and updates about the world of business (as it relates to physics education) to our department. WEST is a facilitator of the technology transfer from academia to business. WEST was founded by a group of former physics and astronomy graduate women who are interested in helping graduate students understand that there are many opportunities available to them in the entrepreneurial world. They are also dedicated to helping them gain the kinds of "real world" professional skills they will need to be successful whether they stay in academia or go into business. Faculty are becoming more aware that not everyone who pursues a Ph.D. will ultimately become an academic. We believe that the contemporary university can help provide a more well-rounded education for graduate students by encouraging participation in such organizations.

The hiring of the fifth physics faculty woman, Susan Coppersmith, brings us from low on the rungs of the "number of women faculty in physics ladder" to closer to the top.

Faculty have been encouraged to consider creating a new, exciting, introductory-level course in physics geared toward biologists. This idea has been keeping folks like Don Cox, Martin Olsson, and others busy. Actually, 207 switched to a textbook which is more adaptable to such an idea this fall semester.

The creation and inauguration of two new alumni awards, Distinguished Alumni Fellow to Fay Ajzenberg-Selove and Distinguished Faculty Fellow to P. R. "Dick" Moran, at our annual Awards Ceremony this past May gave us the opportunity to say "thank you" and reminisce with two of our valued alumni.

While many of these changes seem small and insignificant when looked at individually, cumulatively, from my viewpoint, they are helping to create a more energetic working environment. Participatory management, based on the shared-governance model, and teamwork are the efforts that keep everyone, faculty, staff and students

informed and involved. We are doing our best to be the best. Enjoy the news and have a great year everyone!

Oh — with all the other excitement here, I forgot to tell you my big news. I am planning to retire on January 2, 2002. I will have completed a ten-year stint in physics by that time. I have appreciated the opportunity to personally meet many great physics alums over the years. Please continue to carry on the excellent connections we have built up over the past eight issues of The Wisconsin Physicist. And thanks to the many of you who have contributed your time, efforts and money to your alma mater. Keep up the good work! I'll be watching. Bye.

Jean Meyer Buehlman

BULLETIN

The events of September 11 serve as a tragic and shocking reminder of the fragility of our society. It seems that as technology increases, the robustness of everything is diminished. Those very techological devices of which we are so proud were used against us.

We share the understandable desire is to "fix" the situation as quickly as possible, but this is a "new ball game" whose rules we but dimly grasp. We must guard against a reflexive response and choose a course of action which is measured and effective. But beyond all, we must maintain an even course. It would be truly ironic if we were to lose the very essence of our society that is so envied.

So we will "keep the faith" in the scientific method as we search for understanding and control of our world. And we will continue to pass on to the next generation those skills and knowledge that have brought us to this point.

For those who suffered personally in the attack, be assured of our sympathy and concern. We on campus wish all of you a safe and secure passage through these turbulent times. I trust that cooperation and collaboration will continue to assist us in the journey.

Don Reeder

View from the Chair

I have now completed my first year as a recycled Chair and so far have avoided running the ship of state onto the rocks. In November 2000, we had a review of the Department by an external committee chaired by Prof. C. P. Slichter of the University of Illinois. In general we were confirmed in our knowledge of deficiencies and our path to improvement. One new component is the periodic retreat, a day-long meeting at which the entire Department considers important issues. The External Committee did note that one item was beyond the capability of the Department alone to rectify — the shortage of space. Although the renovation of Chamberlin Hall will address the quality of the Department's lab space, the quantity remains short and limits programmatic expansion and development. The acquisition of additional space will be a long-term effort requiring the assistance of the College and Campus as well as the UW Foundation and the generosity of our donors.

Don Reeder, Chair

One engaging and enchanting feature of being chairman is to watch (from a secure place) the wonderful and varied accomplishments of my colleagues. More details are available in this issue, so I will but provide some examples.

- In February, a cold but happy Prof. **Peter Timbie** hosted a celebration in honor of the completion of construction of his POLAR telescope that is designed to observe the polarization of the cosmic microwave background radiation. The observatory is located just outside of Madison at Pine Bluff. After commissioning and checking out the apparatus, he intends to deploy it in Antarctica.
- In better weather, i.e. May, our version of Newton's original Apple Tree was planted near Chamberlin Hall. The tree was a gift of the Hon. F. J. Sensenbrenner, member of Congress and former Chair of the House Science Committee.

- In addition to the more conventional honors received by my colleagues, we were delighted in June to welcome Professor **Gelsomina "Pupa" DeStasio** back from Chicago where she received the "Cavaliere della Repubblica." In consonance with our precedent breaking reputation we now have our first Sir Madam Professor.

- Another important and well-deserved recognition was the Frontline Award by the Student Personnel Association to **Barb Schutz**, our Graduate Secretary. Her warmth and enthusiasm has helped new graduate students to decide to become Badgers and to settle in as well as documenting their progress in surmounting the regulations and requirements.

- Professor **Clint Sprott** continues to reach out to the public with his "Wonders of Physics" performances which are held in the spring. He has also put his show "on the road" and the demand remains high to appear at various schools around the state.

I was delighted to preside at the Second Annual Awards Banquet held in May, during which I was privileged to award the first Distinguished Alumni Fellow to Professor **Fay Ajzenberg-Selove** of the University of Pennsylvania in recognition of her outstanding career and for her interest and support of the Wisconsin Physics Department. Another highlight was the presentation of the first Distinguished Faculty Fellow to Prof. (emer.) **P. "Dick" Moran** of the Bowman Gray School of Medicine at Wake Forest, also for exceptional contributions.

The reconstituting of the Department continues as we cope with the maturing of the faculty and the evolution of physics research. Professor **Paul Quin** retired after almost thirty years of research in nuclear physics. We are delighted to welcome Professor **Susan Coppersmith** to the faculty. She comes to us from the University of Chicago and before that from AT&T Bell Laboratories. She is a condensed matter theorist and received her degree at Cornell.

The Department has been particularly well served recently by the former Chancellor Ward's initiative in which he challenged the legislature and the Governor among other things to match the UW Foundation to support the increase of the Madison faculty by about 10% — specifically in interdisciplinary areas. Physics successfully competed for these Madison Initiative and Sesquicentennial positions and we have been able to attract Professor **G. "Pupa" DeStasio** in Biophysics; Professor **Robert Morse**, Astroparticle Physics; Associate Professor **Brenda Dingus** in Astroparticle Physics and Assistant Professor **Mark Eriksson** in Nanostructures.

In the final round of the initiative we were successful in a joint proposal with Mathematics to add three faculty members in String Theory and Topology for which the search is under way. Another area is in New Organic Materials in which **Michael Winokur** will act for Physics in a search for four faculty.

Finally, as I alluded to at the beginning of this piece, our time in Sterling Hall is finite. The School of Pharmacy has completed their move to their new building on the west side of campus near the hospital. It is intended that almost all of Physics move into the upgraded Chamberlin Hall. The space that Pharmacy left behind will be completely gutted with only the floors and external walls remaining. Plans have been proposed and discussed repeatedly over the past few months and we believe we have a working solution to the renovation. It remains to be seen if we can fit these plans into our budget. The schedule now calls for the demolition phase to begin about February 2002. Keep watching this space!

Don D. Reeder

Don Reeder
Professor of Physics
Current Chair Physics Department

CHAMBERLIN REMODELING

By Dave Huber

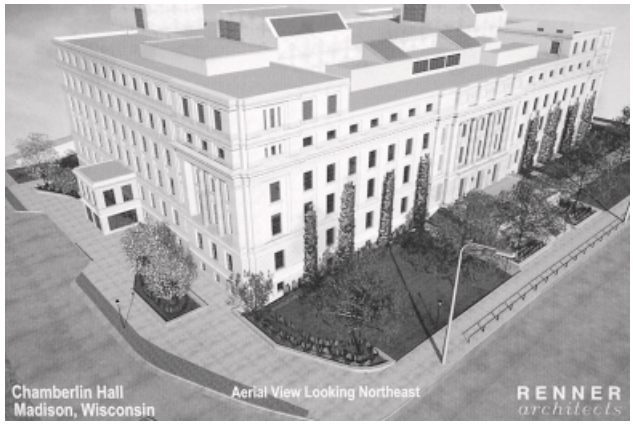
The remodeling of Chamberlin will take place in two phases.

In Phase I, which will start in February 2002, the interior walls of the Pharmacy area will be demolished.

Phase II, which will begin in the summer of 2002, involves reconstruction of the Pharmacy area and the first and second floors of the center section. When completed, the first floor will have labs and offices for plasma, condensed matter and atomic physics, the instrument and student shops and the stockroom. The second floor will contain the lecture halls and classrooms, the lecture demonstration area and the departmental administrative offices. The instructional labs will be located on the third and fourth floors of the remodeled area. The remodeled areas on the fifth floor will house labs and offices for condensed matter, atomic and HE physics. In addition, there will be new astrophysics labs on the fourth and sixth floors. Phase II is scheduled for completion in the spring of 2004.

After the remodeling of Chamberlin is finished, plans call for the remodeling of Sterling Hall. The department will retain space in the basement, and the rest of the building will house the Psychology and Astronomy departments.

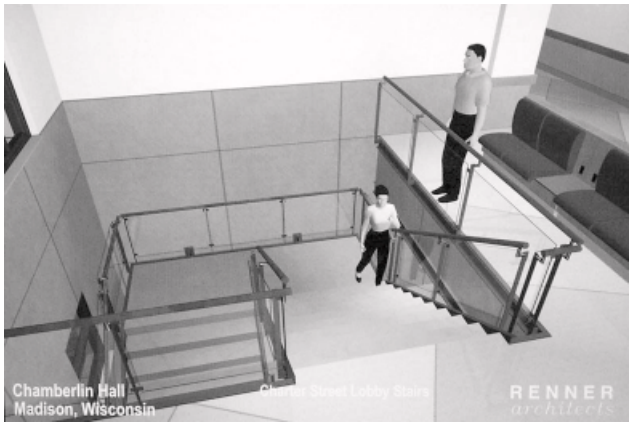
The following images are computer generated renderings from Renner Architects depicting views of the proposed remodeled Chamberlin Hall, Physics facilities.
You can see these and other images on the Web — in color — at:
http://www.physics.wisc.edu/chamberlin_remodeling/remodel-home.html




CHAMBERLIN HALL
Chamberlin Hall
Madison, Wisconsin
University Street Entrance
RENNER
architects


Chamberlin Hall
Madison, Wisconsin
Charter Street Lobby Stairs
RENNER
architects


Chamberlin Hall
Madison, Wisconsin
University Street Lobby Entrance and Display
RENNER
architects


Chamberlin Hall
Madison, Wisconsin
RENNER
architects


Chamberlin Hall
Madison, Wisconsin
University Street Lobby Looking East
RENNER
architects


Chamberlin Hall
Madison, Wisconsin
2nd Floor Lobby Looking West
RENNER
architects


Chamberlin Hall
Madison, Wisconsin


Chamberlin Hall
Madison, Wisconsin
Study Area
RENNER
architects

FACULTY RESEARCH AWARDS

Saffman awarded Sloan Fellowship

Mark Saffman

Mark Saffman, has received an Alfred P. Sloan Research Fellowship, a highly competitive award for young scholars. The fellowship carries $40,000 to support the recipient's research. Saffman, who joined UW-Madison as an Assistant Professor in 1999, studies complex behavior such as pattern formation, in particular in optical systems. He received his Ph.D. at the University of Colorado at Boulder in 1994. From 1994–1999, he worked as a Senior Scientist at Risø National Laboratory in Roskilde, Denmark. Mark has been teaching in the 200 general physics engineering series on a regular basis, but is teaching 746 — Quantum Electronics in the Fall, 2001-02 semester.

Han receives Romnes Faculty Fellowship

Tao Han

Tao Han, professor of Physics was one of seven UW-Madison faculty to receive a 2001 Romnes Fellowship, a program that helps younger faculty further establish their scholarly careers. Han is a member of the physics department's Phenomenology Institute and is a world leader in collider physics. His theoretical research focuses on fundamental issues of particle physics — a Higgs particle as the origin of mass, the search for supersymmetry and the experimental consequences of extra dimensions of space-time. This fellowship for $50,000 is supported by the Wisconsin Alumni Research Foundation. Candidates are chosen by a committee of the Graduate School. The Romnes award recognizes an exceptional faculty member who has attained tenure within the prior four years. (Wisconsin Week, Feb 6, 2001)

Balantekin to Chair APS Division

Baha Balantekin

Our congratulations are extended to **Baha Balantekin** who was elected to the Chair of the Division of Nuclear Physics of the American Physical Society. Professor Balantekin is widely acclaimed for his research at the interface of nuclear, particle physics and astrophysics as well as mathematical physics. His four year term started in April 2001. The Division of Nuclear Physics of the American Physical Society was founded in 1966, and currently includes about 2,400 members. The fundamental objective of nuclear physics is the understanding of nuclei, which are the hearts of atoms and the place where almost all the mass of ordinary matter resides. Nuclear physics also extends to interdisciplinary studies of nuclear phenomena in the cosmos and to studies of fundamental symmetries of nature.

Lagally named Fellow

Professor **Max G. Lagally** was one of four UW faculty members who have been named fellows of the American Association for the Advancement of Science, a distinction accorded to individuals who have distinguished themselves in science and engineering. Lagally was recognized for his ground-breaking studies of atomistic mechanisms of thin-film growth and the thermodynamics and kinetics of surfaces. He is a professor of Materials Science and Engineering and jointly Professor of Physics.

(Other winners included Francis P. Bretherton & Donald R. Johnson, Atmospheric and Oceanic Sciences and Kenneth W. Potter, Civil and Environmental Engineering.) The four UW-Madison professors were among 251 scientists and engineers from around the country cited for their

work. Founded in 1848, AAAS is the world's largest federation of scientists; it works to advance science in the public interest. (Wisconsin Week, November 8, 2000.)

More Hilldale for Halzen

Professor **Francis Halzen** has been reappointed as Hilldale Professor for another five-year period.

Francis Halzen
Photo by: Jeff Miller

Halzen was first awarded a Hilldale professorship in 1991 in recognition of his prominent career as a theoretical particle physicist. He made fundamental contributions to the verification of quantum chromodynamics and developed the methods to exploit matter-antimatter colliders at which the weak intermediate bosons were discovered. He also co-authored a very successful textbook on particle physics and was a co-founder of the Institute for Elementary Particle Physics Research.

