

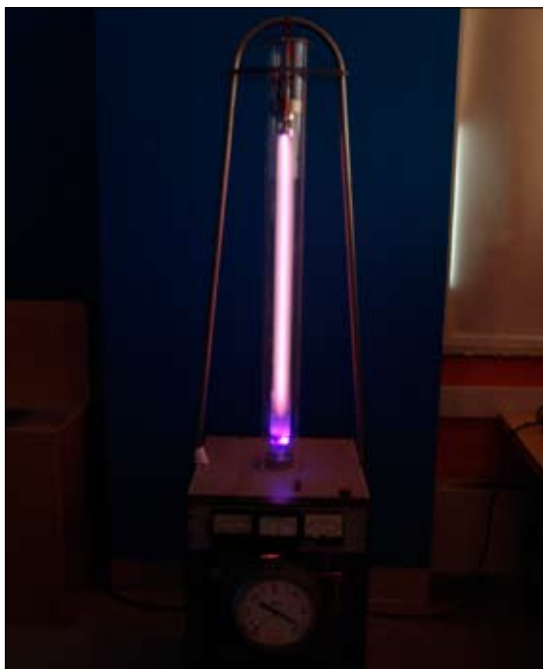
# The Wisconsin Physicist

Newsletter for  
University of Wisconsin Physics Alumni  
Vol.14 No.1 Fall/Winter 2007



## Leonard R. Ingersoll PHYSICS MUSEUM





Do-it-yourself DC glow discharge.



Brownie troop does the loop-the-loop.



Students peering into black hole.

# The Wisconsin Physicist

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**The Wisconsin Physicist**  
**University of Wisconsin–Madison**  
**Department of Physics**

Vol. 14 No. 1 Fall/Winter 2007

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Assistant Editor: Katlin Kowalkowski

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## Greetings from the UW–Madison Physics Department!



**Susan N. Coppersmith,**  
professor and chair

I am delighted to report on a great many positive and exciting developments in the Physics Department over the past year. One tremendously exciting development is the arrival on of three new faculty: Michael Ramsey-Musolf is a theorist from Caltech, working at the interface of nuclear physics and particle physics; Natalia Perkins is a condensed matter theorist from the Technical University in Braunschweig, Germany; and Stefan Westerhoff, a particle astrophysicist, joins us from Columbia University. Details of their research programs are in this newsletter and on the web at [www.physics.wisc.edu](http://www.physics.wisc.edu). We look forward to the excitement, energy, and innovation these new faculty will bring to the department and to the UW–Madison scientific community.

In May, Vice Provost for Diversity and Climate Bernice Durand stepped down from her post to become a professor emerita. We are all deeply indebted to her enormous contributions to research, teaching, and daily life in the Physics Department over the years.

Three faculty members will be enjoying sabbatical leaves in 2007–08: Sridhara Dasu and Yibin Pan will be in Geneva, Switzerland, working at the LHC, which is just about to turn on; and in the spring Pupa Gilbert will be working with colleagues at Berkeley and the Weizmann Institute.

The department congratulates Franz Himpsel, who won the 2007 Davisson-Germer Prize in Atomic or Surface Physics awarded by the American Physical Society, and Erik Spence, who received the 2007 APS Division of Plasma Physics Outstanding Thesis Award.

The seventh Annual Awards Banquet was held in May. In addition to awards to outstanding students, three Distinguished Alumni Fellow Awards were presented. The first went to Dr. W. Paul Menzel, a distinguished meteorologist who worked at NOAA for many years and recently joined the UW faculty as the Verner Suomi Distinguished Professor in the Department of Atmospheric and Oceanic Sciences. The second award went to Dr. Stephen L. Olsen, the PI of the high energy physics group at the University of Hawaii, who has had a distinguished career at the forefront of particle physics. The third Fellow was Dr. Michael Witherell, a distinguished elementary particle experimentalist who was director of Fermi National Accelerator Laboratory in Batavia, Illinois, June 1999–June 2005, and is currently the vice chancellor for research at the University of California, Santa Barbara. Distinguished Faculty Fellow Awards were presented to former UW faculty Don Reeder, Martin Olsson, and Richard N. Dexter (Port Angeles, Washington), in recognition of their outstanding and productive careers. A Special Recognition Award was presented to the Liebenberg family, who endowed the very first fund dedicated to supporting summer undergraduate research in the department.

A plaque honoring Robert Fassnacht, who was killed in the 1970 Sterling Hall bombing, was installed on Sterling

Hall near the site of the bombing. We are grateful to the alumni who offered to donate funds for the plaque and to those who attended the dedication on May 18, 2007.

This was an exciting year for gifts. The department became the proud recipient of the Nobel Prize Medal and other personal effects of 1977 Physics Nobel Prize winner John Hasbrouck Van Vleck. The medal is currently on display in Special Collections at Memorial Library, and will eventually be part of a display in the Physics Library documenting J. Van Vleck's life from his childhood years in Madison to when he won the Nobel Prize.

Department alumni Pete and Cheryl Jolivet have created an annuity that will ultimately become the Pete and Cheryl Jolivet Undergraduate Physics Scholarship, which will help undergraduate physics majors to participate in summer research. Pete received his BS and PhD, and Cheryl her BS and MS, in physics at UW–Madison. Cheryl is the founder of our present day Physics Club.

Gerald and Tui Hedstrom, both UW physics graduates, visited their former “home” in the summer of 2006. Since returning home to California, they have created the Gerald W. and Tui G. Hedstrom Scholarship Fund to provide scholarship assistance to undergraduate students in the College of Letters and Science. Scholarships will be awarded annually to female students in their junior year. Preference will be given to students majoring in physics, astronomy, AOS, and math.

I am especially pleased to announce that we have received a wonderful “lead gift” from Anne Herb, wife of former Emeritus Professor Ray Herb, to “kick start” a much needed endowment for the Ingersoll Museum.

With the continuing tight budget at L&S, there are no UW funds to support museum operations. The museum is an important part of our public outreach, promoting awareness and literacy in science, and providing groups hands-on experience with important physical concepts. About 2,000 people visit the museum each year. We are seeking additional donations to this endowment to provide perpetual support for the museum and its staff. If you can help, please designate your donation to the UW Foundation, Friends of the Ingersoll Museum Fund. If you wish to consult with a UW Foundation development officer on future gifts or other options, including estates, trusts, gifts in-kind, or planned giving, please contact Chris Glueck, UW Foundation at 608/265–9952 or [chris.glueck@uwfoundation.wisc.edu](mailto:chris.glueck@uwfoundation.wisc.edu).

Lastly, on behalf of the department, I thank you, our alumni and friends who have provided generous support to the department. This support is invaluable in furthering the educational and research missions of the department.

Susan N. Coppersmith, Chair

# The L.R. Ingersoll Physics Museum

by Emeritus Professor Ugo Camerini

The Ingersoll Physics Museum has more than doubled in size with its move to the newly remodeled space near the University Avenue entrance to Chamberlin Hall. It now occupies about 1,800 square feet and offers 30 exhibits. The exhibits area is still designed with the hands-on approach that has been developed over the years. The new museum has been painted with bright colors and adorned with new signs. A web site describing the exhibits is under way at [www.physics.wisc.edu/museum](http://www.physics.wisc.edu/museum).

The exhibits have been improved: the Lissajous curves now show the difference between the just and the well-tempered scales, the magnetic field experiment has new liquid-damped compasses, the spectrophotometer is fully functioning, and the color subtraction exhibit has a better light source.

There is a new gas discharge exhibit, a mystery window that passes light only one way, and a Newtonian telescope that can be converted to Galilean. In another new exhibit, the spectra of emission of various gases are compared with the spectrum of an incandescent lamp. Also new to the museum is an exhibit that subjects your voice to a Fourier analysis, showing the differences among vowel sounds. Other new exhibits are in the works: why the sky is blue, microwave absorption and diffraction, tone memory, series and parallel circuits, and an exhibit explaining the difference in the concepts between energy and power.

We have nostalgia for the old Foucault pendulum. Originally, the pendulum was located in Science Hall: it was moved, along with the entire department, to Sterling Hall around 1917, and was disassembled in 2005 when the department moved to Chamberlin Hall. We plan to install it in Chamberlin Hall as soon as funds become available.



## HISTORY

The museum was conceived by Professor Leonard Rose Ingersoll in 1917 during the planning stages of Sterling Hall. Sterling Hall was completed in the early 1920s after delays caused by World War I. The initial orientation of the museum was toward educating children as well as university students, an approach that continues today.

Over the course of 80 years, the museum developed a small set of hands-on exhibits that are now used by more than 2,000 visitors each year. Visitors include middle and high school students, undergraduate and graduate students, visiting alumni, summer visitors, and prospective students. The museum is a primary outreach facility for the department. The exhibits are maintained and the tours are arranged by the Museum Committee with help from volunteers. As a committee-run project with minimal funding, the new museum admirably provides enhanced opportunities to all user groups.

## DOCENTS

Through efforts of a few dedicated souls, the museum was awarded a \$5,000 grant from the Knapp Foundation to provide support for a student docent program. The undergraduate and graduate-student docents are trained by senior faculty to give tours to visiting school groups. The docents are paid from the grant. The program supports the communication, teaching, and outreach skills of the docents and provides guidance for visitors so they can take advantage of the interactive exhibits that demonstrate physical principles and their observable effects.

*continued on next page*

For tours of the museum, contact  
**Steve Narf,**  
**608/262-3898**  
**[srnarf@wisc.edu](mailto:srnarf@wisc.edu)**



**Students taking the spinning table for a spin.**



Student, not left in peace to find focal length of lens.



### To All Alumni

Please stay current by mailing any name, address, phone, or e-mail changes to:

WAA  
650 N. Lake St.  
Madison, WI 53706-1410

or by e-mailing:  
AlumniChanges@  
uwalumni.com

or calling 608/262-9648  
or 888/947-2586 (free)

(Obituaries and death notices also appreciated)



### FUTURE

Planning for new exhibits is under way, but funds are needed to construct them. More exhibits are needed to cover the range of physical phenomena: resonance, waves, electrostatics, holograms, polarized light, and perhaps a heliostat.

What is most needed is a curator to coordinate tours to school groups and work more closely with middle and high school science teachers, to train and supervise docents, to improve and maintain the website, and to work with faculty and staff to maintain the exhibits. Efforts to procure a Baldwin Foundation grant have thus far been unsuccessful, but we will continue to seek support from various sources. Donations to the Friends of the Ingersoll Museum will help our efforts to secure additional funding.

We welcome visitors and provide tours by request. If you would like to arrange for a tour of the museum, please contact Steve Narf, 608/262-3898 or snarf@wisc.edu. Please contact him at least a week before desired date.



Student bending steel with her bare hands.

