

WAVES

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Department Chair's Comments



Hello to all our alumni and friends out there!

Al Compaan stepped down as chair of the department in October 2008 after almost 5 years of service, so that he could devote more time to his research efforts in photovoltaics. As the new chair of the department (and at this point wondering what I've gotten myself into!), I'd like to

fill you in on some of the many changes and developments that have occurred over the past year. Of course, given the current economic climate, not all the news is good, but we are working hard to adapt to rapidly changing conditions and to keep our department as active and strong as it has been.

As you will see in more detail in the newsletter, we continue to welcome new additions to the department. J.D. Smith arrived in January 2008 from the Steward Observatory in Arizona to join our astronomy faculty, completing the three strategic hires in astronomy. Together with Tom Megeath and Rupali Chandar, these dynamic young faculty members have really re-energized all of us in the astronomy and astrophysics group. It's fun to have them all here, and their contributions have already been substantial.

Mike Heben and Randy Ellingson have joined us from the National Renewable Energy Laboratories in Golden, CO, completing the strategic hires in photovoltaics. Mike is the new PVIC Endowed Chair and professor, and Randy is a new associate professor in the department. They bring substantial experience, expertise, and additional strength to the outstanding photovoltaics and materials science efforts in our department. Their lab space will be in the upgraded R1 building, where six new labs for the photovoltaics effort are nearing completion as part of the Wright Center PVIC effort.

The department is very fortunate to have strong supporters in the community who have made major pledges in support of two new professorships. I would like to mention two specific examples. We are deeply grateful to Helen McMaster, who has endowed the Harold McMaster Chair in Photovoltaics, and to Helen Brooks, who has enabled the Helen Luedtke Brooks Professorship in Astronomy. The crucial support of our friends continues to make it possible for our department to grow, thrive and be very successful in attracting outstanding new faculty and students. Thanks from all of us!

Our undergraduate and graduate student enrollment continues to increase, and we are working to develop new options for our majors. At the graduate level, we have a new Ph.D. concentration in Astrophysics, and at the undergraduate level, a new minor in Alternative Energy has just been approved. The Medical Physics program has applied for national accreditation. The photovoltaics area maintains its excellence and is attracting a great deal of attention (and funding!) from the state, the nation, and the world. Several of the astronomers are heavily involved in major projects for the new Herschel Infrared Space Telescope that is scheduled for launch in April. The planetarium continues its outstanding efforts in outreach and education, bringing in over 25,000 visitors each year. We are proud of all these efforts, and hope to develop even more in future years. If you'd like to help us grow and improve, there is information elsewhere in this newsletter about how you can contribute.

In closing, let me just say that we value all our supporters, friends, former students and colleagues. We'd love to hear from you, so please do drop us a line sometime and tell us what you're doing these days. If you happen to be in the area, do stop in and visit us.

Karen Bjorkman

WELCOME OUR NEWEST FACULTY MEMBERS!

The University of Toledo continues to fortify its expertise in the field of photovoltaics with the addition of two internationally renowned faculty members, Dr. Michael Heben and Dr. Randall Ellingson who joined the department in August 2008. Both Michael and Randall come to us from NREL (National Renewable Energy Laboratory) in Golden, Colorado. "The addition of these professors will have tremendous benefit to The University of Toledo's photovoltaics programs, as well as other innovative programs for developing cleaner energy resources," said Dr. Alvin Compaan, professor of physics and former chair of the Department of Physics and Astronomy. "This also gives our undergraduate and graduate students even more opportunities to interact with the best scientists in this field."

Michael Heben has been appointed Wright Center of Innovation (WCI) endowed chair in photovoltaics, in addition to professor of physics. Heben's position is part of an \$18.6 million WCI Award secured through the Ohio Department of Development. Formerly, he was a principal scientist and team leader of the Nanostructured Materials Group at NREL.



Michael Heben



Randall Ellingson

Randall Ellingson has joined UT's Department of Physics and Astronomy as an associate professor. He has been with NREL since 1994, first as a postdoctoral scientist and currently as a senior scientist. In 2005, he also was a one-year detailee to the DOE's Office of Basic Energy Sciences in the Division of Materials Sciences and Engineering in Washington, D.C. Recently, Ellingson's team reported a unique quantum effect in silicon nanocrystals in which a single photon can produce more than one electron. The effect is under intense investigation as a way to improve the efficiency of solar cells.

We look forward to the expanded expertise and bright future that these excellent scientists bring to our department, and particularly to our condensed matter and photovoltaics programs!

NOTABLE FACULTY NEWS

DR. ROBERT COLLINS NAMED DISTINGUISHED UNIVERSITY PROFESSOR

Excerpts from UT News, September 18, 2008



Prof. Robert Collins

Professor Robert Collins was named one of 4 new Distinguished University Professors at UT in spring 2008. His nomination cited Collins' excellence in teaching and research, noting that he has been instrumental in securing more than \$32 million in funding for UT's photovoltaics program "These Distinguished University Professors are symbolic of the excellence we strive to achieve, every day, here at

the University," added Dr. Jeffrey Gold, Health Science Campus provost and executive vice president for health affairs and dean of the College of Medicine. "As you'll see from their credentials, these colleagues are defined by their academic achievements, as well as their desire to share their knowledge with their peers and their students."