In the last decade he has re-invented himself as a pioneer in the new interdisciplinary field of particle astrophysics. He has spearheaded the AMANDA project which led to the construction of the first neutrino telescope, and is the Principal Investigator of an international effort of some 20 institutions to construct the ultimate kilometer-scale neutrino observatory, IceCube. Congratulations!

Undergraduate/Faculty Hilldale Awards

Physics student **Joshua Friess** and Professor **Tao Han** have been awarded the 2001–02 Wisconsin Hilldale Undergraduate/Faculty Research Award. Student Matthew Jewell and Professor David Larbalestier, of Materials Science and Engineering Physics also won a Hilldale.

*Correction: Last year's issue of The Wisconsin Physicist incorrectly reported that Professor **Mark Eriksson** received a Packard fellowship. Actually, Eriksson has been awarded an NSF CAREER award, for the work described in last year's issue. The CAREER will support his research over the next five years. Eriksson has also recently been awarded a Research Innovation Award by the Research Corporation for closely related work.*

SOAR (Student Orientation, Advising & Registration) guides leading students on a campus tour in front of Bascom Hall during summer.
Photo by: Jeff Miller

FACULTY RESEARCH

POLAR TELESCOPE SIGHTS FIRST HIGH-ENERGY NEUTRINOS

Story by Terry Devitt, "Wisconsin Week," March 21, 2001

The university is slated to receive $15 million in federal funding for the first phase of creating the worlds largest scientific instrument. The bill cleared a congressional conference committee on Nov. 6, 2001 and is expected to win approval from the full U.S. House of Representatives, Senate and President George Bush. (In FY 2000, UW-Madison was the second-recipient of NSF funding in the Big Ten, the sixth-largest among universities, and the ninth-largest overall.)

MADISON — A novel telescope, buried deep in the Antarctic ice at the South Pole, has become the first instrument to detect and track high-energy neutrinos from space, setting the stage for a new field of astronomy that promises a view of some of the most distant, enigmatic and violent phenomena in the universe.

Writing in the March 22 edition of the British scientific journal "Nature," an international collaboration of physicists and astronomers reports the first observation of high-energy neutrinos using the AMANDA Telescope, a large array of buried detectors designed to detect the fleeting signs of high-energy subatomic particles from the farthest reaches of space.

"We have proven the technique," says **Francis Halzen**, a University of Wisconsin-Madison professor of physics and the lead author of the "Nature" paper. "We have a unique probe with a sensitivity well beyond other experiments,

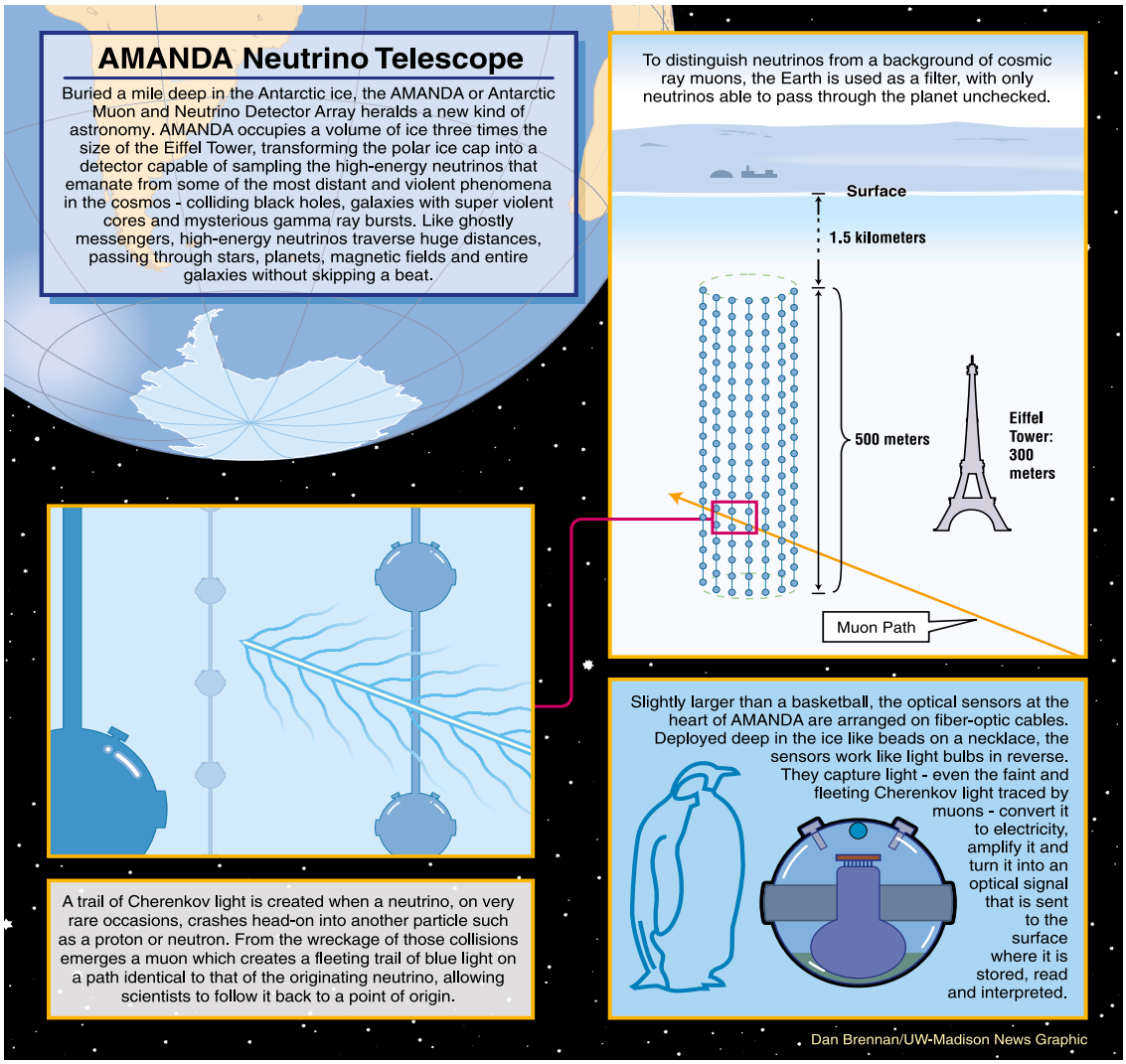


Illustration by: Dan Brennan

and the neutrinos we've seen are of a higher energy than has been seen before."

Neutrinos are invisible, uncharged, nearly massless particles that can travel cosmological distances. Unlike the photons that make up visible light, or other kinds of radiation, neutrinos can pass unhindered through stars, vast magnetic fields and entire galaxies without skipping a beat.

The photomultiplier tubes within these basketball-sized glass orbs are at the heart of the AMANDA neutrino telescope, a novel telescope being built at the South Pole to detect cosmic neutrinos.
Photo by: Jeff Miller

To be able to detect high-energy neutrinos and follow their trails back to their points of origin promises unparalleled insight into such extraordinary phenomena as colliding black holes, gamma-ray bursters, the violent cores of distant galaxies and the wreckage of exploded stars.

Of all high-energy particles, only neutrinos can directly convey astronomical information from the edge of the universe — and from deep inside the most cataclysmic high-energy processes, notes **Robert Morse**, a UW-Madison professor of physics and the principal investigator for the AMANDA project.

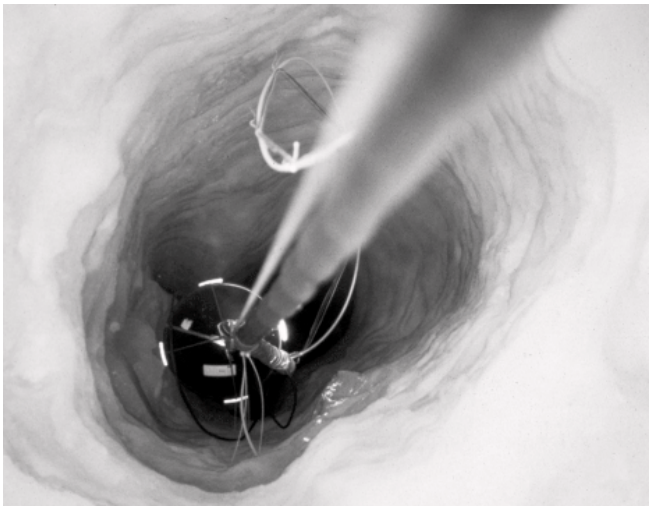
Sunk more than one-and-a-half kilometers beneath the South Pole, the National Science Foundation-funded AMANDA Telescope is designed to look not up, but down, through the Earth to the sky in the Northern Hemisphere. Since neutrinos can and do skip through the Earth continuously, it is the logical direction to point the telescope in order to filter out other, confusing high-energy events. The Earth between the detector at the South Pole and the northern sky filters out everything but neutrinos.

The AMANDA telescope array consists of 677 optical modules, each the size of a bowling ball, arrayed on electrical cables set deep in the ice beneath the South Pole and arranged in a cylinder 500 meters in height and 120 meters in diameter.

The glass modules at the heart of AMANDA work like light bulbs in reverse, capturing the faint and fleeting streaks of light created when the occasional neutrino crashes head on into another particle such as a proton. The subatomic wreck creates a muon, another subatomic particle that, conveniently, traces an ephemeral trail of blue light through the ice identical to the path of the neutrino. In theory, that trail can be used to point back to the neutrino's point of origin. The discovery of point sources of high-energy cosmic neutrinos is a long-standing quest of modern astrophysics.

Cosmic neutrinos are believed to be generated in the universe's most violent events — exploding stars and active galactic nuclei, extremely violent and not-at-all understood phenomena at the heart of many galaxies.

The results presented in "Nature" are based on AMANDA observations of high-energy atmo-

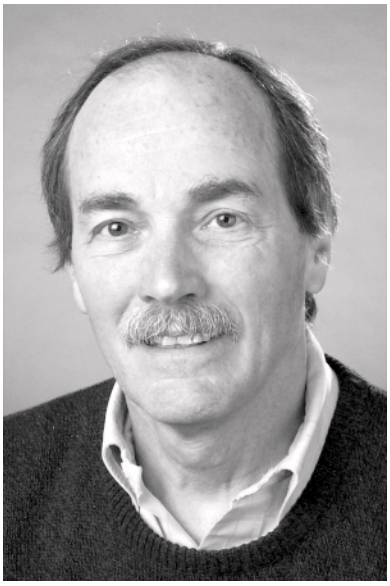


Scientists with the National Science Foundation-funded AMANDA Telescope project drill deep holes such as this one in the South Pole ice, where they have deployed an array of neutrino detectors. Sunk more than one-and-a-half kilometers beneath the ice, the AMANDA Telescope array is designed to look down through the Earth to the sky in the Northern Hemisphere.
Photo by: Robert Morse

spheric neutrinos, neutrinos created when cosmic rays crash into the Earth's atmosphere. While astrophysical in nature, they are not the cosmic neutrinos coveted by scientists. Instead, they simply prove that the AMANDA detector is a working neutrino telescope.

"This paper establishes the AMANDA experiment as a neutrino telescope," according to **Albrecht Karle**, a UW-Madison professor of physics and AMANDA scientist. "Now we can do astrophysics."

However, while the new results from AMANDA represent a critical step toward establishing a new field of astronomy, a much bigger detector is required, the "Nature" paper's authors write, to search the sky for the speculated sources of the cosmic neutrinos that constantly bombard the Earth. Toward that end, plans are being made to construct a much larger detector known as Ice Cube. To consist of 4,800 optical modules on 80 strings, the Ice Cube detector would effectively convert a cubic kilometer of Antarctic ice into the world's largest scientific instrument.



Bob Morse

Still, the success of AMANDA in detecting neutrinos at high energies effectively extends the reach of conventional neutrino physics beyond any existing experiment and is a promising step toward the 40-year-old dream of neutrino astronomy, says **Morse**, who has spent the last decade overseeing the building of AMANDA.

"This is our coming-out party," he says. "Now we start the process of discovery."

This paper published in "Nature" was the product of a collaboration between 119 scientists at various institutions from around the world.

UW TEAM TO BUILD NEXT-GENERATION "QUANTUM" COMPUTER

Story by Jim Beal, "Wisconsin Week," April 18, 2001

MADISON — A working quantum computer could be so powerful that it would solve in seconds certain problems that would take the fastest existing supercomputer millions of years to complete.

Seeking this "Holy Grail" of computing power, an interdisciplinary team of engineering and physics researchers at the University of Wisconsin-Madison plans to use silicon germanium quantum dots to build the foundation for a new generation of computers.

From a competitive field of more than 30 submissions, the U.S. Army Research Office chose to fund the UW-Madison researchers with a three-year, $1.2 million grant to combine their unique tools and talents in the development of a semiconductor-based quantum gate or qubit.

At the center of the invisible atomic world of quantum computing is the quantum dot, a nanometer-scale "box" that holds a distinct number of electrons. The number can be manipulated by changing electrical fields near the dot.

A quantum computer would use these dots to take advantage of a quantum phenomenon known as superposition, in which, for example, an electron would have its spin state both up and down at the same time. Where a classical computer uses an on or off state to represent bits of information in the "zeros" and "ones" of binary code, a quantum computer uses the superposition as qubits.

With superposition, a qubit is in neither the zero nor the one state before being measured, but exists as both zero and one simultaneously. The spin state of the particle is determined at the time it is measured. Quantum theory holds that particles that have interacted are connected or entangled in pairs through the process of correlation. Determining the up or down spin state of one particle affects the spin state of its entangled pair. Even more astounding is that the entangled particles retain their connection no matter how great the distance between them. It's something Einstein called "spooky action at a distance."

All of this together means that a quantum computer could perform massively parallel calculations enabling certain "hard" problems, like encryption, to be resolved in mere seconds.

Included in UW Madison's team are Physics Professors **Mark Eriksson** and **Bob Joynt** and **Max Lagally**, the Erwin W. Mueller Professor and Bascom Professor of Surface Science. Also involved

in submitting the proposal were postdoctoral researcher **Mark Friesen**, physics theory, staff scientist **Don Savage**, and graduate student **Paul Rugheimer**, materials growth.

The team will combine advanced physics theory, silicon-germanium heterostructured materials, low-temperature and high frequency measurements to build an elemental piece of a quantum computer, called a solid-state Controlled-NOT logic gate.

