

# waves

SUMMER 2019 ■ THE UNIVERSITY OF TOLEDO | COLLEGE OF NATURAL SCIENCES AND MATHEMATICS

## DEPARTMENT CHAIR'S COMMENTS



Sanjay V. Khare

**G**reetings to all our alumni, friends and well-wishers of the department. I hope this newsletter finds you well. We had an exciting past year with new faculty searches and hires, staff and student achievements, and a 50th year celebration of Ritter Planetarium and Observatory and our Ph.D. program.

The College of Natural Sciences and Mathematics had some administrative updates this past year. **Dr. Karen Bjorkman** was named interim provost and executive vice president for academic affairs. **Dr. John Plenefisch** was named interim dean of the college and **Dr. Brian Ashburner** was named associate dean for graduate education. We also have a new director of development, **Mr. Nick Butler**, who may reach out to you in the coming months. Our department continues to enjoy the support of our excellent administrative staff. **Ms. Lori Burkholder**, our business services officer, has continued to streamline and improve the management of our departmental financial accounts and records. **Ms. Lynda Obee**, our administrative assistant, continues to maintain and improve facilities, student services and scheduling of classes. Our department would not function without them.

The Ritter Planetarium and Observatory were dedicated on Oct. 13, 1967. This past year, a number of events and lectures were held in honor of the golden anniversary, which included a public talk by our own alumnus, **Mr. Fred Espenak**, also known as “Mr. Eclipse,” about the “Great American Eclipse.” **Prof. Adolf Witt** gave an excellent recounting of the history of Ritter Observatory, and **Dr. Robert Dempsey**, another of our distinguished alumni, gave a public talk: “Houston, we have a problem – when things go wrong on the International Space Station.” The final event as part of the celebration was a lecture on “Great Observatories: Present and Future” by **Dr. Ken Sembach**, director of the

Space Telescope Science Institute, which runs the Hubble Space Telescope and the soon-to-be-launched James Webb Space Telescope.

In 2017, Ritter Planetarium hosted a free viewing event for the public of the solar eclipse. This was the first time in 38 years that a total solar eclipse was visible from parts of the U.S. mainland, and reached approximately 80 percent as viewed from Toledo. An estimated 1,200 people came to UToledo to view the Great American Eclipse, including representatives from all four local TV stations. Guests viewed the eclipse through filtered telescopes, much sought-after eclipse glasses, personal solar-eclipse boxes and the ever-favorite Ritz cracker.

The department was one of 12 simultaneous hosts of the 2018 Conference for Undergraduate Women in Physics (CUWiP), which is a yearly conference sponsored by the American Physical Society (see the article later in this publication).

First Solar generously donated more than 1,000 photovoltaic modules to The University of Toledo in 2017 to enable the construction of a 400 kW array to be installed near the Facilities Service Building on the Health Science Campus. The donation, valued at \$192,000, was secured through an initiative led by **Prof. Randy Ellingson**, along with **Michael Green** and **Jason Toth** of Facilities and Construction. We will report more about this wonderful gift as we move forward to its installation in the coming months.

Our faculty members received several awards, honors and distinctions. **Drs. Karen Bjorkman** and **Steven Federman** were recognized in 2017 as Fellows of the American Association for the Advancement of Science (AAAS). **Dr. Tom Megeath**, professor of astronomy at UToledo who specializes in the formation of stars and planets, has been selected as one of only 12 members of the executive committee of  
(continued on page 2)

## Department chair's comments

(continued from page 1)

NASA's Cosmic Origins Program Analysis Group. Congratulations to **Dr. Robert Collins** for receiving the 2017 Outstanding Research and Scholarship Award from The University of Toledo, and to **Dr. Jillian Bornak** for receiving the 2017 University of Toledo Outstanding Teacher Award!

Our faculty members continue to attract significant external funding to support their research and teaching efforts.

**Drs. Randy Ellingson, Bo Gao, Michael Heben, Tom Megeath, Nikolas Podraza, J.D. Smith, Yanfa Yan** and I all obtained new external grant funding. Research publications led by our faculty and post-docs continue to gain national media recognition. We are publishing new results based on observations taken with the Discovery Channel telescope, of which UToledo has dedicated access.

We are incredibly proud of the accomplishments of undergraduate physics student **Mr. Nathan Szymanski**, who published research work on vanadium oxides under my supervision. His overall academic and research accomplishments led him to win the prestigious Goldwater Scholarship. Sixteen years ago, **Mr. Robert Cooper** was the previous undergraduate student from our department to receive the national award. Learn more about Mr. Szymanski on page 8.

This year, we established the Nancy Morrison Astronomy and Astrophysics Student Travel and Publication Fund to support travel and publication costs for UToledo astronomy and astrophysics students, undergraduate or graduate. This newly developed fund will be used to encourage novel and independent student research in astronomy. It is another avenue for supporting the research contributions of the students to our astronomy program.

If you'd like to help us grow and improve, information about how you can contribute is in this newsletter. We describe several funds that support various efforts within the department. We are very fortunate to have strong supporters in the community and beyond, and we are grateful to all of you.

In closing, let me just say that we value all of our supporters, friends, former students and colleagues. We would love to hear from you, so please drop us a line and tell us what you are up to these days. If you happen to be in the area, we would love for you to stop and visit.

Sanjay V. Khare

## UToledo astronomers Karen Bjorkman and Steven Federman elected Fellows of the AAAS

(adapted from *UT News*)

Two of our faculty, **Drs. Karen Bjorkman** and **Steven Federman**, were among the 396 researchers elected in 2017 as Fellows of the American Association for the Advancement of Science (AAAS) in recognition of their important contributions to scientific discovery. AAAS is the world's largest multidisciplinary scientific and engineering society, and recognizes members for their scientifically or socially distinguished efforts to advance science and its applications.

Dr. Bjorkman was elected in recognition of her leadership in the field of stellar astrophysics and spectropolarimetry to better understand the disks around massive stars. "Most of the atoms that make up everything around us originated in the center of stars, so it is important to advance our understanding of stars and their evolution, while at the same time applying the laws of physics. That is how we learn things, by continuously testing our understanding," Dr. Bjorkman said. "It is an honor to have one of the largest science associations in the world acknowledge our contributions to science. When two of the seven astronomers in this year's class of Fellows are from UToledo, that is nice recognition from our colleagues about the strength of our program here."

Dr. Federman was elected in recognition of his contributions in the research of interstellar matter and for advancing the field of laboratory astrophysics. "Studying the abundances of elements and isotopes in the material between stars informs about the reactions and processes that happened in the past that led to the outcome we see today," Dr. Federman said. "I'm proud to have been able to contribute over the years as we've moved from modeling to observations to lab studies as we continue to learn more and more about the chemical makeup in material that will become the next generation of stars and planets."



Three UToledo researchers have been named Fellows of the American Association for the Advancement of Science. From left to right, Dr. Heidi Appel, Dr. Steven Federman and Dr. Karen Bjorkman.

## New grants awarded to UToledo faculty

Our faculty continue to attract significant external funding to support their research efforts. Here are significant new awards made to UToledo faculty since the last **WAVES**.

**Dr. Randy Ellingson** – UT RFF – “Earth-Abundant and Low-Barrier Back Contacts for CdTe PV”;

UT RFF – “Perovskite Hole Transfer Layer for Advanced CdTe PV”

**Dr. Bo Gao** – NSF – “Quantum Theories of Fundamental Atomic and Molecular Interactions and Their Applications”

**Dr. Mike Heben** – Office of Naval Research – “In-situ Investigations and Strategies for Addressing Extrinsic and Intrinsic Degradation Mechanisms in Perovskite Solar-cell Materials and Devices”;

DOE – “Northwest Ohio Building to Grid Modernization”;

NSF – “Towards Low-cost Manufacturing of 30% Monolithic Perovskite/CIS Tandems”

**Dr. Tom Megeath** – NASA/ADAP – “A Spitzer, Herschel, and WISE Census of Protostars within 500 pc of the Sun”;

HST – “The 6 pc DASH: A WFC3 1.6-micron Survey of the Orion Integral Shaped Filament”

**Dr. Nik Podraza** – NSF – “Role of Small-angle Grain Boundaries in CdTe Solar-cell Performance”

**Leonardo** – DRS – “Fabrication of VO<sub>2</sub> Thin-films on 6” Wafers at The University of Toledo”

**Dr. J.D. Smith** – NASA/ADAP – “After the Fall: Probing Dust and Gas in Post-starburst Galaxies with Herschel”

**Dr. Yanfa Yan** – DOE – “Crosscutting Recombination Metrology for Expediting VOC Engineering”;

NSF – “TDM Solar Cells: Collaborative Exploration of Stable Wide-bandgap Cu<sub>2</sub>BaSnS<sub>4</sub> Top Cell for Monolithic Tandem Cell Applications”

## Congratulations!

Congratulations to **Dr. Robert Collins** for receiving the 2017 Outstanding Research and Scholarship Award!

Congratulations to **Dr. Jillian Bornak** for receiving the 2017 University of Toledo Outstanding Teacher Award!

## Award recognitions

**UT photovoltaics group wins multiple awards** at the 44th annual Photovoltaics Specialists Conference.

**UToledo physics and astronomy** graduate’s pictures going on stamp.

## Publication recognitions

**Article by Yunsic Shim and**

**Dr. Jacques Amar** on step instabilities in Fe/Cu growth highlighted as an Editor’s Choice in *Physical Review Materials*.

**Dipesh Niraula and Victor Karov** receive the “Best Paper Award” at 2017 International COMSOL Conference.

**Article by Dr. Bo Gao and collaborators** on d-wave Feshbach resonances highlighted in *Physics Viewpoint*.

**Article** on microdosimetry of radiation dose enhancement by **Drs. Nava Paudel, Diana Shvydka and Ishmael Parsai** awarded “Excellence for the Best Radiation Measurements” by editors of the *JACMP*.

Articles by **UToledo P&A group** (“Technoeconomic Analysis of Perovskite Solar Cells” and “Life Cycle Analysis of Tandem Solar Cells”) have been selected as two of *Energy & Environmental Science’s* 2017 HOT articles.

**Essay** by **Dr. Tom Megeath** on UToledo deep space exploration featured in *The Blade*.

**Article** by **UToledo P&A group** on perovskite solar cells among most-read articles in *ACS Energy* for month of May 2017.

**Article** by **Prof. Michael Heben and co-workers** on perovskite solar-cell stability among the top 20 most accessed papers in 2016 in the journal *Advanced Energy Materials*.





## UToledo astronomer Dr. Tom Megeath selected as member of elite NASA group

(adapted from *UT News*)

**Dr. Tom Megeath**, professor of astronomy at UToledo who specializes in the formation of stars and planets, has been selected as one of 12 members of the executive committee for NASA's Cosmic Origins Program Analysis Group.

"His appointment is yet another national recognition of the astrophysics expertise at UToledo," according to Dr. Karen Bjorkman, interim provost and executive vice president for academic affairs. "This means that he and UToledo will have significant input on the science and technology priority decisions for NASA's future directions."

Other committee members hail from Arizona State University, California Institute of Technology, University of Maryland, NASA's Goddard Flight Space Center, Johns Hopkins University, NASA Jet Propulsion Laboratory, Ball Aerospace, NASA's Ames Research Center, Saint Michael College, University of Minnesota and University of Washington

Dr. Megeath is the first UToledo faculty member to serve on this advisory group. Another UToledo professor of astronomy, **Dr. J.D. Smith**, is chair of the NASA Far Infrared Science Interest Group.

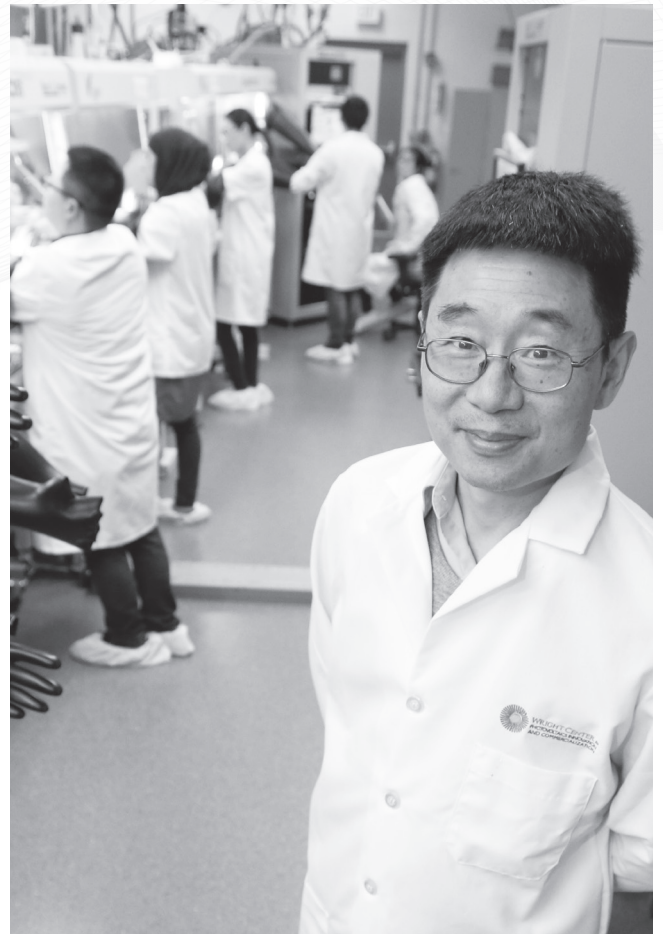
## World-record efficiency for a low bandgap perovskite solar cell obtained by UToledo researchers

(adapted from *UT News*)

**Dr. Yanfa Yan** and his team have recently focused on the area of perovskite solar-cell technology, a compound material with a special crystal structure.

"Metal halide perovskites can effectively harvest sunlight and efficiently convert it into usable electrical power. They have the potential to be used for fabricating cheap and highly efficient solar cells," according to Dr. Yan. "Perovskite photovoltaic technology has attracted tremendous interest in the past several years."

His team achieved a world-record efficiency for the conversion of sunlight into electricity in the area of perovskite solar-cell technology. "The publication of this paper in *Nature Energy* shows a significant recognition of our work by the peers in the field of photovoltaics," Dr. Yan said. "We are very proud of our achievements."



## UToledo hosts Conference for Undergraduate Women in Physics (CUWiP)

The department was one of 12 simultaneous hosts for the 2018 Conference for Undergraduate Women in Physics (CUWiP), a yearly conference sponsored by the American Physical Society. Graduate students **Allison Bratcher, Nicole Karnath, Jennifer Greco** and **Paula Johns** proposed, planned and executed the conference, including fundraising and arranging panelists and speakers. During the weekend of Jan. 12-14, 2018 more than 150 undergraduates from Ohio, Michigan, Indiana and western Pennsylvania attended the event, undaunted and only slightly delayed by the weekend's frigid winter conditions.



**President Sharon L. Gaber, Ph.D.**, gave the opening address and Stanford University's Dr. Patricia Burchat gave a simultaneously broadcast keynote,

"Going far together — Advancing science and learning through collaboration." Participants attended a variety of lab tours and panel discussions on topics ranging from writing advice to the two-body problem. Additionally, 35 undergraduates presented posters about their impressive research results on topics across physics and astronomy. The organizing committee shared its experience and advice with 2019 CUWiP planners.

## UToledo hosts Discovery Channel Telescope partner board meeting

The department hosted the annual partner board meeting for the Discovery Channel Telescope Nov. 8-9, 2017. A dozen representatives from UToledo, the Lowell Observatory, Boston University, Yale University, the University of Maryland, Northern Arizona University and the University of Texas at Austin met to discuss shared governance of the telescope and the best scientific uses of the instrument. The Discovery Channel Telescope partnership has been a boon to UToledo astronomers and has helped elevate the profile of the astronomy program.

"Our astronomy program at UToledo is on an accelerating path," said **Dr. J.D. Smith**, professor of astronomy who planned the board meeting. "We're being recognized nationally and internationally, and this partnership is a big part of the reason why."

## UToledo star and planet formation group starting the '6 parsec DASH'

Led by **Dr. Tom Megeath**, this new project is using the new DASH (Drift and Shift) mode on the Hubble Space Telescope to quickly map with high resolution the integral-shaped filament in Orion, the most active region of star formation near (500 pc) the Earth. The first observations were received last winter, and the project should be completed this winter. The group also has been awarded a grant through NASA's Astrophysics Data Analysis Program to compile a database of all protostars found within 500 pc of the sun using archival data from the Herschel, WISE and Spitzer space telescopes.

## Talk on breakthrough physics research by UToledo alum

(adapted from *UT News*)

**Dr. Robert Cooper**, an assistant professor of physics at New Mexico State University who received his bachelor of science degree in physics and mathematics from UToledo in 2002, discussed his contributions to "Observations of Coherent Elastic Neutrino-Nucleus Scattering" on Nov. 16, 2017. He went on to study particle physics at the University of Michigan, where he received his Ph.D. in 2008. Since 2015, Cooper and his collaborators have been searching for direct evidence of this scattering process at the U.S. Department of Energy's Spallation Neutron Source at Oak Ridge National Laboratory.

"The situation is akin to measuring the momentum transferred by a ping pong ball colliding with a bowling ball," Dr. Cooper explained of the process, which was predicted 43 years ago. They used the smallest neutrino detector on the planet to record the first measurement of coherent scattering of neutrinos off nuclei.

Dr. Cooper and collaborators published their results in the August 2017 issue of **Science**. "This measurement capability has applications to help understand supernovae, nuclear structure, neutrino oscillations and nuclear reactor monitoring," Dr. Cooper said.



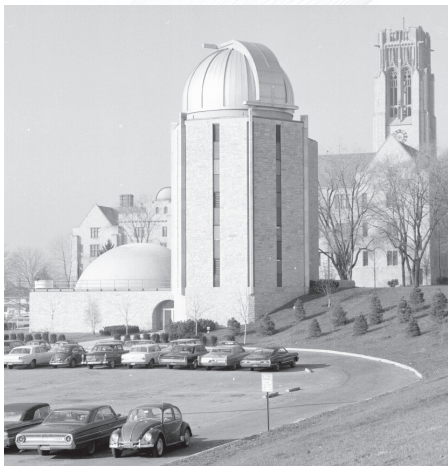
## UToledo celebrates 50th year of Ritter Planetarium and Brooks Observatory

(adapted from *UT News/The Blade* articles)

“The common interests of those who discover and those who learn are symbolized in this building where advanced astrophysical research and graduate study and a program of public education in astronomy proceed under a single roof. Its dual functions represent the basic obligations of a publicly supported institution of higher learning – to pursue knowledge and to serve the public by making that knowledge easily accessible.”

– Dr. William S. Carlson, president, University of Toledo, at the dedication of the Ritter Observatory and Planetarium, Oct. 13, 1967

The astronomy building at UToledo is unique in that it houses the Ritter Planetarium in the basement, a highly productive, 1-meter telescope (largest optical telescope in the U.S. east of the Mississippi River) in the dome on top of the building and the offices of professional astronomers in between. On any given day, the building hosts school children visiting the planetarium for a customized program about the night sky and members of the public to learn about the universe.



Construction of the Ritter Astrophysical Research Building.

The Ritter Planetarium was dedicated on Oct. 13, 1967, with **Helen Brooks** as the first director. This past year, a number of events and lectures were held in honor of its golden anniversary. On June 15, 2017, **Dr. Fred Espenak**, also known as “Mr. Eclipse,” delivered a public talk about the “Great American Eclipse” of Aug. 21, 2017. Our own **Prof. Adolf Witt** gave an excellent recounting of the history of Ritter Observatory during a free open house on Oct. 26, 2017. **Dr. Robert Dempsey**, another distinguished UToledo alumnus, presented a public talk, “Houston, we have a problem – when things go wrong on the International Space Station.”

The final event was a lecture on “Great Observatories: Present and Future,” by **Dr. Ken Sembach**, director of the Space Telescope Science Institute, which runs the Hubble Space Telescope and the soon-to-be-launched James Webb Space Telescope. James Webb, the first administrator of NASA, attended the dedication of Ritter in 1967 and was awarded an honorary degree. More than 100 locals attended both talks; afterward, speakers were peppered with questions.

A view of the Ritter Planetarium and Brooks Observatory from the 1970s.

## News from Ritter Planetarium and Brooks Observatory

The Ritter Planetarium and Brooks Observatory has been busy since the last edition of **WAVES**. In the spring of 2017, we hosted the Ohio meeting of the Great Lakes Planetarium Association. Our full dome program, “Shining Light on the HR-Diagram,” has been distributed to approximately 50 planetariums worldwide, and has been translated into both Polish and Czech. The planetarium presents roughly 300 programs annually to the general public, UToledo students, K-12 students on class-sponsored field trips, scouting groups and other civic organizations.

We are continuing upgrades at the newly renovated Brooks Observatory. We recently purchased a CCD camera for the 14-inch telescope, as well as a video camera. The observatory is visited by virtually all introductory astronomy students, the general public on weekends, as well as Boys and Girls Scout groups. The observatory recently received a grant from The University of Toledo’s Women & Philanthropy to install educational displays in the hallway leading to the observatory.

Finally, we are proud to announce that the Ritter Planetarium and Brooks Observatory has been chosen to host the 2019 Great Lakes Planetarium Association Regional Conference in October 2019!

## UToledo to participate in DOE Sunshot Initiative Community Challenge

The University of Toledo, as part of the Glass City Community Solar (GCCS) group, was selected to participate in the U.S. Department of Energy Sunshot Initiative's Solar in Your Community Challenge, a competition that awards funds to provide solar electricity access to low- and moderate-income (LMI) residents. The GCCS team is one of just 35 teams nationally selected to receive \$60,000 in seed funding to support project planning and raise awareness.

"To be able to have a hand in a project that has so much potential to benefit LMI residents, as well as educating the Toledo community about the use of renewable energy, is extremely exciting for us," said **Blaine Luszcak** and **Evan Nichols**, co-presidents of UToledo's Building Ohio's Sustainable Energy Future (BOSEF) student group at The University of Toledo.

“  
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”

**Dr. Randy Ellingson**, UToledo professor of physics, sees great synergies for UToledo and GCCS, adding that "our students will benefit tremendously from these real-world PV projects, as they create an extended learning lab that will result in several large, operational PV power systems."

A replicable model will be created to install commercial solar arrays on Toledo-area LMI housing, with financing provided through the Toledo-Lucas County Port Authority. This will focus on reducing electric bills, empowering LMI residents to engage in clean energy-generation

projects and subsidizing an LMI solar-workforce training program.

More information about the GCCS team and projects is at [solarinyourcommunity.org/en/challenge/solar-in-your-community-teams/1/teams/view/6536](http://solarinyourcommunity.org/en/challenge/solar-in-your-community-teams/1/teams/view/6536).



## UToledo researcher makes discovery about massive stars as part of international team of astronomers

(adapted from *UT News*)

**Dr. Noel Richardson**, a researcher at UToledo, was part of the international team that mapped, for the first time, the surface of a massive star. The team's observations confirmed a decades-old theory that suggested that hot spots on such a star's surface affect the behavior of their strong winds.

"We're now better able to understand how massive stars send out material into space through their winds," said Dr. Richardson, post-doctoral research associate in the UToledo Department of Physics and Astronomy, who was a member of the research team. "This research gives us a better understanding of how stars lose material, which then forms new stars and planets."

The team's research appeared in a paper published in October 2017 in the *Monthly Notices of the Royal Astronomical Society*, one of the world's leading astronomy journals.



## UToledo undergrad discovers elusive companion star to Beta Canis Minoris

(adapted from *UT News*)

UToledo junior **Mr. Nick Dulaney** was determined to understand why there is an unexpected, wavy edge on a disk around a nearby, rapidly rotating star. He spent the summer of 2016 analyzing 15 years of data collected by the 1-meter Ritter Observatory on campus, and discovered that the star, Beta Canis Minoris, is not alone.

With the help of post-doctoral researcher **Dr. Noel Richardson** and **Prof. Jon Bjorkman**, Mr. Dulaney found that the well-studied star featuring a disk around its equator is actually a binary, or double star. "A low-mass secondary star orbits around Beta Canis Minoris," Mr. Dulaney said. "While it's circling the bright star, the smaller star stops the disk on the bigger star from getting too big by creating a wave in the disk."

"Nick discovered that the star was moving back and forth every 170 days," Dr. Richardson said. "This motion is caused by the pull of the companion star and is very difficult to measure."

Mr. Dulaney is the lead author on the recently published research paper in the *Astrophysical Journal* that presents his discovery. He worked on the project as part of UToledo's long-running Research Experience for Undergraduate (REU) program sponsored by the National Science Foundation.

"This student observing team is a gem for the University," said Dr. Karen Bjorkman, interim provost and executive vice president for academic affairs. "Nick's project highlights how our 1-meter telescope on campus is used for both educational and scientific missions."

## UToledo publishes first research paper making substantial use of the Discovery Channel Telescope partnership

(adapted from *UT News*)

UToledo's partnership with the Discovery Channel Telescope in Arizona has launched the astronomy program to a new level. For the first time, a UToledo graduate student, **Aditya Togi**, published a paper made possible by data collected from observations with the telescope.

The paper, on the properties of interstellar dust, was featured as the cover article in the September 2017 issue of *Astronomy & Astrophysics*.

The research team also included **Prof. Emeritus Adolf Witt** and

**Ms. Demi St. John**, an undergraduate student from Murray State University who was selected to participate in the Research Experiences for Undergraduates (REU) program.

Access to the Discovery Channel Telescope was crucial to this research. It's also a powerful tool when attracting graduate students and young faculty. "To be truly competitive, to have a first-rate program, you've got to have this kind of access to a first-class instrument," Prof. Witt said.

## UToledo student awarded prestigious Goldwater Scholarship

(adapted from *UT News*)

UToledo physics student **Mr. Nathan Szymanski** is one of just 211 students in the United States selected to receive the prestigious Goldwater Scholarship, established by the U.S. Congress in 1986 to honor the lifetime work of Senator Barry Goldwater and to support "highly qualified undergraduates who are subsequently obtaining advanced degrees and going on to become this country's leading scientists, engineers and mathematicians."

"It feels truly amazing to be selected for the Goldwater Scholarship, and I am very grateful for all the help that the faculty at UToledo, especially in the Department of Physics and Astronomy, has provided me," said Mr. Szymanski, who is double-majoring in physics and mathematics. "I believe I was chosen because of my high level of research experience."

Mr. Szymanski plans to continue his studies and pursue a Ph.D. in material science. "My overall, long-term goal is to make meaningful contributions to the advancement of future technology, such



as solar cells and batteries, as well as hopefully improve the theoretical and computational methods being used to do so."

Mr. Szymanski is the first UToledo student to be named a Goldwater scholar in 16 years. The last undergraduate was **Dr. Robert Cooper**, also from our department, who recently had his own breakthrough research results highlighted in this issue of *WAVES*.



## Graduate degree awards

The following graduate students successfully defended their Ph.D. dissertations or received M.S. degrees during the 2015–16 academic year:

Laxmi Karki Gautam, Ph.D.

Zhiquan Huang, Ph.D.

Abedl-Rahman Ibdah, Ph.D.

Alexander Mulia, Ph.D.

Paul Roland, Ph.D.

Aditya Togi, Ph.D.

Zhaoning Song, Ph.D.

Carl Starkey, Ph.D.

Sean Tanny, Ph.D.

Gregory Warrell, Ph.D.

Nicholas Franzer, M.S.  
(professional science master's degree  
in photovoltaics)

Kiran Ghimire, M.S.

Negar Heidarian Boroujeni, M.S.

Maxwell Junda, M.S.

Zhi Liu, M.S.

Brandon Tompkins, M.S. (professional  
science master's in photovoltaics)

## Graduate and undergraduate awards ceremony

The Department of Physics and Astronomy's 15th Annual Recognition Ceremony and Sigma Pi Sigma induction were held April 18, 2016. The following awards were presented:

### Undergraduate Awards

2018 Physics & Astronomy Outstanding  
Graduating Undergraduate Student:

**Nick Dulaney**

Elgin C. Brooks Memorial Astronomy  
Scholarship: **Jackson Tatum**

A. Jackson and Sally K. Smith  
Scholarship: **Noah Daugherty**

Chad Tabory Memorial Award for  
Outstanding Undergraduate Research  
in Physics and Astronomy: First Place:

**Nathan Szymanski**

Second Place: **Nick Dulaney**

Robert and Noreen Stollberg Award:  
**Christina Poduska**

C.V. Wolfe Scholarship in the Natural  
Sciences: **Thomas Routt**

### Graduate Awards

David Turnbull Scholarship in Materials  
Science: **Geethika Liyanage**

Physics & Astronomy Outstanding  
Service Award: **Nicole Karnath**

Robert and Noreen Stollberg Graduate  
Teaching Award: **Dhurba Sapkota**

### Recognition of Students Receiving Undergraduate Degrees

**Sanskar Basnet**, B.S., Physics

**Cheyann Beam**,  
B.S., Biomedical Physics

**Joseph Derkin**, B.S., Physics

**Nicholas Dulaney**, B.S., Astrophysics

**Scott Legeza**, B.S., Astrophysics

**Danielle Lombardi**, B.S., Astrophysics

**Kevin Schelkun**, B.S., Applied Physics

**Johnathan Winckowski**,  
B.S., Astrophysics

**James Windsor**, B.S., Astrophysics

### Recognition of Society of Physics Students (SPS) Officers

President: **LaLaina Shumar**

Vice President: **Alex Bordovalos**

Secretary: **Gabrielle Lennox**

Treasurer: **Thomas Routt**

Webmaster: **Jennifer Greco**

Faculty Advisor: **Dr. Richard Irving**

### The 2018 Sigma Pi Sigma inductees

**Joseph Derkin**

**Nicholas Dulaney**

**Scott Legeza**

**Juan Lopez**

**Nathan Szymanski**

**James Windsor**

**Prof. Scott Lee**, faculty advisor

## UToledo graduate student wins physics award

UToledo graduate student in physics **Mr. Geethika Liyanage** won "Best Presentation" in solar and renewable energy at the 9th Midwest Graduate Research Symposium.



## Give a gift. Make a difference.

The support of our alumni and friends is paramount to the success of our educational programs. Your generous financial support will impact the lives of current and future students in the Department of Physics and Astronomy at The University of Toledo.

For more information about giving, including setting up scholarships or additional gift funds, please contact **Mr. Nick Butler**, development officer for the College of Natural Sciences and Mathematics, at 419.530.5428 or [nicholas.butler@utoledo.edu](mailto:nicholas.butler@utoledo.edu).

Gifts to the UToledo Foundation are tax-deductible as provided by law. Make your gift online at: [give2ut.utoledo.edu](http://give2ut.utoledo.edu) or return this form to: The University of Toledo Foundation, PO Box 586, Toledo, OH 43697-0586

### Support the Department of Physics and Astronomy

**Yes!** I would like to make a GIFT/PLEDGE in the amount of:

\$1,500  \$1,000  \$500  \$250  \$100  Other \$ \_\_\_\_\_

### Please designate my gift to the following fund:

- |  |  |
|--|--|
| <input type="checkbox"/> Physics and Astronomy Funds for Excellence (1300328)          | <input type="checkbox"/> Planetarium Progress Fund (2401117)                                 |
| <input type="checkbox"/> John J. Turin Memorial Fund (1300083)                         | <input type="checkbox"/> College of Natural Sciences and Mathematics Progress Fund (2401937) |
| <input type="checkbox"/> Chad Tabory Outstanding Undergraduate Research Fund (1300483) | <input type="checkbox"/> Reach For the Stars Fund  |
|  | <input type="checkbox"/> Other   |

### Payment options:

- Enclosed is a check made payable to the UToledo Foundation.
- Charge my:  Visa  MasterCard  American Express

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

- I am making a pledge to be paid in installments. Please bill me:  
 Annually  Quarterly  Semi-annually  Monthly

Start Date \_\_\_\_\_ Installment Amount \_\_\_\_\_

### Matching gift:

- My company  my spouse's company will match my gift.

*Please include a completed matching gift form from your Human Resources office.*

### Personal information:

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone \_\_\_\_\_ Email Address \_\_\_\_\_

**Thank you for supporting The University of Toledo.**

## Alumni news

Alumna **Dr. Anca Sala** will receive the John J. Turin Award for outstanding career accomplishments. Dr. Sala is dean of the College of Engineering at Baker College, and earned her Ph.D. in the department in 1998.

### It is with great sadness that we note the passing of Prof. Armand Delsemme – colleague, mentor, friend. (Adapted from *AAS article*)

**Armand H. Delsemme**, professor emeritus of physics and astronomy at UToledo, passed away on July 22, 2017. He was 99 years old. He earned his Ph.D. in molecular spectroscopy in 1952 from the University of Liege in Belgium, and in 1966 became the first professor of astronomy at UToledo in the physics department.

During his career at UToledo, he made early, important contributions to virtually every subdiscipline of cometary research, including nuclear activity, orbits and origin studies, laboratory studies of ices and many others. For his lifetime contributions to cometary and planetary science, Armand was awarded the Gerard P. Kuiper Prize in 1998 by the Division for Planetary Sciences of the American Astronomical Society. He also was awarded the Jules Janssen Prize of the Astronomical Society of France (SAF). Asteroids Delsemme (2954) and Delphine (3218) were named after Armand and his wife, Delphine.



## The UToledo 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.

### 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 UToledo's first Ph.D. program in the 1960s. 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 UToledo physics graduate and research lab technician, funds the outstanding undergraduate research award.

### Ritter Observatory Publication Fund

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

### Reach for the Stars Fund

This fund supports student access, research, and remote observing with the Discovery Channel Telescope (DCT) in Arizona. UToledo established a long-term scientific partnership agreement with the Lowell Observatory in 2012 to guarantee access to the DCT for UToledo students, post-docs, and faculty to carry out cutting-edge research in astronomy and astrophysics at this new, state-of-the-art facility located at an excellent observing site.

### 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 UToledo. This award remains one of few awarded by the faculty to peers in recognition of their outstanding contributions to the research enterprise at UToledo. We are proud to note that eight of the 29 winners of this award through 2014 have been from the Department of Physics and Astronomy.

### The Nancy Morrison Astronomy and Astrophysics Student Travel and Publication Fund

This fund was established in recognition of the many contributions of **Emeritus Professor of Astronomy Nancy Morrison** to the students in the Department of Physics and Astronomy. It will be used to support travel and page charges for undergraduate and graduate students to support their research efforts in astronomy.

## The UToledo Alumni Association wants to hear from you.

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

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Check out our website at **toledoalumni.org**. Please join the movement!

Name

Home Address (check if new )

Street

City/State/Zip

Position (check if new )

Address

Comments:



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