Collins has developed four new courses for a proposed interdisciplinary doctoral program that will engage faculty from three colleges and five departments. He also has published more than 300 peer-reviewed articles and given 75 invited presentations with approximately 200 citations.

"I am grateful for this honor and look forward to working within UT and statewide to achieve recognition as the leading center for

basic sciences of photovoltaic materials and devices," Collins said. "In the four-plus years since I have arrived at UT, I have found an extraordinarily stimulating environment for such an effort and have received great support from the State of Ohio, the University, the colleges, and many faculty and industry colleagues throughout the state."



Prof. Karen Bjorkman

DR. KAREN BJORKMAN RECEIVES OUTSTANDING TEACHER AWARD

Excerpts from UT News, April 21, 2008

Dr. Karen Bjorkman received the University's Outstanding Teacher Award in Spring 2008 along with three other UT faculty members who were so honored at the academic awards banquet in April. "Karen is a brilliant astronomer. But what's exciting is that

she can share that with her students as an extraordinary teacher. She makes a difficult concept manageable, and manages to do it with intelligence, humor and class." one nominator wrote.

"I believe that part of the benefit of having active research faculty teaching courses is that we can bring the excitement of new discoveries and ongoing scientific inquiry into the classroom, at all levels, on a personal basis, and I make an effort to do this in my classes." Bjorkman said.

PROFESSOR EMERITA HELEN BROOKS HELPS UT REACH FOR THE STARS

Excerpts from *UT News*, July 21, 2008



Helen Brooks, UT professor emerita of astronomy, poses at the observatory following the announcement.

Her first telescope in grade school set the course for Helen Brooks' life long love of astronomy, eventually leading to a bachelor's degree, a master's degree and an honorary doctorate, all from The University of Toledo. And it was at UT where she continued her work in the field, through teaching.

"Astronomy has been my interest all my life," she said, "and this is where I've been able to take advantage of that interest."

As UT's only astronomy professor for many years, Mrs. Brooks witnessed the department's major growth period. She was there for the country's developments in the space program, which she believes gave astronomy its "impetus." She was also on staff when a gift from George Ritter helped create UT's Ritter Planetarium.

"That allowed me, early on, to see first hand the difference that private gifts make to a University," she said. With their own major gift, she and her late husband Elgin established the Brooks Observatory in 1987. Now, fifty years after the start of her teaching career, Mrs. Brooks is supporting the department with a \$1 million trust gift, to establish the Helen Luedtke Brooks Endowed Professorship of Astronomy.

Her gift will offer financial stipends and recognition to a UT astronomy professor, said Mrs. Brooks, who continues to participate in department activities such as the Brown Bag Lunch Series. "This professorship will recognize a professor's worthwhile work and show the astronomy faculty that their work is appreciated," she said. "It is a remarkable situation to have a professorship funded by someone who has as much detailed knowledge and understanding of the field as does Helen Brooks," said Dr. Al Compaan, of physics and astronomy. "From her experience, Helen feels UT astronomers are as good as those in the best departments and observatories. She wanted this professorship to provide the recognition our faculty so richly deserve."

Mrs. Brooks said that providing for the professorship through a planned gift was especially advantageous. "This type of gift allows you to pledge a larger contribution to be provided at some future time. Hopefully, by giving it now, it might induce others to do the same."

MCMASTER FAMILY GIVES \$2M FOR ENERGY RESEARCH CHAIR

Excerpts from *Toledo Blade*, May 2008 and *UT News*, May 28, 2008



Harold and Helen McMaster

The McMaster family is continuing to invest in the University of Toledo as it carves out a niche as a leader in alternative energy research. A \$2 million gift from the family in honor of the late solar-energy pioneer Harold McMaster was announced on May 28,

2008 in the lobby of McMaster Hall. The gift will establish the "Harold and Helen McMaster Chair in Photovoltaics" that will draw an experienced researcher in the field to Toledo through an international search. Mr. McMaster, who died in 2003 at the age of 87, had more than 100 patents in his name and left a legacy for his equipment that produced tempered safety glass that has no sharp edges when broken. The McMaster chair will continue to strengthen UT's work in photovoltaics and the Toledo area's

reputation as an industry leader, said Al Compaan, chairman of UT's department of physics and astronomy. "It's a recognition of the building strength in photovoltaics," he said. "It's a recognition of a lot of good work that's already going on and the good people who are there, but it's an opportunity to bring in an additional world-class scholar."

When Harold McMaster looked to the future of glass, he saw beyond automobiles and windows. With his foresight and ingenuity, he saw the power for energy.

