

WAVES

<http://www.physics.utoledo.edu>

Department Chair's Comments

Notable Staff News

Appointment of Kim Dusseau as Business Services Officer

After the retirement of Ms. Stephany Mikols in June, Mrs. Kim Dusseau has been hired as the Departmental Business Manager. Mrs. Dusseau comes to the Department with extensive experience at the University of Toledo. As Kim notes, “I have been here 22 years starting in the Bursar’s office and have worn a few hats on my way here to Physics.”

Appointment of Sherry Cox as Administrative Assistant

After the retirement of Ms. Willie Brown in June, along with the elimination of the Secretary 1 position held by Nadine Hoffman (who has moved to another position in Engineering) Mrs. Sherry Cox joined the Department as an Administrative Assistant in September. She manages the office and assists with student walk-ins and faculty needs. Some of her duties include assisting with the REU program, course scheduling, organizing department functions, and serving as a liaison between administrators and the department Chair. Previously, Sherry worked for University College for ten years and in the dean’s office at Wright State University. She spent many years volunteering for the American Red Cross, Ohio Reads program, and supporting service member families in the USAF and Army. Her upcoming endeavors include volunteering at a local hospital and pursuing some med tech courses.



Sherry Cox



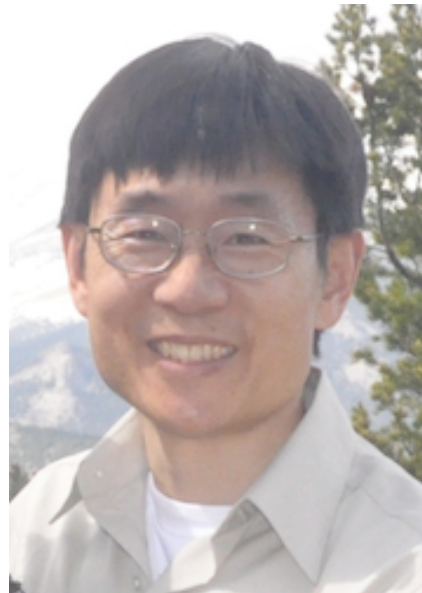
Kim Dusseau

Notable Faculty News

UT welcomes two new faculty to photovoltaics research and education



Assistant Professor Nikolas Podraza



Professor Yanfa Yan

Two new faculty members, Dr. Yanfa Yan and Dr. Nikolas Podraza, have joined UT's hub of the Wright Center for Photovoltaics Innovation and Commercialization (PVIC). The two faculty positions were created in the Department of Physics and Astronomy with funds competitively awarded to UT via the Ohio Research Scholars Program (ORSP). Dr. Yanfa Yan joins UT as a Professor of Physics and the ORSP Endowed Chair in Photovoltaics, while Dr. Nikolas Podraza comes to UT as an Assistant Professor of Physics. Drs. Yan and Podraza bring unique and complementary experience to the existing UT PVIC team, broadening and strengthening UT's already world-renowned expertise in the area of thin film PV.

"UT's Wright Center for PV Innovation and Commercialization (PVIC) attracted me to UT," said Yan. "The large and growing number of solar cell companies in the Toledo area help to drive UT's strong PV research and education program. My interests lie at the intersection between academia and industry, where we can combine the industry's needs for rapid advances and problem solving with the PVIC's creative and innovative research ideas and solutions."

Dr. Yan joins UT following 12 years as a thin film solar cell scientist on the staff of the National Center for Photovoltaics, part of the National Renewable Energy Laboratory (NREL) in Colorado. Dr. Yan has received numerous awards for outstanding research, holding research positions at Oak Ridge National Laboratory (Tennessee), Tohoku University in Japan, and the French National Centre for Scientific Research (CNRS) in Paris. Dr. Yan aims to combine his expertise in theoretical and experimental research to improve existing PV technology and to develop new materials with the potential to further lower the cost of solar electricity.

"UT's perspective on photovoltaic research is what brought me here," said Dr. Podraza. "Specifically, important opportunities arise from the direct connection formed between UT's PV research program and regional and national companies. It helps us to affect real world

problems.” Dr. Podraza received his Ph.D. in 2008 from UT under the supervision of Distinguished University Professor of Physics, Dr. Robert Collins. Podraza spent three years at Penn State University’s Materials Research Institute, where he developed his extensive expertise in applying optical measurements to thin film materials -- a process critical to the understanding, design, and manufacture of high efficiency solar cells. Podraza has taught classes in Physics and Engineering since 2003, and at Penn State, he mentored students en route to their PhD’s in these subjects. “Working in a place like Toledo, which has a history in manufacturing products essential to the PV industry, is incredibly useful. Toledo’s PV community understands what is needed to support the development of a new manufacturing base within this challenging economic climate.”

Both Yan and Podraza believe that we will increasingly use sunlight to generate electricity, and eventually, fuels. “We’re in an energy crisis right now,” said Podraza, “and PV, along with other renewable energy sources are what are going to get us through this as a society.” “It is forecasted that over 30 terra Watts (10^{12} watts) of power will be needed globally by 2050,” said Yan. “To maintain atmospheric CO₂ concentrations near their current level and avoid further harm to environment and human health, the majority of the new power must come from renewable energies that do not rely on fossil fuels such as coal. Photovoltaic solar electric technology is considered the top choice of renewable energies. Once the solar cell module is produced, the ‘fuel’ to run it is free from the Sun.” Thin film solar cells will continue to lead the way as an affordable and effective way of harnessing this energy needed for the present day as well as the future. “Thin film holds the greatest potential for achieving large scale deployment at low cost,” said Yan. “Not only are thin film solar cells cheap,” adds Podraza, “but they point the way to new, important scientific problems that we can solve to make even cheaper PV technologies. We have numerous new areas in which to study.” Both faculty members will teach within UT’s new School for Solar and Advanced Renewable Energy (SSARE), and have research laboratories within the PVIC home location – the Research and Technology Complex 1 – which boasts 20 kiloWatts of cadmium telluride solar cells in front of the building along Dorr Street. The Department of Physics and Astronomy and SSARE offer programs to train students at the undergraduate and graduate levels, providing the essential educational component of UT’s PV program.