## Physics Museum Update

by Professor Stewart Prager



After many decades in Sterling Hall, the Physics Museum has moved to a new and improved venue in the remodeled Chamberlin Hall. The museum, residing near the main entryway to the building, contains old standards, such as the spinning platform to demonstrate angular momentum. However, fascinating new hands-on exhibits have been conceived and installed, covering physics topics ranging from optics to magnetism to fluorescence to plasmas to probability concepts. These exhibits appeal to all levels—elementary school to professional physicist.

A strange feature of the museum is that it is unfunded and has no paid staff. So how does it function and evolve? Through voluntary efforts (and donations). The masterminds and master builders of the clever exhibits are Professor Emeritus Ugo Camerini and plasma group engineer Paul Nonn (with occasional input from Steve Oliva and Bob Ganch). The museum has become a popular stop for school groups, with tours organized by Steve Narf (with occasional help from Jim Reardon and Rachael Lancor). The museum is complemented by displays and posters that are beginning to adorn the adjacent corridors.

A visitor to the museum is struck by two impressions: physics is fascinating (the exhibits both impress and teach) and the museum has enormous untapped potential. The ideas and projects under way by Paul Nonn and Ugo Camerini are limitless and include a helical Jacob's ladder, transmission of microwaves, wave action in liquid kerosene, a motor-generator demo, and more. Peter Weix is developing plans to possibly relocate the Foucault pendulum, updated with laser tracking, to Chamberlin Hall. These ideas can be complemented by exhibits that directly reflect contemporary research, where concepts can be demonstrated at a basic level. In the longer term, the full potential of the museum, and its access to the community, cannot function fully on the kindness of volunteers. Efforts are under way to seek funding, donations or otherwise, for a part-time employee dedicated to the museum.

## ALUMNI NEWS &amp; AWARDS

## Distinguished Faculty Fellows

**Richard N. Dexter (PhD 1955)**

Professor Dexter retired in June 1990, after 35 years of long and distinguished service to the department. He received a UW PhD in 1955, then joined the physics faculty. He did research in condensed matter physics until about 1977, when he

switched to plasma physics. He made major contributions to both fields. His graduate students in condensed matter included John Wiley and Paul Peercy. He was a cofounder of the Madison Symmetric Torus, which continues today as a major UW facility in plasma physics. He received a UW award for excellence in teaching in 1976.

**Martin Olsson (PhD 1966)**

Professor Olsson joined the department as an assistant professor in 1966, after graduating from Maryland. He retired in June 2005, following a distinguished research and teaching career, including service as department chair from 1988 to 1991. As an active member

of the UW phenomenology theory group, his research contributions include detailed studies of bound states of heavy quarks. He co-authored several popular undergraduate textbooks with Vernon Barger and also received a Chancellor's Teaching Award in 1989.

**Don D. Reeder (PhD 1966)**

Professor Reeder retired in June 2005. He served two terms as department chair, while maintaining an active program in experimental high energy physics. When the Fermi National Accelerator Laboratory first opened in 1971, he initiated one of the early experiments:

studying neutrino interactions in a large detector of iron plates and spark chambers. This program spanned several years and made major contributions to the Electroweak theory of the standard model. For many years he served as PI of the high energy grant with the DOE. Reeder is a UW alumnus, having received his PhD in 1966 under the direction of Myron Good.

## Distinguished Alumni Fellows

**W. Paul Menzel (PhD 1974)**

Professor Menzel received a PhD in physics from UW-Madison under the direction of C.C. Lin in 1974. He was senior scientist at NOAA for many years, working with the UW Space Science and Engineering Center on satellite-borne meteorological measurements. He joined the UW faculty as Vernon Suomi Distinguished Professor in the Department of Atmospheric and Oceanic Sciences in January 2007, after retirement from NOAA.

**Stephen L. Olsen (PhD 1970)**

Stephen Olsen is presently professor of physics at the University of Hawaii, where he is PI of the high energy physics group. He earlier held faculty appointments at Rochester and Rockefeller. He is an active researcher in elementary

*continued on next page*

## Special Recognition Award

This year the department's Special Recognition Award was made to **Don Liebenberg** and **Lelia Ladenberger**, in honor of the Liebenberg Family Undergraduate Scholarship Fund. The creation of this fund was a historical event in the department, since it was our very first undergraduate scholarship.

The fund was started in 1999 by Maude Sachtjen Liebenberg, mother of Don and Lelia.

Maude Liebenberg was a 1928 graduate of UW-Madison. Her husband, Rex, was also a Wisconsin graduate. Seven physics undergraduate students have received this award since its inception.



**Don Liebenberg, recipient of the Special Recognition Award, shown with Adam Maus, 2007 recipient of the Liebenberg Family Undergraduate Scholarship.**

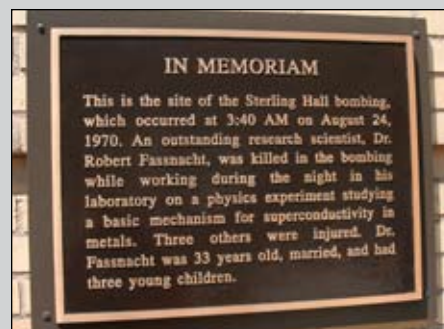
## At Last, a Plaque Commemorates the Victim of the 1970 University of Wisconsin Bombing

The University of Wisconsin–Madison dedicated a plaque on Friday to commemorate a physics graduate student who was killed in 1970, when antiwar activists detonated a car bomb outside the campus building where he was working on an experiment, the Associated Press reported. The student, 33-year-old Robert Fassnacht, was a pacifist and his work was unrelated to the military or to the Vietnam War. He left three small children.



Three of the four bombers, who were trying to destroy an Army research center elsewhere in the building, were caught, convicted, and jailed. All have served their sentences and been released, but they don't often seem very remorseful. The fourth has remained on the FBI's most-wanted list for more than three decades. The bombing itself remains a subject of bitter debate among critics of the bombers and of the war.

Mr. Fassnacht's family members long opposed a memorial to him, but recently, at the urging of the university's chancellor, John D. Wiley, who knew Mr. Fassnacht as a fellow graduate student, they reconsidered. —*Andrew Mytelka*



*continued from page 5*

particle physics, with ongoing programs in Japan and China. He has reported results from these programs as a plenary speaker at international conferences all over the world. He has spent several years in Japan as a visiting scientist and has served on many national and international committees. He received a PhD in Physics from UW–Madison in 1970, under the direction of Lee Pondrom.

### Michael S. Witherell (PhD 1973)

Michael Witherell is presently the vice chancellor for research at UC, Santa Barbara. From July 1999 to June 2005 he was director of Fermi National Accelerator Laboratory in Batavia, Illinois. He won the WKH Panofsky Prize of the APS in 1990, and he served as chair of HEPAP, an important advisory committee to the DOE and NSF regarding the program in high energy physics. He received the Secretary of Energy Gold Award in 2004 and is a member of the NAS. He received a PhD in Physics in 1973 from UW–Madison under the direction of Richard Prepost.

## Physics Fair will be held Saturday, February 16, 2008, 11 a.m.–4 p.m.

Research groups will make posters, have tables with demonstrations and physics activities, and some will give lab tours. The goal for this open house is to have at least one table from each research area, so that the whole department is represented. Additionally, there will be stations on general physics topics. We expect that posters will remain on display in the lobby after this first-time event. T-shirts will be available for \$10 each. The Ingersoll Museum will be open all day.

We anticipate that the audience will be interested families from the Madison area. Presentations will be aimed at a middle school level, engaging both parents and kids. Conversations can be scaled up or down as needed.

## New Display in the Physics Library

The following is an article that will appear in the UW Library System newsletter describing the first of a series of displays in the Physics Library on a well-known UW Physics Department alumnus.

*John H. Van Vleck, "The Early Years"*  
by Erik Opsal, UW library system intern

Winner of the Nobel Prize for Physics in 1927, John H. Van Vleck, whose father is the namesake of Van Vleck Hall, came to Madison in 1905 as a young boy. This exhibit focuses on Van Vleck's early years, from his birth in 1899 until the time he was hired by the UW Physics Department in 1928. The display includes his high school and college yearbooks, grade school notebooks, and photos from his childhood, as well as a program from his time in the UW Band, where he played the flute. Van Vleck earned an undergraduate degree in physics from UW–Madison in 1920 and received his PhD from Harvard in 1922. "The Early Years" will be a permanent display in the Physics Library, with displays for the middle and later years coming sometime next year.



# REACHING OUT

## Tours of the L.R. Ingersoll Museum

We are currently in the process of reconstructing and updating the L.R. Ingersoll Museum, Room 2130 Chamberlin Hall.

The museum is open to visitors from 8 a.m. to 4:15 p.m., Monday through Friday.

If you would like to arrange for a tour of the museum, please contact Steve Narf at 608/262-3898 at least one week before desired date(s). To find out more about campus tours, please contact Matt Dulak or Lisa Wingert, interim group tour coordinators at 608/265-6599 or [visitor@uwmad.wisc.edu](mailto:visitor@uwmad.wisc.edu).

Tours can accommodate groups of up to 30, and back-to-back tours can be arranged. Tour groups over 40 may require special accommodations. Duration of a tour is about 50 minutes, with a 25-minute guided tour of about six exhibits, with the remainder of the time devoted to play and one-on-one education on the exhibits.

## Upcoming Wonders of Physics Presentations

Scheduled presentations of The Wonders of Physics are given on the UW-Madison campus in mid-February each year. Free tickets are recommended and are available after January 1 by calling 608/262-2927, or by e-mailing [wonders@physics.wisc.edu](mailto:wonders@physics.wisc.edu), or by using the online ticket form at [sprott.physics.wisc.edu/cgi.bin/tickleft.exe](http://sprott.physics.wisc.edu/cgi.bin/tickleft.exe).

### The next presentations of The Wonders of Physics are scheduled as follows:

February 9, 2008, 1 and 4 p.m.  
February 10, 2008, 1 and 4 p.m.  
February 16, 2008, 1 and 4 p.m.  
February 17, 2008, 1 and 4 p.m.

These presentations will be held in 2103 Chamberlin Hall, 1150 University Avenue, Madison, Wisconsin.

For more information on The Wonders of Physics, please visit [sprott.physics.wisc.edu/wop.htm](http://sprott.physics.wisc.edu/wop.htm).

**Note:** Twenty-three hours of past presentations of The Wonders of Physics, dating back to 1986, can now be viewed (for free!) on the web at [sprott.physics.wisc.edu/wop.htm#videos](http://sprott.physics.wisc.edu/wop.htm#videos).

## WCATY Work with Jessica Hodges and Karen Andeen

This year, the Physics Department contributed to a local organization called WCATY (pronounced "wickety"), the Wisconsin Center for Academically Talented Youth. Founded in 1991, WCATY provides a unique set of services to children from elementary through high school. It is the only organization working with the state's most promising students on a year-round, statewide basis. The mission is to nurture Wisconsin's academically talented students by providing encouraging programs that support, motivate, and challenge them. Examples include online programs, as well as enrichment and accelerated courses. In spring 2007, an enrichment program for 7th and 8th graders hosted two physics graduate students, Karen Andeen and Jessica Hodges, to discuss neutrino physics and the IceCube project. The WCATY students were very engaged and particularly interested in hearing about the details of life at the South Pole and descriptions of what it is like to work in science.