Working with Norman Nitschke and other local investors, Harold McMaster founded companies including Solar Cells, which later became First Solar. The pioneer in solar energy held more than 100 patents at the time of his death in 2003.

His wife, Helen, is honoring his memory and his commitment to solar energy research through a \$2 million gift to The University of Toledo to create the Harold and Helen McMaster Chair in

McMaster continued from page 3.

Photovoltaics. The fund will support a distinguished research scholar in the field of photovoltaics, the technology used to convert sunlight into electricity. An international search will be conducted for the position, which will strengthen the University's already significant work in alternative energy research.



Helen McMaster and her son, Ron McMaster, right, talked to Dr. Lawrence Elmer, associate professor of neurology, following the announcement of her \$2 million gift to support UT's photovoltaics research.

PROFESSOR XUNMING DENG WINS TOLEDOAN OF THE YEAR AWARD

Excerpts from UT News, Sept. 18, 2008



Xunming Deng

Dr. Xunming Deng, UT professor of physics, received the Toledoan of the Year Award for innovation in September 2008. The award honors outstanding Toledoans who contribute to the betterment of the city in the categories of humanitarian, innovation, mentorship, leadership and business community investment. The 40 award nominees were selected by a panel of judges along with Mayor Carty Finkbeiner based

on their contributions to the city of Toledo. "I'm very proud and honored to be named Toledoan of the Year," Deng said. "It's nice to build a company in Toledo and to be recognized by the city and community." Deng is co-founder and president of Xunlight Corp., a pioneering enterprise that in 2006 signed with UT, which gave the company the resources needed to begin production. Since its inception, Xunlight has become an industry leader in clean, renewable energy, and its employees build some of the most advanced solar panels in the country. Recently, Prof. Deng and others from Xunlight met in UT President Lloyd Jacobs' office to sign a transfer of equity agreement, giving UT a stronger financial stake in the future of Xunlight.

TEAM LED BY P&A FACULTY RECEIVES FUNDING FOR OHIO RESEARCH SCHOLARS

Excerpts from UT News, June 23, 2008



President Lloyd Jacobs and OBOR Chancellor Eric Fingerhut, center, posed for a photo last week with, from left, College of Arts and Sciences Dean Dr. Yueh-Ting Lee, Dr. Vijay Goel, and Dr. Robert Collins and Dr. Sylvain Marsillac of Physics & Astronomy.

A team led by Dr. Robert Collins and Dr. Sylvain Marsillac, with participation by other faculty members at UT and at Bowling Green State University was awarded \$8.9 million from the Ohio Research Scholars Program to recruit top scholars and to establish "research clusters" for work on photovoltaics - the direct conversion of sunlight into electricity. The \$8.9 million award will be used for a new \$2.5 million endowed chair in photovoltaics, another \$4.5 million for new, state-of-the-art instruments and computer equipment for modeling of materials, as well as for operating support for three new faculty members, according to Dr. Robert Collins, professor of physics, the Nippon Electric Glass Chair in Silicate and Material Science, and the proposal's principal investigator. According to the terms of the award, the holder of the new chair must come from outside the state. With the recent addition of Michael Heben and Randall Ellingson, this brings the total number of UT faculty members involved in photovoltaics research to 16.

PROFESSORS COMPAAN AND DENG RECEIVE 3RD FRONTIER FUNDING

Excerpts from UT News, May 31, 2008

The Ohio Third Frontier Commission has announced awards of more than \$12 million in grants to 17 organizations to accelerate the development of advanced energy industry in Ohio, and University of Toledo-related projects shone brightly in the competition for funding. On another project, UT will collaborate with Xunlight 26 Solar on Xunlight's \$1 million grant aimed at developing building-integrated, flexible photovoltaic systems based on lightweight modules of transparent polymer materials. Xunlight was founded by Drs. Alvin Compaan and Xunming Deng, professors of physics. UT will receive \$360,000 for support of this project from its Department of Physics and Astronomy, the Center for PV Electricity and Hydrogen, and the Wright Center for PVIC. In addition, Akron Polymer Systems will receive a sub-award to collaborate on this project. Compaan also will work with the Garland Co. in Cleveland on its \$1 million project to produce turnkey, factory-integrated solar roofing projects. UT will receive a sub-award of \$300,000 to engage the resources of

the Wright Center for PVIC and the Center for PV Electricity and Hydrogen to assist with Garland's expertise in roofing. Garland is a long-established manufacturer of commercial roofing products and has offered solar roofing products for the past decade. The Third Frontier Advanced Energy Program is designed to help companies in Ohio continue to make technical progress toward the commercialization of advanced energy-related products for future applications. Awards for advanced energy were selected from the wind, solar, alternative fuel, energy storage and instruments, controls, and electronic sectors.

