

Physics & Astronomy at UGA

Fall 2020

www.physast.uga.edu

MESSAGE FROM THE HEAD...



Let me start by introducing myself as the Department Head effective as of July 1, 2018. My predecessor, Dr. William (Bill) Dennis, served admirably in this role for 12 years, leading the Department through changing times. July 1, 2020 marked two years into my term with the department leadership shared with

Dr. Craig Wiegert (Associate Department Head), Dr. Kanzo Nakayama (Graduate Coordinator), Dr. BJ Cooley (Physics Coordinator), and Dr. JP Caillault (Astrophysics Coordinator and Laboratory Coordinator). Dr. Robin Shelton served as Graduate Coordinator during my first year as Head. All of these faculty, as well as our entire physics and astrophysics community, have worked hard to move the Department forward. We therefore felt it would be fitting to relaunch a department newsletter this year – the last one was published in 2010!

And wow! What a crazy year 2020 has turned out to be! It has been a challenging time for the Department of Physics and Astronomy, as well as UGA. Even during the ongoing pandemic, the Department has been very active in our three main missions of instruction, scholarship, and service. While we have seen significant growth, we have also had some set-backs. We continue to do exciting research, connect with our alumni, graduate outstanding students, and serve the community. In this newsletter, you will read about recent happenings in the Department including new faculty, retirements, staff highlights, and upgrades to the Physics building. I want to draw your attention to the piece on Bill Dennis' retirement and the awards and honors received by our undergraduate students, graduate students, and faculty. In particular, 2020 marked the start of the new annual Chhabra-Landau Lecture Series and the awarding of the first Susan Dasher and Charles Dasher MD Professorship in Physics to Dr. Yohannes Abate. These awards and activities have been graciously sponsored by our Department alumni and friends.

While the size of the faculty has been relatively stable for the past decade, we envision growing our research into three main clusters: multimessenger astronomy and astrophysics, quantum materials, and quantum information sciences and cybersecurity. However, the next decade is likely to see a number of our esteemed faculty members retire, while recruitment is on hold due to the pandemic. Fortunately, we success-



ALUMNUS ENDOWS NEW LECTURE SERIES

On the afternoon of January 9, students and faculty met in Physics 202 to hear the first lecture of a new series in the Department of Physics and Astronomy, the **Chhabra-Landau Lecture Series**. The lecture was given by Dr. Sharon Glotzer of the University of Michigan.

Dr. Glotzer works in the fields of soft matter and computational science, and is recognized for her research on problems in assembly science and engineering, nanoscience, and the glass transition. Dr. Glotzer is the 2019 recipient of the Aneesur Rahman Prize for Computational Physics.

During her talk, **Colloidal Self-Assembly and the Entropic Bond**, Dr. Glotzer discussed how computer simulations can be used to design new materials. These new materials are composed of simple building blocks that join together in unusual ways, and they represent “discovery via computer simulation.”

The Chhabra-Landau Lecture Series is endowed by Dr. Ashvin B. Chhabra (MS Physics, UGA 1984; PhD Applied Physics, Yale 1989) in honor of his thesis advisor, Professor David Landau, and acknowledges the hospitality and friendship the faculty and students of UGA accorded Dr. Chhabra when he first came to Athens from overseas as a graduate student.



The Chhabra-Landau Lecture Series celebrates Professor Landau's pioneering work in applying Monte Carlo computer simulations. This work deepens our understanding of phase transitions and, more generally, condensed matter physics.

After the talk, Professor Landau said, “Dr. Glotzer's presentation was clear and exciting. It was pitched to a general audience and showed that she could not only perform world-class science but also make it understandable and intriguing.”

The Chhabra-Landau Lecture Series focuses on the deep connection between physics and computer science, particularly the use of computing or information theoretic ideas, as fundamental tools for physicists to develop novel insights about our world.

The department would like to thank all of the faculty, students, and staff who were involved in organizing the first lecture in the Series, especially Dr. Landau, Dr. Glotzer, and Dr. Chhabra.

To stay informed about upcoming events in the Department of Physics and Astronomy, including the 2021 Chhabra-Landau Lecture, visit our website: <https://www.physast.uga.edu/> ♦

Message from the Head cont'd...

fully hired Dr. Cassandra Hall, who will start her position as Assistant Professor of Computational Astrophysics this semester. Read all about her and her exciting research in this newsletter. Hiring new faculty is expensive and even getting approval to hire is a competitive proposition. One of the biggest challenges is identifying sources of funding to create new positions. If you are an alumnus, please consider making donations to assist in faculty recruitment, sponsoring of undergraduate or graduate student research, or other Departmental activities. We greatly appreciate our alumni. The next time you are in Athens, please feel free to drop by and visit. I would love to show you the exciting progress we are making.

Take care and stay safe,
Phillip

P.S. Stay tuned for the next Department newsletter in 2021 which will highlight the successful launch of UGA's first satellite, built in the Small Satellite Research Laboratory, housed in the Physics Building. ♦



Department of Physics and Astronomy
Franklin College of Arts and Sciences
UNIVERSITY OF GEORGIA

Department of Physics and Astronomy
University of Georgia
Athens, GA 30602-2451

EDITOR
Caroline Grant

WEBSITE
www.physast.uga.edu

STAFF CONTACT
Jessica Hudgins: (706) 542-2485

FACULTY CONTACT
Yiping Zhao: (706) 542-7792

Contributions Made By:
Yohannes Abate, Jessica Hudgins, Loris Magnani, Robin Shelton, Phillip Stancil, Susanne Ullrich, and Yiping Zhao

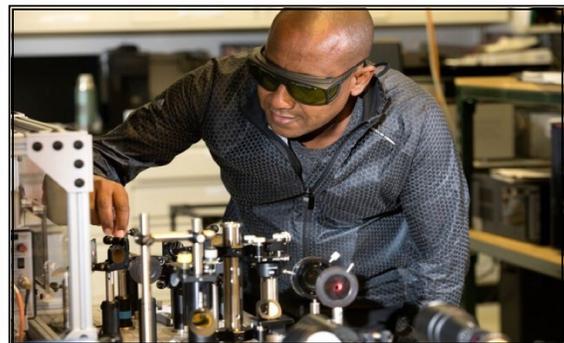
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DASHER PROFESSORSHIP AWARDED TO PROFESSOR YOHANNES ABATE

In December of 2013, Charles A. and Susan C. Dasher, through a desire to strengthen the programs in the Franklin College of Arts and Science, made a generous pledge to The University of Georgia (UGA) to establish the Susan Dasher and Charles Dasher MD Professorship in Physics.

Dr. Yohannes Abate was appointed as the first Susan Dasher and Charles Dasher MD Professor of Physics. The appointment was approved on May 12, 2020 by the Board of Regents. This is a distinguished endowed professorship given in recognition of Dr. Abate's outstanding contributions in research, teaching at UGA, and service to UGA and the community.



Dr. Abate's condensed matter physics research interests include fundamental nanoscale physical phenomena and interactions in nano- and quantum-materials. His group implements various terahertz, infrared, and optical spectroscopy and imaging techniques with diffraction unlimited spatial resolution.

In response to this recognition, Professor Abate noted "The endowment of The Susan Dasher and Charles Dasher MD Professor of Physics gives me a profound sense of accomplishment and honor. I am deeply honored by this award and plan to continue to impact graduate and undergraduate education at UGA."

Dr. Charles A. Dasher MD (BS, 1968) is a Gastroenterologist and Professor at the University of Alabama Birmingham (UAB) School of Medicine. He is also a physician at UAB Highlands.

Dasher Professorship cont'd...

He graduated from UGA with a BS in Physics and received his medical degree from the Medical College of Georgia. He completed his residency at UAB, where he served as Chief Medical Resident. Following his residency, Dr. Dasher also completed a fellowship at UAB under the guidance of Dr. Basil Hirschowitz. His major focus is developing an endoscopy unit that will efficiently provide out-patient services with improved methods of determining and measuring quality and outcomes. While at UGA, Dr. Dasher was in the Phi Beta Kappa and Phi Kappa Phi Honor Societies and in the UGA Honors Program. He continues his service to UGA today as a member of the Franklin College Board of Advisors.

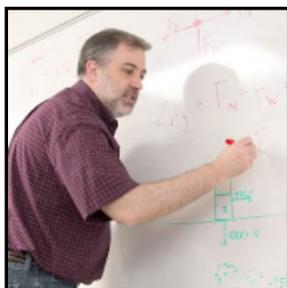


Dr. and Mrs. Charles A. Dasher

Mrs. Susan C. Dasher (BS, 1969) received a BS at UGA in Business Education. Dr. Yohannes Abate received his BS from Addis Ababa University in Ethiopia, his MS from the University of the Philippines, and his PhD from the University of Iowa, all in physics. Prior to joining the UGA Department of Physics and Astronomy faculty, he was a Postdoctoral Scholar at the University of California, Berkeley and Lawrence Berkeley National Laboratory, a Visiting Scientist at the Max Planck Institute for Biochemistry, Assistant Professor of Physics at California State University, Long Beach, and Assistant Professor of Physics at Georgia State University. He became an Associate Professor of Physics at UGA in 2017. ♦

PROFESSOR STEVEN LEWIS AWARDED SANDY BEAVER TEACHING PROFESSORSHIP

Dr. Steven Lewis has been awarded a General Sandy Beaver Teaching Professorship by the Franklin College of Arts & Sciences. The Beaver Professorship is the highest designation for outstanding teaching awarded by the Franklin College.



Since joining the faculty in 1998, Dr. Lewis has steadily and reliably earned the reputation as one of the finest, most dedicated teachers in the department. Dr. Lewis's teaching style resonates with students—whether introductory level, undergraduate majors, or graduate students—for the clarity of his exposition, his ability to explain abstract concepts in

simple, meaningful terms, his engagement of students, and his sense of humor.

The General Sandy Beaver Teaching Professorship annually honors outstanding faculty in the Franklin College who have shown a sustained commitment to high-quality instruction. In order to be

considered for this award, a professor must submit a dossier detailing their teaching experience, including student letters, student evaluation data and published teaching materials.

One former student wrote of Dr. Lewis: "A great teacher is someone who can adjust the way he explains concepts to work best with the students, and that is one of the many reasons Dr. Lewis is a great candidate for this professorship."

Another former student spoke of the engaging rapport Dr. Lewis maintains: "[H]is personality allows him to keep his students engaged in his lectures, whether it's because he put an interesting spin on the lecture, told a funny joke, or made everyone groan at another physics pun."

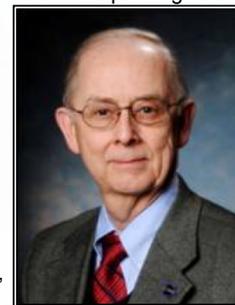
Dr. Lewis not only teaches his students physics, he inspires them to be the best students they can be. As one of his former students wrote: "[H]e was one of those rare teachers who made me feel as though I wanted to succeed not only to have a good grade, but because he expected nothing less of me."

Dr. Lewis's two-year term as a Beaver Professor began in August 2020. ♦

GRADUATE STUDENT ERIC GOETZ AWARDED SHEALY FELLOWSHIP

In December of 2015, Dr. David L. and Mrs. Elaine W. Shealy, in a desire to provide support to an outstanding graduate student in the Department of Physics and Astronomy, made a pledge to The University of Georgia (UGA) to establish the David and Elaine Shealy Graduate Fellowship in Physics. The fellowship was awarded to Eric Goetz for the 2019-2020 and 2020-2021 academic years.

Dr. David L. Shealy is Professor Emeritus of Physics at the University of Alabama at Birmingham (UAB). Dr. Shealy received his BS (1966) in Physics from UGA and was the recipient of both the Ted L. Simons Memorial Award and the Wheatly Award for an Outstanding Physics major. He stayed on at UGA to earn his PhD (1973) in Physics. He then joined the Department of Physics at UAB rising to the rank of Professor and Chair in 1984. During this time he took a leave of absence to serve as a Principal Engineer and Staff Scientist at Motorola, Inc. In 1997, Dr. Shealy took on the role of Director of the UAB IT Research Computing Services. Dr. Shealy continues to lead an active research effort in simulating optical/soft x-ray properties of materials. He has published more than 50 refereed journal articles, 6 book chapters, and 91 conference proceedings/technical reports, and edited 8 books on Laser Beam Shaping. In 1996, he was the Founding Director of the UAB Laser & Photonics Research Center and Served on the Board of Trustees of the UAB Research Foundation.



Dr. David L. Shealy

Eric Goetz joined the UGA Department of Physics and Astronomy in August 2019. He received his BS in Physics, with a Minor in Mathematics, from the University of Richmond in May 2019.

While at the University of Richmond, he was in the Physics Honors Program, a Presidential Scholar, and a member of Pi Mu

Shealy Fellowship cont'd...

Honors Program, a Presidential Scholar, and a member of Pi Mu Epsilon (National Mathematics Honor Society), Sigma Pi Sigma (National Physics Honors Society) and the National Honor Society, Phi Eta Sigma. Eric's research has focused on astrophysics.



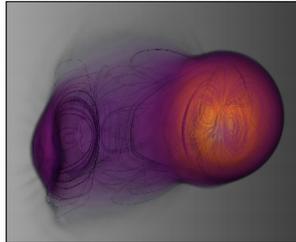
Eric Goetz

While an undergraduate, he simulated cosmic microwave background maps. Eric is now a member of Dr. Robin Shelton's computational astrophysics group where he is using hydrodynamic simulations to study high velocity clouds. These clouds are interesting for a variety of reasons, including their role in star formation and galaxy evolution. Additionally, there is still debate over the origins of these clouds. To answer these questions, it is important to obtain accurate measurements of cloud properties such as mass, metallicity, and ionization fraction. The simulations are used to determine those properties by comparing the results to those derived from observations of these clouds. He hopes to be able to improve on the estimates from observations, which can then be used to better answer questions about the role these clouds play in galactic evolution and their origins. ♦

► ALUMNI HIGHLIGHTS

Joydip Ghosh joined Ford Motor Company's Research and Advanced Engineering Department as Quantum Computing Project Lead in 2018. He graduated with a PhD from UGA in 2013 and worked in Prof. Geller's research group.

Ying Wai Li moved from Oak Ridge National Laboratory to Los Alamos National Laboratory (LANL) as Deputy Team Leader of Future Architectures and Applications Team under the Computer, Computational, and Statistical Sciences Division in 2019.



Patrick Mullen's research at UIUC is with Prof. Charles Gammie; together, they are simulating the Moon-forming giant impact.

She is excited to get into new research areas to solve physics problems using machine learning techniques on supercomputers and emerging computer architectures. She also leads and designs an education program at LANL to disseminate parallel computing and machine learning knowledge to fellow scientists, postdocs, and students.

She got her PhD in 2012 under the supervision of Prof. Landau.

Patrick Mullen, a current graduate student in the Department of Astronomy at University of Illinois at Urbana-Champaign, is simulating the Moon-forming giant impact.

In Fall 2019, Mullen had the opportunity to present this research at an invited talk at the ITC Seminar at Harvard-Smithsonian's CfA. He graduated from UGA with a BS in Physics and Astronomy in 2016. He was an undergraduate researcher with Prof. Stancil.

Emily Pritchett joined the IBM T. J. Watson Research Center in New York as a research staff member in 2019, where she leads simulations of quantum devices. This year, she became a mother.

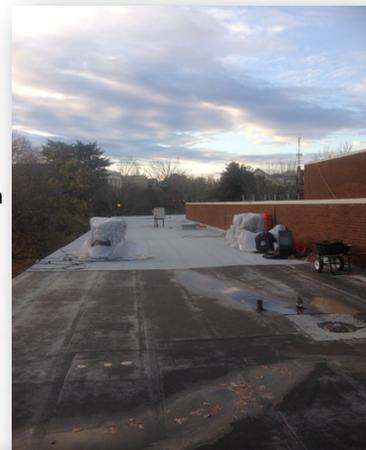
She worked in Michael Geller's quantum computing group and received her PhD in 2010.

Gregory Simchick started a new position as research associate at the University of Wisconsin-Madison in their Department of Radiology this summer. His field is quantitative MRI, and his research primarily focuses on measuring magnetic susceptibility and iron concentration in the liver, as well as developing diffusion- and flow-encoding magnetic field gradient waveforms in order to examine the microstructure of liver tissue.

He graduated with a PhD from UGA in 2020 under the direction of Prof. Qun Zhao. ♦

New Roof for the Physics Building

After decades of water leaks through the roof above the third floor of the main building and above first floor laboratories, a new roof was finally installed. Construction began in the Fall of 2019 and finished in February 2020. The photos show the roof construction in progress (right) and the final product (below). ♦



► BETTER VIEWING AT THE OBSERVATORY

By ROBIN SHELTON

The observatory atop the Physics Building reached its 60th birthday a few years ago.



For generations, this facility has served students and members of the public who wished to investigate the night-time sky using one of the largest visible-light telescopes in the state of Georgia.



In order to keep their view sharp, the telescope mirrors must be periodically cleaned and given new silver reflective coatings. Since the primary mirror weighs 140 pounds and is built into the telescope support structure, this requires unscrewing 80 bolts that hold the telescope together.

During the summer of 2019, emeritus professor Dr. J. Scott Shaw, astronomy professors Dr. Robin Shelton and Dr. Loris Magnani, graduate students Ashton Rutkowski and Lauren Sgro, and building manager Tom Barnello spent a few days disassembling the telescope.



They then lifted out the mirrors, winched them down the observatory staircase, and sent them off to a professional cleaning facility. While the mirrors were out of the way, the telescope structure was repainted. A few months later, the mirrors came back and the disassembling procedure was reversed. The telescope now

looks beautiful and sees beautifully.

For more information about the telescope and public viewing, please see <http://www.physast.uga.edu/observatory> ♦

► INTRODUCING NEW FACULTY

DR. CASSANDRA HALL

Dr. Hall is joining the faculty this fall as an Assistant Professor of Computational Astrophysics. She joins us from the University of Leicester, U.K, one of the leading institutes in Europe for research into planetary and black hole accretion discs. She currently holds the highly prestigious Winton Exoplanet prize Fellowship, which supports



outstanding postdoctoral researchers who are working on the detection and characterisation of exoplanets. Prior to her position at Leicester, Dr. Hall obtained her PhD from the Institute for Astronomy, University of Edinburgh, at the Royal Observatory of Edinburgh.

Dr. Hall is a computational and theoretical astrophysicist who uses state-of-the-art simulations to interpret observations. Her research is focused on improving our fundamental understanding of exoplanet formation through simulations of exoplanets in their birth environments - protoplanetary accretion discs.

Exoplanet science is the fastest growing field in astronomy, and with good reason. As of the 4th of June 2020, there are 4,164 confirmed exoplanets around other stars. Detecting and characterising these planets is not simply a bean-counting exercise.

Some of the most fundamental questions that humanity can ask may be answered by the study of these exoplanets. Why are we here? How did Earth form? How did life begin on Earth? And, perhaps the largest question of all, one previously relegated to the realms of science fiction and conspiracy theories: Are we alone in the Universe?



In every galaxy, there are hundreds of billions of stars. There are also hundreds of billions of galaxies in the Universe.

We know, thanks to exoplanet transit-detecting instruments such as KEPLER and TESS, that statistically speaking there is at least one planet around every star. Hundreds of billions of galaxies, each with hundreds

of billions of stars, gives us 10 thousand trillion planets in the universe. Is an Earth 2.0 out there?

This is an incredibly difficult question to answer, because we realise now that many of the exoplanets we detect are nothing like the planets familiar to us in our own solar system. There are Hot Jupiters, many times the mass of our own Jupiter, orbiting their host star 10 times closer than Mercury orbits the Sun. There are systems with multiple terrestrial-mass planets, systems with

Dr. Hall cont'd...

many Jupiter-like objects, systems with 100 Jupiter mass planets at 10,000 times the distance of the Earth from the Sun at 10,000 times the distance of the Earth from the Sun.

If we want to understand the likelihood of an Earth 2.0, we need to understand the physical processes that have led to this huge diversity in exoplanetary system configuration. The best way to do this is through models of their formation, which means performing computational simulations of their birth environment - protoplanetary accretion discs.

Outside of her research, Dr. Hall is a passionate member of the academic community fully engaged in campus life. She is dedicated to Equity, Diversity and Inclusivity (EDI), serving as EDI officer in her previous department. During her postgraduate studies, she was the departmental coordinator for an equal access to higher education programme that was hugely successful. She frequently volunteers her time for outreach events, and is hoping to start an astronomy outreach programme at UGA specifically targeting under-represented minorities in STEM fields. She is looking forward to bringing her scientific, EDI, and outreach experience to UGA, and actively encourages alumni to contact her with questions about her work. ♦

DR. NANDANA WELIWERIYA

Dr. Nandana Weliweriya, assistant professor (limited term), joined the faculty fall 2019. He earned his M.S. and Ph.D. at the Kansas State University in 2015 and 2019.

As a physics education researcher, he studies problem-solving processes among introductory-level physics students. His research investigates how students construct and coordinate (use) representations (diagrams, mathematics, gestures) while solving physics problems.

Further, he looks between instructor-centered and student-centered teaching approaches to see how immediate Feedback and Assessment Technique forms (IF-AT) affect students' understanding of concepts in introductory-level physics courses.

For the 2020-2021 academic year, Nandana was selected as a Peer Learning Assistant Mentor (PLAdawgs) conducted by the UGA's Division of Academic Enhancement and as a fellow for the Writing Fellows Program run by the UGA's Center for Teaching and Learning, The University of Georgia.

His project's main goal is to understand students' problem-solving processes. This work will help researchers build models of student construction and the use of multiple representations in physics and, more broadly, in STEM. ♦

► STUDENT LIFE

GRADUATE AWARDS

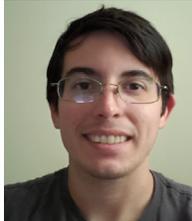
Please join us in congratulating this year's award winners!

Each award comes with a certificate, a monetary prize, and an engraved nameplate displaying the recipient's name on a plaque in the Physics building lobby.

Abed Mohamadzade is a graduate teaching and research assistant working in Dr. Ullrich's lab. He works on Ultra-fast pump-probe molecular spectroscopy, and his research studies focus on the photophysics of natural and modified DNA/RNA bases. His work is motivated by its relevance to astrochemistry and its potential pharmacological applications. He is a recipient of this year's **Robert Wood Teaching Award**.

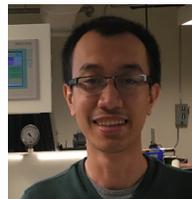


Eric Suter's research consists of simulating defects in crystals of potassium niobate. He makes use of Density Functional Theory and applies the GW approximation to try to glean optical properties of these defected crystals. He is a recipient of this year's **Robert Wood Teaching Award**, and of the **Bill Cummings Award**.



The Bill Cummings award was created in 1995 through the generous contributions of Bill's family to honor his memory. It is given annually to the graduate student who best exemplifies excellence as a student and as a teacher of undergraduates.

Hoang Luong's main research efforts focus on the magneto-plasmonic properties in nanolattices (including nanohole arrays and/or nanotriangle arrays), or, in short, magneto-plasmonic systems. He is the recipient of this year's **Sean M. Kirkpatrick Award for Outstanding Achievement in Graduate Research**.



The goal of this award is to recognize a graduate student who has demonstrated outstanding research abilities in pursuit of his or her dissertation or thesis. It is to encourage the development of creative problem solving, multiple technical and analytic skills, and/or theoretical insight.

Zahra Taghadomi Sarabi is a research assistant working with Dr. Stancil. Her research is on neutron star mergers and the resulting ejecta. She studies the atomic structure of heavy elements produced by r-process nucleosynthesis in the merger ejecta and potentially observable with kilonova spectra. She received this year's **Anderson-Pioletti Award**. Created in 2001, the Anderson-Pioletti award was endowed by Robert Anderson and Lois Anderson in memory of their fathers Arthur L. Anderson and Joseph E. Pioletti. It recognizes annually a first- or second-year graduate student showing exceptional promise.



Traditionally, the department hosts a catered reception to celebrate and honor our graduate students at the end of each spring semester. Although we had to forego the in-person ceremony this year, we are still celebrating the outstanding work of our graduate students. ♦

UNDERGRADUATE AWARDS

Terry Phang is studying spin-dependent processes occurring in organic semiconductor molecules under the guidance of Dr. Tho Nguyen and co-authoring a book called Smartphone Based Optics Laboratories with Dr. Yiping Zhao. He serves as the president of the Physics Club. This year, he received an **Undergraduate Grant for Research in Physics or Astronomy**.



Daniel Ross Boyd is collecting data for various molecular clouds from infrared satellite telescopes and generating spectrographs for each cloud. He also received an **Undergraduate Grant for Research in Physics or Astronomy**.



The Undergraduate Grants for Research in Physics or Astronomy are made possible by a 2014 donation to the department. The donors' intent is to promote undergraduate research by providing a stipend to students who might not otherwise have the means to pursue such experiences.

To apply, students must submit a letter of application and a letter of support from their research mentor. An amount totaling \$1250 for each award is granted to each of the two students selected from among the applicants.

Mackenzie Joy started researching the diffuse ISM with Dr. Loris Magnani as a freshman, and continued that work for the next three years. This research gave her the opportunity to present posters at several AAS and APS conferences across the country. This fall Mackenzie begins a Physics PhD at UC Berkeley. Mackenzie was awarded this year's **Charles H. Wheatley Award**.



Established in 1952, the Wheatley Award recognizes excellence in physics at the senior level. The award carries a stipend of \$200, and the recipient's name is inscribed on a plaque displayed in the Physics Building lobby.

In 2016, **Megan Arogeti** applied to work in the Small Satellite Research Lab, a moment that sparked a huge part of her journey at UGA. At the SSRL, Megan had the opportunity to work with students and faculty across multiple departments to put a small satellite into space. For this work, Megan was awarded the **Physics and Astronomy Award**.



This \$200 award that has been presented since 1979 to undergraduates for outstanding accomplishments in the Physics & Astronomy major. In recognition, the recipient's name is inscribed on a plaque in the lobby of the Physics Building.

Elijah David Solomon Courtney's research with Dr. Stancil calculates the rovibrationally resolved rate coefficients of the radiative association formation reaction of helium hydride, and recalculates its numerical abundance in the early universe using recently reported reaction rates. For this research, Elijah received



the **Simons Award**.

Established in 1964, this award recognizes a student who demonstrates outstanding achievement at the junior level. It carries a stipend of \$200, and the recipient's name is inscribed on a plaque displayed in the Physics Building lobby. ♦

UNDERGRADUATE NEWS

Nicholas Kruegler was awarded a 2020 CURO Research Assistantship to do research in theoretical condensed matter physics this summer with Dr. Steven Lewis.

Terry Phang is a 2020 CURO Summer Fellow, and he is working in the experimental condensed matter physics lab of Dr. Tho Nguyen.

Richa Mandar Bhome presented the poster, "Use of Lottery Tickets (IF-AT scratch-off forms) to Solve Problems in Introductory-Level Physics Courses," at UGA's 2020 CURO Symposium.

Elijah Courtney presented the poster, "Revisiting the Formation and Destruction of HeH⁺ in the Early Universe," at UGA's 2020 CURO Symposium.

Troy Crawford presented the poster, "Fine-structure Excitation of Carbon due to Collisions with Protons," at UGA's 2020 CURO Symposium.

The annual CURO Symposium highlights excellence in undergraduate research at the University of Georgia through students' oral and poster sessions—and is open to all undergraduates pursuing faculty-mentored research in any discipline, not just those enrolled in CURO coursework. Students with research at various stages of completion are encouraged to apply. ♦

UGA PHYSICS CLUB

The UGA Physics Club welcomes students across all majors who have an interest in Physics or Astrophysics. Since the club was founded in 2018, we have hosted regular meetings geared toward the discussion of topics within the physical sciences. We are pleased to introduce our new executive board: Physics major Terry Phang (President), Astrophysics major Andrew Tran (Vice President), and Physics major Andrea Hill (Secretary) and Science Education major David Seiden (Treasurer).

In the past, we have hosted events ranging from presentations on physics history to game nights and movie nights. This year, our focus will be on encouraging members to learn about the various research and career opportunities available in Physics, helping members develop connections within the student body and with faculty, and providing general mentorship to students navigating the Physics and Astrophysics majors. With these goals in mind, we have been planning activities based on several distinct themes that we hope to implement at this year's meetings.

We plan on devoting a few meetings to workshop-style activities focused on topics like graduate studies, applying for internships, and looking for research opportunities. We seek to invite faculty,

Physics Club cont'd...

graduate students, and undergraduates to talk about their experiences in these areas. We are also looking at inviting guest speakers to talk about hot topics in research and hosting “mini” presentations where an undergraduate can give a short 10-minute presentation on their research at the start of each meeting. Additionally, we hope our members will have the opportunity to continue the weekly meetings with department colloquium speakers, as we did in the last academic year.

We will also be hosting several open attendance events such as an Intro Physics Day and a Club Tutoring Day to create an environment where students can exchange ideas and meet new people. For these events, we will provide volunteer opportunities to Physics and Astrophysics majors who want to tutor for a day or simply share their experience with others. Our hope is that these events will appeal to students both inside and outside of the Physics and Astrophysics majors.

Throughout the year, we will also participate in campus involvement fairs and host several fundraisers toward our goal of becoming an official Society of Physics Students chapter. We seek to improve our outreach by collaborating with other clubs and having a volunteering presence at STEM focused events like the annual UGA High School Math Tournament. Finally, we will add in our traditional physics game nights and movie nights, where members can unwind and socialize after major exam weeks.

While some of these events are tentative given the modified semester, we feel that each of them will be beneficial for our members and other interested students. Our events will accommodate a wide variety of students across different levels of experience to create a community where members can nurture their interest in Physics and Astrophysics.

For more Information about the UGA Physics Club, contact Terry Phang at ysp79161@uga.edu. ♦

► STAFF SPOTLIGHT By JESSICA HUDGINS

Thomas Barnello, known around the office as Tom, has been a staff member in the department for 24 years. Here he is interviewed by Jessica Hudgins, who started at the department in 2019.

What do you do in the department?

Maybe a better question is—What do I NOT do? I am joking of course, but I do wear many hats in the department. One of my main duties is seeing that the teaching labs run smoothly: making sure that the graduate students are performing their lab teaching duties effectively; maintaining the equipment; and handling any issues that may arise regarding the students. Another important duty is dealing with the building in general—building safety and security, and submitting work orders. There are many other duties I have so



there is always something to do.

What do you enjoy about working at UGA?

I enjoy working on a college campus. I remember way back when, when I myself went away to college. I enjoyed being on my own for the first time and making new friends and meeting interesting and diverse people, and I still enjoy being around that. We also have a beautiful campus and I enjoy just walking from the Physics building to downtown Athens during my lunch break and sitting outside at a downtown cafe.

When did you start? How did you hear about the job?

I started in June of 1996 when the Olympics were in Atlanta with a few events in Athens. I heard about the job in a roundabout way. Dr. Shaw, now retired, was UGA's representative in an astronomy consortium with some other schools at the time. He asked the people at the other schools if they knew of anyone who could do the job and I had a good friend who is an astronomer at one of the schools who told me about it. I was in a different state so I had a conference-call interview and took the job “site” unseen. When I first arrived I thought I'd give it a couple of years—that was 24 years ago!

Do you have a favorite memory of a student? Of a faculty member?

Here is my favorite memory involving a student. I sent it in an email years ago so some of you may have already heard it. As many people in academia know, the end of the school year is a bad time for grandparents. Apparently the very thought of their grandchildren taking final exams is so stressful for them that many of them do not make it, conveniently giving their grandchildren an appropriate excuse for missing their final exams.

When lab exams started one year I got a call from a student saying that she missed her lab exam because of her grandmother, but the twist was, her grandmother did not pass away, she had emergency surgery to have her leg amputated. I know that some people are very close to their grandparents, and perhaps, because of the woman's age, there was a possibility she would not survive the surgery, so I thought it was a legitimate excuse. But I have also become quite cynical over the years after listening to all kinds of excuses for missing labs, especially after we caught one student who said he missed a lab to attend his grandmother's funeral, when, in fact, we discovered that he went on a family vacation! So I asked the student to bring me a note from the doctor as proof.

She came into my office a couple of days later and said she had trouble connecting with the doctor so she did not have a note, but then said, “Will a picture of my grandmother be good enough?!” Before I could say anything she handed me a printed copy of a photo, and there was her grandmother, sitting up in bed with the covers thrown back, with her right leg clearly missing up to mid thigh!—(it was bandaged of course)—not only that, her grandmother had this great big smile on her face! I said to the student, “Well, she seems to be in good spirits!” and the student said, “Oh yeah, she's been a real trooper her whole life!”

Are there any exciting developments you're looking forward to?

Learning how to play the piano.... in my upcoming retirement. ♦

► **MAGNANI RESEARCH GROUP OBSERVES MOLECULAR CLOUDS**

Dr. Loris Magnani's research group is interested in the cold interstellar medium and studies small, diffuse molecular clouds using rotational and hyperfine molecular transitions. Lately, the group has been using the 305-meter dish in Arecibo, Puerto Rico.

Like most international radio astronomy facilities, Arecibo has dozens of receivers and many versatile spectrometers and autocorrelators to allow astronomers to observe anything from millisecond pulsars to distant quasars. For half a century this was the largest single-dish telescope in the world, only recently supplanted by the 500-meter FAST instrument in Guizhou, China.

The research experience begins with the submission of observing proposals. The proposals detail the scientific questions under investigation, the reasons a given facility has the right



Dr. Loris Magnani and Dr. Tim Robishaw at the Arecibo Observatory in 2015. The 305-meter reflector is in the background. The platform is more than two football fields above the dish.



Former graduate student, Allison Smith, conducting radio observations from the Arecibo control room. These days, the observations are made remotely from the investigators' offices.

instrument(s) for the job, and how the group wishes to set up the various receivers and spectrometers to obtain the necessary data.

The proposals are reviewed anonymously by 4-5 astronomers and are graded. If the proposals are deemed good to excellent, a local committee allocates time, and the group's observations are

scheduled on the telescope.

In February of this year, graduate student Erin Dailey and Dr. Loris Magnani submitted three proposals to Arecibo. These proposals involved observations of the ground state, hyperfine, spectral transition of the methyldine molecule (CH) at 3335 MHz (the FM radio band runs from 87.5 to 108 MHz and much of WiFi is carried at 2400 or 5000 MHz). They all received high grades and were scheduled at Arecibo for July and August of this year. Erin and Loris made the observations remotely from their offices in the Physics Building.

The three projects involve searching for a molecular filament at a peculiar velocity in an interstellar cloud about 270 light years away (that's in our galactic neighborhood), making a series of technically challenging measurements of the 3335 MHz line to determine the excitation temperature of the transition, and continuing a mapping project in the outskirts of a fairly large molecular cloud known as MBM 53, about 500 light years away (still in our neighborhood, but in the "outskirts" of our spiral arm).

These projects will be incorporated in Erin's thesis, and eventually published. ♦

► **FACULTY AWARDS AND ACHIEVEMENTS**

INTERNAL

In Spring 2017, **Steven Lewis** became the Director of the Lilly Teaching Fellows program, a prestigious faculty development program for early-career faculty, run through the UGA Center for Teaching and Learning. **Steven Lewis** was awarded the General Sandy Beaver Teaching Professorship for 2020, the highest recognition for teaching in the Franklin College of Arts & Sciences.

Nandana Weliveriya was selected as a participating faculty in the peer learning assistant (PLAdawgs) program for Fall 2020, conducted by the Division of Academic Enhancement, The University of Georgia. **Nandana Weliveriya** was selected as a participant in the Active Learning Summer Institute (ALSI) 2020, conducted by the Center for Teaching and Learning, The University of Georgia

Craig Wiegert is part of the DeLTA project at UGA, a 5-year, \$3M National Science Foundation-funded grant to transform STEM teaching across several departments at UGA. **Craig Wiegert** was selected as one of eight UGA Senior Teaching Fellows for the 2020-2021 school year. ♦



EXTERNAL

In 2019, **David Landau** was reappointed as member of the Rektor's Academic Advisory Council of the University of Heidelberg, Germany. **David Landau** was appointed Chair of the IUPAP C20 Commission on Computational Physics 2017-2021.

Robin Shelton was a Fulbright Scholar, stationed in Berlin, in the spring and early summer of 2017. In 2018, Robin Shelton was invited to speak at the Hendrik van de Hulst,

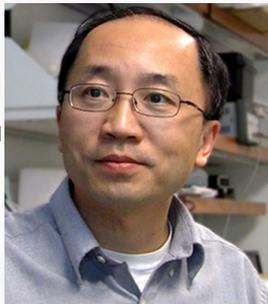
External cont'd...

an international conference. Her talk was called "Collisionally Ionized Gas, the Hot Ionized Medium."

Phillip Stancil became Chair of the Laboratory Astrophysics Division of the American Astronomical Society. His term is June 2019 until June 2021 after serving two years as Vice-Chair.

Starting July 2018, **Phillip Stancil** become Head of the UGA Department of Physics and Astronomy, while **Craig Wiegert** was appointed Associate Head.

Jennifer McDowell and **Qun Zhao** (Co-PIs, UGA) and Shaoyong Su (PI, Augusta Univ.) received an R01 grant, awarded by the National Institute of Health. The grant, entitled "Pediatric Ambulatory Blood Pressure Trajectory and Brain Health in Midlife," started on 1 June 2019 and will end on 31 March 2024.



Dr. Qun Zhao

Yiping Zhao was named 2017 American Vacuum Society Fellow and a 2017 SPIE Fellow. **Yiping Zhao** was a visiting professor in India Institute of Technology Delhi from Jan. 2020 to Mar. 2020. ♦

► THE DELTA PROJECT

The Department of Physics and Astronomy just completed its first year as a part of a collaborative research project that aims to improve STEM education on campus. The five-year project, called "Department and Leadership Teams for Action (DeLTA)", is funded by a \$3 million grant from the National Science Foundation. Dr. Wiegert, associate professor of physics and associate department head, helped write the grant proposal and leads the department-level team of faculty in Physics and Astronomy.



The DeLTA Project has five core goals:

1. Design educational experiences to achieve clear and measurable learning outcomes.
 2. Base education decisions on evidence, including students' conceptions, capabilities and attitudes.
 3. Actively collaborate and communicate about undergraduate education.
 4. Foster continuous teaching improvement.
 5. Promote inclusion and diversity.
- To implement these goals, the DeLTA Project is organized around

teams at three levels. At the course level, instructional action teams (IATs) of faculty within a department work on revising courses and analyzing data about student learning. Faculty membership in the IATs rotates on a regular basis, so that a large number of faculty are eventually engaged in thinking critically about their instructional practices. At the next level, a leadership action team (LAT) brings together department heads from mathematics, physics and astronomy, chemistry, biology, computer science, and engineering, to reconsider department policies and practices, including the way that departments evaluate and recognize teaching for promotion and tenure. Finally, strategic action teams (SATs) comprise faculty, department heads, deans, and senior administrators in the Office of Faculty Affairs and the Office of Instruction.

These university-level teams work to revise institutional practices and incentives, including criteria for promotion and teaching evaluation. Throughout the duration of the project, the principal investigators for the DeLTA grant are collecting data from all team participants to investigate the shifts in practices, beliefs, and policies. Research findings from the analysis of these interviews, surveys, class observations, and course assessments may spur other institutions similar to UGA to adopt successful models of institutional change in STEM education. ♦

► WORKSHOPS

Center for Simulational Physics (CSP)

During the week of Feb. 17 - 21, 2020, the Center for Simulation Physics held its 33rd Annual Workshop, "Recent Developments in Computer Simulation Studies in Condensed Matter Physics." The event was a success with a full week of scientific talks and collaboration among the Workshop participants. On Feb. 19, a reception was held to celebrate the 33rd Anniversary of the Workshop. Many former members of the Center and many international visitors participated.

Quantum Science and Engineering Program (QSEP)

In the Spring of 2020, a Quantum Science and Engineering Program (QSEP) was instituted at the University of Georgia (UGA) to establish its role in the ongoing quantum revolution focusing on quantum materials and quantum sensing.

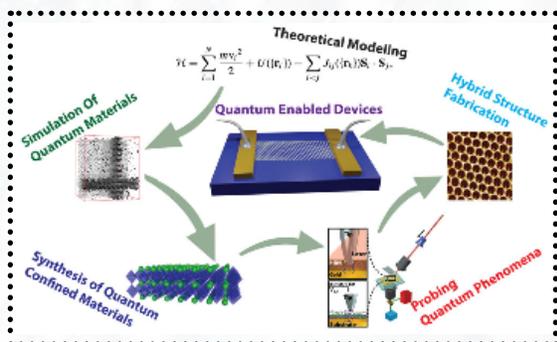


The QSEP's plan is to address key fundamental science, engineering and technologically driven problems surrounding quantum materials and quantum enabled technologies, currently one of the most exciting and active research areas in science. The Program will facilitate collaborations among multiple principal investigators at UGA by leveraging the unique strengths of physicists, chemists, and engineers who are actively engaged in quantum science research.

The QSEP is led by Dr. Yohannes Abate. Team members of the QSEP include faculty from The Departments of Physics

QSEP cont'd...

of the QSEP include faculty from The Departments of Physics (Landau, Zhao, Geller, Nguyen, Stancil, Ullrich, Wiegert), Chemistry (Salguero and Reber), Engineering (Wang and Song), Statistics (Ma), Geography (Cotton) and Computer Science (Parasuraman). The QSEP's unique combination of capabilities includes novel experimental and simulational techniques in nano and quantum materials, optics and plasmonics, new types of scanning probe microscopies, innovative expertise in materials synthesis and crystal growth, state-of-the-art imaging and spectroscopy characterization methods, and contemporary theoretical and computational methods.



Combined with novel high-resolution imaging and spectroscopy capabilities, the Center for Simulational Physics (CSP) at UGA opens a unique opportunity to exploit the power of state-of-the-art Monte Carlo and other simulational tools for application in QSEP.

NASA LABORATORY ASTROPHYSICS WORKSHOP HELD AT UGA

During April 9-11, 2018, 95 astronomers, chemists, and physicists from across the US and beyond met for three days of invited talks, contributed talks, posters, and discussions at the GA Center Hotel and Conference Center for the 2018 NASA Laboratory Astrophysics Workshop (LAW 2018).

The purpose of LAW 2018, sponsored by the Astrophysics Division of NASA's Science Mission Directorate, was focused on identifying and prioritizing critical laboratory (both experimental and theoretical) astrophysics data needs to meet the demands of NASA's current and near-term astrophysics space missions. Thanks to great weather and a welcoming environment, lively discussions took place on a range of issues which ultimately lead to a report from the LAW 2018 Scientific Organizing Committee to NASA.

The workshop was co-chaired by Professor Phillip Stancil, while the Book of Abstracts was edited by UGA Associate Research Scientist Benhui Yang, UGA graduate student Yier Wan, Physics Department IT administrator Jeff Deroshia, and Dr. Ella Scimma-O'Brien (NASA Ames). 11 undergraduate students, 4 graduate students, and 2 other faculty members from our department participated and volunteered to help with the meeting, as well as CSP Administrator Traci McKinney.

Additional details can be found at:
<https://www.physast.uga.edu/workshops/law>

Additional meeting support was provided by the Joint Institute for Nuclear Astrophysics, the UGA Franklin College of Arts and Sciences, the UGA Office for the Vice President of Research, and the UGA Center for Simulational Physics.

SOUTHEAST QUANTUM COMPUTING WORKSHOP (SEQCW)

The Center for Simulational Physics has been pioneering the use of computer simulations to study problems in physics and astrophysics for decades. However, large and highly correlated quantum systems, such as complex molecules and low-dimensional materials, remain beyond the reach of classical simulation due to their inherent exponential resource requirements. Efficient simulation of these systems is one of the most important and exciting applications of quantum computers.

In 2017, Michael Geller and David Landau started a regional conference, the Southeast Quantum Computing Workshop (SEQCW), to bring together researchers in the region to discuss all aspects of quantum computing and quantum information science. The SEQCW took place in 2017, 2018, and 2019. This year the workshop was cancelled due to the pandemic, but the plan is to bring it back in Spring 2021. ♦

SERVICE IN THE DEPARTMENT



Sarita Shrestha, a graduate student in the Ullrich Ultrafast Spectroscopy Group, at the Women in Science Event at Sandy Creek Nature Center on March 30, 2019. Using optics and vacuum demonstrations, Sarita explains her research on the photoprotective properties of eumelanin – our skin's built-in sunscreen – to elementary and middle school aged children. ♦

Undergraduate Degrees Awarded 2019-2020

Matthew Hummel, BS, Astrophysics

Michael Toler, BS, Astrophysics

Megan Arogeti, BS, Astrophysics

Kinsey Poland, BS, Astrophysics

Oskar Johnemark, BS, Astrophysics

Mackenzie Joy, BS, Astrophysics

Yung Kipreos, BS, Astrophysics

Kirsten Floyd, BS, Astrophysics

Mark (Eliot) Williams, BS, Astrophysics

Emory Perry, BS, Physics

Troy Crawford, BS, Physics

Jackson Browne, BS, Physics

Zachary Eidex, BS, Physics

Luke Allen, BS, Physics

Nicolas Lohner, BS, Physics

Retirements



ZHENGWEI PAN

Professor Zhengwei Pan was appointed as joint assistant professor in the College of Engineering and in the Department of Physics and Astronomy at UGA in 2006. He was promoted to associate professor in 2011, and then full professor in 2016.

Dr. Pan's research group focused on persistent luminescent materials emitting in the infrared and ultraviolet spectral regions and made some pioneering work in the field. The group also conducted research on various nanomaterials including Eu^{2+} -activated aluminate nanobelts, zinc oxide nanowires, graphene, and carbon nanotubes reinforced ceramic composites.

Dr. Pan is the recipient of 2010 NSF CAREER award, the 2011 Applied Spectroscopy William F. Meggers Award and the 2014 College of Engineering Research Award. During his stay at UGA, Dr. Pan was awarded a total of \$2.7M research fund from ONR, NSF, EPA, DOJ, ACS-PRF, UT-Battelle and Saudi Aramco. Dr. Pan published about 120 papers, which were cited more than 23,000 times.

He is now a senior research scientist and a program lead at the Center for Integrative Petroleum Research, College of Petroleum Engineering & Geosciences, King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia.



BILL DENNIS

Professor William M. Dennis retired last year after more than 31 years on the faculty. Bill came to the department as a postdoctoral researcher working with Professor William Yen in 1986.

Seeing his strong potential, the department soon offered him a faculty position, which he accepted and started in January 1988. He rapidly became an indispensable member of the faculty, excelling in research, teaching, and service.

For most of his career, Bill was an experimental condensed matter physicist, using ultrafast lasers to study the dynamics of phonons, magnons, and other elementary excitations in nonlinear optical materials. He published 50 or more journal articles in this area, many highly regarded, in fewer than 20 years.

In the 2000s, his interests spread to other types of materials, ranging from nanocrystals to green fluorescent protein.

By the 2010s, Bill became drawn to the power of computers to simulate complex phenomena, and he applied this new interest to diverse problems, including light propagation in metamaterials and first-principles studies of enhanced photorefractive materials.

Bill took on many leadership roles within the department and across the university during his career. Early in his career he served as Assistant Department Head for nine years, and after stepping down, he followed it up by founding UGA's interdisciplinary Nanoscale Science and Engineering Center. After being away from departmental leadership for six years, he returned to it as Department Head

Graduate Degrees Awarded 2020

Gregory Simchick, PhD, Physics

Amara Katarbarwa, PhD, Physics

Retirements cont'd...

in 2006, serving in this role for the next 12 years. Bill was an exceptional Head, aptly shepherding the department through the Great Recession and bringing his boundless energy, sense of class, and good humor to meet the various challenges of a dynamic university.

Students were always front and center for Bill. He was a dedicated and successful teacher at all levels, with students favoring him for his gracious manner, his clear, crisp teaching style, and his warm sense of humor. Where he really shone with students, however, was as a research mentor. Students were drawn to Bill's group for his excellent and much deserved reputation for mentorship. No faculty member gave more time, energy, wisdom, and caring to their students than Bill, and generations of his students sing his praises.

For his superlative mentoring, Bill won the UGA Graduate School's Outstanding Mentor Award in 2007 and the Conference of Southern Graduate Schools Achievement Award for Faculty Excellence in Mentoring Graduate Students in 2011.

In retirement, Bill, his wife Aideen, and their husky Soma are enjoying an idyllic life in their lovely mountain home in southwestern North Carolina. Bill cooks, reads, fishes, and enjoys the peace, serenity, and natural beauty of his surroundings. If you ask nicely, he just might let you visit!



UWE HAPPEK

Our dear friend and colleague, **Professor Uwe Happek**, retired in June after 25 years in our Department.

Dr. Happek was born in Germany and earned his Diploma in Physics at the University of Regensburg where he also got the PhD in physics in 1989. After his PhD, Dr. Happek was awarded a Feodor Lynen postdoctoral fellowship from the Alexander von Humboldt Foundation. He then became first a Postdoctoral Researcher and then a Senior Research Associate at Cornell University in the Laboratory of Atomic and Solid State Physics under the direction of Prof. A.J. Sievers. In 1994, Dr. Happek accepted a position at the University of Georgia and joined our Department as an Assistant Professor.

At UGA, Dr. Happek worked primarily in various areas of condensed matter spectroscopy, relaxation dynamics of molecular impurities, non-radiative relaxation, efficiency of luminescent materials, and electron transfer processes in solids. During his career, Dr. Happek authored over 100 journal articles garnering over 2500 citations. His work was recognized nationally and internationally and, in 1997, he was a Visiting Erskine Fellow at the University of Canterbury in Christchurch, New Zealand.

In 2004 he won the University's Creative Research Medal for his work in understanding the underlying physics that control light-emitting efficiency in phosphor materials. Dr. Happek taught extensively across the range of physics courses and was extremely popular with his introductory physics course for non-majors. He was an excellent mentor graduating a dozen PhD students and several MS students, and working extensively with undergraduates.

In addition to his love of and proficiency in physics, Dr. Happek had many outside interests. He was an avid bicyclist, a member of several local cycling clubs over the years, and he often engaged in 50 plus mile bike rides throughout the region. He loved playing the violin and baking bread, a hobby which he turned into a second profession. At first, he sold bread at the local farmer markets and then built up a bakery, The Comerian, which has become one of the premier artisanal bakeries in Northeast Georgia. ♦

▶ LAB UPDATES

ULLRICH LAB

Skin is often cited as the body's biological defense system against ultraviolet radiation.

Umelanin, the pigment that gives skin its color, is presumed to act like a built-in sunscreen that helps minimize DNA photodamage. The photophysical properties inherent to the nucleobases themselves provide additional photostability to our genetic coding material.



Photoprotection, in general, relies on the ability of the chromophores (light-absorbing part of the molecule) to quickly and efficiently dissipate harmful ultraviolet energy into heat. The mechanistic details regarding these internal conversion processes, which occur on timescales as short as a trillionth of a second, are not yet well understood. Dr. Susanne Ullrich's group applies ultrafast time-resolved laser spectroscopy to observe these processes in real time and derive the underlying photophysical principles.

Most recently this group has extended its work from natural skin chromophores to the study of modified nucleobases. Whereas the canonical nucleobases are photostable, seemingly minor changes such as single atom substitutions can profoundly alter their photophysics. For example, in thiouracils, where an oxygen is replaced by sulfur, internal conversion pathways are inaccessible and crossing onto the triplet manifold becomes highly efficient.

This work revealed a surprisingly strong dependence of the intersystem crossing dynamics on the position and degree of thionation. While long-lived, reactive triplet states as observed in some of the thiouracils negate their photoprotection, these properties are highly desirable for pharmacological applications, e.g. as photosensitizers in cancer treatments.

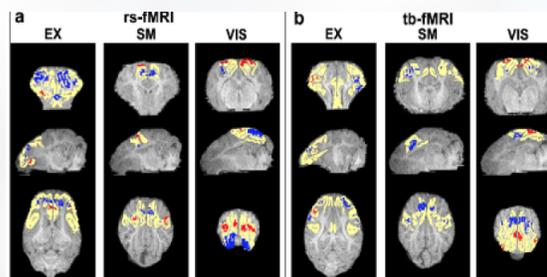
QUN ZHAO LAB

Since 2018, Dr. Qun Zhao and his collaborator, Dr. West, have continued to develop machine learning and functional MRI to investigate traumatic brain injury (TBI) in pig models. In a recent manuscript submitted to the journal *Neuroimage*, they demonstrated the feasibility of detecting functional connectivity disruptions using both resting-state and task-based fMRI.

Significantly decreasing (TBI<Control) and increasing (TBI>Control) activation was consistently observed for specific functional networks and anatomical structures using Pearson spatial correlations, mean ratios, and a permutation test (See the figure attached).

Controlled cortical impact (CCI) resulted in functional damage spanning multiple brain networks beyond the injury location of the motor cortex. To the best knowledge of the authors, this is the first study to investigate disruptions in functional connectivity in a translational pig TBI model using fMRI.

Representative images of two-dimensional permutation maps



from the resting-state (rs-; a) and task based (tb-; b) fMRI analysis for the executive control (EX), sensorimotor (SM), and visual (VIS) networks and their corresponding reference atlases (yellow) overlaid on the template pigs' T1-weighted anatomical image. The blue indicates voxels with significantly decreased activation values of the TBI group in comparison to the control group, and red indicates significantly increased activation values.

This research indicates that pig brains are even better platforms than previously thought for the study of human neurological conditions such as Alzheimer's and Parkinson's. To read more about this research, visit: <https://www.liebertpub.com/doi/abs/10.1089/brain.2019.0673>

MELTZER LAB

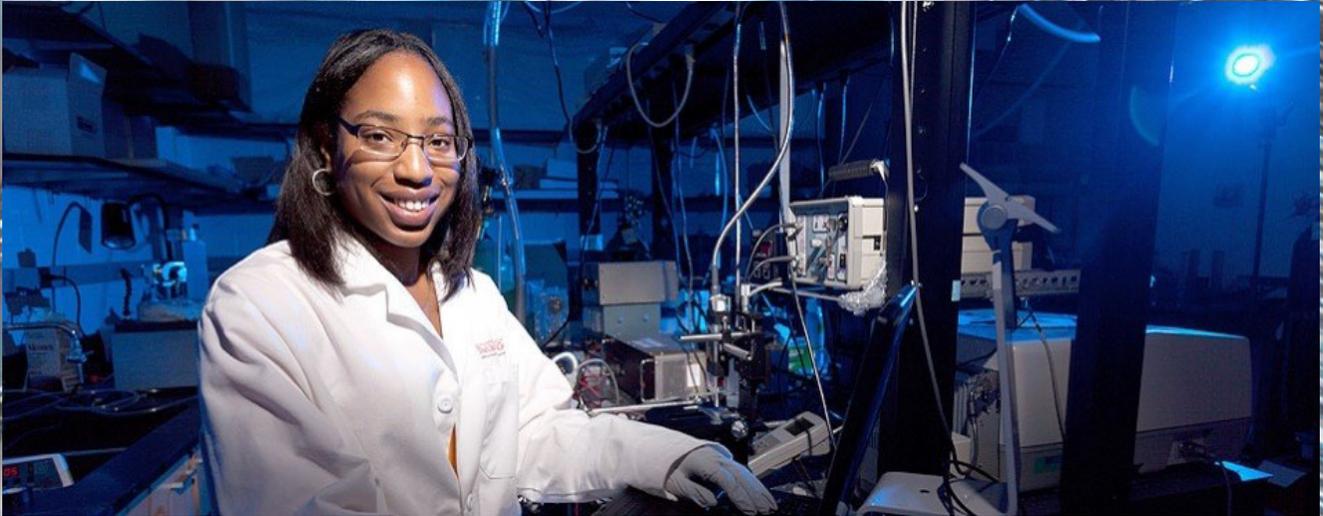
In 2019, the Department received \$75,000 from the President's Supplemental Funding for Laboratory Renovations fund. These funds are designated to upgrade and repair research laboratory space in order to enhance productivity at the University.



The Department used these funds to renovate Professor Richard Meltzer's 1500 square-foot research laboratory space. Professor Meltzer retired in 2009 after nearly 40 years of service at UGA. While the lab was filled with cool items for laser physicists (optical tables, spectrometers, lasers), it was last renovated more than 30 years ago and much of the research equipment was outdated.



As the before and after photos show, the renovated lab is now a prime research space which should help the Department recruit new faculty in experimental physics. ♦



Send us your updates on new jobs, awards, marriages, children, retirements or special trips to Jessica Hudgins at jh72780@uga.edu, or call **706-542-2485**. We are especially interested in receiving your email addresses, so that we can send out reminders about upcoming events.

Help Us Grow...

Visit gail.uga.edu/physics to support the UGA Physics and Astronomy department.

SUPPORT PHYSICS

Your commitment to the Physics Department allows us to provide boundless opportunities for life-changing learning, enhanced career preparation and exceptional teaching. Your gift is important to us and helps support critical opportunities for students and faculty alike, including lectures, travel support, and any number of educational events that augment the classroom experience. Now is your chance to make a difference knowing every gift fully benefits Physics!

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