Special thanks to Thomas Sinks from WCATY and Professor Bob Morse from the IceCube Project at the University of Wisconsin-Madison for cultivating this relationship, which we hope will continue in the coming years.



## PHYSICS TRIVIA

### What's become of PhysWEB?

It has been replaced. If you are looking for ongoing, current UW-Madison Physics Department science news, just go to [www.physics.wisc.edu](http://www.physics.wisc.edu) and click on NEWS. This site will provide you with our latest news stories as they appear in the local press. Enjoy!

## Update on the Physics Learning Center

With motivated students and tutors, the Physics Learning Center has had another busy year. On a typical afternoon, the Physics Learning Center is a bustling place—undergraduate tutors are leading small study groups of peers in introductory physics. Moveable partitions separate the groups: in one area students are meeting to work on homework; in another a staff member meets with tutors to discuss strategies for teaching course content.

The Physics Learning Center provides small-group academic support for students studying introductory algebra-based (Physics 103–104) and calculus-based physics (Physics 207–208) sequences. These courses are gateway courses taken by students majoring in the biological sciences, physical sciences, pre-health professions, pre-secondary science education, and engineering. We expanded our program in spring 2007 to include students from both semesters of Physics 103–104 and Physics 207–208. The Physics 207–208 sequences have been the focus of curriculum development. The Physics Department, in collaboration with campus biology faculty and the staff from the Center



**A small study group in the Physics Learning Center.**

for Biology Education, are working to improve the teaching of physics concepts and to show the relevance of physics to biological topics.

We were fortunate to welcome Eric Hooper to our staff this past year. He joins as our third half-time staff member, following Amihan Huesmann's move to the College of Gustavus Adolphus in Minnesota. Eric is an astronomer who is doing research within the Astronomy Department and who has also taught the introductory astronomy course. He is an enthusiastic contributor to the team of Larry Watson and Susan Nossal. Larry brings his physics education background to help guide our teaching of physics on a conceptual and fundamental level.

In addition to working in the Physics Learning Center, Larry also worked as a physics staff member on curriculum development, assessment, and coordination for the development of the modified Physics 207–208 course for biologists. In addition to serving as director of the Physics Learning Center, Susan continues to work in the department as a scientist focusing on atmospheric physics.

During the 2006–07 academic year, there were 189 students who participated in the Physics Learning Center (note: students who participated both semesters were counted twice). Students participating in our program include ethnic-minority students, low-income students, returning adults, first-generation college students, transfer students, students from small rural schools,

international students, and students with disabilities. These are nontraditional students who may feel isolated in large introductory courses, and thus may have difficulty finding study partners. We also work with students at risk for having academic difficulty (factors such as previous D, F, or drop in physics, academic probation, weak math background, low first exam score, no high school physics).

Another mission of the Physics Learning Center is to provide teacher training and teaching and leadership experience for undergraduate peer mentor tutors.

During the 2006–07 academic year, we had ten undergraduate peer mentor tutors who ran small study groups for students studying introductory physics. Of those who graduated, one will be going on to graduate school in physics, another will be a secondary science and mathematics teacher in a high school in Janesville, Wisconsin, a third will spend the year doing post-baccalaureate research in astrophysics before applying to graduate school, and a fourth is going to pharmacy school. Several of our tutors returned to work as tutors in the Physics Learning Center. We are excited that this year, for the first time, two students who were participants in the Physics 207–208 academic support program have become tutors and will serve as role models for students in our center.

We invite you to visit the Physics Learning Center at 2338 Chamberlin Hall.

## LOOKING BACK



This picture of Joe and Martha Dillinger was taken in Boston, MA, when Joe was working at the MIT Rad Lab during World War II. They liked to take outings on bicycles, as their car was in storage due to gasoline rationing.

Martha had an administrative job at Harvard University, in the president's office. The highlight of her experience was attending Winston Churchill's famous "The price of greatness is responsibility" speech at Harvard in September 1943. After the war, Joe's graduate instruction continued in Madison, where he received his PhD in 1946. He was on the UW-Madison Physics faculty until 1975.

# New Badger Physicists

## New PhD's

### August 2006

**Arthur Blair**, *Oscillating Field Current Drive Experiments in the Madison Symmetric Torus* (Prager)

**Terrance M. Figy**, *NLO QCD Corrections to the Jet Activity in Higgs Boson Production via Vector-Boson Fusion* (Zeppenfeld); Postdoc, U. of Durham, U.K.

**Jonathon Hollar**, *Measurements of Rates, Asymmetries, and Angular Distributions in  $B_s \rightarrow K^+ e^- e^-$  and  $B_s \rightarrow K^+ e^- e^-$  Decays* (Prepost); LLNL Postdoc, CMS collaboration at CERN

**Xianglin Ke**, *Magnetic and Electronic Transport Measurements of Magnetic Oxide Heterostructures* (Rzchowski); Postdoc, Penn State

**Oo Kaw Lim**, *Nonclassical Correlations and Entanglement in Intracavity Second Harmonic Generation* (Saffman); Postdoc, Electrical Engineering Dept. at Northwestern University

**John Wheeler Maiden**, *Applications of B-branes in Phenomenology and Cosmology* (Shiu); Assoc. Research Physicist, Princeton University

**Mark David Nornberg**, *The Role of MHD Turbulence in Magnetic Self-Excitation: A Study of the Madison Dynamo Experiment* (Forest); Postdoc, Princeton Plasma Physics Lab

**Patrick Daniel Ryan**, *Photoproduction of Events with Rapidity Gaps between Jets with ZEUS at HERA* (Smith); Postdoc, Michigan State University

**Keith Aaron Slinker**, *Quantum devices in Si/SiGe Heterostructures* (Eriksson);

Materials Engineer, Advanced Development Program at Lockheed Martin Aeronautics

**Emre Tepedelenioglu**, *X-ray Observations of Rotation Powered Pulsars* (Ogelman)

**Pengpeng Zhang**, *Structure and Electronic Transport Properties of Nanometer-Scale Silicon-on-Insulator (SOI) Membranes* (Lagally); Postdoc Research Assoc., Penn State

### December 2006

**Rachel Cannara**, *The Atomic-Scale Origins of Friction: A Nanotribological Study of Diamond Surfaces* (Eriksson/Carpick)

**Alexander Donkov**, *Raman Studies in Low-Dimensional Spin Systems* (Chubukov)

**Benjamin Hudson**, *Fast Ion Confinement in the Reversed Field Pinch* (Prager); Postdoc Research Assoc., Lawrence Livermore National Laboratory

**Paul Kutter**, *Measure of CP Violation in  $B_s \rightarrow K$  and Branching Fraction of  $BO \rightarrow F_0(980)KS$  (Wu)*

**Delmar Marshall**, *Computational Studies of Diatomic Molecules—A Comparison of Three Methods* (Lin); Prof. of Physics, Amritapuri Campus, Kollam, Kerala, India

**Antonio Romano**, *Testing the Boundaries of Accelerating Cosmological Models* (Chung); Researcher at Instituto Astrofisica Canarias

**Jason Simmons**, *The Effects of Local Chemistry on the Growth and Electronic Properties of Single-Walled Carbon Nanotubes* (Eriksson)

### May 2007

**Shan-Huei Chuang**, *First Search at CDF for the Higgs Boson Decaying to a W-Boson Pair in Proton-Antiproton Collisions at the Center-of-mass Energy of 1.96 TeV* (Carlsmith); Postdoc with Rutgers CDF/CMS group

**Maria Teresa Herd**, *Branching Fractions, Radiation Trapping, and the Infrared Continuum: A Spectroscopic Study of Lamps* (Lawler)

**Brennan Hughey**, *Rolling Search for a Cascade GRB Signal* (Karle)

**Pavle Juranic**, *Multiple Photoionization Studies of Atoms and Molecules Using Ion Time of Flight Spectrometry* (Lawler)

## Master's Degree Recipients

### August 2006

Richard Magee  
Nicolas Nelson  
David Ryan Burke

### December 2006

Benjamin Chiaro  
Amanda Gault  
William Creighton Hogg  
Aongus Omurchada  
Bonita Jean Squires  
Chad Staus

### May 2007

Jonathan Tyler Green  
Ryan Toonen  
Erik Hanley

## Bachelor's Degrees Recipients

### Summer 2006

**Astronomy-Physics**  
Jacob Robert Meyers

### Physics

Elena Bezrukova  
Rebecca Alice Cole  
Dustin John Kunkel

### December 2006

**Applied Math, Engineering, Physics (AMEP)**  
Joanna Jean Kaul  
Benjamin Henry Payne  
Vineet Prafulla Sudame  
Brian Jeffrey Thompson

### Physics

Benjamin Thomas Chiaro  
Brendan Hodis  
Ian Erik Saunders  
Andrew Kenneth Tabbutt  
Andrea Marie Schoohs

### May 2007

**Applied Math, Engineering, Physics (AMEP)**  
Eric Michael Ashbrenner  
Brianna Rose Coughlin Cash  
Youngjoon Paul Choe  
Joel Adam Shulruf

### Astronomy-Physics

Matthew Allen Bayer  
Michael Anthony DiPompeo  
Scott Mathew Fallows  
Allison Germaine Noble  
Cristine Patricia Plecki  
Joshua Eric Reiter  
Matthew Michael Sieth  
Michael G. Taylor

### Physics

Jeremy James Basken  
Matthew Allen Bayer  
Samuel David Bockenbauer  
Youngjoon Paul Choe  
Elizabeth Lyn Conant  
Levens Peter DeBack  
Samuel Mark Dredzdon  
Donald Patrick Fahey  
Scott Mathew Fallows  
J.J. Nelson  
Allison Germaine Noble  
Charles James Pomasl  
Eric Thomas Poweleit  
Prommapan Prommapan  
Matthew Michael Sieth  
Michael Slutski  
Jonathan David Sperling  
Benjamin Thomas Spike  
Jessica Waters  
Ryan James Wiseman

# NEW BADGER PHYSICISTS Aug 2006–May 2007

## New Faculty

● Assistant Professor

**Natalia Perkins** is a theorist working in the fields of solid state physics and magnetism. Her current projects concentrate on the interplay between spin, orbital, and charge degrees of freedom in various transition metal oxides. She is also interested in studying frustrated magnetic systems in which non-trivial magnetic ordering follows the non-trivial topology of underlying lattices.

Professor Perkins received her PhD from Moscow State University in 1997. Before joining the faculty of the University of Wisconsin, she worked as a scientist at Bogoliubov Laboratory for Theoretical Physics in Dubna, Russia; and as a postdoc fellow in Laboratori Nazionali di Frascati (INFN), Frascati, Italy; the Max Planck Institute for the Physics of Complex Systems, Dresden, Germany; and at the Institute for Theoretical Physics, Technical University of Braunschweig, Braunschweig, Germany.