Creating this item will be an achievement in itself, but it is the team's approach that is a breakthrough. A useful quantum computer will require a chain of thousands of qubits. Other approaches have formed qubits using nuclear magnetic resonance or by trapping individual atoms in a vacuum but have been limited by the inability to link together large numbers of qubits.

The UW-Madison team's process uses new science and existing technology similar to complementary metal-oxide semiconductor (CMOS) technology. That means if one qubit can be made, the process likely could be scaled to make and link qubits by the thousands. The researchers predict their success could result in the first useful quantum computer in 10 to 30 years. The team has already disclosed its approach to the Wisconsin Alumni Research Foundation for consideration of a patent.

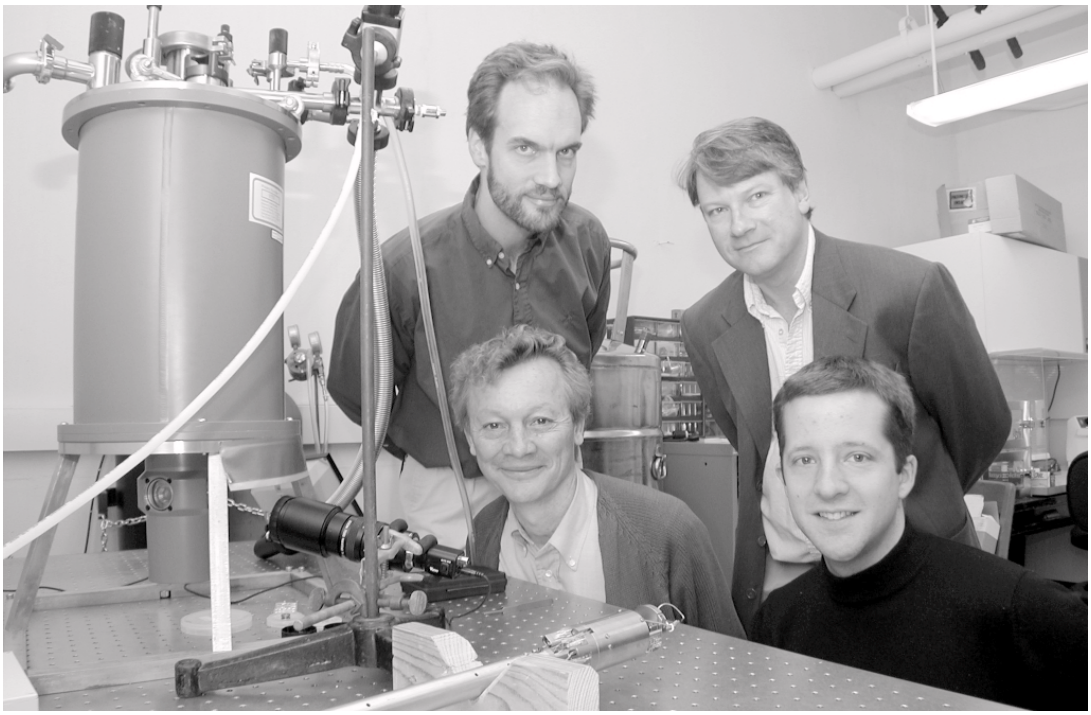
"That is what is so exciting," says Eriksson. "Here we are building a new type of quantum dot that hasn't been made before, and if we can do this successfully, the infrastructure is out there so that the technical community should be able to run with this."

The team attributes its success in winning the competitive grant to its novel approach, their unique mix of intellectual expertise and specialized facilities found on the UW-Madison campus. While related research efforts might focus on theory, materials growth or experimentation alone, the UW team is situated to integrate its new approach with existing results and theory into a working result.

"This has been an unusually strong and collaborative team effort right from the beginning," says Lagally, a Professor of Materials Science and Engineering.

"It's really an outgrowth of MRSEC (Materials Research Science and Engineering Center) directed by Tom Kuech," Lagally says. "The fact that we have this excellent collaboration in materials and the physical sciences made us successful in the Nanophase Hiring Initiative."

Mark Eriksson was among the first cluster hires of the Madison Initiative, a public-private partnership to improve research, teaching and outreach by UW-Madison. "The nanophase hiring is allowing us to explore the future of computing," Lagally says.



Pictured clockwise from top left are associate Professor of Electrical and Computer Engineering Dan van der Weide, Professor of Physics, Bob Joynt, Assistant Professor of Physics, Mark Eriksson, and Professor of Material Science and Engineering, Max Lagally.

Photo by: Jim Beal

Coppersmith Brings New View

Understanding granular materials is basic to comprehending a wide variety of physical processes. One important step in this effort is to understand how the forces are distributed in stationary granular media. This knowledge will not only be a first step in elucidating dynamics, but also it will yield insights into failure mechanisms in composite materials. One example of a problem in which knowledge of the yield stresses is crucial is that of earthquake initiation.

Research by Susan Coppersmith and her collaborators has shown that the forces in a granular material are distributed very differently in, for example, sand than a "normal" solid. Forces much larger than the mean occur, but they are exponentially rare. These force inhomogeneities can be understood using an exactly solvable statistical model, in which the fluctuation in the force distribution arise due to variations in the contact angles and the constrains imposed by the imbalance of forces on each bead in the pile.

The model is described in detail in her publication, "Model for Force Fluctuation in Bead Packs," published in Physical Review E 53, 4673 (1996). She has in the intervening time extended the application of the model to inhomogeneous elastic and granular media.

[More on Coppersmith, see page 17]

Susan Coppersmith recently joined the Physics faculty.
Photo by: Jim Hanesworth

Microscopy Expert Puts Cancer Under Fierce New Light

Story by Brian Mattmiller,
taken from "News@UW Madison," 8/23/00

Cluster area: Biophotonics: The development of new microscopes that peer deeply into the inner workings of living cells. The field incorporates physics, chemistry, biology and medicine.

Research focus Gadolinium Neutron Capture Therapy — a cancer treatment that De Stasio likens to "making a microscopic nuclear bomb explode in each cancer cell."

Gelsomina De Stasio speaks English and Italian with equal fluency. But when she speaks of a "multilingual approach" to curing cancer, it has little to do with either language. De Stasio, a physics professor and one of the university's new strategic hires, talks about multilingual science: a hybrid of physics, chemistry, biology and oncology that is guiding her to new approaches to fighting lethal cancers.

De Stasio came to the Physics Department in fall 1999 as part of an interdisciplinary team that's creating a new generation of high-powered mi-

Gelsomina "Pupa" De Stasio, standing above the particle beam ring at the Synchrotron Radiation Center in Stoughton, WI.
Photo by: Jeff Miller

croscopes. Her technology is putting cancer cells under a new light and may lead to one of the most precise treatments yet for cancer.

"The more we progress with science, the more there is left to do," says De Stasio, whose research is based at the Synchrotron Radiation Center in Stoughton. "Whatever's left will require the cooperation of specialists from many different disciplines."

In one of the greatest challenges left — battling cancer — De Stasio is working on a promising treatment called Gadolinium Neutron Capture Therapy, a two-part treatment that she likens to "making a microscopic nuclear bomb explode in each cancer cell."

For years, scientists have known that the element gadolinium is an important tool for pinpointing the exact location of tumors during magnetic resonance imaging. When injected intravenously into cancer patients, gadolinium collects only inside cancer tissue without damaging healthy tissue.

De Stasio is mining greater potential. Gadolinium also is highly reactive to thermal neutrons, which are low-energy atomic particles that deliver almost no radiation. Infusing cancer cells with gadolinium and then bombarding the tumor with thermal neutrons creates an explosive reaction and kills cancer cells with no "collateral damage" to healthy tissue.

Although clinical trials are still ahead, De Stasio's recent findings have been promising. This summer, she discovered that gadolinium is capable of invading the nucleus of cancer cells, a necessary component to killing them. The technical results have been sent off to a major journal and are likely to garner national attention among cancer specialists.

This research offers particular hope for treating glioblastoma, a brain cancer that is often nonoperable and in most cases lethal. De Stasio is involving a group of doctors in the oncology department to begin preparing steps toward a clinical trial.

"This could not be achieved by physicists or medical doctors separately," she says. "Only the synergy of these two disciplines will make it possible." Although a recent addition to the UW-Madison faculty, De Stasio has been working for more than a decade at the Synchrotron Radiation Center. The Rome native, known by nearly everyone as "pupa," was an accomplished, internationally known scientist working for Italy's National Research Council and the Swiss Institute of Technology.

Since 1989, her actual research was done at SRC, where she co-created and installed one of the highest-resolution microscopes in the world.

In 1998, at age 34, De Stasio was first approached about joining the UW-Madison faculty as part of the strategic hiring program. At the same time, she had another attractive offer from California's Jet Propulsion Laboratory, where she would have applied her talents to creating new materials for NASA missions to Mars.

She says the full professorship seemed out of character for her, as someone with night-owl tendencies and little interest in office formalities. But the prospect of academic freedom and some compelling teaching assignments won her over.

De Stasio teaches a course called "Physics in the Arts" for physics non-majors. She abhors blackboard teaching and immediately went to work creating her entire course in computer presentations, full of famous paintings, photography, architecture and examples from nature and technology.

The class suits her well, as an art lover and self-taught surrealist painter who creates "alternative realities" on canvas. She adds: "I was surrounded by beauty growing up in Rome. You couldn't avoid artwork if you tried."

She's now immersed in faculty life. "Oh yeah, they welcomed me," she jokes about her colleagues. "They put me on every committee they possibly could."

But the research remains her driving force, and she often works until 2 or 3 a.m., gathering data from the SRC "beamline." SRC is famous for its advances in silicon chip etching, micromachines and materials research, yet few people realize that this intense synchrotron light is being harnessed for cancer and Alzheimer's research, she says.

"FIRST LIGHT" PARTY FOR THE OLDEST LIGHT IN THE UNIVERSE

by Peter Timbie, Associate Professor

In February an intrepid and curious crowd shivered at the wind-swept Pine Bluff Observatory in Pine Bluff, Wisconsin to dedicate a new radio telescope that has begun to measure the remnant "glow" from the Big Bang, the 2.7 K Cosmic Microwave Background (CMB) Radiation. This telescope is the first ever built specifically for measuring a particular property of this ancient light — its polarization. The experiment is called COMPASS (Cosmic Microwave Polarization At Small Scales) and is the result of over three years of work by an international collaboration from UW-Madison, UCSB, U. Miami, U. Rome III, U. Wales, and CalTech.

Recently, observations of tiny temperature variations in maps of the CMB made from balloons and from the ground have shown conclusively that the space-time geometry of the Universe is flat. Ordinary Euclidean geometry is all you need to navigate through the cosmos. Future observations promise to answer many other key questions of cosmology: What is the dark matter made of? What is the expansion rate of the universe and is it accelerating (as recent measurements suggest) or not? What is the origin of the large-scale structures (galaxies and clusters of galaxies) that we observe in the universe? When did the first luminous objects form in the universe? Answering these questions will require careful study of the polarization of the CMB, a signal that has not yet been detected.

In the last few years, cosmologists have also turned to the early universe to try to answer fundamental questions in particle physics. In the most popular model, called Inflation, spacetime expanded by a factor of 10^{29} in the first 10^{-35} seconds of the Big Bang. During this period the universe resembled a particle accelerator, with its contents reaching energies far beyond those accessible on earth. Gravitational waves produced during inflation will leave their imprint on the CMB polarization. In this way, COMPASS is the first step toward probing GUT-scale physics at 10^{16} GEV!

Ph.D. candidate Slade Klawikowski is in charge as the COMPASS telescope searches for primordial polarization in the microwave background radiation at UW's Pine Bluff Observatory.

Madison has turned out to be an excellent site for these microwave measurements. During the cold, crisp, clear winter weather here, the effects of the atmosphere on our observations are negligible. In the future, we may take the instrument to Antarctica or White Mountain, CA for longer observing periods, but for now the convenience of being near campus more than offsets the advantages of more remote spots. Our goal is to make the first detection of the faint polarized CMB signal. During the previous year, we operated a precursor to COMPASS, called POLAR, at Pine Bluff. POLAR holds the world record for the most precise measurement of polarization by setting an upper limit at the level of 3 parts per million of the 2.7 K background temperature. Under very different conditions from the wintry dedication ceremony, in July we dismantled the old POLAR instrument and planted an apple tree at the site. More details are at cmb.physics.wisc.edu.

Superconducting Material Shows Promise

Story by Brian Mattmiller, "Wisconsin Week," March 21, 2001

The jolt of excitement from the January discovery of a new high-temperature superconducting metal, magnesium diboride, may get another voltage boost this week with evidence that the material can carry electrical currents at high density.

A team of scientists from the university's Applied Superconductivity Center discovered that the material carries large currents without the common barriers seen in the ceramic superconductors in development for real-world electric power applications.

Results of the study, done in collaboration with chemist Robert Cava's research group at the Princeton University Materials Institute, are detailed in the Thursday, March 8, issue of the journal Nature.

Achieving a high critical current density has been the Achilles' heel of ceramic high-temperature superconducting materials, first discovered about 15 years ago. High current densities are vital for enabling superconductivity to enter the mainstream electric utility industry, breaking out from existing medical and scientific uses.

The research team found that MgB_2 is indeed capable of transporting high electrical currents, because, unlike the ceramic superconductors, the grain boundaries between crystals do not obstruct current flow.

"Our evaluation shows that this material is not just interesting scientifically, but practically as well," says **David Larbalestier**, principal author and ASC director. "MgB_2 appears to be a good conductor with a very simple structure with only two atoms to be concerned about."

The discovery by Japanese scientists that MgB_2 superconducts up to 39 degrees Kelvin (-390 degrees Fahrenheit), almost twice the temperature of any other metallic superconductor, could be a major step toward moving superconductivity from limited application to everyday use.

Superconducting materials have the ability to conduct electricity with almost no loss of energy, and are currently being tested in large demonstration motors and power cables to bring high efficiency to energy transmission.

But the essential challenge for applications of superconductivity is not just to work at higher temperatures, but to fabricate wires that carry high densities of electric current, Larbalestier says. Current has to weave and meander through billions of obstructive grain boundaries in the ceramic superconductors. Grain boundaries are interfaces a few atoms wide that separate the individual crystals of virtually all solid materials.

Because of the obstructive effects of such crystal boundaries, today's ceramic superconductors are reaching only about one-fourth to one-tenth of their potential to carry electricity across distances, Larbalestier says.