ASTRONOMERS LEAD SEARCHES FOR ANSWERS TO QUESTIONS OF COSMIC ORIGINS

Excerpts from UT News, May 30, 2008

University of Toledo researchers Tom Megeath and J.D. Smith have scheduled their time travel for early 2009. The two assistant professors are key members of two teams using Herschel, the far-infrared space-based telescope, to look back through time to investigate the births of individual stars and the life cycles of galaxies. This revolutionary observatory will be able to examine the cold universe, objects that don't emit enough visible light to be seen by the human eye and must be studied in infrared light.

As "key projects" for Herschel, both Megeath's and Smith's work will help form a foundation of knowledge that will impact astronomy for years to come. Megeath will lead the Herschel Orion Protostar Survey, which has been allotted 200 hours and includes members from Germany, France, Spain and Canada, as well as the Smithsonian Astrophysical Observatory, the California Institute of Technology, Johns Hopkins University, and the universities of Arizona, Michigan and Rochester. Smith will lead one of three sub-teams of the 537-hour study KINGFISH, a survey of nearby galaxies that includes members from the United Kingdom, Germany, France, the Netherlands, Canada and Italy, as well as the Space Telescope Science Institute in Baltimore, the California Institute of Technology, Princeton University, and the Universities of Arizona, Maryland, Wyoming and Massachusetts.



Astronomers Dr. J.D. Smith, left, and Dr. Tom Megeath, shown here in front of UT's Ritter Observatory telescope, will use the infrared space-based telescope Herschel to investigate the origins of stars and galaxies.

UT LANDS \$2.6 MILLION FOR SOLAR ENERGY RESEARCH FROM U.S. DEPARTMENT OF ENERGY

Adapted from UT News, March 24, 2008

The U.S. Department of Energy has announced \$13.7 million in funding for 11 university-led projects focused on developing advanced solar photovoltaic technology manufacturing processes and products. The University of Toledo has been selected to receive a total of more than \$2.6 million for two of the projects. UT was one of only two universities to be selected for two projects. Other schools receiving funding include the Georgia Institute of Technology, Massachusetts Institute of Technology and the University of Florida.



Dr. Robert Collins, professor of physics and astronomy and holder of the Nippon Electric Glass Chair in Silicate and Materials Science, shown here adjusting optical instrumentation for the plasma reactor used to facilitate amorphous silicon solar cell growth, is principal and co-principal investigator for two UT projects that received \$2.6 million from the U.S. Department of Energy.

The University has received \$1.44 million to work with Xunlight, a recent graduate of UT's Clean and Renewable Energy Incubator, to develop a high-speed coating technology to put thin-film silicon on flexible stainless steel foil, therefore reducing the costs of flexible solar modules. The University of Toledo Principal Investigator on this project is Dr. Xunming Deng, UT professor of physics. Xunlight was founded by Dr. Xunming Deng who serves as its President and Chief Executive Officer. With the University and industry contribution, the project's total cost is approximately \$1.9 million.

The University also will use \$1.16 million in DOE funding on a project in collaboration with industry partners Calyxo USA, formerly Solar Fields, and Pilkington, and with academic partners from the University of Nevada Las Vegas and the University of Michigan. The University of Toledo Principal Investigator on this project is Dr. Robert Collins UT distinguished university professor of physics and NEG endowed chair. The universities will assist the industrial partners in optimizing a high-speed coating process for a cadmium telluride coating on glass. The total project cost is approximately \$1.7 million. Projects were selected in response to DOE's June 2007 Funding Opportunity Announcement — University Photovoltaic Process and Product Development Support — which seeks to strengthen university involvement in the rapidly growing photovoltaic industry. Funding is subject to appropriations from Congress.

OTHER NOTABLE FACULTY NEWS

JACQUES G. AMAR, LARRY CURTIS & ROBERT DECK

Professors **Jacques G. Amar**, **Larry Curtis**, and **Robert Deck** received the *APS Outstanding Referee* award from the American Physical Society (APS) as part of the inaugural group of *Outstanding Referees*. An awards ceremony recognizing their contributions was held at the March 2008 APS meeting in New Orleans, LA.

ALVIN COMPAAN

Alvin Compaan was interviewed in an article about his 'Lectrk Lifestyle in the Independent Collegian in April 2008. Not only do 96 solar panels supply his home with electricity, but they also power his GMC pickup truck. The pickup truck, with license plate "LECTRK," runs on 20 batteries charged from the solar panels, he said. "This is a dream that we've both had for many years, which is to have an energy-efficient home ... and a vehicle for commuting that would be solar powered," said Al Compaan, a distinguished physics professor at UT. The 2,600 square foot home located in Holland, Ohio has been running on efficient energy for the past four years.

MAHABALA ADIGA

Mahabala Adiga reports that a high-school student, Lin Lin Hwang, whom he mentored in a hydrogen-fuel cell project won Silver Medals at the International Sustainable Word Project Olympiad in Houston and at the International Science and Engineering Fair in Atlanta and secured full tuition at Louisiana State University.