**Natalia Perkins**

● Professor **Michael**

**Ramsey-Musolf** is a theoretical physicist whose research lies at the interface of nuclear physics, particle physics, and cosmology. He received his PhD from Princeton University in 1989. He is joining the department after completing six years as a senior research scientist at Caltech. He is a recipient of the Dissertation Award in Nuclear Physics and an NSF Young Investigator Award.

Professor Ramsey-Musolf's current research includes electroweak baryogenesis and the cosmic matter-antimatter asymmetry, electroweak precision tests of the Standard Model and its extensions, supersymmetry, fundamental symmetry tests in nuclei, neutrino properties and interactions, Higgs boson phenomenology, and higher twist effects in quantum chromodynamics.

He is also an ordained Episcopal priest.



**Michael Ramsey-Musolf**

● Assistant Professor

**Stefan Westerhoff** is an experimental astroparticle physicist who specializes in cosmic ray astrophysics. His main research interests are in the search for the origin of the highest energy cosmic rays above  $10^{18}$  eV and the understanding of cosmic ray acceleration and their propagation over



**Stefan Westerhoff**

cosmological distances. Specific questions include the study of the energy spectrum, the chemical composition, and the arrival direction distribution of these particles. He is currently working on the Pierre Auger Observatory in Malargue, Argentina, which recently started data taking.

Professor Westerhoff received his PhD in 1996 from the University of Wuppertal. He worked as a postdoctoral fellow at the University of California at Santa Cruz on the Milagro TeV gamma ray observatory and on the faculty of Columbia University.

## News on Current Faculty

● Professor **Franz Himpel**

has been awarded the prestigious 2007 Davisson-Germer Prize in Surface or Atomic Physics sponsored by AT&T Bell Laboratories (now Lucent Technologies) as a means of recognizing outstanding scientific work in America by the Executive Board of The American Physical Society. The Prize was established to recognize and encourage outstanding work in atomic physics or surface physics. It consists of \$5,000 and a certificate with the citation: "For pioneering investigations of the electronic structure of surfaces, interfaces, adsorbates, and nanostructures."

The Davisson-Germer Prize was presented at the APS March 2007 meeting in Denver, Colorado, at a special ceremonial session congratulations, Franz!



**Franz Himpel**

● **Susan Coppersmith** is

one of six faculty to receive the Kellett Mid-Career Award for research. Professor Coppersmith studies the role of disorder on changes in the fundamental properties of materials. She is a fellow of the American Physical Society, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences.

The awards, each of which includes \$60,000 in unrestricted research support, are conferred annually by a faculty committee in the Graduate School. They recognize the work of faculty five to 20 years beyond their first promotion to a tenured position. Supported by the Wisconsin Alumni Research Foundation (WARF), the awards are named for William R. Kellett, a former president of the WARF Board of Trustees and retired president of Kimberly-Clark Corporation.



**Susan Coppersmith**

● We're delighted to report that **John Sarff** has been elected a Fellow of the American Physical Society. The citation for his fellowship reads: "For seminal contributions to the understanding and control of magnetic fluctuations and associated transport, to the understanding of magnetic self-organization, and to the advancement of the reversed field pinch fusion configuration." Congratulations, John!

● Congratulations to **Mark Eriksson** and **Mark Saffman** on being promoted to full professors, and congratulations to **Teresa Montaruli** on her promotion to associate professor, effective fall 2007–08.

● **Professor Mark Rzchowski** agreed to test the introduction of student response systems (clickers) in his spring Physics 107 class (Ideas of Modern Physics). In every lecture, he presented 3 or 4 multiple choice questions to the students for them to answer by pressing the buttons on their hand-held clicker. "The results show up on my computer in real time, with a histogram for the class to see showing the distribution of the student responses. This helps the students evaluate whether they were following the ideas in the lecture and to help me determine whether we needed to spend more time discussing the concept."

There were several meetings with other awardees throughout the semester where strategies and results were discussed on clicker usage in the class. The goal of the project was to help DoIT evaluate the effectiveness of clickers and how to support faculty who will be using them in the future.

● Congratulations to **Frank Petriello** for being selected to receive an Outstanding Junior Investigator award from the DOE.

● Congratulations to **Stas Boldyrev** for being selected to receive a Plasma Physics Junior Faculty Program Award from the Office of Fusion Energy at DOE for his proposal: "Toward the Theory of Turbulence in Magnetized Plasmas."

● Professor **Andrey Chubukov** won the Mercator Guest Professor Award of the German Science Foundation.

## Faculty Retirements

● **Bernice Durand**, a professor of physics and a campus leader in the areas of climate and diversity, has announced her retirement at the end of June. During a nearly 37-year career on campus, Durand has served on the faculty as a theoretical physicist specializing in particle theory and mathematical physics, and she also has served in key campus leadership positions.



**Bernice Durand**

Bernice Durand came to Wisconsin after earning her PhD at Iowa State University. She was appointed as a lecturer and part-time postdoc in the Physics Department

in 1970, joined the faculty in 1977, and advanced through the ranks to full professor. Since 2003 she has served as the vice provost for diversity and climate for the UW–Madison campus.

Until late in her career, Professor Durand maintained an active funded research program in theoretical high energy physics, directing nine PhD and three MS students. She has been a leader both on campus and nationally in improving climate and diversity in physics and other fields in science and technology, serving on national committees on the status of women in physics and astronomy. In 2002, she was awarded a special Chancellor's Recognition Award for Outstanding Leadership in Campus Diversity, as well as the 2002 Faculty and Staff Recognition Award from the Wisconsin Alumni Association's Cabinet 99.

Professor Durand has played an active role in shared governance at UW–Madison, leading the most recent chancellor search and chairing many other important committees, including the University Committee, the Athletic Board, the Diversity Plan 2008 Development and Oversight committees, the University Library Committee, and the Letters & Science Curriculum Committee, leading the development and implementation of the university's ethnic studies requirement.

A recipient of the Chancellor's Award for Outstanding Teaching, Professor Durand has taught courses at all levels, from modern physics for nonscientists to a specialized course she developed for advanced graduate students in physics and mathematics in the use of topology and algebra in quantum field theory. Many graduate students have benefited from her qualifier exam coaching. She was early to adapt her pedagogy to incorporate technology, showing her nonscientists course on public television with the course work web-based. For several years she gave popular physics lectures to service organizations, high school students, and the general public.

## LOOKING BACK



### Tokopole

In 1981 Professors Sprott and Prager examined the Tokopole plasma physics apparatus. Can you help us identify the other men with them? Please e-mail [maclarke@wisc.edu](mailto:maclarke@wisc.edu) if you know.

# The TeV II Particle Astrophysics Workshop in Madison, August 28–31, 2006

By Professor Teresa Montaruli

The idea of having this workshop in Madison was born at a table on the Memorial Union Terrace one evening in summer 2005. Francis Halzen, Albrecht Karle, and I had just attended the first TeV meeting at Fermilab. We wished to convene the community of particle physicists and “new astronomers” using particles to study the universe so everyone could share information on their activities and the methods they were using. All of us wanted this to be a meeting between younger and more experienced people, experimentalists and theorists with a common background—dealing with signals produced in the universe and not controlled by humans.

We decided to ask the organizers of the Fermilab workshop, which was chaired by Gianfranco Bertone, to have a second edition in Madison, and thus to start a series of such meetings. The next edition was planned for summer 2007 in the Venice region of Italy.

To make the meeting more productive, we planned to have an appropriate number of “working sessions” and open discussions. Besides the Fermilab first edition, other inspiring meetings included the Neutrino Oscillation Workshops (see, e.g., [www.ba.infn.it/~now2006](http://www.ba.infn.it/~now2006)) and the Kavli Institute Inaugural Symposium in Honor of David Shramm ([newviews.uchicago.edu](http://newviews.uchicago.edu)) in December 2005. These workshops had plenary talks in the morning and parallel sessions in the afternoon. Conveners organized these sessions, inviting experts in the field to come and speak on their areas of experimentation and study.

In the second case, the website for the workshop allowed potential speakers to propose talks for their sessions to its conveners so that the organizers could also have a chance to include proposed talks. We felt that allowing this possibility was an excellent chance for unknown young students to offer interesting proposals that could then be selected. We developed our website to make this process work with the help of our web master, Rene Shei, and main supporting secretary of the workshop, Kim Kreiger (who was also responsible for the wonderful food available at coffee breaks and at the social dinner!). This website can be viewed at [www.icecube.wisc.edu/tev](http://www.icecube.wisc.edu/tev).

We singled out seven main areas for discussion for the workshops with self-explanatory names, calling its afternoon sessions “Working Groups” as follows: (1) Gamma Astronomy, (2) Ultra-High-Energy Cosmic Rays, (3) Dark Matter, (4) Neutrino Astronomy, (5) New Technologies, (6) TeV Particle (i.e., connections between cosmic-ray, high-energy, and accelerator physics) and (7) Gravitational Waves. The conveners had to not only organize the schedules, but also had the unfortunate task of summarizing all of the discussions which took place in their sessions for a presentation on the last day of the conference.

The plenary talks in the morning were also on these seven subjects, but we mixed them up to keep attendees’ interest high by offering a variety of topics; thus we could have a large number of experts and extremely active representatives in the field of astroparticle physics interact with each other over several days. Particular attention was paid to the selection of working group (WG) organizers and plenary speakers to achieve the highest possible participation by women, which resulted in their level of involvement reaching 20 percent across the board.

While no discoveries of astrophysical neutrinos, gravitational waves, or dark matter particles were reported at this conference, detection of many positive signals was described by representatives from gamma astronomy experiments, such as Milagro (related talks by J. Goodman, A. Branden and G. Yodh) for the cygnus region, HESS (talks by B. Giebels, G. Hermann, D. Horns), and magic (talk by M. Teshima). We had occasion to also explore multiwavelength approaches (see E. Resconi’s talk and related posters by M. Bayer and M. Tluczykont), using not only different wavelengths but also different messengers (e.g., neutrinos and photons in different bands). E. Aprile, L. Baudis, and L. Kaufmann reported on the impressive amount of progress that has been made with LAr and LXe detectors for dark matter.

A very active session was held by D. Saltzberg, including an open discussion lead by A. Karle, on new techniques: radio and acoustic. H. Falcke presented the amazing results of radio detection surface arrays in his plenary session and also gave us a status report on the construction of LOFAR. He summarized future proposals as well, such as radio@Auger and projects exploiting signals from the moon. The success of LIGO was illustrated by R. Weiss and others in the parallel gravitational Wave WG. Having achieved the expected sensitivity and a stable operation, work will go on toward an advanced LIGO that will improve the sensitivity by more than 1 order of magnitude. Neil Cornish gave a review on sources of gravitational waves. Hopes in the community (stressed by G. Mueller in his summary) are that LISA, the proposed interferometer experiment with three satellites in orbit around the moon spread over five million kilometers, will become a reality in 2015. This would extend the frequency range up to  $10^{-4}$ – $10^{-2}$  Hz, allowing sensitivity to coalescent black holes and galactic binaries.