What the research team found with MgB_2 was that crystal boundaries did not obstruct current, allowing high current densities to flow unimpeded. And this compound is unlikely to be the only simple metal boride that superconducts. "Sister compounds that work to higher temperatures than MgB_2 probably exist and are under intense study," he adds.

The Applied Superconductivity Center is in a unique position to study superconducting materials because it has a broad multi-disciplinary capability for doing both basic and applied studies of superconducting materials. One crucial capability is that of magneto-optical imaging, a technique brought from Russia by ASC scientist Anatoly Polyanskii, which allows the precise flow of electricity through the material to be visualized in fine detail.

News of the Japanese discovery spread like wildfire in late January through e-mail between center staff and alumni well before results were public. In late January, Larbalestier and UW-Madison materials science professor Eric Hellstrom decided to make the new material. The very next day, Cava's Princeton research team called to say they had samples of MgB_2.

"He sent us the sample and the students, staff and postdocs just went at it night and day," Larbalestier says.

A flurry of work is rapidly defining the applied potential of this very surprising discovery, not yet two months old. Teams led by Hellstrom and Materials Science Professor Chang-Beom Eom, jointly a Professor of Physics, already have created wires and thin films from the material. UW-Madison Physics Professor Mark Rzchowski's group is studying the basic physics of the superconducting mechanism, while Materials Science Professor Susan Babcock's team is studying its atomic structure using transmission electron microscopy.

ASC projects are supported by the Air Force Office of Scientific Research, the Department of Energy and the National Science Foundation, through its Materials Research Science and Engineering Center.

FACULTY NEWS

New Hire

We are delighted to welcome **Susan N. Coppersmith** who has joined the faculty of the UW Physics Department. Professor Coppersmith received her Ph.D. in l983 from Cornell University. She then worked at Brookhaven National Laboratory, AT&T Bell Laboratories, and Princeton University before becoming a Member of Technical Staff at AT&T Bell Laboratories in 1987. She moved to the University of Chicago as a Professor of Physics in 1995, and joined the faculty of the University of Wisconsin in August 2001.

Prof. Coppersmith's research focuses on elucidating the fundamental principles that give rise to the complex properties of disordered solids. She has made important contributions to the understanding of sand, non-linear conductors, glasses, and some biological systems. Her most recent research has focused on the novel behavior of nonequilibrium quantum systems and of some biological systems.

Prof. Coppersmith has served on numerous boards and panels. She has just finished serving on the NRC Physics Survey Overview panel, and is a General Member of the Aspen Center for Physics, a member of the Board of Trustees of the Gordon Research Conferences, and Chair of the Nominating Committee of the American Physical Society. Professor Coppersmith is a Fellow of the American Physical Society and of the American Association for the Advancement of Science.

Promotion

Congratulations to faculty member **Tao Han** on his promotion to full Professor. Han is a member of the Phenomenology Institute and is a world leader in collider physics. His theoretical research is focused on the fundamental issues of particle physics — a Higgs particle as the origin of mass, the search for supersymmetry, and the experimental consequences of extra dimensions of space-time.

Prof. Han officially joined the Physics Department as Associate Professor in August 1997. He had come to Wisconsin from the Institute for High

Energy Physics, University of California-Davis. Han received his Ph.D. at the University of Wisconsin-Madison in 1990. His undergraduate work was completed at Nankai University, the People's Republic of China, where he also completed his Master's degree.

New Emeritus Faculty

Prof. **Paul Quin** retired from the Physics Department in early January, 2001. Paul has been a valued member of the Physics Department since 1971. Paul received his graduate education at the University of Notre Dame where his thesis work centered on the spectroscopy of the SD-shell nuclei. He joined the nuclear physics group in Madison as a postdoc in 1969, playing a central role in the construction and installation of the new Lamb-Shift polarized ion source.

After joining the faculty, Paul's research activities focused on the use of polarized beams as a tool for nuclear spectroscopy. Along with his students and postdocs, Paul made numerous important contributions in this field. In addition, Paul was an important player in the many instrumentation development projects that took place in the nuclear physics lab during the 70's and the early 80's. In particular, he was the leader of the first experiment to test storage-cell technology for targets of polarized hydrogen atoms, a technology which has gone on to become important for polarization experiments at storage ring machines throughout the world.

Around 1980, Paul began expanding his research focus, moving into the field of weak interactions. In the years that followed, he carried out a variety of interesting and important experiments on β decay of polarized nuclei. These experiments typically involved tests of the conserved-vector-current hypothesis or searches for right-handed currents. In 1986, he published, together with T. Girard, an important paper which described a new and potentially very sensitive technique for detecting right-handed currents in β decay. This new concept, which involves measuring the polarized-nucleus beta asymmetry correlation, was to become the basis for a number of experiments performed over the subsequent decade in both the U.S. and Europe, with Paul playing a central role in many cases.

In recent years, Paul has continued to work in the area of weak interactions helping to define the role of various nuclear physics experiments that place constraints on extensions of the standard model.

Paul has also made many contributions to the teaching mission of the department. His great enthusiasm for teaching was always in evidence and he frequently introduced new and innovative ideas in the classes he taught. In the '80's, he took responsibility for developing new experiments for the Physics 321 lab and upgraded a number of the existing experiments. More recently he has been a tireless instructor in the large introductory courses, contributing in a number of important ways to the implementation of computer-based laboratories. In addition, Paul was a staunch supporter of the department's new Peer Mentor Tutor Program. Paul's main contribution to graduate education has been the supervision of the nine students who received Ph.D.'s under his guidance.

In summary, Paul Quin has had a rich and productive career, contributing a great deal to the reputation of the UW Department of Physics. Thanks, Paul!

Sabbaticals for 2001–02

Both **Lee Pondrom** and **Michael Winokur** have been granted sabbatical leave for Spring 2002.

Cluster Hiring Initiative to Continue

The Physics Department found itself a participant in two of ten selected clusters of the UW Madison Cluster Hiring Initiative to explore new areas of cooperation that span disciplines, departments and colleges.

The first is the Mathematical Physics/String Theory initiative. Over the past few years there has been spectacular progress in quantum gravity and cosmology, the understanding of black holes as quantum mathematical objects and in the construction of model universes in which the four dimensions we observe easily are just a 4-dimen-

sional surface (a 4-brane) in a real ten-dimensional spacetime. The physical, mathematical, cosmological and philosophical questions associated with string theory and our changing view of the universe are of great interest to many people. It is intended to hire three faculty members with significant joint appointments in physics and math. This would allow UW-Madison to establish leadership in superstring theory and build a bridge between two strong programs, topology & geometry in the Math Department and elementary particle phenomenology in the Physics Department.

In addition, Physics will be one of the participants in a three position cluster hiring effort in the area of Functional Organic Materials. Chemistry faculty are the leading collaborators. Professor Michael Winokur is the Physics faculty member participating. Other areas involved include Chemical Engineering, Materials Science and Engineering, and Pharmacy and campus centers: Materials Science and Engineering Center, Center for Nanotechnology, and the Center for Plasma-Aided Manufacturing. It is proposed to hire a cluster of faculty members who will devise methods and strategies for the synthesis and fabrication of novel functional organic materials. Organic materials (including common plastics) play a major role in our society today. The materials that result from new research groups will play a major role in future technologies involving medicine, electronics, and other emerging areas. This creation of novel materials is an activity at the intellectual frontier of science and engineering, requiring state-of-the-art understanding of material properties, computational/theoretical methods, and material synthesis.

Physics has definitely benefited from earlier cluster hiring initiatives. These included the hiring of **Pupa De Stasio** (biophysics), **Mark Eriksson** (nanostructure), **Brenda Dingus** (Sesquicentennial), plus **Bob Morse** and **Albrecht Karle** as part of the Astroparticle cluster with Astronomy.

The effects of these hires are long reaching for our department into the future of physics at Wisconsin. We look forward to continued growth in these areas.

Timbie Receives Faculty Development Grant

Peter Timbie, Department of Physics Undergraduate Coordinator, has received a faculty professional development grant for his proposal titled, "Modern Cosmology at University of Wisconsin Campuses." Peter's proposal addressed the fact that the veritable explosion of new data and ideas concerning the evolution of the universe is not appropriately represented in our curriculum. This grant provides him with a means of resolving this problem. The beneficial results to our department will be a graduate and undergraduate course in this subject. The development of these courses in cosmology will augment and complement the offerings now available on campus in astro-physics, astronomy, and astro-particle physics. In preparation for creating these new classes, Timbie was a regular participant in the weekly Cosmology seminar at the University of Chicago.

Under U.W System guidelines, one half of the cost of the project will be covered through System funds, with a one-half match by the Department of Physics. For more details on the relevancy of Timbie's goal, see "Opportunity for Giant Step" on page 21.

UW Scientist Gets "Knighted" by Her Native Italy

(Story by Brian Mattmiller, UW Communications, 6/08/01)

MADISON — **Gelsomina De Stasio**, a University of Wisconsin-Madison Physics professor, is known by friends and colleagues by her nickname, "pupa." (She always uses lower case.)

As of this month, better make that "Sir Pupa."

De Stasio, a native of Rome, was bestowed with the honor, "Cavaliere della Repubblica," or Official Knight of the Italian Republic, during a special ceremony June 1 at the Italian Consulate General in Chicago. She was honored along with University of Chicago oncologist, Michele Carbone.

The honorees are chosen each year by the President of Italy to recognize some of the country's

most accomplished native sons and daughters around the world. De Stasio is a microscopy expert who is developing new strategies for fighting cancer.

De Stasio, who joined UW-Madison in 1999 through its strategic hiring program, admits being a little bemused by the honor. De Stasio says she was notified by telegram last summer by Italy's President Ciampi. Knighthood apparently isn't gender-neutral: she says her official certificate actually does refer to her as "Sir."

With a research project at the Synchrotron Radiation Center in Stoughton, De Stasio is developing a cancer-treatment technique called gadolinium neutron capture therapy, which she likens to creating a microscopic explosion inside each cancer cell. The work could offer new hope for a type of inoperable brain cancer.

Jokes De Stasio, "You could call me the Knight of the Periodic Table."

The Physics of Athletics

Prof. **Bernice Durand**, Professor of Physics since 1970, has been appointed as Chair of the UW Athletics Board. Durand just recently spent three years as a member of the University Committee, acting as Chair in her third year, and as Chair of the recent chancellor search committee.

Durand has been an Athletics Board member since 1996. In a recent article in The Wisconsin State Journal, Durand says, "Anybody who has ever been on the Athletic Board says it is not like any other shared governance committee on campus and it is not like any other board." The Athletic Board must deal with a variety of complex issues, such as budgets, personnel matters and gender equity. Because of the popularity of the sports programs, the public scrutiny is intense.

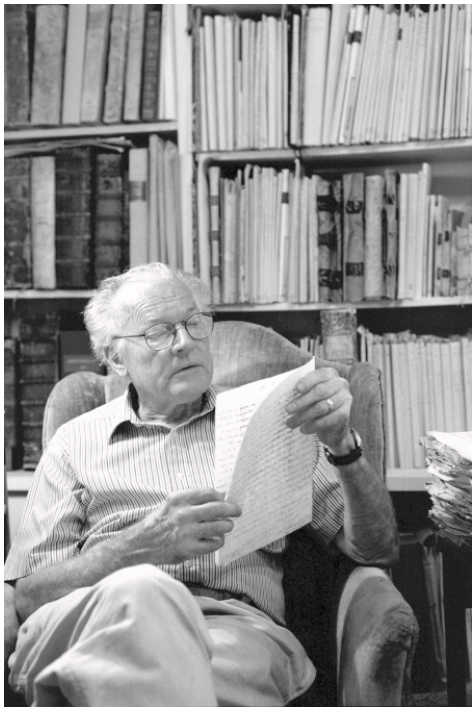
The article goes on to say, "Durand, who has spent her career in the mostly male-dominated world of physics should not be intimidated in what in some respects is still the male-dominated world of college athletics. As a freshman at Harvard, Durand only knew of two other women who were physics majors. Until last year, she was the only woman at UW-Madison teaching in the Physics Department." "It is not unusual for me to be a woman in a man's field, " she says.

Durand's term with the board is currently for two years. Among other things, she plans to continue to examine the complex relationship of the Athletic Department to the university, "The division of intercollegiate athletics is part of the university and it's a business," Durand says. "And it's pretty hard to be both. I'm not sure any university in the country has solved that."

The Fry Collection of Italian History

(Story by Don Johnson, "Wisconsin Week," 2/28/01)

W. F. (Jack) Fry, Hilldale Professor of Physics emeritus at UW-Madison, is donating more than 26,000 documents he has collected during his lifelong interest in Italian history. The collection, which will be housed in the Department of Special Collections, U. W. Library, includes material ranging from an Italian family archive of the late Middle Ages to political pamphlets of the post-World War II period. Some rare finds include a diary of the 16th-century Italian Renaissance poet Lodovico Ariosto, one of the most important Italian poets at a time when Italian literature was preeminent.



Emeritus Prof. Jack Fry at home reading from his collection of historic Italian government documents.
Photo by: Jeff Miller

"The place for such documents is here," says Fry, "in a library where they can be preserved and used."

INSTRUCTION

Opportunity for Giant Step

As a result of a recent Faculty Development Grant, the department hopes to delve into the forefront of instruction on cosmology. This fall **Peter Timbie** is teaching Physics 801, a topical course resulting from his course development opportunities during the spring 2001 semester. Why did he choose cosmology? Timbie explains his rationale below.

In the first decade of the new millennium, humanity is poised to take a giant step forward in understanding the universe and our place within it. Only 70 years ago, we believed that the universe was made up of only the stars of the Milky Way galaxy that surrounds us. The first major cosmological discovery of the past century was the Hubble expansion: that most of the Universe is made of other galaxies, beyond the Milky Way, and that these galaxies are receding from us with high velocities. Along with Einstein's General Theory of Relativity in 1915, the Hubble expansion formed the basis for the "Big Bang" model of the universe. In the 1940's, models of the formation of elements in the first few seconds of such a universe, when temperatures were expected to be quite high, matched the observed cosmic abundance of these elements. And in 1965, the thermal radiation remaining from the hot early universe was discovered in the form of the cosmic microwave background radiation, which is believed to provide us with a direct view to conditions when the universe was only 0.001% of its current age. In the last decade, this radiation has allowed us to peer far back in time to find the seeds from which all galaxies, including our own Milky Way, were formed.