UT welcomes Assistant Professor Michael Cushing

A new faculty member in astronomy, Michael Cushing, joined the Department of Physics & Astronomy in Fall 2011, where he will also serve as Director of the Ritter planetarium. Dr. Cushing comes to us from the Jet Propulsion Laboratory. Dr. Cushing’s research interests include low-mass stars and brown dwarfs, extrasolar giant planets, infrared astronomy and instrumentation. Welcome Dr. Cushing!



Assistant Professor Michael Cushing

Congratulations to J.D. Smith

Congratulations to J.D. Smith, who has been promoted to Associate Professor.



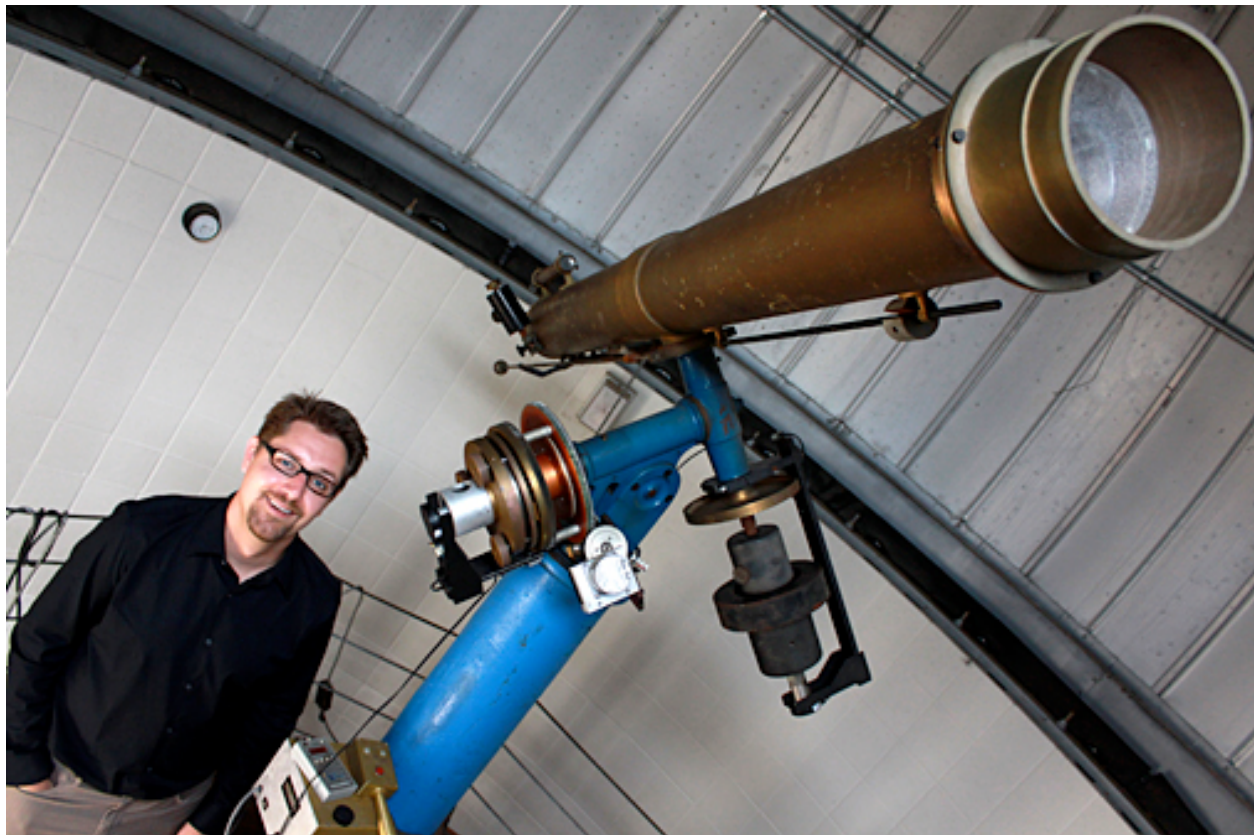
Associate Professor J.D. Smith

Professor Yanfa Yan elected as Fellow of the American Physical Society

Professor Yanfa Yan has been elected as a Fellow of the American Physical Society “for contributions to the understanding of defect physics and structure and electronic property relationship of energy materials, quasicrystals, and wide band gap metal oxides, through electron microscopy and first-principles electronic structure calculations.” Prof. Yan joins two other Departmental faculty, Bo Gao and Steven Federman, who are APS Fellows.