Pierre Auger will have a leading role in ultra-high-energy, cosmic-ray physics for years, unraveling the puzzle of the GZK cut-off and small-scale anisotropies, as did Jim Cronin, the person who, with A. Watson, suggested its construction. Currently, 1,000 tanks are operating in Argentina, and completion is expected in 2007. During the workshop, this collaboration was preparing its proposal for another 10,000-km<sup>2</sup> observatory in Colorado.

Appealing proposals for other large infrastructures were also announced, such as the CTA mentioned by M. Teshima, made up of two arrays of about 100 Imaging atmospheric Cherenkov telescopes over a square kilometer, possibly using silicon photomultipliers. We discussed current activities in the neutrino telescopes field (K. Hanson and P. Coyle talks in the plenary session) and expectations from standard physics and exotic phenomena were also updated (T. Weiler, C. Dermer, and many of the talks in the WGs led by I. Albuquerque, A. Kusenko, D. Hooper, and L. Koepke).

The Mediterranean community met the Antarctic one, which is already constructing the cubic-kilometer IceCube. The IceCube Project hosted the workshop, together with the University of Wisconsin. The group is already discussing R&D activities for extending the sensitivity by a factor of 100. All this happened at the beginning of the 2006 fall semester, making, for many of us, the last four days of August a culturally interesting time to remember!

The web page of the workshop, including all presented talks, can be found at [www.icecube.wisc.edu/tev](http://www.icecube.wisc.edu/tev). The proceedings of this workshop will be published in *Journal Physics: Conference Series* in 2007.

### Acknowledgements

Due to the high quality of help that we received from them, we acknowledge the conveners of the WGs mentioned in the text with the same numbering: 1) Felix Aharonian, Gus Sinnis, Frank Krennrich, and Masahiro Teshima; 2) Piera Ghia and Tom Gaisser; 3) Laura Baudis and Gianfranco Bertone; 4) Lutz Koepke and Dan Hooper; 5) David Saltzberg and David Waters; 6) Ivone Albuquerque, Alexander Kusenko, and Tom Weiler. A special thanks to Tom Gaisser, who also gave a comprehensive final summary of the conference.

## University Physical Society

The Physics Club at the University of Wisconsin–Madison, also known as the University Physical Society, can be found online at [ups.physics.wisc.edu](http://ups.physics.wisc.edu). Check it out! Also, check out our space in 2328 Chamberlin Hall, which overlooks the Charter Street entrance.

UPS provides information on:

- Job Posting in the UW Physics Department
- Upcoming UPS Events
- Your UPS Officers
- Research Opportunities
- What is the University Physical Society?
- Tutoring (we offer volunteer tutoring)
- Bad Physics Humor
- Photos of Physics Club Memories

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

### 2007–2008 Officers:

**Bill Dirienzo**—President  
**Kristen Jones**—Vice President  
**Erin Conrad**—Treasurer  
**Brandon Harris**—Coordinator  
**Sam Hurley**—Webmaster  
**Quintin Schiller**—Coordinator



## PHENOMENOLOGY SYMPOSIUM • May 7–9, 2007



The 2007 Pheno Symposium, sponsored by the Phenomenology Institute, was held at the Memorial Union and the Pyle Center on May 7–9, 2007. The title of the symposium was “Prelude to the LHC.” The meeting focused on the physics discoveries that can be made at the Large Hadron Collider, which is scheduled to begin operation in Geneva, Switzerland, in 2008. The agenda also included related issues in astrophysics and cosmology. The symposium attracted 196 participants and had 138 talks, which gives an indication of the growing excitement about particle physics in the LHC era. The annual Pheno Symposia are a venue for young physicists to interact with senior physicists, and as such have become a very popular event in the particle physics community. Among the speakers and participants were former UW–Madison physics graduate students Ted Allen, Howie Baer, Dan Hooper, Danny Marfatia, Bob McElrath, David Rainwater, Tom Weiler, and Kerry Whisnant; former postdocs Ulrich Baur, Tilman Plehn, and Xerxes Tata; and former faculty member William Walker. The chair of the organizing committee was Professor Tao Han. Since the institute was founded in 1984 it has sponsored 25 symposia and workshops in phenomenology.

# LHC

By Professor Wesley Smith

University of Wisconsin high energy physics group members eagerly await the mid-2008 turn-on of the Large Hadron Collider (LHC) at CERN in Geneva, Switzerland. The LHC will operate at seven times the energy and 100 times the luminosity of the present world's highest energy collider, the Fermilab Tevatron. It will permit physicists to search for the mechanism of particle mass generation; for supersymmetry (SUSY) which introduces a partner for each known particle, stabilizes the Higgs mass, and provides a candidate for the dark matter making up most of the universe; for extra dimensions; and for other exciting new physics possibilities.

The LHC experiments will start taking physics data in 2008, with initial running expected to yield about 1, 10, and 30 fb<sup>-1</sup> of integrated luminosity in 2008, 2009, and 2010. There are several physics channels with the potential for rapid discovery. New resonances could include a super-massive Z', a new heavy neutral gauge boson motivated by, for example, models with compact extra dimensions. Spectacular multi-jet, multi-lepton, and missing energy signatures of SUSY could also appear. Roughly 100 events per day are predicted at luminosities of 10<sup>33</sup> cm<sup>-2</sup> s<sup>-1</sup> for squark and gluino masses of ~ 1 TeV. Almost all of the allowed Higgs mass range will be explored with 10 fb<sup>-1</sup>. With 30 fb<sup>-1</sup> the experiments will explore the entire expected range with more than 7 $\sigma$  sensitivity.

UW faculty, scientists, postdocs, and engineers have made major contributions and played leading roles in the ATLAS and CMS detectors that will observe the collisions of the LHC proton beams. Both ATLAS and CMS groups have been training Wisconsin graduate students in preparation for theses on the LHC discovery physics.



**Lowering of the CMS endcap disk, designed and equipped by the University of Wisconsin for the CERN LHC.**

Professors Duncan Carlsmith, Sridhara Dasu, Matt Herndon, and Wesley Smith, and Senior Scientist Dr. Richard Loveless have built and are commissioning major parts of CMS: the trigger system including the calorimeter level-1 trigger and higher level triggers, the endcap muon system including its infrastructure and alignment, tracking system infrastructure, software for simulation and event processing, and a leading Tier-2 US CMS computing facility. A Physical Sciences Lab (PSL) engineering and technical team led by Farshid Feyzi has been responsible for the design of the CMS 4000-ton endcap iron disk system and its infrastructure.

Professors Bruce Mellado, Yibin Pan, and Sau Lan Wu, and Senior Scientist Haimo Zobernig are leading the ATLAS preparations for the Higgs search. They have developed innovative analyses for inclusive SUSY searches with leptons and missing transverse energy for small and large integrated luminosities, for searches for exotic particles such as a Z' or W', and for understanding backgrounds at turn-on. They have leading roles in the silicon and pixel readout driver, high level trigger, detector performance studies, software, and computing.

Both ATLAS and CMS groups have partnered with UW Computer Science Department Professor Miron Livny and his Condor team in developing extensive computing facilities that take advantage of grid computing networks on campus and across the world to provide unprecedented high throughput computing for LHC physics analysis.

Professors Vernon Barger, Dan Chung, Lisa Everett, Francis Halzen, Tao Han, Frank Petriello, Michael Ramsey-Musolf, and Gary Shiu are working on calculations of new physics models and backgrounds to interpret the new data from the LHC and to connect the results of the LHC to other exciting physics phenomena, such as astronomical observations of cold dark matter and studies of the cosmological origins of the Universe. They are also training students and postdocs to perform these calculations in the future.

The commissioning of the LHC machine began earlier this year with the cool down and powering of the first sector (of eight) at 1.9 degrees K. Each of the other sectors is being successively cooled down and powered. The LHC will be ready for operation with the other CERN pre-accelerators in the spring of 2008 and operate at high energy during the summer.

Both the ATLAS and CMS detectors are being readied for data taking. ATLAS is mostly installed in its interaction hall 100 m below the surface. CMS has been partially commissioned in surface facilities and more than half of its ~ 1,000-ton pieces have been lowered into its interaction hall, also 100 m underground. UW PSL engineers led the design effort for the installation of the endcap disks, comprising 2/5 of the CMS detector.

The Wisconsin teams on ATLAS and CMS have been working on these projects since 1993, and now with the prospect of start up within the year, the excitement of opening up the next energy frontier is building quickly.

STUDENT UPDATES  
NEWS & AWARDS 2007

## Graduate Program Report

by Jane Schimmel

The quality of the graduate applicant pool has improved in recent years. In fact, the applicant pool for fall 2007 admission was the most competitive applicant pool that any of us could remember. We were unable to make offers to many qualified applicants who would have been at the top of our offer list about five years ago. We have 23 new graduate students, listed below, joining our program in fall 2007. Two other students were admitted and granted deferrals of one or two years.

## Fall 2007 Admissions

## GAANN Fellows

Cami Collins  
Christine Lewis  
Elijah Martin  
Hiren Patel  
Nathan Whitehorn

## Teaching Assistants

## Domestic

Lindsey Gray  
Lisa Hardy (plus Firminhac)  
Eli Parke  
Jared Schmittthener  
Bjorn Van Bael

## Teaching Assistants

## International

Michail Bachtis  
Saurabh Maiti

Kiritkumar Makwana  
Valerie Plaus  
Koki Takasaki  
JianJia Fei  
Yuanfeng Gao  
Yongyan Rao  
Siyuan Zhang

## Admitted with Outside Support

Laura Gladstone (DOD/Firminhac)  
Joao Paulo Rodrigues (Fulbright  
Scholar, and RA appointment)

## Research Assistants

Joseph Kane  
Hainchen Wang

Our system of hosting two group visits in March, with heavy involvement of both faculty and current graduate students, continued last spring. Our current group of first-

and second-year graduate students deserves special recognition for the effort and enthusiasm they demonstrated in assisting with our group visit events this year. They are a cohesive group that has proven to be terrific ambassadors for our graduate program. Prospective students unable to participate in the group events were given the option of an individual visit to campus.

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

Please refer them to:

**Jane Schimmel**  
**physgrad@physics.wisc.edu**  
**608/262-9678**

## Graduate News and Awards

**Erik Spence** was selected as the recipient of the 2007 **Marshall N. Rosenbluth Outstanding Doctoral Thesis Award**, sponsored by General Atomics of the Executive Committee of the American Physical Society-Division of Plasma Physics (APS-DPP). The Award was established to recognize exceptional young scientists who have performed original doctoral thesis research of outstanding scientific quality and achievement in the area of plasma physics. Congratulations, Erik!

Henry and Eleanor Firminhac  
Physics Scholarship

This is the second year for this award, which is given to undergraduates or graduates in physics with financial need as the primary consideration, with at least one-half of recipients being women. **Laura Gladstone** and **Lisa Hardy**, new physics graduate students this fall, are the recipients for 2007-08.

Joseph Dillinger  
Award for Teaching  
Excellence

**Yoshi Hirai** won this award in May 2007. Yoshi has served as a TA for several courses, and his students love him. Additionally, Yoshi has been instrumental in working on new lab experiments in Physics 109, Physics in the Arts. Yoshi writes:



Yoshi Hirai

I truly appreciate various opportunities and support given by physics faculty and staff members. Thank you. Now, I would like to share a story of coincidence at the Physics Award Banquet and then my background as my introduction.

At the banquet table, I was glad to talk directly with Professor Stephen Olsen, who won the Distinguished Alumni Award. I introduced myself as Japanese and

from Tokyo area, where my high school was. As it turned out, he lived in Tsukuba Science City in Japan, just like I once did. Then the ordinary conversation turned into an extraordinary one. I had lived there only for my upper elementary and junior high school years but, oddly enough, our recollections of places and events around us were almost one-to-one correspondence. We made two new discoveries that day: our houses were just a few blocks away, and he was there when I was there! I, however, did not speak English at all, so chances are slim that I had conversed with him at the time.

Beyond the times in Japan, I am no stranger to education in Wisconsin. Starting from an English Language school, I earned my undergraduate degrees from UW-Madison. At present, I am an experimental condensed matter physicist and also lean towards physics and science education. Many of my friends and people I met during my undergraduate years are Wisconsin natives and non-scientists. Quite naturally, teaching Wisconsinites and UW-Madison students is appealing. All activities related to education, such as Saturday science sessions with Professor Onellion and instructional materials development with Professor Gilbert, were real opportunities for teaching. Teaching non-physics and non-science majors in the Physics in the Arts (PITA) course is rewarding.

Many TAs in PITA have been profoundly interesting, as I learn new ideas in music and arts from students every semester. Comments and feedback received from students in fall 2003 to 2005 semesters were very much appreciated and were used for many improvements. Some contributions to the lab updates for PITA during the time of migration to Chamberlin Hall were particularly important experiences. With much help from physics staff members, especially Joe Sylvester and Bill Grogan, we fixed many existing and new problems at the same time. The responses recorded in lab notebooks suggest that the updates removed some of the major misconceptions that formed in the past. Developing course content, testing it in the field, and revising the content based on various assessments were all pieced together in the past few years. The result is just lovely. And this is the part I enjoy the most—comments like “I get it now” were heard very often in the past, but comments like “Labs actually work” and “Professor [X] is right” are added on the list now. Use real stuff and they will get it for real!

## Campus-Wide TA Awards

In two extremely competitive competitions on campus, Physics won two awards for TAs. Congratulations to **Bret Underwood**, who won one of two Exceptional Service Teaching Awards, and to **Del Marshall**, who won the only Capstone PhD Teaching Award, a prestigious award that only the best teaching assistants win. For many years Del served as head TA for our largest introductory physics course and did a tremendous job!

Now in India, Del writes the following:



Del Marshall

It now appears that I will be teaching a nonlinear dynamics and chaos course next semester—10 or more students have actually registered for it—which I plan to model after Clint Sprott's Physics 505. It will have two lectures and two one-hour Matlab sessions per week. There won't be much homework to grade, because I plan to handle that in the Matlab sessions, where we will experiment with various nonlinear systems.

I will continue to get invitations to do colloquium-like presentations, which I will have time to do (hopefully) if I'm only responsible for one course. I like doing these because it gives me a chance to learn survey-level knowledge in areas of physics that I'm unfamiliar with, but always wanted to check out when I had time, which I didn't while a grad student.

I am continuing to develop inquiry-based labs, which use computer simulations instead of lab equipment, and I'm looking into low-budget, equipment-based labs as well. Would you believe they had no motion labs here? The computer simulations are a nice way around buying Pasco equipment at \$1,000+ for the first experiment and several hundred for each additional.

I have ranted a bit about homework and quizzes here, because students copy so much from each other. I'm mellowing out about it (see what two hours of ashram-style meditation a day will do for you!), and I now see it as a cultural difference. In the US we think we all have to be heroes and do everything on our own—asking for help is regarded as borderline cause for shame.

Here everything is done by groups. To Indian people, I think it must seem crazy not to rely on your fellow human beings as much as possible, particularly when you can't turn around without bumping into one. I think it continues when they graduate—they will just join a new group which will work together on a new project. We do things more efficiently and carefully in the US, but things get done here just the same, and with a lower level of stress, which is worth something.

It's instructive to watch the huge construction project that's under way at this campus. In the US, we have huge trucks bring in 25 cubic yards of concrete to pour, or even pump, into forms built by small crews of workers. Here they have a two-yard cement mixer or two, with piles of gravel and sand-cement mix on site and veritable swarms of workers with wok-like containers they carry on their heads. Twenty guys carrying 50 or 100 loads each is nothing to them, and it's still 25 yards of cement. And they do it in the hot midday sun, where I don't even go out without an umbrella for portable shade!

I watched a small crew (six to eight) making a flat concrete roof over a fruit stand. To get the “woks” full of wet cement onto the roof, they formed a bucket brigade with a guy on the ground, a guy on a three foot ledge, a guy on a six-foot ladder, and a guy on the roof. As each guy tossed a full wok upward, the guy above would simultaneously toss an empty one downward, like a juggling team, and I never saw them drop anything. They had to get the roof poured in one shot before the cement set, so every movement had to count.

Plans for the future? I'm going to watch this place grow both physically and academically, and contribute what I can to the latter. I quit the construction biz when I went back to grad school! But be careful, I tell myself. As John Lennon said, ‘Life is what happens while you're busy making other plans.’

## Departmental TA Awards

● **Eva Tsoncheva** and **Jacob King** were honored as the Best TAs of Spring 2006. **Peter Hyland** was given the title Best TA of Fall 2006–07, and **David Hover** was our Rookie of the Year 2006–07. All of these graduate students do a tremendous and conscientious job TAing in physics. Thanks for all your efforts!

● **Jeff Klukas** and **Dong Zhou** won the Emanuel R. Piore Award, presented annually to recognize excellence on the Physics Qualifying Examination.

Jeff Klukas came to Madison from Wittenberg University in Springfield, Ohio, where he received a bachelor's degree with dual concentrations in physics and French language and literature. Although he grew up in Pittsburgh, Pennsylvania, his family has been living in Nashotah, Wisconsin, since 2002.

At UW, Klukas works in high energy particle physics, preparing for experiments soon to go online at the Large Hadron Collider at CERN. As part of the Madison group, he has been involved with several aspects of CMS, one of the two main detectors at the LHC. With Professor Duncan Carlsmith, he worked on the endcap muon alignment system, which measures the positions of the detector's numerous muon chambers as they shift under CMS' 4 Tesla magnetic field. Currently, Klukas is working with Professor Matt Herndon to improve tracking algorithms used to reconstruct events within the detector.

Outside of physics, Klukas always looks forward to summers in Madison—spending time at the Union Terrace and enjoying concerts. He is a guitarist and songwriter and loves to travel. He looks forward to spending more time in France and Switzerland as he continues his research.

● **Dong Zhou** writes:

I did my undergraduate work in Zhejiang University, China, where I graduated with a degree in Physics and a degree from an honored interdisciplinary program called Mixed Class.

In the past years, I have worked on mathematical modeling (lottery design, species control, etc), IC design, Robert design, Monte Carlo simulations on magnetic systems and high energy systems, quantum gate design, etc. I enjoy interacting with people from different fields and would love to do interdisciplinary research in the future.

Currently, I am working with Professor Pupa Gilbert and Professor Susan Coppersmith on biomineralization. We aim to understand the relevance of protein-mineral interaction to the biominerals' mechanical properties and morphologies in the foreseeable future.

● The Jansky Award was given to **Siddharth Malu** of Physics. This award goes to an outstanding graduate student pursuing an advanced degree with interest in astrophysics and astronomy. This award rotates between the departments of astronomy and physics. Siddharth writes:

I am a fifth-year graduate student in physics. I am working with Professor Peter Timbie on the design, construction, and analysis of data from the Millimeter-wave Bolometric Interferometer (MBI), which will probe the earliest epochs of the universe through anisotropies in the polarization of the cosmic microwave background (CMB). The MBI operates in the EHF (extremely high frequency) band of radio frequencies, at a wavelength of 3mm. I am therefore honored to receive an award named after of the founder of this field, Karl Guthe Jansky, and his wife, Alice Knapp Jansky.

I graduated from St. Stephen's College, Delhi University, in 1998 with a BS (honors) in physics, and from the University of Oxford in 2000 with a master's in physics. I received the Radhakrishnan/British Chevening Fellowship for the master's degree at Oxford. While at Oxford, I did research in cosmology and prepared myself for a PhD in cosmology.

I have accepted an offer for a postdoctoral fellowship at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India. While there, I will continue my research in the CMB. Eventually, I would like to have my own research program in cosmology as a professor in astrophysics.

● This year two graduate women were awarded the Hirschfelder Award to travel or to attend a conference in support of each of their areas of research. This year's winners are **Christie Simmons** and **Annelise Malkus**.

● **Don Huynh** won the Advanced Opportunity Fellowship for 2006–07. The Ray and Anne Herb Wisconsin Distinguished Graduate Fellowship winners were **Steve Sendelbach** and **David Hover** and the Jeff and Lily Chen Wisconsin Distinguished Graduate Fellowship winner was **Larissa Ejzak**. Don offers the following:

I graduated cum laude from Boston University with a BA in physics and minors in chemistry and mathematics. During the summer of 2005 I lived and worked in Italy as part of a summer research exchange program sponsored by the U.S. Department of Energy and the Italian National Institute of Nuclear Physics. The research I did in Italy was on the degradation induced by protons and light ions in silicon substrates for the development of radiation hard detectors for the future very high luminosity hadron colliders.

I am interested in plasma physics, and this summer I worked with Professor Boldyrev on a project on viscoelastic and magnetorotational instability. In the future I would like to work on thermonuclear fusion research such as the ITER project.



**Siddharth Malu**



**Dong Zhou**



**Don Huynh**

## Undergraduate News and Awards

We are pleased to announce that **Matthew Allen Bayer** won the Leo and Jean Besozzi Scholarship. He has declared physics, astronomy, and history as his majors. Over 215 applications were received last November for approximately 60 awards. The pool was full of excellent scholars. Congratulations, Matt!

A number of physics majors have been awarded the prestigious Hilldale Awards: **William Dirienzo** (working with Professor Snazana Stanimirovic), **Nick Leaf** (working with Professor Mark Eriksson), **Michael Line** (working with Edwin Mierkiewicz), **Nick Schafer** (working with Professor Dan Negrut), and **Dan Zou** (working with Professor Karsten Heeger), who submitted a proposal titled, "Are neutrinos their own antiparticles?—Towards the observation of neutrinoless double beta decay through a precise calibration of the energy spectrum in CUORE."

The U.S. Department of Education is honoring 141 high school seniors nationwide as Presidential Scholars, and the only two from Wisconsin are from Madison. One is **Robert Marsland**. He is the principal cellist with the Wisconsin Youth Symphony Orchestra and an accomplished pianist, Eagle Scout, and lab assistant under Professor Thad Walker at the University of Wisconsin—Madison Physics Department. Robert has been working in Professor Walker's laser cooling lab since January 2007, working on his research on an electronics project.

The honor is based on test scores or through nomination by the nationwide Young Arts Talent Search, WISC-TV reported.

### L.R. Ingersoll Awards

L.R. Ingersoll Awards for distinguished achievement in undergraduate physics for spring and fall were awarded on May 4, 2007, at the Physics Banquet & Awards Ceremony at the Fluno Center. Awardees included:

#### Spring 2005–06

- (103) Eric Johnson
- (104) Hao Li
- (201) Grant Gelderman
- (202) Zebadiah Breuckman
- (207) Nancy Ning Hail Ho
- (208) Bryan Simmons
- (248) Adam Beardsley

#### Fall 2006–07

- (103) Michael Austin Bohl II
- (104) Ben Landgraf
- (201) Kai Bark Lau
- (202) Daniel James Morgan
- (207) Andrew Bolanowski
- (208) Songyu Ng
- (247) Alex Lang

### Albert Augustus Radtke Scholarship

The 2007 Albert Augustus Radtke Scholarship for distinguished achievement in the study of undergraduate Physics was awarded to several Physics students, including **Samuel Bockenhauer, Jonathan Sperling, Matthew Bayer, Matthew Sieth, Jessica Waters**, and **Nicholas Ballering**.

**Jessica Waters** writes:

I'm a senior majoring in physics and the history of science. I have worked for Professor Thad Walker since my sophomore year, and over the last year I have worked with him and another undergraduate, Mike Slutskiy, on a senior thesis. It has been a challenging experience, and Professor Walker has been amazing. He has taught me in three classes and has served as my "boss" for three years. He has personally helped me through countless problems (both homework and what am I doing with my life).

I took last semester off from school in order to intern in a mechanical engineering cooperative learning program. Working for this program directed my career focus toward applied physics. However, before attending graduate school I am taking a year or two to travel and hone other skills. This year through AIESEC, an international student organization, I have devoted a lot of time to promoting understanding and student exchange between the U.S. and the Middle East. I hope to spend the summer there in order to gain experience with the culture and to learn Arabic. After that, I have plans to spend a year teaching English (and working on my Spanish) at EAFIT University in Medellín, Colombia.

My time in physics at the University of Wisconsin—Madison has been wonderful. I am looking forward now to graduating and beginning my next journey.



**Jessica Waters**

**Nick Ballering** is a Madison native. He graduated from East High School in 2004. When he began at the UW, he was undecided in his major, knowing only that he did not want to be a doctor or a lawyer. The introductory physics sequence with Professor Don Cox intrigued him enough to declare a major

in physics, and he has not regretted the decision. Nick finished his third year as an undergraduate and has accreted a few other majors along the way, including mathematics



**Nick Ballering**

and astronomy, and most recently he joined the Applied Mathematics, Engineering and Physics Program (AMEP).

Outside of class, Nick loves camping, scuba diving, eating interesting food on State Street, watching movies, and playing tennis. Nick has also taken an interest in teaching after he volunteered as a physics tutor through GUTS for a semester. He is now employed by the Academic Advancement Program as a tutor for the introductory physics courses. In addition, Nick volunteers at the UW Space Place, the Astronomy Department's public outreach program, where he helps run public stargazing parties.

This summer, Nick started working for the IceCube Neutrino Detector project, where he works for the AURA project, detecting neutrino interactions in the radio regime. He plans to finish his undergraduate studies in two years, but beyond that his trajectory remains uncertain. Attending graduate school has always been one of Nick's goals, but he may opt to volunteer or travel for a couple of years prior to returning to school. Ultimately, he would like work in observational astronomy or in astronomical instrumentation. He would love a career in which he can travel, but also hopes to satiate his desire to teach. Although Nick has many ideas for his future, he is most focused on making his remaining semesters at the UW as productive and enjoyable as possible.

## Fay Ajzenberg-Selove Award

The 2007 Fay Ajzenberg-Selove Award for outstanding undergraduate women majoring in physics, astrophysics, or astronomy had two winners this year: **Allison Noble** (Astronomy) and **Erin Conrad** (Physics).

## Liebenberg Family Undergraduate Summer Research Fellowship

Our thanks goes to the family of Maude Liebenberg and her son, Don. Because of their generosity, the Liebenberg Family Undergraduate Summer Research Fellowship was awarded to Adam Maus at the May awards banquet, where Don was our special guest. This award provides funding to encourage undergraduates to become involved in summer research programs. Adam worked with Professor Clint Sprott in summer 2007. Adam writes:



Adam Maus

I appreciate the Liebenberg award that I received and feel that it will greatly help my research progress and experience. I am currently an undeclared first semester junior leaning towards a major in computer science. I have found research to be the most rewarding experience in college thus far. I have taken URS

(the Undergraduate Research Scholars Program), which has been the most important series of classes I have ever taken. Through that program, I was able to find research in chaos theory with Professor Clint Sprott. Professor Sprott has been a great mentor, supporting my ideas and challenging me to work hard. This project and his guidance have helped me figure out what I would like to do later in life.

Ideally, I would go to graduate school after my time at Madison. Right now, I have not fully researched many schools, but would like to find a school that offers programs in machine learning, artificial intelligence, or nonlinear dynamics. I find these areas of research fascinating, and I would like to continue my education and research in chaos theory as well. Also, ideally, I would continue my education to the point of starting on the road to a PhD, though these are ideas I just am toying with. I also like working with website design and researching artificial neural networks in my off time. I believe that college has so many things to offer, and I feel privileged to have received such an award to help me continue what I find most rewarding.

## Dr. Maritza Irene Stapanian Crabtree Undergraduate Award

This is the third year of this award, which stems from a bequest by William Crabtree on behalf of the late Dr. Maritza Irene Stapanian Crabtree to the University of Wisconsin to support tuition and fees based equally on merit and need for undergraduate students in physics. This year's winner is **Jonathan Hedstrom**, an undergraduate senior triple majoring in physics, electrical engineering, and mathematics at UW-Madison. He's had wonderful experiences working as a lab assistant in the Applied Superconductivity Center working on MgB<sub>2</sub>, in a multi-disciplinary lab studying electro-permeabilization of HL-60 cells under Professor John Booske and Steve Kennedy, and in Professor Robert McDermott's lab studying quantum computing and qubits.

## Bernice Durand Undergraduate Research Scholarship

This award goes to undergraduate women or minorities majoring in or planning to major in physics or astronomy. It is made possible through the generosity of Associate Vice Chancellor and Physics Professor Bernice Durand, who established this scholarship to encourage young women and minorities to do research and continue their career in science. This year's winner is **Lauren Levac**, who worked with Professor Peter Timbie doing research in summer 2007.

# I N M E M O R I A M

## **Martha (Freeman) Dillinger, 1917–2006**

**Martha (Freeman) Dillinger**, age 89, of Chelmsford, Massachusetts, formerly of Madison, Wisconsin, and Carbondale, Illinois, died Friday, October 20, 2006. She was the widow of Joseph R. Dillinger, professor of physics at UW–Madison (deceased in 1975).

She was born on January 25, 1917, in Benton, Illinois, to James Alexander and Nancy (Young) Freeman. Martha was united in marriage to Joseph R. Dillinger on June 6, 1942, in Benton, Illinois. Martha moved to Madison in 1946. She raised her family in Madison, where she contributed to the University, the public school system, and the community at large, while Joe worked as professor of physics at the University of Wisconsin.

When Joe preceded her in death in 1975, Martha returned to southern Illinois, where she contributed to Southern Illinois University and the Carbondale, Illinois, community.

Survivors include three children, James of Austin, Texas, Ellen of Pittsburgh, Pennsylvania, and Thomas of Chelmsford, Massachusetts; two grandchildren, Kristi (Dillinger) Chandler and Jeffrey Dillinger; four great-grandchildren, Mason, Grace, Davis, and Nolan Chandler; and five nieces and nephews.

## **Cheryl Green Friedman, 1939–2006**

**Cheryl Green Friedman**, wife of Emeritus Professor Bill Friedman, passed away Friday, September 1, 2006, at home in Mill Creek, Washington, surrounded by her husband, sister Aletha, and sister-in-law Florence. She fought a courageous two-year battle with cancer.

Cheryl was a true daughter of Seattle and the Northwest. Born in 1939, she lived happily in San Francisco, Washington, D.C., Boston, Copenhagen, Princeton, and Madison for 34 years, but her heart was always with the city of her birth, Seattle. After her husband retired as professor emeritus of physics at the University of Wisconsin, she was able to return to the Pacific Northwest only two short years ago.

Having inherited a love of that part of the country from her family, Cheryl introduced her husband to extensive camping, which they both enjoyed. Alaska was always a favorite of hers, and she made at least eight visits there by land, sea, and air, bringing family and friends to share her experiences.

A lover of learning, she majored in philosophy, graduating with a BA from George Washington University in Washington, D.C., in 1961. Cheryl continued her studies in Madison in sociology and trained in public administration at the graduate level, with the dream of helping others and, later, the possibility of serving her city of birth. While she had no children of her own, as the eldest of five she was always looking out for her siblings and, later, their children. She also took loving care of her husband's family, especially his mother, with whom she traveled, with and without his company. Of particular concern and interest were her nieces and nephews on both sides of the family. Her love of nature, life, and humanity stemmed from her close relationship with Bill, and she shared these with her husband of 45 years.

Cheryl was preceded in death by her father, Philip Gordon Green. She is survived by her husband, William Albert Friedman; her mother, Charlotte Canfield Green; sisters, Aletha Bonebrake, Heather Bell, and Hollyn Green; her brother, Philip David Green, her mother-in-law, Minnon Friedman; sister-in-law, Florence Rosenblum, and numerous nieces and nephews.

## **Mike Murray, 1925–2006**

Longtime electronics technician **Myron “Mike” Francis Murray, Jr.** died on Monday, December 4, 2006, at his home in Madison. He was born on February 19, 1925, to Myron and Geneva (Oimoen) Murray. Mike was a graduate of Mount Horeb High School in 1942. The Blue Mounds native was a World War II veteran serving in the Army signal corps.

He began his career at UW–Madison in 1948, when he was hired as a student worker in nuclear physics. From 1948 through early 1949, he worked as an electronics technician while pursuing a degree in electrical engineering.

Murray had been involved with many experiments, such as the Amanda project and the Hubble space telescope, and spent several years on the electrical wiring for the linear proton accelerator in the basement of Sterling Hall. He organized the nearby electronics shop for nuclear physics, then reorganized it when a bomb exploded just outside the shop in 1970. He also organized the Physics Department's main electronic shop in Chamberlin Hall when it relocated. The state of Wisconsin honored him in 2005 with a Certificate of Commendation for his 56 years of faithful service.

Mike built his own home, which he was able to live in until his death. He was very involved in Crestwood neighborhood activities, serving on the board of directors of the Wisconsin Cooperative Housing Association.

Mike is survived by his son, John (Mary) Murray; a daughter, Jean (Dyck) Shepherd; grandchildren, Michael, Ruth, Christopher and Molly Murray, Amanda (David) Temple and Marissa Shepherd; a brother, Robert Murray; and a sister, Barbara Sutter. He was preceded in death by his first wife, Audrey E. Murray; his later wife, Karen Bradford; a son, Mark J. Murray; and his parents.

# IN MEMORIAM

## **Hugh Taylor Richards, 1918–2006, Emeritus Professor**

**Dr. Hugh Taylor Richards**, PhD, died on Friday, September 29, 2006, at the Dunn County Health Care Center in Menomonie, Wisconsin, where he received loving and respectful care during the last three years of his life.

Hugh was born November 7, 1918, on a homestead in Baca County, Colorado. He graduated from Platteville High School.

In 1939 he received a BA from Park College, Parkville, Missouri, and in 1942 he earned his PhD in nuclear physics from Rice University, Houston, Texas. During World War II, Hugh collaborated on the Manhattan Project at Los Alamos, New Mexico. His area of expertise was neutron measurements of the atomic bomb. While there, he met Mildred Paddock, and on February 11, 1944, they married.

After the war, he accepted a research and teaching position at the University of Wisconsin and moved to Madison. In 1952 he became a full professor of physics. While at the university he served terms as department chair and associate dean of Letters and Science. Hugh's true passion was scientific research, and he was a mentor to 49 PhD-level graduate students. After the 1970 bombing of Sterling Hall, in which a physics graduate student was killed and years of valuable research destroyed, Professor Richards' leadership was credited with preserving the personnel, focus, and morale of the Physics Department.

Hugh was an active member of the First Unitarian Universalist Society in Madison and promoted using reason to solve problems between nations. In 1988 he became emeritus professor and remained active in his field until 2000. In retirement he treasured his family, especially his grandchildren, entertaining them with his unique "punny" sense of humor.

Hugh and Mildred moved to Menomonie, Wisconsin, in 2000 in order to be cared for by his son and daughter-in-law, Tom and Mary Richards. In 2001 he was diagnosed with Alzheimer's disease. He was loved and respected, touching the world in many profound ways.

## **Beatrix "Trixi" Roesler, 1938–2006**

**Beatrix "Trixi" Roesler** passed away on Wednesday, August 23, 2006, in the company of husband, Emeritus Professor Frederick L. Roesler and daughters, Kirsten (Elder) Thompson and Monica (Elder) Bridgewater at the Don and Marilyn Anderson Hospice Care Center in Fitchburg. The cancer that took her life was diagnosed last November. Trixi remained optimistic and brought cheerfulness to friends and family throughout the difficult treatments; in the end she made peace with the inevitable advance of her disease.

She was born on July 19, 1938, in Hanau, Germany, and immigrated to the U.S. in 1959 to marry and live in Los Alamos, New Mexico, where her daughters were born. After her first marriage ended, Trixi moved to Madison and married Frederick Roesler in 1968. She became a U.S. citizen in 1969. For many years she was an enthusiastic volunteer for the Wisconsin Youth Symphony Orchestra. Between 1982 and 1992, she and her husband were frequently in Washington, D.C., where Trixi helped design and install exhibits for the Smithsonian Museum of American History and later worked for the Department of Veterans' Affairs. From 1992 to 1997 she worked in the oncology section at the Madison VA Hospital. Trixi's great love for the arts was expressed in all she did; many treasure her personal works in fiber arts. Her birth brought a sensitive spirit of great depth and beauty to earth that enriched people wherever she went. In death, her spirit will live on in the hearts of her family and many friends who deeply loved her.

## **James A. Van Allen, 1914–2006**

**James A. Van Allen** was born in Mount Pleasant, Iowa, on September 7, 1914. He received his PhD in physics from the University of Iowa in 1939 and was a research fellow at the Carnegie Institution of Washington's Department of Terrestrial Magnetism until 1942. As a Navy officer during World War II, he worked at the Johns Hopkins University Applied Physics Laboratory (APL); after the war, he worked at APL on instrumenting V-2 rockets for scientific research and on various rocket- and balloon-borne instruments for studying cosmic rays at high altitudes and high latitudes. He also headed the development of the first sounding rocket, the Aerobee. In 1951 he returned to the University of Iowa as head of the Department of Physics and Astronomy, where he remained an active and respected scientist and teacher.

Van Allen worked with the highest levels of government and scientific administration. A member of the National Academy of Sciences' Space Science Board at its inception in 1958 and working with NASA since its creation in 1959, he helped plan and select the initial suite of space-based observations and experiments. He was among the most influential of individuals in the late 1960s, laying the groundwork for the exploration of the outer solar system and the missions that became Pioneer 10 and 11, Voyager, and Galileo. He was an articulate and outspoken advocate of small, inexpensive missions long before this view became popular.

A member of the American Geophysical Union since 1948, Van Allen helped to organize the first planetary sciences section in 1959 and served as its president from 1964 to 1968. He was president of AGU's solar-planetary relationships section from 1976 to 1978. Van Allen was elected an AGU Fellow and named John Adam Fleming Medalist in 1963, was awarded the William Bowie Medal in 1977, and served as Union President from 1982 to 1984. He passed away August 9 at the age of 91.

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Cardholder Signature \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_ Home Phone: (\_\_\_\_\_) \_\_\_\_\_

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City, State, ZIP \_\_\_\_\_

For a description of all UW Foundation Physics Funds, go to: [www.physics.wisc.edu/giving/fund-details.html](http://www.physics.wisc.edu/giving/fund-details.html).

## I WISH TO DESIGNATE MY GIFT TO THE FOLLOWING FUND(S):

☐ **Physics Newton Fund** (#1269172) — *An unrestricted general fund — **greatest need**.*

☐ **Undergraduate Support — General** (#1269172)  
*To provide for undergraduate student special needs.*

☐ **Undergraduate Support — Specific**  
*Indicate fund name and number below. Select from list of "undergraduate" funds on next page.*

Fund Name \_\_\_\_\_ Fund Number: \_\_\_\_\_

☐ **Graduate Support — General** (#1269172)  
*To provide for graduate student special needs.*

☐ **Graduate Support — Specific**  
*Indicate fund name and number below. Select from list of "graduate" funds on next page.*

Fund Name: \_\_\_\_\_ Fund Number: \_\_\_\_\_

☐ **Other**  
*Indicate fund name and number below. Select from list of "Other" funds on next page.*

Fund Name: \_\_\_\_\_ Fund Number: \_\_\_\_\_

- Should you prefer to make your donation electronically by credit card on a secure server, please go to: [www.physics.wisc.edu/giving/fund-details.html](http://www.physics.wisc.edu/giving/fund-details.html). Click on the fund in which you are interested for information and then complete the UW Foundation secure site form.
- If you wish to consult with a UW Foundation development officer on your gift or other options, including estates, trusts, in-kind gifts, or planned giving, please call or e-mail: Chris Glueck, University of Wisconsin Foundation at 608/265-9952 or [chris.glueck@uwfoundation.wisc.edu](mailto:chris.glueck@uwfoundation.wisc.edu).

*We thank you!*

# UW FOUNDATION ACCOUNTS FOR THE DEPARTMENT OF PHYSICS

If you wish to make a donation to a specific fund, rather than a general area, please select from the following:

## Of Special Interest

### **Friends of the Ingersoll Museum ..... 12694069**

With a "lead" future donation from Anne Herb, we are searching for more friends to help us create an on-going endowment to support and staff the Ingersoll Museum.

## Student Support—Specific

### **Fay Ajzenberg-Selove Scholarship ..... 12691618**

(Undergraduate) Provides encouragement for undergraduate women majoring in physics, astronomy, or physics-astronomy to continue their careers in science.

### **Dr. Maritza Irene Stapanian Crabtree Undergraduate Scholarship ..... 12693412**

(Undergraduate) Provides assistance to undergraduate students based on merit and need.

### **Bernice Durand Research Scholarship ..... 12693561**

(Undergraduate) Promotes meaningful undergraduate research opportunities, plus supports and encourages women and ethnic minorities as undergraduate majors in the departments of physics and astronomy.

### **Henry & Eleanor Firminhac Scholarship ..... 12693645**

(Undergraduate or Graduate) Provides assistance to students in Physics with financial needs.

### **Liebenberg Family Research Scholarship ..... 12692683**

(Undergraduate) Supports physics, AMEP, or astronomy-physics majors in summer research experiences.

### **Cornelius P. & Cynthia C. Browne Endowed Fellowship Fund ..... 12692082**

(Graduate) Provides support to graduate students pursuing doctoral studies in the Physics Department.

### **Jeff & Lily Chen Distinguished Graduate Fellowship ... 00000000**

(Contact department directly.)

(Graduate) Provides support to an outstanding graduate student in the department annually.

### **Joseph R. Dillinger Teaching Award Fund ..... 12691359**

(Graduate) Provides recognition to an outstanding teaching assistant in the Department of Physics.

### **Ray & Anne Herb Distinguished Graduate Fellowship 00000000**

(Contact department directly.)

(Graduate) Provides support to two outstanding graduate students in the department annually.

### **Elizabeth S. Hirschfelder Endowment ..... 12693190**

(Graduate) Supports women graduate students in physics research.

### **Karl & Alice Knapp Jansky Fellowship Fund ..... 12693916**

(Graduate) Provides funding to an outstanding graduate student interested in astrophysics and astronomy.

### **Graduate Student Recruiting ..... 12692106**

(Graduate) Provides assistance in recruitment expenses of physics graduate students.

## Other

### **Barschall Enterprise Fund ..... 12694421**

Established in 2005 in honor of former Professor Heinz Barschall. Provides unrestricted-use fund for chair in recruiting senior researchers to faculty.

### **Elementary Particle Physics Institute ..... 12691418**

Provides funding for activities of the institute.

### **Physics Community-Building Fund ..... 12694622**

New in 2006. Provides funding for chair in establishing and reaffirming a sense of community among the faculty, staff, students, and alumni of the department.

*We sincerely thank each and every one of you  
for being a part of our program improvement effort.*

Susan N. Coppersmith, Chair



**University of Wisconsin–Madison**  
**Department of Physics**  
**1150 University Ave.**  
**Madison, WI 53706-1390**