These new measurements have answered some of the fundamental questions of cosmology, such as: What is the expansion rate of the universe? How did large structures such as galaxies and clusters of galaxies form? Why is the universe homogeneous on huge scales? The "standard model" of the Big Bang incorporates "inflation." But as in any healthy growing field of science, new observations have created new questions that are stretching the inflation model to its limits. We used to believe that gravitational attraction would slow the expansion of the universe and possibly cause a contraction (Big Crunch) sometime in the distant future. It now appears that the universal expansion is not decelerating at all, but rather is accelerating in response to some cosmic force that is not at all understood. We have strong evidence that most of the matter in the universe is not in the form of "ordinary" matter such as protons and neutrons, but rather, is in the form of some mysterious "dark matter" and "dark energy." The latter is sometimes called "quintessence." As the second millennium comes to an end, we are in the midst of a modern version of the Copernican Revolution: we are not only not at the center of the solar system, or the center of the galaxy, or the center of the universe. But, we are not even made of the same "stuff" that makes up most of the universe!

Naturally, these issues have attracted an enormous amount of attention by physics and astronomy graduate students, undergraduates, and the public in general. This year the decadal report of the National Research Council on "Astronomy and Astrophysics in the New Millennium" emphasizes that "these questions are all part of the tapestry of science, cutting across traditional disciplines and funding agencies, and connecting the universe from the smallest to the largest scales. Answering these questions will alter the perception of our place in the universe. The search for the answers can also capture the imagination of the public, inspire interest in science, and thereby create a more scientifically literate society."

It is Peter Timbie's dream to ultimately use this topic to provide the department with an opportunity to move into distance learning opportunities, by sharing this course with System schools.

Faculty Collaborations to Yield New Courses

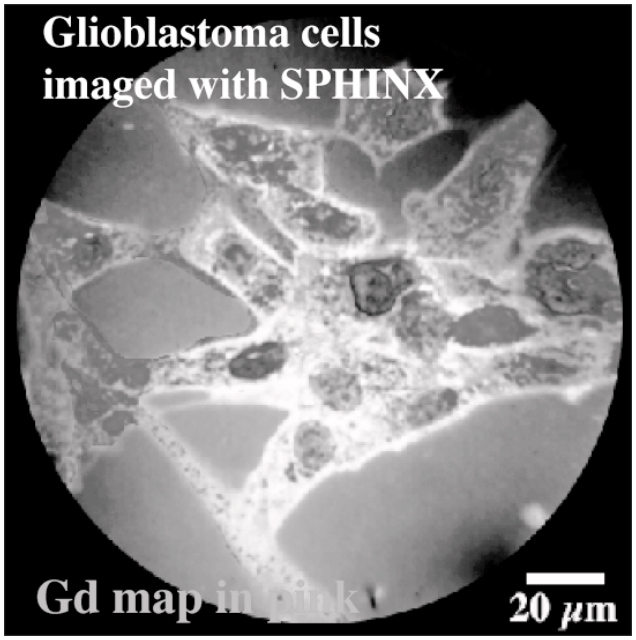
From story by Barbara Wolff, "Wisconsin Week," 5/02/01

New collaborative classes dealing with comparative languages, Latino politics and history, international studies and emerging relationships be-

tween the biological sciences and new technology have received the 2001 Chancellor's Grants for Collaboration in Teaching.

In Physics, a new course, Microscopy of Life, will be offered in the Spring 2002 semester. This course will offer a strong basis in the physics of medical imaging technology as well as consider its applications to and implications for biomedicine. Under the leadership of Gelsomina De Stasio, Professor of Physics; Patrick Turski, Professor of Radiology; and consultant Jamey P. Weichert, Assistant Professor of Radiology, the course will combine lectures and labs in venues around campus to give students direct experience with the equipment.

Robert Skloot, associate vice chancellor for academic affairs and developer of the grant program, says the awards expand both the undergraduate curriculum and interdisciplinary teaching on campus. Each award recipient receives $13,500 to defray costs and time spent in developing the new courses. For more information, visit: http://www.wisc.edu/provost/ccae/.



Brain cancer (glioblastoma) cells, exposed to a gadolinium (Gd) compound. The localization of Gd at the subcellular level was detected with the SPHINX spectromicroscope at the UW-Synchrotron Radiation Center by G. De Stasio and her group, in collaboration with M. P. Mehta. Gd in glioblastoma cells will help develop a new therapy for this most lethal brain cancer.

GRADUATE PROGRAM

Graduate Program Report

The Admissions and Fellowships Committee, under the chairmanship of Jim Lawler, is pleased to report that a total of 82 offers were made (66 domestic, 16 international) to this fall's (2001) graduate program applicants. Acceptances number 22, including 2 new students who will be receiving WARF Fellowship supplements of $9,000 during their first year of study. Fourteen of the incoming students are domestic, and eight are international. Because of last year's (2000) very successful recruitment efforts resulting in a record high incoming class (49), we were limited in the number of offers we were able to make for this fall.

There were a total of 292 applications for admission (up 14% from last year) to the Physics graduate program. Of these, 107 were domestic and 185 were international. Offers were made to 60 males and 22 females, with 19 males and 3 females accepting.

The changes made last year were continued — namely; two group visit events in March, greater involvement of current graduate students, an increased financial supplement to all TA offers with a marked boost to our top 15 applicants, and several summer RA offers to prospective students. Prospective students unable to participate in the group events were given the option of an individual visit to campus. Additionally, Professor Tao Han conducted telephone interviews with approximately 15 Chinese students as part of the application process.

We invite you, as alumni, to encourage prospective graduate students to consider pursuing their graduate studies at the UW-Madison.

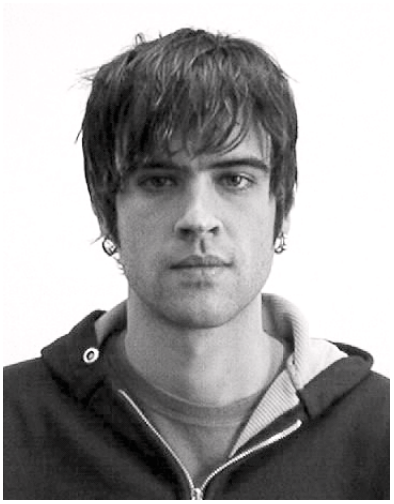
Graduate Awards

Wood & Cengher Win
Emanuel R. Piore Awards

This award is given annually to recognize excellence in the first year of graduate studies. This year congratulations go to **Ben Wood** and **Mirela Cengher**.

Ben Wood grew up and attended high school in South Dakota. After graduating, he moved to

Eugene, Oregon to attend school at the University of Oregon. While there he studied business, economics, and math before finally settling on a physics major. He graduated in 1999 and began graduate studies at Wisconsin that same year. He is currently teaching and doing research in the area of neutrino oscillation phenomenology. In the future, he'd like to continue studying neutrino properties, perhaps broadening his knowledge to include the theoretical origins of neutrino mass outside the standard model. He plans to graduate in spring 2002 with a Ph.D. under Professor Vernon Barger.



Ben Wood

Mirela Cengher

The second Piore award winner this year was Mirela Cengher. Mirela tells us that she came from Romania. Her interest in physics began in high school when she won the first prize two consecutive years in the Buzau county's contest in physics for high school students. She graduated from the Faculty of Physics at the University of Bucharest, the biggest and most prestigious University in Romania. Her major was Engineering Physics.

Mirela has worked several years as a scientist in the Plasma Focus Group at the National Institute for Laser, Plasma and Radiation Devices from Bucharest, Romania, and about one year at the Institute for Electronic Structure and Lasers in Iraklion, Greece. She has 20 papers in journals or presented at conferences. Her main experience is in medium and hard X-ray measurements, device design and construction, spectroscopy in the visible-infrared domain, X-ray image recording, image processing, vacuum measurement and vacuum chamber design, high speed measurements of high currents and voltages. Her adviser is Professor Prager and she currently is a research assistant at the Madison Symmetric Torus.

Four Grad Women Get Career Boost

This year the **Elizabeth Hirschfelder Scholarship for Graduate Women in Math, Chemistry and Physics** enabled four physics graduate women to participate in profession development opportunities. This award has been made possible through a fund established by Elizabeth Hirschfelder. (Editor's note: This fund has been great in helping Physics women have opportunities which could not have otherwise been funded. We are most grateful!)

Rellen Hardtke

Rellen Hardtke — Rellen received her undergraduate degree in Mathematics from M.I.T. After a diversion in the private sector, she began graduate school at UW in 1996. She works with data from the Antarctic Muon and Neutrino Detector Array, a high energy neutrino telescope located at the geographic South Pole. (See Nature, 21, March 2001.) She searches for neutrinos from gamma-ray bursts. GRB's are the most energetic explosions in the universe since the Big Bang.

They are not well understood and detection of, or upper limits on, GRB neutrinos would tell us a great deal about the underlying physics of this cosmological phenomenon. She has used her Hirschfelder Award to attend the 2001 International Cosmic Ray Conference in Hamburg, Germany at which she presented the results of her latest research.

Evelina Tsoncheva — Evelina's background is not atypical. She spent three years of high school as a piano performance major in a music school in Sofia, Bulgaria and five years in a Spanish school in the same city. She has both an under-

graduate and graduate degree in theoretical and physical chemistry from Sofia University. She came here as a chemist and spent over two years in the Chemistry Department at UW-Madison, enough to get a MS degree. Following that, she left Chemistry and became a physics graduate student. Evelina's area of research is condensed matter physics. Evelina is also an outstanding teaching assistant. She has worked for more than three semesters in Physics 109. During the spring 2001 semester, Evelina was the 2nd highest ranking TA in the department. She plans to use her Hirschfelder Award as an opportunity to do research with Professor Chubukov during the intersession period.

Evelina Tsoncheva

Michele Sumstine was another of the Year 2001 Elizabeth Hirschfelder Awardees. She used her award to attend the Materials Research Society's fall meeting in Boston during November 2001. Michele began her college career at the University of Iowa as an art major. The loan of a book on quantum mechanics from an engineering student helped steer Michele toward the mysteries of physics. She eventually enrolled at the University of Illinois at Chicago, worked in the Microphysics Lab, and completed her undergraduate degree in physics there. Michele began a research assistantship during Summer 2001.

Rachel Cannara was the fourth winner of the Hirschfelder Award. She is entering her second year as a graduate student at UW Madison. She intends to use this award to complement her experimental research with additional inquiries into mathematics and topics relevant for possible theoretical interpretations of her thesis work. The award will help finance useful reading materials and attendance at a conference. She completed her undergraduate degree in physics at the University of California, Santa Cruz. Rachel has decided to study quantum theory and is currently working with Professor Robert Carpick in Engineering Physics.

Dillinger Teaching Award Presented

Jay Anderson was the winner of the 2001 **Dillinger Award for Teaching Excellence**.

Jay received his B.S. degree from Gustavus Adolphus College in Saint Peter, Minnesota. He came to the UW Madison Physics Department in 1995 and has been an exceptional teaching assistant for many years. Students reported comments like, "He's one of the best TA's I've had in my college career." Jay often taught courses at the 200 level, with his most recent assignment in Physics 207.

The Dillinger Award was instituted by the Dillinger family in memory of their father, former Professor Joseph Dillinger.

Wisconsin Distinguished Graduate Fellowship Program

Both the **Jeff & Lily Chen** funds and the **Raymond and Ann Herb** funds are hard at work earning interest to create endowments under the Wisconsin Distinguished Graduate Fellowship Program.

To attain the level of providing annual support for one graduate student, an endowment of $500,000 is necessary for each fellowship. These occur when a donor provides the University with $250,000 and it is matched by the Graduate School. The Chen Fellowship is expected to begin in Fall 2002, while the Herb Fellowship has had two participants. Once again, a big thank you to these folks!

New Physics PhD's

Summer 2000

Barger, Andrew

"Fast 3D magnetic resonance imaging using undersampled projections" (Halzen/Mistretta)

Medical Student, UW-Madison, Madison, WI

Hansen, Alexander

"Nonlinear resonant electromagnetic torques in plasmas" (Prager)

Research Scientist at Columbia University, New York City, NY

Li, Tianjun

"Chargino and neutralino studies for future colliders" (Barger)

Postdoc, University of Pennsylvania, Department of Physics, Philadelphia, PA

Fall 2000

Petrovykh, Dmitri

"Self-assembled nanostructures on vicinal surfaces" (Himpsel)

Postdoc, Naval Research Lab, Washington, DC

Wu, Xiaowei

"Magnetic oxides and heterostructures" (Rzchowski)

Research Assistant, Seagate Technology, Pittsburgh, PA

Spring 2001

Altmann, Kyle

"Electronic states in magneto-electronics by photoemission" (Himpsel)

Postdoc, Synchrotron Radiation Center, Stoughton, WI

Chapin, Douglas

"A measurement of dijet production in deep inelastic scattering with Zeus at HERA"(Reeder)

Postdoc, Brown University working at Fermilab, Batavia, IL

Crocker, Neal

"Magnetic reconnection in MST" (Prager)

Postdoctoral Researcher, University of California-San Diego, Department of Mechanical and Aerospace Engineering, La Jolla, CA

Cross, Richard

"A measurement of the total photon-proton cross section at ZEUS" (Smith)

Programmer, Interact Disease Management, Conyers, GA

DeYoung, Tyce

"Observation of atmospheric muon neutrinos with AMANDA" (Halzen)

Postgraduate Researcher, Santa Cruz Institute for Particle Physics, Santa Cruz, CA

Ferguson, Douglas

"A measurement of the W pair production cross section and derived mass at threshold in positron electron collisions" (Wu)

Haslinger, Robert

"Surface order parameter symmetry in YBCO" (Joynt)

Postdoc, Santa Fe Institute, Santa Fe, NM

Nelson, Ian

"Physics of practical spin-exchange optical pumping" (Walker)

Research Physicist, Nycomed Amersham Imaging, Durham, NC

Shalizi, Cosma

"Causal architecture, complexity and self-organization for time series and cellular automata" (Olsson/Griffeath)

Postdoctoral Fellow, Santa Fe Institute, Santa Fe, NM

Masters' Degree Recipients

Summer 2000

Hardtke, Rellen
Haslinger, Robert

Fall 2001

Crocker, Neal
Eichenbaum, Andrew
Hooper, Daniel
O'Dell, Christopher
Sekula, Stephen
Silver, Charles
Zhao, Yuegang

Spring 2001

Castellini, Olivia
Corliss, Jason
Laird, Angela
Peterson, Stephen
Zhang, Junfeng

UNDERGRADUATE NEWS & AWARDS

Undergrad Program Update

by Peter Timbie,
Coordinator of the Undergraduate Program

A few years ago we interviewed our students and some alumni to evaluate our UG program. A manifesto called the Walker Committee Report resulted in a series of improvements that are just now underway. Our program is getting better year by year!