UT astronomer discovers room-temperature stars

(adapted from UT News, September 2011)



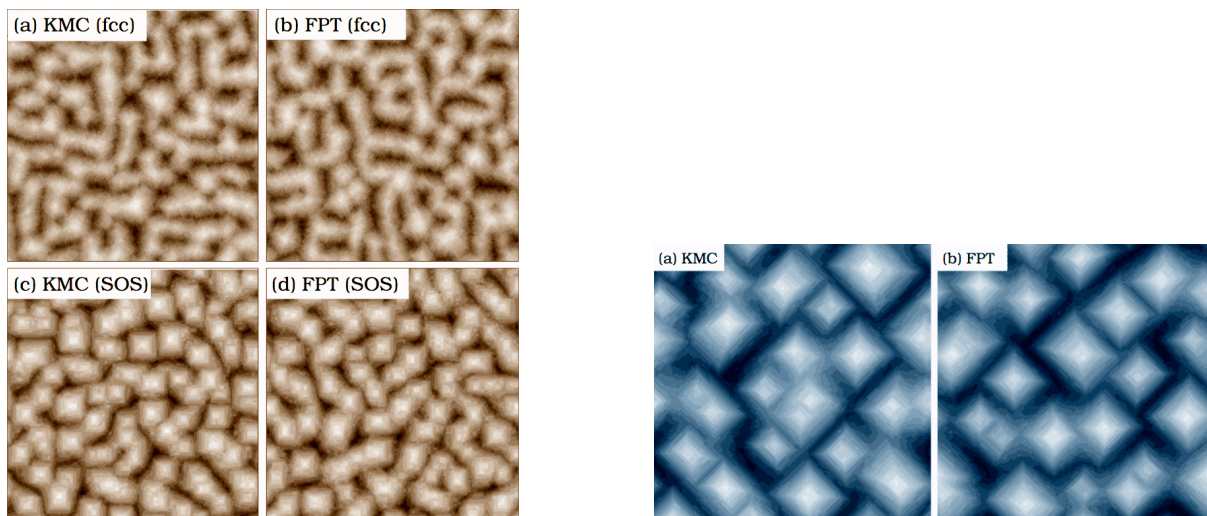
Dr. Michael Cushing, assistant professor of astronomy and director of the Ritter Planetarium, shown here in the Brooks Observatory, is part of a team that discovered a new type of star, the Y Dwarf.

There have been hotter days in Toledo this summer than in the atmosphere of a new class of stars discovered right in our galactic neighborhood by a University of Toledo researcher. While stars with searing temperatures as high as 50,000 degrees Fahrenheit are not uncommon, Dr. Michael Cushing, assistant professor of astronomy, is part of a team of scientists that has discovered brown dwarf stars, called Y dwarfs, with atmospheric temperatures as low as 80 degrees Fahrenheit. “Brown dwarfs have the mass of very small stars, but never got hot enough to ignite the thermonuclear fires that keep stars like our sun shining for billions of years. Instead they’ve

just gradually cooled down over time,” Cushing said. In a statement released by NASA, Cushing told the space agency that “Finding brown dwarfs near our sun is like discovering there’s a hidden house on your block that you didn’t know about. It’s thrilling to me to know we’ve got neighbors out there yet to be discovered. With WISE [NASA’s Wide-field Infrared Survey Explorer], we may even find a brown dwarf closer to us than our closest known star.” Cushing, who was the lead author of a paper on Y dwarfs published in the *Astrophysical Journal*, recently joined UT from NASA’s Jet Propulsion Laboratory. “Because these stars are so cold, they emit almost no visible light,” he said. “By using WISE, we were able to detect what are essentially failed stars using infrared light.” The team also used the Hubble Space Telescope to home in on candidates once WISE identified them. Cushing said they have discovered six Y dwarfs so far, all within 40 light years of Earth, but believe there could be many more out there. We’re looking for more Y dwarfs and we’re also looking to see if there are still colder stars out there somewhere,” he said. “Just how cold can a star get?”

Professor Amar’s research on accelerating simulations of thin-film growth highlighted by Ohio Supercomputer Center

(adapted from Ohio Supercomputer Center News, May 2011)



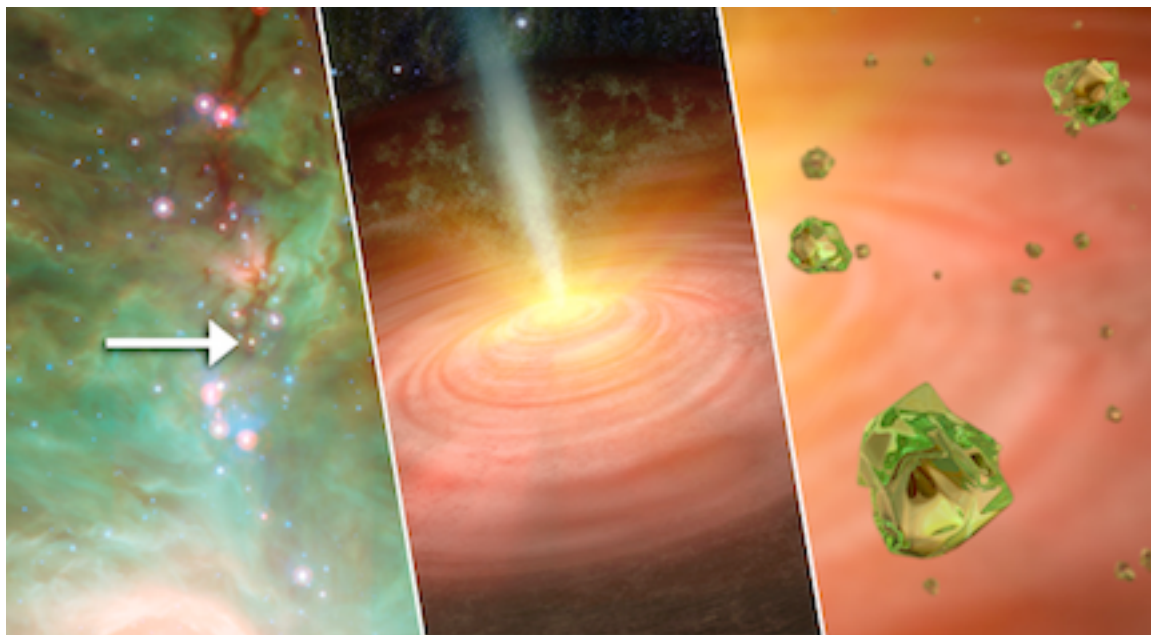
Thin-film morphologies obtained in epitaxial thin-film growth simulations using both regular KMC and first-passage-time (FPT) simulations