JACQUES G. AMAR

Awarded a "Challenge Grant" from the Ohio Supercomputer Center (OSC) for 100,000 RUs (Research Units). This is the largest grant awarded by OSC. Prof. Amar was also awarded a Teragrid grant from the National Center for Supercomputer Allocations (NCSA) for 250,000 resource units.

Prof. Amar was also interviewed for an article in the Columbus Dispatch on the Ohio Supercomputer Center in April 2008.

An article on "Vacancy formation and strain in low-temperature Cu/Cu(100) growth", by Y. Shim, B.P. Uberuaga, A.F. Voter, and J.G. Amar was published in Physical Review Letters (September 2008).

Co-I on the recently awarded Ohio Research Scholars Program Grant (May 2008)

Invited Talk on "Effects of Steering and Shadowing in Epitaxial Growth", at the American Vacuum Society meeting in Seattle (November 2007).

RUPALI CHANDAR

Awarded two observing proposals at the National Optical Astronomy Observatory facilities for the Feb-July 2008 semester. She is co-I on a project at Gemini South, and PI on a project that received 3 full nights of queue observing time on Gemini North. The latter is titled, "*Lamp Posts in the Dark: Globular Clusters as Tracers of the Halo in M101.*" Gemini North is an 8-meter telescope on Mauna Kea, one of the largest instruments in the world.

STEVEN FEDERMAN

Steven Federman started a second term as Topical Editor (Atomic and Molecular Physics) for the *Journal of the Optical Society of America B* and also began an initial term as Scientific Editor (interstellar matter and laboratory studies) for *The Astrophysical Journal*.

SANJAY KHARE

Co-PI with R. W. Collins, X. Liu, and X. Deng (PI) on recently awarded \$1,442,000 Department of Energy grant entitled, "High-Rate Fabrication of a-Si-Based Thin-Film Solar Cells Using Large-area VHF PECVD" (April 2008).

Co-I on Department of Defense grant, "Rapidly Deployable Solar Electricity and Fuel Sources," Kirtland Air Force Base, New Mexico (April 2008). Prof. S. X. Marsillac is the main PI.

Awarded 10,000 RUs (Research Units) from the Ohio Supercomputer Center (OSC).

Prof. Khare gave an invited presentation on "A Scientific Perspective on the Energy Challenge" at the International Conference on Metallurgical Coatings and Thin Films in May 2008. He also gave an invited talk on "Energy Crises: Their Imminence, Scale, and Impact" at the University of Toledo Alumni Affiliates program in June 2008.

JOHN-DAVID SMITH

Received \$315K in support of the NASA/Herschel Observatory Program *KINGFISH -- Key Insights on Nearby Galaxies: A Far-Infrared Survey with Herschel*. Herschel will be the space telescope with the largest primary mirror when it launches this April. The three year program will allow Prof. Smith to track the heating and cooling of all phases of the interstellar medium in a comprehensive sample of nearby galaxies. A postdoctoral researcher is currently being recruited to join the program at Toledo.

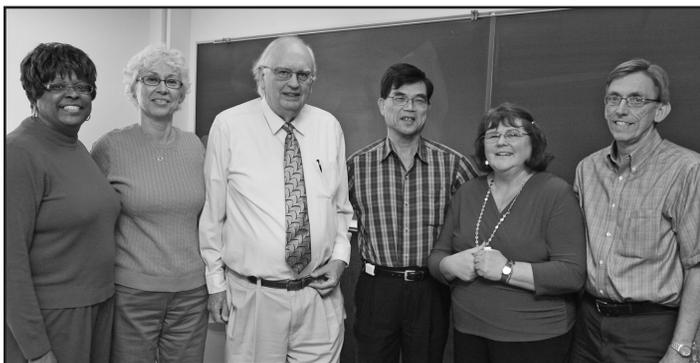
J.D. Smith was also awarded five additional grants from the Jet Propulsion Laboratory (JPL) and the Spitzer Space Telescope for work on dust in nearby galaxies and star formation in the early universe.

ADOLF WITT

On January 11, 2008 the very popular NASA-sponsored "Astronomy Picture of the Day" Web site featured an image of interstellar clouds near the region of Polaris (the North Star). This image was made as part of a funded research project being done by our own Prof. Adolf Witt in collaboration with noted astrophotographer Steve Mandel. The image and a brief description are available at this Web link: antwrp.gsfc.nasa.gov/apod/ap080111.html

RETIREMENT OF PROFESSOR BRIAN BAGLEY

The Department of Physics and Astronomy held a retirement reception in September for Professor Brian Bagley, who retired in May 2008. Professor Bagley joined UT in 1991 as the first holder of the Nippon Electric Glass Chair in Silicate and Materials Science, professor of physics and astronomy, and director of the Eitel Institute for Silicate Research. His research spans the spectrum from fiber optics to superconductors and currently is focused on optical integrated circuits. He has 15 issued patents and 102 technical publications. It'll be business as usual for Bagley, who will continue teaching and conducting research.