Last year we kicked off a brand new series of courses, Physics 247, 248, and 249, which provide for the care and feeding of that special breed of student who is considering majoring in physics. Unlike the mass-market courses of the past, this new sequence, under the guidance of Profs. **Eriksson, Walker, and Cox**, eschews the standard inclined plane fare and gets right into relativity and modern physics topics. In our first year we met our enrollment goal of 30 students and are on track to increase the numbers this coming year. Don Cox and others are working on a plan to build a new intro course for biology students through a university-wide program called "Symbiosis." Don has also begun a "Teaching Forum" in the Department so faculty and TA's can exchange ideas about improving our classes.

Susan Nossal, **Don Cox**, **Matt Briggs**, and **Bob Benjamin** spearheaded a proposal to the NSF to develop a full-fledged Physics Learning Center in the Department, similar to the one that our friends in Chemistry have. We will build on the very successful Physics Peer Mentor Tutoring Program that Susan began through sheer force of will a few years ago. We're keeping our fingers crossed that the proposal pans out, but have some university support lined up just in case…

Former majors may remember struggling with broken chart recorders in the intermediate labs. No more! In the past two years we have replaced those machines, as well as many other antiquated laboratory objects. And we are looking forward to moving into Chamberlin Hall in a few years. The remodeled building will feature all new teaching labs, lecture halls with modern AV equipment, space for the Physics Learning Center, etc.

Finally, in May we had a "Senior Sendoff" picnic on the observatory level of Sterling Hall along with our friends in Astronomy. The weather and pizza were superb. This event was so popular that we had another one at the beginning of the fall semester for all of our majors. In 2001, we graduated 25 Physics Majors (the most in 6 years). There were 19 Astronomy-Physics majors (the most ever!) and 3 AMEP majors. As always, we are launching our grads into careers everywhere: some are going to graduate school at places scattered across the country from Philadelphia to San Diego, some are going to the corporate world at companies like Motorola, others are taking a well-deserved rest, and one is headed to the Peace Corps in Gambia.

Other plans for the year ahead: a GRE coaching session for seniors, a Grad School planning meeting, a Find Our People Meeting, a non-academic careers meeting, another Senior Sendoff, and much more.

Please feel free to send me (timbie@wisp.physics.wisc.edu) a few words if you have comments or suggestions. [*Editor's note: New physics majors now get a free, official Physics undergraduate T-Shirt when they declare. I might mention that they have become a very popular item.*]

Undergraduate Awards

Undergraduate/Faculty Hilldale Awards

As mentioned under the Faculty Research Awards section earlier, undergraduate physics student **Joshua Friess** and Professor **Tao Han** have been awarded the 2001-02 Wisconsin Hilldale Undergraduate/Faculty Research Award.

L. R. Ingersoll Awards

L. R. Ingersoll Awards for distinguished achievement in undergraduate physics for Spring and Fall were awarded on May 11, 2001 at the Physics Banquet & Awards Ceremony at the Fluno Center. Awardees included:

Spring 99–2000
(*We run one semester behind on these.*)

Kelly J. Hansen (103-104)
Mark C. Albrecht (201-202)
James R. Braun (207-208)

Fall 2000–01
Joshua W. Hagen (103-104)
Angela B. Penrose (103-104)
Kin-Chung Wong (201-202)
Barrett Foat (207-208)
Joanna Yi (207-208)

Albert Augustus Radtke Scholarship

The 2001 Albert Augustus Radtke Scholarship for distinguished achievement in the study of undergraduate physics was awarded to several physics seniors including:

Hal Canary
Joshua Friess
Justin Harker
Adam Martin
Jill Meyer

Fay Ajzenberg-Selove Award

The 2001 Fay Ajzenberg-Selove Award for outstanding undergraduate women majoring in Physics, Astrophysics or Astronomy had two winners this year. They were a Physics major, **Jennifer Palguta** and an Astronomy-Physics major, **Rebecca Pifer**.

Here is Jennifer's story:

"I was born and raised in Vienna, Virginia. Growing up, I always liked planning every detail well ahead of time; nevertheless, I had a hard time deciding upon a career. Several times during elementary school, I had to write on the subject of what I wanted to be when I grew up. Each time I wrote on the topic, my choice of a career had changed. By the time I reached high school, I had gone through just about every career option ranging from architect to zoologist. It was not until my senior year at James Madison High School in Vienna, Virginia, that I discovered physics. Shortly into the course, I realized that I'd finally found a subject that fascinated me.


Jennifer Palguta

My instructor, Martin Romeo, recognized and fostered my interest in physics. His motto was 'It isn't what you know, it's what you can figure out.' This not only encouraged me to persevere even if I didn't at first understand something, it seemed the perfect field of study for one who'd never outgrown her childhood tendency to always ask 'why?' or 'how?'. I knew then that I had discovered what I wanted to study when I reached the University of Wisconsin.

Since entering the physics program here at UW Madison, my interest in physics has continued to grow. However, although I've finally decided on my undergraduate major, I've yet to identify the field of physics on which I'd like to focus in graduate school. To better define both my options and my interests in the area, I plan to take a variety of additional physics classes and pursue other educational opportunities prior to graduation. Also, this past summer I worked as a technical intern at the Nuclear Regulatory Commission in Washington, D.C."

Rebecca Pifer, the second winner, is an undergraduate physics/astronomy major who will graduate in 2002. Her nominator for this award indicated that she has had diverse as well as successful research experience in astrophysics. In l998, she presented the results of her research on the interstellar nitrogen and sulfur spectra in a poster session at a meeting of the American Astronomical Society in Chicago. She is presently working with Ron Reynolds to finish a formal paper on this work for the Astronomical Journal. Last spring, Rebecca participated in the University's Undergraduate Research Symposium 2000 and in summer 2001 she participated in the eight-week National Solar Observatory Research Experience for Undergraduates in Tucson, Arizona.


Rebecca Pifer

Liebenberg Family Undergraduate Summer Research Fellowship

A big thank you to the family of **Maude Liebenberg** and her son, **Don**. Because of their generosity, a new Liebenberg Family Under-

graduate Summer Research Fellowship was presented at the May awards banquet. The purpose of this fellowship is to encourage undergraduates to become involved in summer research programs. A very excited **Louise Helenius** was the first recipient of this award.

Louise Helenius

Here's what Louise has to say:

"I am very happy to be an undergraduate physics student at UW Madison and honored to have been awarded the Liebenberg Scholarship. The fall of 2001 will be my fifth semester. I am on a five-year plan and intend to major in Astronomy, Physics, and Computer Science. Thus far, I've been blessed with wonderful professors who have a passion for both teaching and their research.

I have been working with Professor Don Cox since the summer of 2000. My main involvement in this research has been to write a program simulating a loose magnetic flux tube in interstellar space. The Liebenberg Scholarship has given me an opportunity to dedicate my time to working on this project this summer. Furthermore, my background consists of only general and introductory modern physics, so this scholarship has awarded me with an opportunity to focus on understanding the underlying physics involved.

I am also a student assistant for the WES program in the Math Department, a program designed to help undergraduates grasp the fundamental concepts in calculus. I am hoping to also become a Peer Mentor Tutor for Physics l03/l04 this upcoming fall semester. Aside from my research this past summer, I took one class and volunteered for Universe in the Park, a program designed to bring astronomy to the public via state parks.

I plan on attending graduate school for either astronomy or physics right after I finish my undergraduate program here. I hope to continue my career to eventually become a research professor."

University Physical Society

The Physics Club of the University of Wisconsin Madison, also known as the University Physical Society can be found at http://www.sit.wisc.edu/~ups/index.html. Check it out!

They feature information on:

- Jobs: job postings in the UW Physics Department
- Events: Upcoming UPS Events
- Officers: Your UPS Officers
- Research: How to find research opportunities
- About: What is the University Physical Society?
- Tutoring: We offer volunteer tutoring.
- Humor: Bad physics Humor
- Photos: Physics Club memories

They also provide links to The American Physical Society and the Society of Physics Students.

The officers for the 2001-02 year are:

Christopher Malie (Co-President)
Abe Smith (Co-President)
Rebecca Pifer (ASM Liaison)
Sara Knaack (Secretary)
Caitlin Doran (Treasurer)

A trip to Fermilab, February 2000

W.E.S.T.

Building Connections in the Physics Community

By Paula Wamsley, co-founder of WEST (Women Entrepreneurs in Science & Technology)

You graduated with a shiny new Ph.D. in hand some time ago and went out into the real world to make your way. If you were like many of your colleagues, including this author, you left Madison with little experience outside the realm of academia. This is no surprise since you probably spent the majority of your life in an academic setting. Graduate school was an extension of a life that you had already mastered. Upon graduating you were familiar with university structure, rules, and standards, the research tools that a university can provide, what it takes to be successful in a university setting, and had a list of professional contacts. You were well-prepared for an academic career. But for many alumni, graduate school is the end of life in academia. Next we venture into the great unknown.

Three UW alumnae did just that. Each of us wound up working in a small business within a few years of graduation. We no longer knew the rules, structure, and standards. We no longer had the same research tools that were available to us at the university. And perhaps most importantly, we didn't have a well-stocked Rolodex of people to contact for advice. Our list of professional contacts represented varied technical expertise, but the experience was mostly limited to an academic setting. We searched for professional associations and organizations that could provide us with the network of contacts from whom we could learn the ropes. When we couldn't find such an organization, we decided to found WEST.

WEST stands for Women Entrepreneurs in Science and Technology. WEST is committed to building a community to increase the connections between the entrepreneurial and the scientific communities. While entrepreneurship may be the last thing on your mind when you think of your career, the reality of the current U.S. economy is that new job creation is led by small businesses. And small businesses are created by entrepreneurs. The rapid technological advances made possible by university research often require highly skilled workers for implementation. Graduate training in physics is a good way to acquire the technical skills required to participate in ventures that rely on technology transfer. A scientist that can work effectively in a business environment can play a key role in technology transfer. This benefits society, the scientist, and the wider physics community.

The Physics Department and WEST would like to foster closer ties with alumni. Particular areas of interest include collecting a list of lessons learned in graduate school to be included in a graduate student guide and career stories to be made available to students to increase their awareness of their many opportunities. (Please feel free to email lessons learned & career stories to pwamsley@WESTaction.org.) Finally, we encourage alumni, at any stage of career development, who are willing to speak with students about career issues to let us know when they will be in the Madison area. The Physics Department will contact the graduate students to let them know that an alumnus is visiting and is willing to share their professional experiences. A variety of formats such as brown-bag lunch, seminar, speech, and social are available.

WEST would like to help prepare students for interesting and rewarding careers. Our approach to this is to encourage the students to start career exploration and planning as soon as possible. Once the students get a clearer picture of what lies ahead, they can make the most of their time in graduate school so that they are prepared to become leaders no matter what specific career goal they may pursue. WEST and the Physics Department encourage you to take an active role in guiding and mentoring today's graduate students.

WEST is also developing a professional program with activities focused on the needs of working scientists rather than students. Our inaugural chapter is in the Boston area. Once the Boston chapter is up and running we plan to expand to other locations. Please contact us if you are interested in establishing a local WEST community in your area. For more information about WEST, please see our website: http://WESTaction.org or email pwamsley@WESTaction.org.

I.C.E.

Astronomy in the Ice

Story by Jodi Cooley, Physics Graduate Student

Over the course of the last year, several people from the UW-Wisconsin Antarctic Muon and Neutrino Detector Array (AMANDA) research group have been teaming up with a new program on campus called "K through Infinity (KTI) Professional Development Partnership" to create a course called "Astronomy in the Ice." AMANDA is a neutrino telescope that is located at the South Pole in Antarctica.

Shown above are the summer 2001 participants in the "Astronomy in the Ice" Program.

Jim Madsen, professor at UW-River Falls, and **Francis Halzen**, professor at UW-Madison, first thought of the project after Jim completed a year sabbatical with AMANDA. Francis then invited **Katherine Rawlins**, **David Steele** and me to join in during the spring of 2000. This past year Professor **Brenda Dingus** and her student, **Robert Atkins**, joined the team.

KTI, funded by the National Science Foundation (NSF) and the UW-Madison Graduate School, is the parent organization of this project. KTI's mission is to make university resources available to the community. This is being done through several projects, including "Astronomy in the Ice," with the help of approximately 20 graduate student fellows.

"Astronomy in the Ice" is a course that secondary school teachers can take in the summer at UW-River Falls as part of the Master's of Science Education-Science degree program. The course instructors are professors and graduate students who are affiliated with the AMANDA neutrino telescope.

The course is intended to be a first step in a partnership between the AMANDA research group here at Wisconsin and secondary school teachers. It lasts two weeks. Each day a different topic related to the AMANDA telescope is presented. In the morning, we have three lectures that last 50 minutes on the topic for the day. The afternoons are spent working on and refining projects that demonstrate the different types of physics that take place in AMANDA. These projects are then put together on a CD. Each teacher then has a copy of all the projects that he/she can take back and do in their classroom.

After the class is finished, each of the teachers receives, if he/she wishes, a visit from one of the physicists working on the project. Last year between Jim, Katherine, David and I, we visited 12 classrooms and talked to approximately 2000 students about AMANDA.

The program's first year was during the summer of 2000. The first class contained 17 secondary school teachers. From that class we had several teachers who decided to teach a one-week unit on AMANDA in their classrooms.

This year's class had 24 secondary school teachers. Included in this year's class were two unique teachers, Mats Petersson from Sweden and Jason Petula from Pennsylvania. Mats and Jason are participating in the Teachers Experiencing Antarctica (TEA) program and will be working with the AMANDA collaboration at the South Pole in November.

David Steele, physics graduate student, talks with a high school class about the AMANDA telescope.