A new mathematical approach that accelerates some complex computer calculations used to simulate the formation of micro-thin materials, developed by Prof. Jacques G. Amar and co-workers, was recently highlighted by the Ohio Supercomputer Center. Prof. Amar studies the modeling and growth of materials at the atomic level. He uses Ohio Supercomputer Center (OSC) resources as well as a variety of atomistic methods including quantum (*ab initio*) calculations, molecular dynamics, accelerated molecular dynamics, and kinetic Monte Carlo (KMC) to simulate thin-film growth. Thin films are used in industry to create a variety of products, such as semiconductors, optical coatings, pharmaceuticals and solar cells. “Ohio’s status as a worldwide manufacturing leader has led OSC to focus on the field of advanced materials as one of our areas of primary support,” noted Ashok Krishnamurthy, co-interim co-executive director of the center. “As a result, numerous respected physicists, chemists and

engineers, such as Dr. Amar, have accessed OSC computation and storage resources to advance their vital materials science research.” Recently, Amar leveraged the center’s powerful supercomputers to implement a “first-passage time approach” to speed up KMC simulations of the creation of materials just a few atoms thick. “The KMC method has been successfully used to carry out simulations of a wide variety of dynamical processes over experimentally relevant time and length scales,” Amar noted. “However, in some cases, much of the simulation time can be ‘wasted’ on rapid, repetitive, low-barrier events.” While a variety of approaches to dealing with the inefficiencies have been suggested, Amar settled on using a first-passage-time (FPT) approach to improve KMC processing speeds. “In this approach, one avoids simulating the numerous diffusive hops of atoms, and instead replaces them with the first-passage time to make a transition from one location to another,” Amar said. Additionally, he employed two different methods for calculating the FPT for these events: the mean FPT (MFPT), as well as the full FPT distribution. Both methods provided “very good agreement” between the FPT-KMC approach and regular KMC simulations,” Amar concluded. “In addition, we find that our FPT approach can lead to a significant speed-up, compared to regular KMC simulations.” Amar’s research was supported through multiple grants from the National Science Foundation, as well as by a grant of computer time from OSC. A paper co-authored by Amar and UT colleagues, Giridhar Nandipati and Yunsic Shim, “First-passage time approach to kinetic Monte Carlo simulations of metal (100) growth,” appeared in a recent issue of the journal Physical Review B.

Spitzer Sees Crystal 'Rain' in Outer Clouds of Infant Star

(adapted from JPL News, May 26, 2011)



Tiny crystals of a green mineral called olivine are falling down like rain on a burgeoning star, according to observations from NASA's Spitzer Space Telescope. This is the first time such crystals have been observed in the dusty clouds of gas that collapse around forming stars. Astronomers are still debating how the crystals got there, but the most likely culprits are jets of gas blasting away from the embryonic star. "You need temperatures as hot as lava to make these

crystals," said Tom Megeath of the University of Toledo in Ohio. He is the principal investigator of the research and the second author of a new study appearing in *Astrophysical Journal Letters*. "We propose that the crystals were cooked up near the surface of the forming star, then carried up into the surrounding cloud where temperatures are much colder, and ultimately fell down again like glitter."

Spitzer's infrared detectors spotted the crystal rain around a distant, sun-like embryonic star, or protostar, referred to as HOPS-68, in the constellation Orion. The crystals are in the form of forsterite. They belong to the olivine family of silicate minerals and can be found everywhere from a peridot gemstone to the green sand beaches of Hawaii to remote galaxies. NASA's Stardust and Deep Impact missions both detected the crystals in their close-up studies of comets.

"If you could somehow transport yourself inside this protostar's collapsing gas cloud, it would be very dark," said Charles Poteet, lead author of the new study, also from the University of Toledo. "But the tiny crystals might catch whatever light is present, resulting in a green sparkle against a black, dusty backdrop." Forsterite crystals were spotted before in the swirling, planet-forming disks that surround young stars. The discovery of the crystals in the outer collapsing cloud of a proto-star is surprising because of the cloud's colder temperatures, about minus 280 degrees Fahrenheit (minus 170 degrees Celsius). This led the team of astronomers to speculate the jets may in fact be transporting the cooked-up crystals to the chilly outer cloud.