Surrounded by Friends: Several people stopped by Dr. Brian Bagley's retirement party. Posing for a photo were Physics & Astronomy colleagues, from left, Willie Mae Brown, Sue Hickey, Bagley, Dr. Suo Wang, Stephany Mikols, and Dr. Al Compaan.

NEWS FROM RITTER PLANETARIUM-BROOKS OBSERVATORY

Last year's very successful Astronomers' Lecture Series is being repeated this year, again with co-sponsorship by the planetarium and the department. Lectures are usually on the first Thursday of each month. Featured are encore performances by Karen Bjorkman and Tom Megeath and new appearances by Research Assistant Professor Uma Vijh (January), postdoctoral fellow Will Fischer (February 5), and Visiting Professor Reva-Kay Williams (April 2). The identity of the March 5 lecturer is still being determined as of this writing. For more information about the lecture series, see the planetarium web pages.

The International Year of Astronomy 2009, celebrating 400 years of the use of the telescope in astronomy, has begun. Ritter Planetarium is planning an extensive suite of activities, peaking on the first weekend in April, when we will join organizations all over the world in the Hundred Hours of Astronomy. Again, watch the planetarium's web pages for details.

NEWS FROM RITTER OBSERVATORY

Ritter Observatory welcomes our new Observatory Technician, Ashok Bhandary, who came to us in August, 2008, after receiving his MS in physics at Auburn University. His duties are half time in the observatory and half time in the McMaster Hall research labs.

The 1-meter telescope continues to be used on nearly every clear night to collect stellar spectra, mainly at high resolution with the echelle spectrograph. During the period August 15, 2007,

to August 14, 2008, about 700 spectra were collected during 104 full or partial nights. The observing team during that period consisted of Professors Nancy Morrison and Karen Bjorkman and graduate students Erica Hesselbach, Adam Ritchey, Sara Rother, and Greg Thompson.

In late July 2008, the observatory was the subject of a full-page news story by Columbus Dispatch science writer Kevin Mayhood. It appeared in the newspaper's science section and featured a night-time red photograph of the telescope in use, as well as a colorized representation of an echelle spectrum. Graduate student Adam Ritchey, who was the scheduled observer the evening the Dispatch team visited Ritter, is featured in the story. The observatory's home page has a link to the on-line version of the article.

Ritter Observatory is fortunate to have received a generous gift from Scott Smith, who received his Ph.D. from UT in 1984. His dissertation research on RS Canum Venaticorum stars was carried out at Ritter under the direction of Bernie Bopp. He is now the president and CEO of Technology Group International, Ltd. The gift was designated for a director's discretionary fund to support research at Ritter Observatory. Preference will be given to support activities by graduate students, such as presentation of Ritter results at professional meetings and publication in refereed journals, in situations where grant funds are not available.

RESEARCH EXPERIENCES FOR UNDERGRADUATES (REU)

The Summer 2008 NSF-REU program in Physics and Astronomy, directed by Dr. Richard Irving and Professor Thomas Kvale, gave enhanced research opportunities to 15 undergraduate students from 10 colleges and universities in 9 states spread from coast to coast. Of these fifteen students, one was fully funded by the department as its pledge of support to the REU grant. Student participants were chosen competitively from the 75 applications from students in 27 different states in all regions of the U.S. Besides these undergraduates, a highly motivated local high school senior, Casey Bennett, participated unofficially in our REU program. Casey discovered the REU program while attending our 2007 physics camp. He then expressed a strong interest in participating in the REU program of 2008. Al Compaan volunteered to be his mentor. All the participants were serious and talented young scientists, who tackled substantial problems, participating in all stages of a project, from formulation to conclusion, including oral and written presentations of results.

Social activities were coordinated by three UT participants (Adam Gray, Rosa Zartman and Ryan Zeller). The students again this year formed a close-knit group. Weekly activities included movie night on Mondays, Tuesday nights at a local restaurant called Del Taco and dinner night on Wednesdays at various spots.

REU continued on page 8.

REU continued from page 7.

The perennial favorite is a windsurfing adventure, courtesy of Professor Alvin D. Compaan at his solar hybrid home. Some of the other special events included: Frisbee Golf, several BBQ's, a trip to Cedar Point Amusement Park, and a Toledo Zoo visit.

A weekly "Brown Bag" seminar series is an important part of our summer program. Faculty members and/or outside speakers are asked to present a talk over the lunch hour for the chosen day. This format fosters more of an informal atmosphere, which the students appreciate when it is their turn to give a presentation at the close of the summer session. This weekly meeting of the entire REU group also provides an opportunity to plan social events and field trips, and discuss any topics of interest to the group.