LOCAL NEWS

The spirit of Sir Isaac Newton

In February, we were notified that the Honorable Mr. Sensenbrenner, Member of Congress, was to be given a cutting of Newton's apple tree by

Physics Department Chair, Don Reeder, assists in the planting of the Newton apple tree.
Photo by: Bill Grogan

NIST in recognition of his long service to science as Chair of the Energy and Science Committee of the House of Representatives. Mr. Sensenbrenner suggested that the tree be planted near the physics building. A site was chosen in the botany garden adjacent to Chamberlin Hall and the tree was planted by Mrs. Sensenbrenner on May 25, 2001. Among the colleagues and spectators in attendance were Chancellor Wiley, Mrs. Sensenbrenner and son, Bob, plus faculty and staff of the Departments of Physics and Botany.

New awards established

The department of Physics established two new awards during the spring semester of 2000–01. The inaugural awards were presented at the departmental awards banquet on May 11, 2001, at the Pyle Center. The first award is the Distinguished Alumni Fellow. This award will be presented to a graduate of the Department who has had an outstanding and meritorious career. It is also awarded in recognition and appreciation of exceptional service to the Department.

The second new award is the Distinguished Faculty Fellow award. This award will be given to a former faculty member in recognition and appreciation of exceptional service to the Department.

Winners of this year's awards were Fay Ajzenberg-Selove, Distinguished Alumni Fellow and P. R. "Dick Moran, Distinguished Faculty Fellow. (Information on student awards presented at the annual banquet can be found in the Undergraduate and Graduate Student sections of this newsletter.)

Picnic Persists

The annual spring Physics Department picnic tradition continued again this year. The event was held on Saturday, May 5, at Hoyt Park. Thank you to **Mark Eriksson** who has helped coordinate picnic efforts the past few years. (Guess he must have enjoyed it as an undergrad!)

Schutz Stars

Barb Schutz, Student Status Examiner in Physics, was among seven student-services employees to be honored on April 25, 2001 by the University of Wisconsin Student Personnel Association. Barb was thoroughly surprised to learn that she was the winner of the Student Personnel Association's 2001 Frontline Award for Outstanding Service to Students. The Chair and others in the department managed to confidentially nominate her and keep her winning a "secret" until the moment it was formally announced to a crowd of about 200 people.

Barb Shutz

As her department's graduate coordinator, Schutz processes hundreds of applications each year and was commended for her attention to detail. She also coordinates fellowship nominations, organizes visits to campus by prospective students, provides newcomers with information about housing, transportation, other "housekeeping" items and more. Barb provides the department with information on graduate school rules and works closely each year with the gradu-

ate program admissions committee. She also provides an ongoing historical perspective on the past several years of admissions to the department.

Barb has worked at the University of Wisconsin Madison for 29 years! The past seven of them in her current position. Way to go, Barb!

Sanders Completes ASEC Chair/ Buehlman elected Vice Chair

Wilt Sanders, scientist in the Physics Department and Space Science & Engineering, recently completed his second three year term as a member of ASEC, the Academic Staff Executive Committee. In UW Madison's shared governance structure, ASEC parallels the University Committee (UC) and is charged with the day-to-day governance activities of the Academic Staff Assembly. Wilt served as Chair of the committee for the past year.

Jean Buehlman, who was elected to ASEC last year, has been chosen to serve as Vice Chair for the 2001–02 year.

UW Madison Plasma Physics Research Group Counts Its Savings

(Story by Dale Schutte, Program Administrator in the Plasma Research Group, as featured in the Federal Surplus Shopper Newsletter, June 2001)

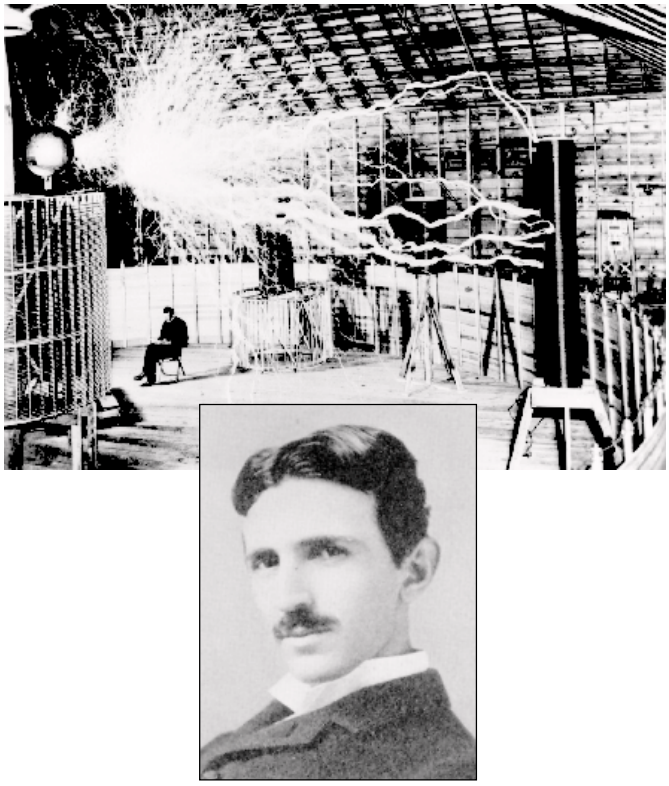
Over the past years, the UW Madison Plasma Physics Research Group has been able to buy chain hoists, storage cabinets, tool chests, frequency counters, function and signal generators, oscilloscopes, spectrum analyzers, power supplies and industrial supplies through the Federal Property Program (FPP) at a fraction of the cost of similar items.

One example of these great savings was last July when our research group purchased an HP Model 5343A Microwave Frequency Counter. This one purchase from the FPP saved our research group over $3,000 versus buying the identical item from a used test equipment dealer.

Using the Intranet, our research group screened some of the items we have purchased. Because of this, we have saved thousands by buying from the FPP and so can other organizations that need good quality test equipment for instruction or research purchases.

Tesla: The Electric Magician

John Wagner, a retired elementary school teacher from Michigan, is on a crusade to honor Nikola Tesla. Has donated busts of Tesla to about ten schools and to the Physics Ingersoll Museum. You can find a photo at http://sprott.physics.wisc.edu/photos/friends/wagner.jpg.



Nikola Tesla

(*Editors comments: Who is Nikola Tesla? We found an interesting story on the Web at http://www.parascope.com/en/0996/tesindex.htm. He is credited with creating alternating current. His life story is certainly worth reading. You might want to note that the first application of his new technology was at Niagara Falls. George Westinghouse negotiated with Tesla to manufacture the dynamos and won the coveted contract to harness Niagara, bidding half of what Edison bid for a DC system. In 1895, the Niagara AC power system transmitted electricity to Buffalo twenty-two miles away — something that would have been impossible with direct current. This discovery played a huge part in making electric power commonplace for everyone.*)

UNIVERSITY NEWS

Around the University

John Wiley Becomes New Chancellor

When John D. Wiley assumed his new office as Chancellor on January 1, 2001, he became the 27th leader of the university.

From 1994–2000, Wiley served as the university's provost and vice chancellor for academic affairs. From 1989–94, Wiley was dean of the UW Madison Graduate School and the university's senior research officer. From 1986-89, he served as associate dean for research in the College of Engineering.

Wiley received his bachelor's degree in physics from Indiana University in 1964; attended graduate school at UW Madison as an NSF Fellow and received master's and doctoral degrees in physics in 1965 and 1968, respectively. He joined the technical staff of Bell Telephone Laboratories at Murray Hill, N. J., from 1968 to 1974 and then spent a year at the Max Planck Institute in Stuttgart, Germany as an awardee of the Alexander von Humboldt Senior U. S. Service Award for Research and Training.

Wiley joined the UW Madison faculty in the Department of Electrical and Computer Engineering in August 1975. His research and teaching focused on a variety of topics related to semiconductors and other materials and processes important to the electronics field. He is a co-founder of several highly successful research centers, including the Center for X-ray Lithography and the Engineering Research Center for Plasma-Aided Manufacturing. From 1982 to 1986, he chaired the Materials Science Program.

(Note: Want to see the latest statistics on the University? For UW-Madison Facts go to http://www.news.wisc/edu/ucomm/facts.html)

Peter Spear Named Provost

Photo at
http:///www.news.wisc.edu/newsphotos/spear.html
Story by Kent Barrett, UW Comms., 7/06/01

Nationally recognized neuroscientist Peter Spear will return to the university this fall as provost, Chancellor John Wiley recently announced.

"We had a terrific pool of candidates," Wiley says. "All four finalists were very strong, but Peter's experience makes him the right fit for the campus at this time."

Spear has served as Dean of the College of the Arts and Sciences and Professor of Psychology at the University of Colorado-Boulder since 1996. He also held various leadership positions during his 20 years as a Professor of Psychology at UW Madison, including Department of Psychology chair from 1990–94 and Associate Dean for the Social Sciences in the College of Letters and Science from 1994–96.

Along with administrative experience, Spear brings with him a long list of academic and research accomplishments. He has written more than 90 publications, including a textbook, "Psychology: Perspectives on Behavior." His research focuses on how brain mechanisms of vision change during development, aging and while recovering from brain damage.

Spear is excited to be returning to UW Madison. "Without question, it is one of the top public research universities in the country, " Spear says. "This is really a wonderful opportunity to come back and make it even better."

Cadwallader Named Interim Grad School Dean

Story by Brian Mattmiller & Terry Devitt, "Wisconsin Week," 5/02/01

Martin Cadwallader, an 11-year veteran of the Graduate School, has been named the school's interim dean and vice chancellor for research while the search for a successor is underway.

A national search will be conducted to replace Virginia Hinshaw, who led the school since 1995 and has accepted a position as Provost of the University of California-Davis.

"Martin brings a wealth of knowledge and experience to this key leadership position," says Chancellor John Wiley. "Our graduate education and research programs will be in very capable hands under his guidance."

Wiley says he would like to have a new dean on board by spring 2002.

Cadwallader, the senior associate Dean of the Graduate School, has been an associate dean since 1990. He oversees research and graduate education in the social sciences. The native of Sussex, England, has been a member of the UW-Madison geography faculty since 1974.

College of Engineering Dean Physics Department Alum

Paul S. Peercy, the Dean of the College of Engineering received his M.S.(1963) and Ph.D. in Physics (1966) at UW Madison. Peercy came to the college in September of 1999 from SEMI/SEMATECH, an Austin, Texas-based nonprofit consortium of more than 160 of the nation's suppliers to the semiconductor industry, where he was president since 1995. Prior to that position, he was director of Microelectronics and Photonics at Sandia National Laboratories in Albuquerque, New Mexico.

As Dean of the College of Engineering, Paul S. Peercy is committed to preparing the college to take full advantage of changes in the engineering field and continuing its tradition of academic and ethical excellence.

His research interests include phase transitions in solids, ferroelectricity, Raman and Brillouin scattering studies of solids, ion-solid interactions, laser-induced phase transformations, microelectronics and photonics, and solid state physics.

Alumni Get New Gateway to UW Madison and the World

(Interested in more information? Contact Cheryl Porior-Mayhew, 608-262-7545)

MADISON — The Wisconsin Alumni Association recently launched a new customizable Web site, http://www.uwalumni.com, that promises to connect more alumni to the University of Wisconsin-Madison and each other.

Now, grads who want to keep up with what's happening on campus and around the world can log on for the latest in events and information. WAA expects this site will be the place where loyal UW alumni begin their day.

"Every day for at least four years, UW grads started their day on the Madison campus," says Paula Bonner, executive director of WAA. "Now that they've graduated and live all around the world, they want to be involved in news and events happening in their area, but they want to remember life at UW-Madison. Our Web site allows them to do both the minute they open their browsers."

Because the Web site is a portal, in addition to standard campus news, alumni events and career information, users can customize their home page to include national news and sports, local weather forecasts, personal financial data, and more. At any time, users can add and remove sections, as well as control the amount of information provided at a glance.

Alumni are encouraged to join the online community by bookmarking the site in their browsers. WAA will run contests periodically for frequent as well as first-time visitors, and will add features such as bulletin boards and online discussion groups that will continue to facilitate alumni connections.

The Wisconsin Alumni Association has been serving UW-Madison and its graduates since 1861. WAA provides an array of services designed to connect alumni to the UW, enrich their lives and serve their many needs.

Wisconsin Alumni Association's Alumni Center along the Lake Mendota shoreline.

ALUMNI CORNER

(To access our Physics Web Page of alumni links, go to www.physics.wisc.edu)

Jim Berryman, Ph.D., 1975, tells us that his professional web pages are located at Stanford: http://sepwww.stanford.edu/sep/berryman.

Steve Bomba, Ph.D., 1968, deserves a huge thank you from the Physics Department for coming to Madison from Whitefish Bay, Wisconsin to give an excellent WEST career exploration talk to graduate students and faculty. Steve has retired from Johnson Controls. He is now doing business consulting with an emphasis on technology management. He has formed his own company, the sjBomba Company.

Herbi Dreiner, Ph.D., 1989, is now a professor at the University of Bonn, Germany. His web page is available at http://www.th.physik.uni-bonn.de/th/People/dreiner/

Featured Alum

David Fahey, B.S., 1975, (Ph.D. in 1979 from the University of Missouri - Rolla) has been the recipient of two distinguished awards recently. He has received the U.S. Department of Commerce Silver Medal for Meritorious Federal Service in December of 1996 for "Leadership in making the first direct measurements of supersonic aircraft emissions and analyzing the atmospheric implications." In January of 1996, he was the recipient of the American Meteorological Society Henry G. Houghton Award for "Outstanding contributions to our understanding of the ozone layer through airborne observations and theoretical analyses."

Fahey is currently a Research Physicist in the Meteorological Chemistry Group, Aeronomy Laboratory, National Oceanic and Atmospheric Administration, Boulder, CO. He has been with the department for about 22 years, about 19 of them as a civil servant. His career since 1985 has been defined by building atmospheric sampling instrumentation for reactive nitrogen oxides, the installation of such instruments on the NASA ER-2 high altitude aircraft, the deployment of that aircraft to gather data in the stratosphere in missions around the globe, the interpretation of those data sets to address issues of contemporary importance in the atmosphere, and the publication of the interpretation in peer review journals. He worked with **Wilmer Anderson** and the late **William Fitzsimmons** in gaseous electronics investigations. He indicates that they set him on a course to be a physicist and atmospheric scientist by giving him extensive opportunities as an undergraduate to work in their labs aiding various graduate student projects. He helped construct the first nitrogren laser in Anderson's group and built parts of one of their high-energy ion sources for scattering cross-section studies.

Andy Ferstl, B.S., 1993, graduated with a Ph.D. last June from the University of Minnesota and is now working as an assistant professor at Winona State University, Winona, MN.

Christopher Fink, B.S., 1987, is currently at the Florida State University Physics Department in Tallahassee, FL , where he received his Ph.D. in high energy theory. He can be found in the alumni data base or at fink@hep.fsu.edu.

Steve P. Fossum, Ph.D., 1969, retired from a teaching career at UW Stout in December of 1998 after 32 $^1/_2$ years there, the last 23 as the Physics Department Chair. He is currently self-employed in real estate appraising and bank auditing. He resides in Minneapolis, MN.

Mark Gehrke, M.S., 1998, first winner of the Dillinger Teaching Assistant Award, was back in touch recently. He was starting a new job with Veridian Systems in Ann Arbor, MI. He has been and will be working with the development of electro-optical systems for various government agencies. He and his wife are looking forward to their return to the Mid-West from Tucson, AZ. Mark also sent back a news article from the Tucson Citizen dated July 19, 2001, titled, "UA grad student scans stars for aliens." It turns out the article was about Maggie Turnbull, former Wisconsin undergraduate student who is now a grad at the University of Arizona. Maggie is involved in SETI research. We will post the article on our web page.

Featured Alum

John Harte, Ph.D., 1965, currently the Class of 1935 Distinguished Professor of Energy and Resources at the University of California, Berkeley, has received the 2001 Leo Sziard Award from the American Physical Society. He was cited "For his diverse and incisive efforts utilizing physical reasoning and analytical tools for understanding environmental processes and for his teaching and

writing to encourage this approach among students and colleagues." John received his B.A. in physics from Harvard University in 1961 and worked with Robert Sachs at UW in the area of theoretical physics. He was Assistant Professor of Physics at Yale University for five years and has been at Berkeley since 1973. Harte is a Fellow of the American Physical Society, and in 1990 was awarded a Pew Scholars Prize in Conservation and the Environment. In 1993, he was awarded a Guggenheim Fellowship and was elected to the California Academy of Sciences. In 1998, he was appointed a Phi Beta Kappa Distinguished Lecturer and a Distinguished Ecologist lecturer at Colorado State University. He is currently an Associate Editor of Annual Review of Energy and the Environment.

Gregg Jaeger, B.S., 1986 has sent us a link to his web page. He is a Senior Research Associate at the Photonics Center of the Department of Electrical and Computer Engineering, Boston University, Boston, MA.

Fred Lemmerhirt, M.S., 1970, wrote to tell us that he enjoys The Wisconsin Physicist. He finds it remarkable that so many of the faculty who were there 30+ years ago are still very actively involved with the department. He thinks they must be "durable" and enjoy their work. He is at the Waubonsee Community College, Sugar Grove, IL.

David W. Mantik, Ph.D., 1968, came all the way from Rancho Miragae, CA to proudly show his wife and kids that he was a winner of the L. R. Ingersoll award for the best work in beginning physics in 1960. Unfortunately, when he got to the Physics Museum, he discovered that the listing of winners started with the year 1961. We apologize, David. We'll try to rectify the situation. We do appreciate your visit and a copy of your original letter of the award signed by H. T. Richards, W. F. Fry and R. G. Herb.

Ron Mink, B.S., 1994, has moved to Gambrills, Maryland, to take a position as an Aerospace Engineer in the Optics Branch of NASA's Goddard Space Flight Center.

Julie Ann Pickhardt, B.S., 1987, has a new address in Boulder, CO. She is a software engineer who is currently enjoying being full-time mom.

Kurt Riesselmann, Ph.D., 1984, is now working as a Public Affairs Editor in Fermilab's Office of Public Affairs in Naperville, IL. His best advice to graduate students includes: use a couple of summers for internships (away from UW), build up diversity in your knowledge, develop a personal science network of professional contacts.

Christopher Smith, M.S. & M.A., 2000, is now an instructor in the Department of Physics at the U.S. Military Academy, West Point, NY. His military rank is Major. He is teaching a calculus-based, introductory physics course that is required for all students at the institution during their sophomore year (about 1,000). He can be found at majsmith@bestweb.net.

Dan Stump, B.S., 1970, from the Department of Physics and Astronomy at Michigan State University, asks who taught Physics 321 and 322 in Fall of 1968 and Spring of 1969. And who taught 721 in Fall 1969? Do any alumni know?

Arthur Tweet, Ph.D., 1953, says he likes receiving The Wisconsin Physicist and particularly appreciated the interesting piece by one of his contemporaries, John Cameron, in the last issue.

Paul Voytas, Ph.D., 1993, is a former student and post doc from the experimental nuclear physics group who is now on the faculty of Wittenberg University in Springfield, Ohio. He can be reached at pvoytas@wittenberg.edu.

Other News

Hugh Richards has left the Madison area and now resides in Menomonie, Wisconsin.

Erna Rollefson, age 86, died on Sunday, May 6, 2001, at Attic Angel Place, following a prolonged illness. In 1936 she met and married **Ragnar O. Rollefson** with whom she shared her life for almost 62 years until his death in 1998.

Norman Austern, Ph.D., 1951, a major contributor to the theory of direct reactions, died on May 15, 2000 in Pittsburgh, PA. While at Wisconsin, Austern's first paper, published in l947, was with **Julian Mack** on Lamb shift spectroscopy experiments. His interest soon shifted to theoretical nuclear physics. He worked with **Robert Sachs** on the effects of meson currents to explain neutron-proton and neutron-deuteron capture cross sections and angular distributions in deuteron photodisintegration. A complete obituary can be found in "Physics Today," November 2000.

DONORS

Thank You...

I am delighted to acknowledge the more than 130 generous friends of the Department who have contributed to the Department of Physics this year. There seems to be an ever increasing need for expenditures that are "outside the box" provided by conventional sources. The strings and limitations on the usual funds make the gift funds even more versatile and useful. Among the myriad uses to which we have put the gifts are: to assist in the graduate student recruiting, to enhance research by providing partial matching funds and to take advantage of unique and/or special opportunities. The Department has greatly benefited by these gifts and on behalf of my colleagues, I wish to express our gratitude and deep appreciation of your generosity.

Particularly noteworthy this year is the endowment by their family of the Karl Guthe Jansky & Alice Knapp Jansky Fellowship. Karl Jansky was the founder of radio astronomy. This annual fellowship is to be awarded alternately to an outstanding graduate student by the Department of Astronomy and the Department of Physics. The award will provide the recipients with help in pursuing their research in astrophysics and astronomy.

2001 was also memorable with the award in May of the first Liebenberg Family Undergraduate Summer Research Fellowship to Louise Helenius. This fellowship enables an exceptional undergraduate to pursue his/her proposal for research.

One of the perquisites (few) of getting older is that I recognize many of the names of the contributors and recall (with more and more difficulty) our common experiences. I look forward to expanding this list in the coming years.

Again, many thanks to all,

Don Reeder

Dept. of Physics General Fund

Robert K. Adair
Lawrence L. Ames
Carl J. Anderson
Wilmer Anderson
Marguerite G. Anderson
Bechtel Power Corporation
June F. Berenson
Raymond E. Berenson
James G. Berryman
The Boeing Company
Robert A. Bosch
Thomas W. Burrows
Ugo Camerini
Harry Y. Chiu
Douglas B. Clarke
Ronald F. Corry
Joanne E. Cowan
David L. Cowan
Maritza S. Crabtree
Richard L. Dangle
Daniel J. DeVos
Robin L. Dennis
Gertrude K. M. Evans
William D. Evans
Exxonmobil Foundation
Fidelity Investments
Gennady Fiksel
Thomas L. Finch
Rodger C. Finvold
Cary B. Forest
David Bruce Fossan
Cheryl J. Fromm
Richard Clair Fuller
Judith Fuller
GE Fund
Manyee N. Gee
Daniel D. Gee
Roberta K. Gelatt
Daniel Gelatt Jr.
Steven R. Glazewski
Thomas H. Groves
Roger L. Hagengruber
Harold P. Hanson
Gerald Hardie
John M. Harlander
Heidi S. Harlander
Barry S. Hindin
Laurence E. Hoisington
Thomas K. Holley
Nancy Lynne Holley
Honeywell Foundation
Edwin R. Jones Jr.
Keith W. Jones
Allan D. Kautz
Roderick G. Kerr
Alan M. Kleinfeld
George M. Klody
William C. Knudsen
David C. Kocher
Eric J. Korpela
John P. Krepczynski
Robert K. Leach
Frederick R. Lemmerhirt
James E. Lenz
Lockheed Martin
Daniel B. Lovett
David H. Loyd Jr.
Lucent Technologies
James M. Madsen
Linda B. Madsen
Louise Marcoux
& Jonathan D. Slavin
Arleigh H. Markham
Dan McCammon
Doungpornn T. McCammon
Joseph L. Mc Kibben

Kevin J. Miller
Elizabeth R. Moog
Wayne E. Niemuth
Mark R. Pederson
John E. Pinkerton
Leonard E. Porter
James W. Poukey
Principal Financial Group Foundation
Richard S. Raymond
Don D. Reeder
Steven R Riedhauser
Norman D. Rohrig
Louis A. Rosocha
Lawrence N. Rothenberg
Randal C. Ruchti
Margaret A. Ruchti
James L. Schreve
Shell Oil Company Foundation
H. Vernon Smith
James G. Sowinski
Edward J. Stephenson
Mark P. Stevens
Jack E. Taylor
Ronald Joseph Tonucci
Richard G. Turner
Eijiro Uchimoto
William A. Vareka
Paul A. Voytas
& Elizabeth A. George
William J. Weber
Gilbert M. Wilcox
F. Douglas Witherspoon
Margaret Witherspoon
Marvin William Wolfmeyer
King Lap Wong
Thomas E. Wulling
Xerox Foundation
Michael C. Zarnstorff
Sally Marie Handy-Zarnstorff
M. Alva Zook Jr.
Caroline Zook
Martin S. Zucker
Nadine M. Zwettler
& Jack T. Cusma

Joseph R. Dillinger Teaching Award Fund

Walter H. King
Jeanette A. King
Arleigh H. Markham

Elementary Particle Physics Institute

Kevin J. Miller
William D. Shephard

Fay Ajzenberg-Selove Scholarship Fund

Fay A. Ajzenberg-Selove
Walter Selove
Marvin E. Ebel

Cornelius P. & Cynthia C. Browne Endowed Fellowship Fund

Cornelius Browne

Physics Department — Graduate Student Recruiting

Peter Lauson Jolivette
Cheryle L. Jolivette
William F. Long
Principal Financial Group Foundation
Mark R. Stolzenburg
Helen R. Warren

Emanuel Piore Professorship Fund

IBM Corporation

Karl Guthe Jansky & Alice Knapp Jansky Fellowship in Physics/Astronomy

David B. Jansky
Karla M. Parsons-Hubbard
Anne-Moreau Jansky Parsons
Helen A. Sanford

BOOKMARKS

Editor's note: Here are some delightful web sites that I couldn't resist sharing with you.

Check them out!

New Chancellor's Page

http://www.chancellor.wisc.edu/

Meet John Wiley. Chancellor in title, physicist at heart.

Wisconsin Week Wire

http://www.news.wisc.edu/wire/about.html

You can subscribe to Wisconsin Week Wire and stay current on UW-Madison news.

Wisconsin Week Wire is an email publication that complements Wisconsin Week, the faculty and staff biweekly newspaper. The Wire is published weekly throughout the year.

The Wire consists of brief news items, many of which include web addresses where readers can go for more information or longer versions of stories. Many of the items correspond to stories that run in the newsprint edition of Wisconsin Week, though the Wire's weekly, year-round publication schedule allows for more timely news than is the case with the bi-weekly newspaper.

Virtual Campus Tour

http://www.news.wisc.edu/welcome/odyssey/campus/tourstart.html)

A UW-Madison Odyssey. Revisit Madison via a Campus Slide Show. This slide show is made up of 35 Web pages. The average size of the images is 35K. All photos are copyrighted to UW-Madison News and Public Affairs.

AMANDA

Antarctic Muon and Neutrino Detector Array
http://alizarin.physics.wisc.edu/

AMANDA is the world's largest detector of the high-energy neutrinos (sub-atomic particles presumably born in such unbelievably violent events as stellar explosions and black holes). It is an array of optical sensors frozen deep into the crystal-clear ice of the Antarctica. Facing downward, AMANDA uses the mass of the Earth to filter out less exotic particles. The Web site illustrates the science of the project with diagrams, links to collaborating research universities, and an innovative set of animations describing particle collision events. Equally engaging are the personal accounts and photos of the researchers living and working together in the desolation and extreme cold of the South Pole.

Jean Meyer Buehlman's Personal Favorite

http://www.geology.wisc.edu/~maher/air.html

This site is a collection of more than 300 digitized slides of geological formations taken by Professor Lou Maher in the UW Madison Geology Department. They cover Midwest glacial features, floods, tornadoes, Arches National Monument, the Colorado River, Craters of the Moon National Park, Yellowstone National Park, and more.

162-19: Esker in Blue Lake, 10 miles northeast of Elk River, MN. View to the northeast.
Photo by: Lou Maher

TALK TO US

Tear-out Sheet

Address correction and alumni news

Please use this form if you are writing to us hard copy. We are more than happy to hear your news and publish it in next year's issue of ***The Wisconsin Physicist***. This is also the way to update your address. Send this hard copy to:

Editor, "The Wisconsin Physicist"
Department of Physics
University of Wisconsin-Madison
1150 University Avenue
Madison, WI 53706

or E-mail to: *physics@madmail.physics.wisc.edu*

❒ Please check here if your address is different from last year.

Name: _____

UW-Madison Degree(s) and Year(s): _____

Employment: _____

Home Address: _____

Phone: _____

City, State and Zip _____

_____

Work Address: _____

Phone: _____

City, State and Zip _____

_____

My E-mail address is: _____

_____

- I would be willing to be a part of an informal informational Physics network in my area for Physics graduates.

  ❒ yes ❒ no

- Do you have access to the World Wide Web?

  ❒ yes ❒ no

- Have you found us on the World Wide Web at: http://www.physics.wisc.edu/ ? ❒ yes ❒ no

- I would be interested in being included in a UW-Physics alumni database available on WWW.

  ❒ yes ❒ no

- Contact me about linking my WWW home page to the Physics Dept. homepage. ❒ yes ❒ no

Feel free to include the following information in the next issue:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Tell us more

Survey question:

Who would be a great speaker for Physics graduates to hear?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____