The findings might also explain why comets, which form in the frigid outskirts of our solar system, contain the same type of crystals. Comets are born in regions where water is frozen, much colder than the searing temperatures needed to form the crystals, approximately 1,300 degrees Fahrenheit (700 degrees Celsius). The leading theory on how comets acquired the crystals is that materials in our young solar system mingled together in a planet-forming disk. In this scenario, materials that formed near the sun, such as the crystals, eventually migrated out to the outer, cooler regions of the solar system. Poteet and his colleagues say this scenario could still be true but speculate that jets might have lifted crystals into the collapsing cloud of gas surrounding our early sun before raining onto the outer regions of our forming solar system. Eventually, the crystals would have been frozen into comets. The Herschel Space Observatory, a European Space Agency-led mission with important NASA contributions, also participated in the study by characterizing the forming star. "Infrared telescopes such as Spitzer and now Herschel are providing an exciting picture of how all the ingredients of the cosmic stew that makes planetary systems are blended together," said Bill Danchi, senior astrophysicist and program scientist at NASA Headquarters in Washington.

Professional Science Master's Degree program in photovoltaics continues to attract students

The Professional Science Master's Degree program in Photovoltaics which is hosted by The Department of Physics & Astronomy, in collaboration with the College of Business Administration and the Graduate College continues to attract interest. The program, which is directed by **Associate Professor of Physics & Astronomy, Sanjay Khare**, is now in its 2nd year and there are currently 8 students enrolled in the program. The new degree brings together both the science and business knowledge necessary for those interested in alternative energy

careers, while the primary focus is the training of students in the fundamentals of PV science and technology as well as in management and the business aspects of manufacturing. In the two-year program, which began Fall 2010, students conduct a research project with UT faculty and participate in practical training in a local photovoltaic manufacturing company, rather than completing a traditional master's degree thesis.

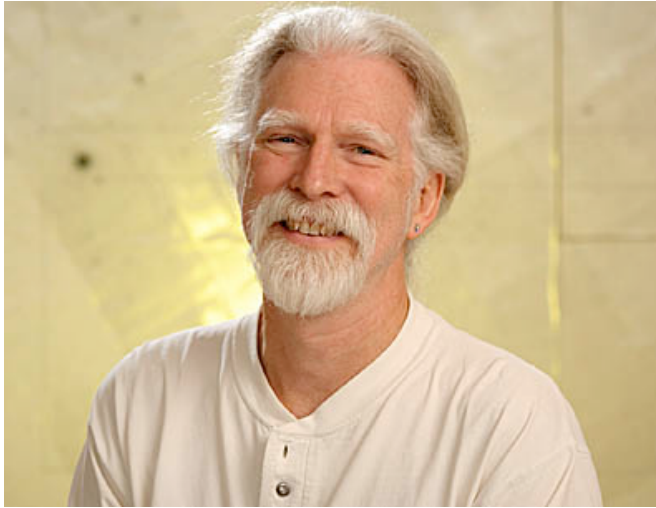


Associate Professor Sanjay Khare

UT Physics & Astronomy Alumnus receives Turin Award

(adapted from UT News, March 2012)

University of Toledo alumnus Dr. Steve Howell received the John J. Turin Award for Outstanding Career Accomplishments. The Turin Award is named after former Physics & Astronomy Chair, John J. Turin, and is presented each year by the UT Department of Physics and Astronomy to a former undergraduate or graduate student for his or her outstanding career accomplishments. Howell received a master's degree in Physics at the University of Toledo after receiving a master's degree in astronomy from the University of Pennsylvania. He later received a PhD in astrophysics at the University of Amsterdam. He is the project scientist for the Kepler space telescope, working at the NASA Ames Research Center in northern California, where he searches for exoplanets. He previously worked at the Kitt Peak National Observatory, where he helped develop digital cameras for use on the telescopes. "The Turin Award honors former students in our program who have become established and used their physics degrees to excel in the fields they entered," said Dr. Steve Federman, UT professor of astronomy. "We've had a number of our graduates work for NASA. The astronomical community and NASA chose Howell as the principal scientist for the Kepler mission, which indicates his stature within the community." Howell presented a free, public lecture on the Kepler mission at 7 p.m. Tuesday, March 20, in Memorial Field House Room 2100.



Steve Howell

Dr. Ishmael Parsai selected Fellow of American Association of Physicists in Medicine
(adapted from UT News, August 2011)

Dr. Ishmael Parsai, professor of radiation oncology, chief of Medical Physics Division and director of the Graduate Medical Physics Program, and adjunct professor of Physics & Astronomy has been elected a Fellow of the American Association of Physicists in Medicine (AAPM). “I am extremely honored and grateful to have been selected for this award and honorable distinction,” said Parsai, who traveled to a presentation banquet in Vancouver, British Columbia, to receive the award. AAPM fellowships are awarded to “senior members of the medical physics community” chosen through a peer-review process, according to Parsai. Fellows must be full members of the association for at least 10 years and be nominated by a chapter or by two Fellows of the association. Nominations are offered to those who have made significant contributions of service to the organization, advancement of knowledge related to medical physics through original research, leadership in the practice of medical physics, and educational pursuits in the field — particularly in the training of medical students, medical physicists, allied health personnel, as well as medical residents. Dr. Don Frey, professor of radiology at the Medical University of South Carolina and chair of the AAPM Awards and Honors Committee, said Parsai excelled in all of these areas. “Dr. Parsai is well-known for his contributions to medical physics on a global scale,” Frey said. “He has served as editor of the Medical Physics World newsletter and has spearheaded many educational projects, helping medical physicists in developing nations understand what they need to know to be well-functioning practitioners in the field.” “I’ve been very fortunate to be here at UT with really brilliant radiation oncologists like Dr. Ralph Dobelbower, our previous chair, and Dr. John Feldmeier, our current chair, with whom I have a number of patents and publications together,” Parsai said. “I am humbled by the honor and take it to heart as an added responsibility to further refine my professional skills in clinical medical physics, teaching and research, and to strive harder to make our graduate program maintain the course of excellence and live up to our reputation to better position our graduates in the field,” Parsai said.