As part of the REU program, the Physics and Astronomy Summer Camp outreach activity for high school students took place July 23-24. The summer camp activities were developed and performed with the help of our REU team. Jackie Kane, a St. Ursula high school science teacher, also had a large role in developing activities and recruiting students for the camp. The first day of the Summer Camp dealt with photovoltaics and the need for alternative energy in general, and included a lecture and tour by Professor Alvin Compaan of his solar house, as well as hands-on activities involving solar cells and wind energy led by a past REU (2007) student and UT graduate, Lindsay Sanzenbacher. The second day featured activities related to astronomy including a lecture by Professor Karen Bjorkman and a variety of demonstrations and hands-on activities. We had a whopping 25 high school students attend. Anthony Wayne, Clay, Northwood, Perrysburg, Sylvania Southview, and St Ursula high schools were represented.

Many thanks to all the people who helped out during our NSF-REU, especially the office staff, Willie Brown, Sue Hickey, and Stephany Mikols. A final thanks goes to the National Science Foundation. NSF's grant to the University of Toledo for the Research Experiences for Undergraduates made this summer program possible.



Mentors and participants (boldface) in 2008 Summer REU: Left to Right (Front row): Rupali Chandar, Al Compaan, Adam Lark, Jon Bjorkman, **Rosa Zartman, Molly Bittner, Dave Bergman, Rachell Gestrich, Michelle Labrecque, Allison Fink, Jeremy Bancroft-Brown, Kyle Bednar** Left to Right (Back rows): Tom Kvale, Rick Irving, Lesley Simanton, J D Smith, **Kellen Mcgee, Dante Amoroso, Nathan Reaver, Casey Bennett, Adam Gray, Adolf Witt, Sam Spencer.**

UNDERGRADUATE AND GRADUATE NEWS

The Department of Physics and Astronomy's Eighth Annual Recognition Ceremony and Sigma Pi Sigma induction were both held on April 23, 2008. The following awards were presented:

UNDERGRADUATE AWARDS

Outstanding Graduating Senior: **Lindsay Sanzenbacher**

Chad Tabory Memorial Outstanding Undergraduate Research in Physics and Astronomy

2008 Awardees: First Place: **Ryan Zeller**
Second Place: **Lindsay Sanzenbacher**

Robert and Noreen Stollberg Undergraduate Academic Achievement

2008 Awardee: **Adam Gray**

C.V. Wolfe Scholarship in the Natural Sciences

2008 Awardee: **Rosa Zartman**

A. Jackson and Sally K. Smith Scholarship

2008 Awardee: **Rachell Gestrich**

Elgin C. Brooks Memorial Astronomy Scholarship

2008 Awardee: **Tiffany Pewett**

GRADUATE AWARDS

Robert and Noreen Stollberg Graduate

Teaching Achievement Award

2008 Awardee: **James Davidson**

David Turnbull Scholarship in Materials Sciences

2008 Awardees: **Do Hyoung Kwon and Naba Raj Paudel**

Bradley Rush was the winner in the Physical Sciences and Astronomy session for his presentation at the Sigma Xi symposium

THE 2008 SIGMA PI SIGMA INDUCTEES WERE:

Erin Allgaier

Kyle Bednar

Rupali Chandar

Mary Dougherty

Do Hyoung Kwon

Bradley Rush

Michelle Sestak

Rosa Zartman

CONGRATULATIONS

Jun Kang, who received her Ph.D. in medical physics in December 2008, presented a paper titled “New Generation Portal Imagers Based on Thin Film CdTe for Clinical High Energy X-ray Beams” at the American College of Medical Physics (ACMP) annual meeting held in Seattle, Wash., May 3-6, 2008. The paper was co-authored by E.I. Parsai and Diana Shvydka. A panel of judges ranked her second in nation, and she was honored that same evening at a dinner celebration being presented a plaque and a certificate.

The following graduate students successfully defended their Ph.D. dissertations or received an M.S. based on a thesis or major peer-reviewed publication in 2008:

Dr. Valery Borovikov, Ph.D.

Dr. Xinmin Cao, Ph.D.

Dr. Yujun Chen, Ph.D.

Dr. Jun Kang, Ph.D.

Dr. David Pearson, Ph.D.

Dr. Feng Shi, Ph.D.

Dr. Xiesen Yang, Ph.D.

Kyle Walker, M.S.

Aaron Korostyshevsky, M.S.

Timothy Muszynski, M.S.

Jason Stokes, M.S.



CONGRATULATIONS

Xiangin “Shine” Liu, Post Doctoral Research Associate, new son, Enoch born April 30, 2008.

Charles Poteet, Graduate Student, new son, Caleb Joseph Poteet, born August 1, 2008

Randy Ellingson, Associate Professor, new daughter, Charlotte Verna, born August 19, 2008

Kristopher Wieland, Research Associate Professor, new daughter, Lillian Rose, born October 14, 2008

Adam Ritchey, Graduate Student, new son, Ewan Michael born February 27, 2009

ALUMNI NEWS

ROBERT DEMPSEY (M.S. 1987, Ph.D. 1991) of NASA Johnson Space Center gave a public lecture October 2, 2008 at The University of Toledo titled, “Houston, We Have a Problem! Now What Do We Do?” discussing his work on the International Space Station. The talk was co-sponsored by the Ritter Planetarium – Brooks Observatory and the College of Arts and Sciences. Robert Dempsey also serves on the Ritter Planetarium Community Advisory Board.