Professor Ishmael Parsai

Sigma Xi chapter recognized nationally for performance at statewide program



UT P&A Prof. Thomas Kvale (right), director of the UT office of undergraduate research, accepts the Program Award on behalf of the UT chapter of Sigma Xi.

The UT chapter of Sigma Xi: The Scientific Research Society has received a Program Award for its distinguished performance at the Posters at the Capitol event. Posters at the Capitol is an annual event where undergraduate students from northwest Ohio display their research at the Ohio Statehouse in Columbus. "Posters at the Capitol provides an opportunity for undergraduate students from northwest Ohio to showcase their research," said Dr. Thomas Kvale, director of the UT Office of Undergraduate Research. "This event is designed for students to become more

involved with their elected officials and thank them for their support, and for the representatives and senators to learn more about the students' research and discoveries on a one-on-one basis.”

The University's Sigma Xi chapter was established in 1955, a UT student research symposium commenced in 1980, and undergraduate researchers started presenting in 2002. The national Sigma Xi is celebrating its 125-year anniversary this year.

News from Ritter Planetarium-Brooks Observatory

2011 was an exciting year for the Ritter Planetarium. In June, we shut down for a major renovation which included a complete overhaul of the theatre and lobby and the installation of the world's first Spitz SciDome XD system. This fully digital system projects over 6.5 million pixels onto our forty-foot dome and is capable of displaying stunning astronomical landscapes. In August our new director, Professor Michael Cushing, arrived and took the reins from the interim director Professor Rupali Chandar. Beginning in late October, we unveiled the new planetarium at three grand re-opening events which drew over 1500 people from the community at large. We have since restarted our K-12 programs, Friday and Saturday public events, and Astronomy 1010 classes as well as begun new collaborative efforts with UT entities including the Art Department and the Center for Creative Instruction. Ritter Planetarium is well on its way to becoming a cutting-edge educational tool for the entire UT community!



Some of the new full-dome programs available at the Ritter Planetarium include "Black Holes: The Other Side of Infinity". Narrated by Academy-Award nominated actor Liam Neeson, this stunning program takes the audience on a trip into the super-massive black hole at the center of our Milky Way Galaxy. "One Sky, One World: Big Bird's Adventure" takes the younger members of the family on a trip with Big Bird, Elmo, and Hu Hu Zhu as they explore the night sky from Sesame Street, the Moon, and China. We are also very excited to be presenting "Dynamic Earth", the latest Spitz production that explores the inner workings of Earth's climate engine, in the spring. Using advanced computer simulations the audience will float along ocean and wind currents, fly into a hurricane, and explore the deep sea in this exciting new program.

RESEARCH EXPERIENCES FOR UNDERGRADUATES (REU)

The Summer 2011 NSF-REU program in Physics and Astronomy, directed by Dr. Richard Irving and Professor Tom Kvale, gave enhanced research opportunities to 20 undergraduate students from 10 colleges and universities in 7 states. Student participants were chosen competitively out of 144 applications from students in 35 different states in all regions of the U.S. The strong support of our faculty for the REU research program is evidenced by four students receiving support from faculty members' external grants and two students volunteering to participate in our REU program. One student received funding from the internal UT USRCAP (Undergraduate Summer Research and Creative Activity Program) and from the NSF-REU grant

(at the level of support of fully NSF-REU funded participants). Josiah Aultman and Philip McDonald were the cohort of participants in our program from the UT-Itasca Community College collaboration. 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 their results.

We are pleased to report that Summer 2011 was a success from both the students' and faculty mentors' perspectives. At least two abstracts by this year's undergraduate researchers have been accepted for presentations at national, professional conferences and at least two manuscripts have been submitted to archival journals based on research this past summer. An additional paper was published this year by a previous REU student. Additional manuscript(s) are in preparation and will be submitted shortly to refereed journals.

Social activities were coordinated with the help of the following local participants: Tyler Fronk, Luke Kwiatkowski, Marina Kounkel, and Dhruv Sengar. Weekly activities included movie night, bowling, sand volleyball, ultimate Frisbee, board games and various ventures to local restaurants. One of the notable establishments people found fun to visit was Pizza Populous. The perennial favorite is a windsurfing adventure, courtesy of Professor Alvin D. Compaan, at his pond. He also has a solar hybrid home and is proud to give tours to the students. Some of the other special events included: Frisbee Golf, several BBQ's, a trip to Cedar Point Amusement Park, a Toledo Zoo visit and swimming at Centennial Quarry. During the REU we also had fun attending a program at the University of Michigan's Angel Hall Planetarium. Again this year the students visited the First Energy Bay Shore coal burning power plant in Oregon Ohio.

PHYSICS AND ASTRONOMY SUMMER CAMP 2011

As part of this NSF program our REU students host the Physics and Astronomy Summer Camp. This is an outreach activity for high school students which took place July 14-15. The summer camp activities were developed and supervised with the help of our REU team. Again this year Jackie Kane, a St. Ursula high school science teacher, was extremely helpful in promoting the camp. We had in attendance 24 high school students composed of one home school person and the following 8 local area high schools: Emmanuel Christian, Ottawa Hills, St. Francis, St. Ursula, Sylvania Northview, Sylvania Southview, Toledo Early College, and Woodward.

The first day of the Summer Camp dealt with alternatives for energy generation. To start this journey the group did a tour of UT's own Scott Park Campus of Energy and Innovation, led by Michael Green, Director of Energy Management for the University of Toledo. During this tour the students were able to visit a 1.2 MW solar and wind system at this campus. The project utilizes thin-film-on-glass photovoltaic solar technology and a 132-foot wind turbine. Both the wind and the solar system are expected to generate power equal to the amount of electricity used by 140 homes annually. Next, the students experienced similar technology at the home-owner level. This consisted of a tour and discussion by Professor Alvin Compaan concerning his 4.3 kW CdTe rooftop PV system and his homemade electric truck. After a barbeque the afternoon provided the students with hands-on activities to explore the concepts of the day. One student activity involved building and testing a dye-sensitized solar cell using fruit such as blackberries,

raspberries, and pomegranate seeds. The students also really enjoyed testing their endurance to power up to four incandescent light bulbs (60 Watts each) with a homemade bicycle generator. While grunting (and laughing) during this physically challenging activity the students expressed the need for conservation by at least avoiding a phantom energy wasting lifestyle.

The second day featured night time activities related to astronomy including a presentation with public viewing on a 6 inch refractor telescope at Brooks Observatory by Alex Mak, the Associate Director. Brad Rush, a graduate student in our department, did a tour of the Ritter Observatory facility which has a 1 meter telescope. Kathy Shan, a doctoral student in curriculum and instruction with a focus in science education, helped develop activities for this part of the camp too. Kathy and the REU students had the students explore the size and scale of the solar system through an interactive demonstration using toilet paper as our unit of measurement. Also Kathy introduced the high school students to astronomy research through participation in a Galaxy Zoo project, using real images from the Hubble Space Telescope archive to classify galaxies.



Mentors and participants (boldface) in 2011 Summer REU:

Left to Right (Front row): **Frances Schmidt**, **Kristen Garofali**, **Olivia Eggenberger**, **Ammaarah El-Amin**, **Anthony Passero**, **Marina Kounkel**, Rupali Chandar, Joe Converse, **Nathan Callahan**, **Luke Kwiatkowski**, Left to Right (Second Row): **Lawrenzo Moses**, **Pattlyn McLaughlin**, **Logan Stagg**, Will Fischer, **Dhruv Sengar**, Jacques Amar, **Tyler Fronk**, **Tyler Kinner**, **Brandon Saner** Left to Right (Back Row): Al Compaan, E. Ishmael Parsai, Tom Kvale, **Jacob Buenger**, Adolf Witt, Steve Federman, **Josiah Aultman**, Rick Irving, **Jakub Prchlik**, **Chad McElvany**, Kris Wieland.

OTHER NOTABLE NEWS

LAWRENCE ANDERSON-HUANG

Professor Anderson-Huang became President of the UT Faculty Senate.

Undergraduate Student News

Undergraduate student Kathryn Hoepfl was lead author on a paper entitled "Solar and Wind Energy Portfolios and Real-Time Pricing", which appeared in the Journal of Technology Policy and Management. Co-authors were Prof. Alvin D. Compaan of Physics & Astronomy and Professor Andrew Solocha of the College of Business.

Graduate Student News

Congratulations to P&A graduate student **Sean Tanny** for winning the second place award at the Ohio River Valley Chapter meeting held at OSU. The title of Sean's paper was "Small Field Electron Beam Dosimetry Using Solid State Detectors on the Surface and in the Build-Up Region" with co-authors David Pearson, George Hancock, and E.I. Parsai.

CONGRATULATIONS!

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 2011:

Dr. Amruta Nawarange, Ph.D .
Dr. Naba Raj Paudel, Ph.D.
Dr. Scott Little, Ph.D.
Dr. Erin Kryukova, Ph.D.
Dr. Yevgen Kryukov, Ph.D.
Dr. Mark Simon, Ph.D.
Dr. Vikash Ranjan, Ph.D.
Dr. Xiance Jin, Ph.D.
Craig Koontz, M.S.
Bradley Rush, M.S.

Recognizing our Donors

The Department of Physics & Astronomy recognizes and thanks all donors who generously made gifts during the past calendar year from January 1, 2011 to December 31, 2011. Donors are listed alphabetically.

Dr. Karen S. Bjorkman
Dr. Jon E. Bjorkman
Mr. Ford B. Cauffiel
Mr. Robert J. Gardner

Mrs. Dolores J. Gardner
Mrs. Michelle L. Ghrist
Mr. Richard W. Ghrist
Mr. John R. Hadley
Mrs. Susan Hadley
Dr. JoAnn M. Hein
Dr. Lee M. Heritage
Mrs. Amy P. Heritage
Ms. Stephanie M. Horne
IBM Corporation
Dr. Upali N. Jayamaha
Mr. Sam Lovalenti
Mrs. Ann Lovalenti
Mrs. Helen E. McMaster
Mr. Frank S. Merritt
Mr. David E. Mitchell
Mrs. Kathy A. Mitchell
Dr. Nancy D. Morrison
Dr. James F. Palmer
Dr. Teresa A. Palmer
Dr. William J. Potvin Jr.
Ms. Linda R. Myers
Dr. Mary L. Rush
Mr. A. Jackson Smith
Mrs. Sally K. Smith
Ms. Sridevi Subramanian
Mr. Jack Wells
Ms. Louise Niemer
Dr. Adolf N. Witt
Mrs. Anita Z. Witt
Dr. Joseph E. Yehoda
Mrs. Gale A. Yehoda