ANDREW D. KOSTIC (B.S. 1971) writes: “I recently started a new position with the Aerospace Corporation as a Senior Project Engineer with responsibility for electronic parts material and processes. The Aerospace Corporation has operated a federally funded research and development center since 1960 in support of national-security, civil and commercial space programs. Their mission is to apply the leading technologies and the brightest minds in the industry to meet the challenges of space.”

JOHN P. WISNIEWSKI (Ph.D. 2005) was awarded a prestigious National Science Foundation (NSF) Astronomy and Astrophysics Fellowship. His fellowship is based at the University of Washington-Seattle, where he is working on studies of extrasolar planetary systems.

JENNIFER BENSON (Ph.D. 2006) has accepted a postdoctoral position with the Mars Climate Sounder instrument team of the Mars Reconnaissance Orbiter mission. She will be based at the NASA Jet Propulsion Laboratory (JPL).

IN MEMORIAM

Rev. Fredrick Douglas Brown, husband of Willie Mae Brown, chair’s secretary, passed away July 2008

Mrs. Delphine Delsemme, wife of Dr. Armand Delsemme, Distinguished University Professor of Astrophysics Emeritus, passed away October 2008

Mrs. Janice Jaskowiak sister of Stephany Mikols, business service officer, passed away January 2009

Flora Haynes, custodian in McMaster Hall for 25 years, passed away January 2009



The UT Endowment Fund Campaign

Alumni and friends of the Department of Physics and Astronomy are urged to remember our department and college as they consider giving and pledging. The department has several established funds, some of which are endowed and others may not yet be endowed. Other funds may have dipped below the threshold required by the UT Foundation for returning spendable earnings that can be used, for example, for scholarships, honoraria for speakers, etc.

John J. Turin Memorial Fund

Established to honor former department chair and dean of the Graduate School, John J. Turin. He was integral in building UT's first Ph.D. program in the 1960's. This endowment funds annual awards to physics students, based on merit (3.5 GPA or higher).

Chad Tabory Outstanding Undergraduate Research Fund

This account, founded in memory of Chad Tabory, a UT physics graduate and research lab technician, funds the outstanding undergraduate research award.

Ritter Observatory Publication Fund

This fund helps to support the cost of publishing the Ritter Observatory annual report, as well as student papers when possible.

Reach for the Stars Fund

This account has recently been established to begin an endowment that will be used to support the buy-in to an international telescope consortium and ancillary activities. This is a major goal of the Department.

The Planetarium Progress Fund

The purpose of the Planetarium Progress Fund is to hold the subscription donations of the Friends of Ritter Planetarium and all other gifts in support of our astronomy outreach programming. All funds are used for large capital expenses and the growth of an endowment portfolio, the interest from which will help cover operating expenses.

Physics and Astronomy Funds for Excellence

The Funds for Excellence supports scholarships and fellowships, acquisition of research equipment, special colloquia, etc. which are so essential for departmental excellence.

Sigma Xi Dion D Raftopoulos Outstanding Faculty Research Award

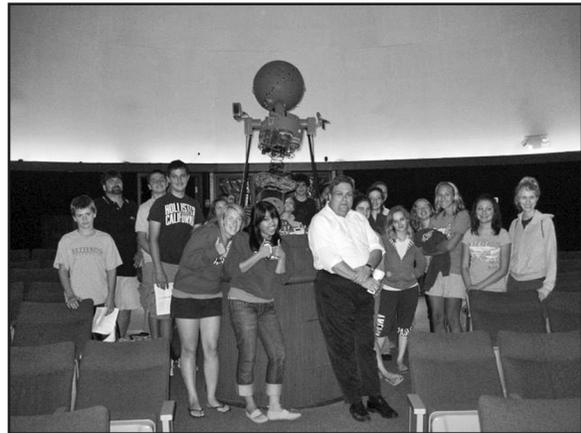
This is a perpetual memorial in honor of Dion D. Raftopoulos for support of the Sigma Xi Award for Outstanding Research at UT. This award remains one of few awarded by the faculty to peers in recognition of their outstanding contributions to the research enterprise at the UT. We are proud to note that 12 of the total 30 winners of this award through 2005 have been from the Department of Physics & Astronomy.

The UT ALUMNI ASSOCIATION wants to hear from you.
Check out their Web site at www.toledoalumni.org.
Please join the movement!

PHYSICS AND ASTRONOMY SUMMER CAMP 2008



REU & summer camp students on the first day after the lab activities.



Summer campers after the planetarium show by Alex Mak.



Summer camp group touring Al Compaan's solar hybrid house.

Department of Physics and Astronomy
The University of Toledo-MS 111
Toledo, OH 43606-3390

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