Graduate and Undergraduate Awards Ceremony

The Department of Physics and Astronomy's Eleventh Annual Recognition Ceremony and Sigma Pi Sigma induction were both held on April 25, 2011. The following awards were presented:

Undergraduate Awards

Physics & Astronomy Outstanding Graduating Undergraduate Student: **Nathan Reaver**

Elgin Brooks Memorial Astronomy Scholarship: **Dayna Boes**

A. Jackson and Sally K. Smith Scholarship: **Julia Deitz**

Chad Tabory Memorial Award for Outstanding Undergraduate Research in Physics and Astronomy: **First Place: Tiffany Pewett Second Place: Kathryn Hoepfl**

Robert and Noreen Stollberg Award: **Anthony Passero**

Edwin Jayamaha Scholarship Award: **Julia Deitz**

John J. Turin Memorial Fund: **Abril Galang**

C.V. Wolfe Scholarship in the Natural Sciences: **Corbin Taylor**

Graduate Awards

David Turnbull Scholarship in Materials Science: **Puruswottam Aryal and Zhaoning Song**

Physics & Astronomy Outstanding Service Award (Graduate):

The 2011 Sigma Pi Sigma Inductees were:.

Amaarah El-Amin
Nichole Hill
Kathryn Hoepfl
Anthony Passero
Tiffany Pewett
Nathan Reaver
Brandon Saner
Naresh Sen

ALUMNI NEWS

JOHN KOHL (Ph.D. 1969) is the principal investigator on the Coronal Physics Investigator (CPI), a solar telescope which will be mounted on the international space station to investigate the processes that produce the sun's fast and slow solar wind. The proposal is one of 11 Explorer science proposals which have been selected for future evaluation as potential science missions. Kohl is at the Smithsonian Astrophysical Observatory in Cambridge.

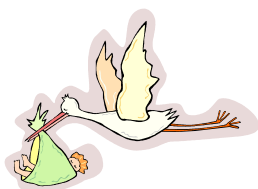
BRUCE WISNIEWSKI (Ph.D. 2005) work as part of a research group (SEEDS) which is carrying out a five-year-long near-infrared study of young stars and their surrounding dust disks has been profiled by NASA. The group has found evidence for planets in circumstellar disks. "What we're finding is that once these systems reach ages of a few million years, their disks begin to show a wealth of structure -- rings, divots, gaps and now spiral features," said

John Wisniewski, a collaborator at the University of Washington in Seattle. "Many of these structures could be caused by planets within the disks."

JOHN TEUFEL (B.S. 1999) John Teufel's recent work on getting to the ground state of a micromechanical oscillator was featured in the September Physics Today. John was the first author on a recent article in Nature which reported this result. John received his B.S. from our department in May 1999. He then obtained his Ph.D. from Yale University and is now at NIST.

CRAIG MALONEY (B.S. 1998) is now on the faculty at Carnegie Mellon University. He has just been awarded an NSF CAREER grant as well as a separate NSF grant.

GREGORY MADSEN (B.S. 1998) is now a Senior Research Fellow at the Sydney Institute for Astronomy in the School of Physics at The University of Sydney.



CONGRATULATIONS



IN MEMORIAM

Ms. Helen Brooks, the first director of the University of Toledo's planetarium and the namesake with her husband, Elgin, of an observatory on campus, passed away September 2011. Helen L. Brooks was 94.

Mrs. Brooks retired in 1972, but until Spring 2011 was a regular participant at the weekly Tuesday bag lunch in which faculty and post-doctoral and graduate students present papers. "She was always there in the front row," said Adolf Witt, UT distinguished professor of astronomy emeritus. She kept track online of developments in astronomy and each week contributed what she learned. "She was a very great inspiration to our graduate students." In 2008, Mrs. Brooks established a \$1 million trust gift to create upon her death the Helen Luedtke Brooks endowed professorship of astronomy. In honor of her husband, an enthusiastic supporter of her pursuits, she established the Elgin C. Brooks undergraduate scholarship in astronomy in 1999 after his death. The couple's contribution in 1987 established the Brooks Observatory atop McMaster Hall on the UT campus. She received bachelor's and master's degrees from UT, but her interest in astronomy started in grade school. In adulthood, she traveled the world to view

total solar eclipses. "If you stayed in one position on the Earth, you'd have a chance of one total eclipse in 350 years. That's why you have to chase them," she told The Blade in 2002.

In the mid-1950s, she became a part-time UT mathematics instructor who taught a noncredit course in popular astronomy. As the Space Age sparked interest in the cosmos, Mrs. Brooks taught astronomy courses exclusively. In the 1960s, she introduced George Ritter, a lawyer interested in supporting education, to UT President William Carlson and physics Chairman John Turin, Mr. Witt said. With Mr. Ritter's financial gift, the result was a planetarium - the Ritter Planetarium - which she and her husband helped plan. Armand Delsemme and Mr. Witt were hired to the faculty and helped develop an astronomy graduate program. "If it hadn't been for her instrumental role, we wouldn't be here and the other subsequent astronomers who came," Mr. Witt said. "Toledo wouldn't be a place where astrophysics is being done and is recognized around the world." The university granted her an honorary doctorate in 2003.

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!

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

Faculty and classmates are interested in you and your career. Please update information on this form and return to the Department.

Name _____

Home Address: (Check if new) _____

Street _____

City/State/Zip _____

Position: _____ (Check if new) _____

Address _____

Comments: