Physics and Astronomy

University of Missouri

Communiqué

News From the Chair

Dear Alumni, Colleagues and Friends,

Greetings from the Department of Physics and Astronomy. It has been a very good year for the department, with many excellent accomplishments by our faculty and students. In a sign that we are returning to normal after the pandemic, over the past year the Physics and Astronomy Graduate Student Association (PAGSA) has organized many social events for students and faculty, including a large orientation banquet this fall pictured below.

We are excited to welcome our newest faculty member, Professor Andrew Meng, who joined our department in August. Professor Meng received his B.S. from CalTech and PhD from Stanford; he is an expert in semiconductors and electron microscopy. He will build a MOCVD laboratory to focus on the epitaxial growth of next-generation functional device materials, including photonics, ferroelectrics, and piezoelectrics that he will investigate by electron microscopy using the state-of-the-art electron microscopy facilities that were recently acquired by MU. He was hired through the campus-wide electron microscopy faculty search that was led by our department (committee chair Professor Giovanni Vignale).

The Department is grateful to the many alumni who continue to support our students and our department's mission. We appreciate the Physics Leaders who attend our annual meetings, even during the pandemic through virtual meetings. We are looking forward to our next Physics Leaders Meeting in October – our first in-person Leaders meeting in three years. We are extremely grateful to Dr. John Letcher (MS'59, PhD'63) who has established a new endowment for the department, the *John H. Letcher Graduate Student Scholarship in Physics*, that will help support our graduate students. During his career (www.johnletcher.com) in both industry and academia, Dr. Letcher has worked in a number of areas, including acoustic and magnetic resonance imaging.

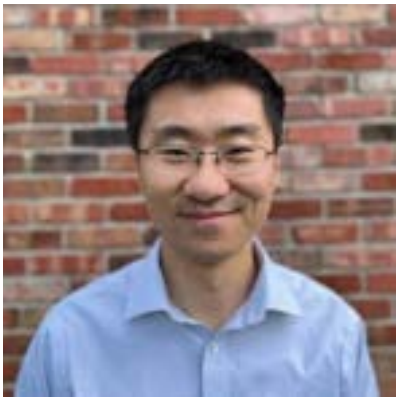
Exciting new research developments in astronomy, biological physics and condensed-matter physics are represented by the many papers published annually (over 120 on average) by our faculty with their students and postdoctoral scholars. While it is impossible to summarize all of these excellent works here, I will highlight one paper in each area. In Astronomy, Professor Yicheng Guo's investigation of distant low-mass galaxies using one of the largest optical telescopes in the world (Keck) reveals new avenues to understand galaxy formation, including baryonic processes in dark matter halos, progenitors of our own Milky Way Galaxy, and analogs of the first galaxies in the universe (ApJS **261**, 12 (2022)). Professor Shi-Jie Chen's group in biophysics developed a physics-based computational method that achieves significant advances in RNA-targeted therapeutic design (Methods **197**, 97 (2022)). (Cont. on page 6)

Yicheng Guo Receives Covington Award

This spring, Professor Yicheng Guo was the recipient of the prestigious Ann Covington Award. Lauryn Williams, an undergraduate student who conducted research with Professor Guo, nominated him for the award. This prestigious award honors faculty and staff who continue Ann Convington's legacy of student mentorship. Those contributions may have come in the form of mentorship with scholarly research or creative endeavors, counsel toward professional aspirations, guidance in developing a fellowship application, and/or other activities that supported an undergraduate in seeking one or more nationally competitive fellowships.

Lauryn Williams and Yicheng Guo

Welcome



The department welcomes Dr. Andrew Meng as a new assistant professor. Professor Meng joined our department for the fall semester 2022 from a postdoctoral position in the Department of Materials Science and Engineering at the University of Pennsylvania. He earned a Ph.D. and M.S. in materials science and engineering at Stanford University in 2019 and a Master of Philosophy in chemistry from the University of Cambridge in 2014. He graduated with a B.S. in physics and chemistry from the California Institute of Technology in 2013. Professor Meng's research focuses on semiconductor crystal growth for optoelectronic device applications and on characterization of materials towards a structure-based understanding of functional properties. Materials synthesis using chemical vapor deposition, optoelectronic property characterization, and electron microscopy are some key topics of interest. He has already published extensively on his work and received several awards and scholarships and will be a valuable addition to our Condensed Matter Physics group.

Retirement

Giovanni Vignale, long-time professor in our department, retired effective September 1. Professor Vignale was also a Curators' Professor. Due to the exceptional quality of his research he was elected a Fellow of the American Physical Society in 1997. Professor Vignale's main areas of research are many-body theory and density-functional theory. He is the author of two books, *Quantum Theory of the Electron Liquid* and *The Beautiful Invisible* and has published almost 200 papers. He influenced many colleagues and students during his time in the department and we wish him all the best in his future endeavors. He has accepted a position at the National University of Singapore working in the Institute for Functional Intelligent Materials.

Faculty News & Recognition

We are pleased to report that **Yun Zhang** was promoted to Teaching Professor and **Guang Bian** was promoted to Associate Professor with Tenure.

Yun Zhang and Guang Bian

Gavin King - The King laboratory continues to pursue experimental biological physics research with an emphasis on central problems in membrane biophysics. Recent work, funded by the NSF and NIH, has addressed the mechanism of action of protein transportation across membranes in E. coli, as well as Candidalysin, the first cytolytic peptide toxin identified in any human fungal pathogen. Another project is focused on elucidating the structural dynamics of P-glycoprotein, which is an integral membrane transporter that pumps a diverse range of drugs across membranes and out of the cell before they can deliver their therapeutic payload. This protein has received a lot of attention in the biophysics community as it is a primary reason for cancer drug failure over time. In addition to biological physics, the group has recently expanded the scope of its research into materials science. This effort is focused on further developing and applying a nanofabrication technique called “ice lithography”. This technique was co-invented by Professor King during his PhD research and employs solid phase condensed gasses as sacrificial resists for electron beam lithography. Recently, Harvard University donated its entire ice lithography apparatus to MU. Professor King and co-workers are currently in the process of setting up the instrument which comprises a field emission scanning electron microscope with custom-built accessories. Along with Professor Suchi Guha, Professor Ioan Kosztin and others, Professor King has a grant pending to catalyze an ice lithography research hub at MU. Similar hubs currently exist in Denmark and China, but not in the United States.

Dorina Kosztin, teaching professor and associate chair of the Department of Physics and Astronomy was named a Curators Distinguished Teaching Professor. A Curators' Distinguished Professorship is the highest and most prestigious academic rank awarded by the Board of Curators. It is awarded to a select few outstanding scholars with established reputations.

Sashi Satpathy spent a one-semester Research Leave in Chennai, India during Spring 2022 to initiate collaborative research work with the Department of Physics, Indian Institute of Technology Madras. The research was supported through a Fulbright Fellowship award as well as an additional VAJRA Fellowship award from the Department of Science and Technology, Government of India. Graduate student Pratik Sahu also joined Professor Satpathy in Chennai. Main work of the collaboration included strong spin-orbit coupled solids including the formation of the skyrmion state due to Rashba and Dresselhaus spin-orbit interaction.

Carlos Wexler and Craig Kluever (Mechanical Engineering) received a $50,400 grant from the “Enhancing Student Success at Mizzou” program for their proposal "Mechatronics Laboratory: a joint proposal from Physics and Mechanical & Aerospace Engineering Enhancing Student Success at Mizzou” to enhance the PHYSCS 4050/7050 (Electronics Laboratory), creating the ability to reach a larger student audience.

Haojing Yan has been actively working on a number of projects using the James Webb Space Telescope (JWST). This is after a long wait of nearly 20 years. He is one of the seven original co-I's of a JWST Interdisciplinary Scientist program (PI. R. Windhorst at Arizona State University) that has received 110 hours of Guaranteed Time Observations (GTO). This program, which recently changed its name from the "Webb Medium-Deep Fields" (WMDF) to the "Prime Extragalactic Areas for Reionization and Lensing Science" (PEARLS), began to receive data from JWST right after it started science operation. Professor Yan has also been using the public JWST data, which were from a few public surveys done on the community's behalf. Working with his collaborators, he has led two papers on the search for the earliest galaxies in the universe. And more are coming. The redshift frontier is now z~20, when the age of the universe was less than two hundred million years.

Ping Yu received a $100,000 grant from the “Enhancing Student Success at Mizzou” campus program with an additional department cost share of $25,846 for his proposal “Renovation of Advanced Physics Laboratory” to enhance the PHYSCS 4060 (Advanced Physics Laboratory) for room upgrade, instrument acquisition and computer software.

Xiaoqin Zou and her research scientist Xiajin Xu published two recent papers: (1) Guohui Zhang, Xianjin Xu, Zhiguang Jia, Yanyan Geng, Hongwu Liang, Jingyi Shi, Martina Marras, Carlota Abella, Karl L. Magleby, Jonathan R. Silva, Jianhan Chen, Xiaoqin Zou*, and Jianmin Cui, "An Allosteric Modulator Activates BK Channels by Perturbing Coupling Between Ca2+ Binding and Pore Opening", Nature Communications, in press; and (2) Xianjin Xu, Xiaoqin Zou*, "Predicting Protein-Peptide Complex Structures by Accounting for Peptide Flexibility and Physicochemical Environment. Journal of Chemical Information and Modeling, 62: 27–39, 2022.

* represents corresponding or co-corresponding author.

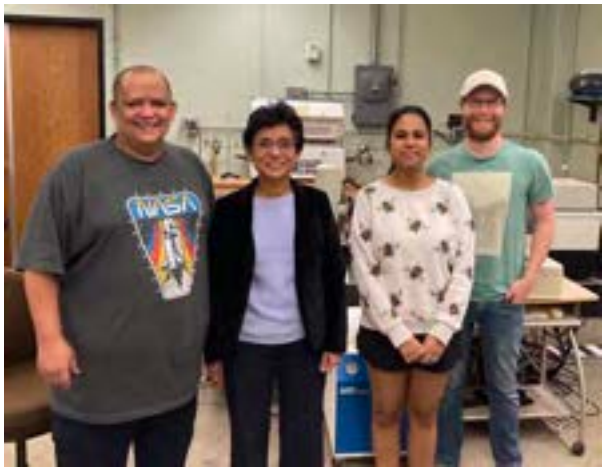
Small World

What do a physics professor, an MU physics alumnus, and MU engineering alumnus all have in common? They like to hike in the mountains. Professor Gavin King and his family traveled to Wyoming for a backpacking trip this summer, meeting up with King's former lab mate and graduate school roommate James Dunning and his family. Dunning is an MU Engineering alumnus, a member of MU Engineering's external advisory board, and … nephew of long-time Physics Leader Donald Packwood (small world!). Packwood, who is 82 years of age, joined the Dunnings and Kings on the backpacking trip and deeply impressed all with his abilities - hiking almost 7 miles with gear on his back for three days in the wilderness. According to Don not being able to carry his 45 pound pack for quite all of the 7 miles in the mountains motivated him to invest in newer lighter equipment for his future backpacking expeditions.

Story contributed by Professor Gavin King and Don Packwood.

Global Connection - From Table Mountain To The Missouri Valley

Professor Christopher Arendse from the University of Western Cape in Cape Town, South Africa, was awarded a Fulbright Grant to conduct research in the Department of Physics and Astronomy for 9 months, starting January 2022. Professor Arendse collaborated with the research groups of Professors Suchi Guha and Paul Miceli on hybrid organic-inorganic perovskite materials. These materials are the front-runners of modern photovoltaics. A research paper, as part of this collaboration, highlighting a unique phase stability in hybrid perovskite films was recently published in ACS Appl. Electron. Mater. (Sept. 2022). This paper appeared as the journal cover page of the Sept. 2022 issue. With his expertise in chemical vapor deposition (CVD), Professor Arendse was instrumental in setting up a system for the growth of 3D to low-dimensional hybrid perovskite thin films. In Spring 2022 he taught a new course to our graduate students on CVD techniques.



Professor Arendse, Professor Guha, graduate students Payal Bhattacharya and John Barron in Profesor Guha's lab

(News from the Chair, Cont. from page 1)

In Condensed-Matter, Professor Guang Bian's group discovered a new semimetal with massless carriers in bismuth atomic layers, which holds potential for energy-efficient electronic applications (Nature Comm. **13**, 4603 (2022)).

Enrollment in our physics courses remains strong and the department offered new courses that engage students in current topics of interest. Professor David Singh developed a new course for physics majors, *Physics of Energy in Technology*, and Professor Giovanni Vignale presented a new course on *Quantum Computing*. Professor Christopher Arendse from the University of the Western Cape (South Africa), who is visiting our department on a Fulbright Fellowship for research with Professor Suchi Guha, presented a well-attended graduate course on *Chemical Vapor Deposition of Thin Films and Nanostructures*.

Recently developed gen-ed courses, *History of Astronomy* and *Everyday Wonders*, continue to attract maximum enrollment from non-majors, as do our other popular gen-ed courses such as *Introduction to Astronomy*, *Life and the Universe*, *Science and Inventions*, and *Physics of Space Exploration*. Our faculty have also worked to improve existing courses by seeking internal competitive funds: significant funds were received by Professor Ping Yu who will expand and improve the *Advanced Physics Lab*, as well as Professor Carlos Wexler who will expand the Electronics Lab course into a collaborative endeavor with Engineering.

There were a large number of noteworthy achievements by our faculty and students over the past year. Dr. Yun Zhang was promoted to Teaching Professor and Dr. Guang Bian was promoted to Associate Professor with Tenure. Dr. Dorina Kosztin (and Assoc. Dept. Chair) received the prestigious award of Curators' Distinguished Teaching Professor, which recognizes her sustained outstanding teaching. Professor Yicheng Guo received the Ann Covington Award, which is a student-nominated award that recognizes outstanding mentoring. Our graduate students have also achieved important recognitions. David Beckwitt received the Green Chalk Award, nominated by undergraduates of the College of Arts and Science and awarded by its Student Council. Randy Burns and Payal Bhattacharya received the competitive Ovshinsky Student Travel Award from the American Physical Society. Our undergraduate majors have received prestigious fellowships and recognitions. Lauryn Williams received a National Science Foundation Graduate Research Fellowship. Brandon Lee and Rory Butler were each awarded Department of Energy graduate fellowships. Brandon also received a Fulbright Scholarship, which he will use to study at the Max Planck Institute for Plasma Physics. Lauryn Williams and Quinn Cunningham received the MU Award for academic distinction.

In alumni news, Dr. Thomas Curtright, Professor at the University of Miami and recipient of the 2021 Physics and Astronomy Distinguished Alumni Award, was named Arts and Science Distinguished Alumni. The award ceremony took place on March 11.

In other department news, this year marked nineteen years that Gay Sturguess has served in our department office. We greatly appreciate her experience and her dedicated service to our faculty and students. We also welcome Susan Korn who recently joined our office staff.

After 35 years as a faculty member in our department, Curators Professor Giovanni Vignale retired this fall. Giovanni has made enormous contributions to our department and we will greatly miss our colleague. He has taken a position at the National University of Singapore and we wish him all the best.

In closing, I want to thank the faculty, students and staff for their enthusiastic hard work as well as thank our Alumni and Friends for their continued interest and support, all of which makes our Department of Physics and Astronomy an outstanding place to explore the world of physics.

Paul F. Miceli

Our Graduates!

Undergraduate Degrees

Fall 2021

Olivia Decker, *Magna Cum Laude, emphasis in Astronomy*
Daniel Rider
Samuel Wingbermuehle

Spring 2022

Maya Alberhasky
Jordan Asmus, *Summa Cum Laude*
Jordan Bavlnka
Rory Butler, *Cum Laude, emphasis in Materials Science*
Blain Coker, *emphasis in Astronomy*
Quinn Cunningham, *Magna Cum Laude*
Bradley Faison
Savannah Feterl, *emphasis in Astronomy*
Miles Goodwin, *emphasis in Biophysics*
Nathan Holtmeyer, *Cum Laude*
Steven Hutto
Ben Krewson, *Summa Cum Laude*
Brandon Lee, *Summa Cum Laude*
Ian Miller, *Summa Cum Laude*
Hunter Pickering
Cierra Presson, *Summa Cum Laude, Department Honors*
Tanner Williams, *Magna Cum Laude, emphasis in Biophysics*
Lauryn Williams, *emphasis in Astronomy, Department Honors*
Jacob Wolfgeher

Departmental Honors requires > 3.5 GPA in physics courses, completion of 6 credit hours of research, and a publication or presentation (oral or poster).

A Certificate in General Honors from the MU Honors College requires students to complete 24 hours of courses for honors credit and maintain a 3.5 cumulative GPA.

To receive Latin honors from our College of Arts and Science requires at least 54 of the student's last 60 hours at MU and:

3.7 – 3.799 GPA for Cum Laude
3.8 – 3.899 GPA for Magna Cum Laude
3.9 – 4.0 GPA for Summa Cum Laude

Graduate Degrees

Masters Graduates

Fall 2021
Alec Martin
Pousali Ghosh
Teja Teppala

Summer 2022
Dillon Balthrop
David Beckwitt
Amarnath Chakraborty
Ehsan Faridi
Moudip Nandi

Ph.D. Graduates:

Fall 2021
Matt Anderson
Sean Fayfar
Yuanzhe Zhou

Spring 2022
Alex Bretana
Chenxiaoji (Jimmy) Ling
Todd Lombardi

Summer 2022
Sicheng Zhang

Student Awards, Scholarships, & Recognition

Many fellowships, scholarships, and other funds have generously been established and supported by our alumni. These students were the recipients of these funds and awards for the academic year 2021-2022 and summer 2022.

Undergraduate Student Scholarships

Paul E. Basye Undergraduate Scholarship

Nicholas Childers, Brandon Lee, James McMillen, Allison Salamone

Rose Marie Dishman Endowed Scholarship in Physics
Quinn Cunningham

Newell S. Gingrich Physics Scholarship Fund
Drake Sivils, Cole Vogt

Eugene B. Hensley Scholarship in Physics
Corey Valleroy

Ernest W. Landen Fellowship in Physics
Cierra Presson

Samuel S. Laws Scholarship
Jayden Francois

Melvin Y. Mora Undergraduate Scholarship Fund
Quinn Cunningham, Jayden Francois, Cole Vogt

Donald L. and Lona Lewis Packwood Endowed Undergraduate Scholarship Fund in Physics
Ian Miller, Nathanial West

Clifford W. Tompson Scholarship in Physics
Luke Lindberg, Ashlyn Morrison, Drake Sivils

Graduate Student Scholarships

Carl & Brynn Anderson Graduate Student Award Fund in Physics
Amarnath Chakraborty

Rose Marie Dishman Endowed Scholarship in Physics
Gourab Nandi, Bangzheng Sun

James L. and Dora D. Fergason Fund for Excellence in Physics:
Dillon Balthrop, John Barron, Randy Burns, Dylan Chiaro, Clayton Conner, Arash Ghobadi, Jiasen Guo, Ishan Pathak, Pratik Sahu, Deepesh Sigdel, Ryan Smith, Mitch Vaninger

Newell S. Gingrich Physics Scholarship Fund
John Barron, David Beckwitt, Deepesh Sigdel,

Newell S. Gingrich Physics and Astronomy Endowment
Clayton Conner, Vishal Jayswal, Charles Mentzer, Bangzheng Sun

Eli Stuart Haynes and Nola Anderson Haynes Scholarship Fund
Gourab Nandi

Eugene B. Hensley Scholarship in Physics
Randy Burns

Ernest W. Landen Fellowship in Physics
Dillon Balthrop

B. H. Rose Endowment Fund
Sadie Nickles

Guy Schupp Scholarship Fund
David Beckwitt

O. M. Stewart Scholarship
Dallar Babaian, Payal Bhattacharya, Jacob Cook, Alex Daykin, Harold Diaz-Quiroz, Ehsan Faridi, Tapesh Gautam, Pousali Ghosh, Aaron Gulliams, Stephen Klue, Victoria Kuhn, Creighton Lisowski, Qiangsheng Lu, Tsumuraya Mari, Connor Nance, Moudip Nandi

Graduate Student Awards

Ron Boain and Catherine Rangel-Boain Dissertation Awards (fall 2021)
First Place: Travis Hurst
Second Place: Lisa Shepard

Harry E. Hammond Teaching Assistant Award
Dallar Babaian, David Beckwitt, Payal Bhattacharya, Randy Burns, Jacob Cook, Creighton Lisowski, Sadie Nickles, Dylan Weaver

Ron Boain and Catherine Rangel-Boain Travel Award
Dillon Balthrop, John Barron, Payal Bhattacharya, Amarnath Chakraborty, Vishal Jayswal, Creighton Lisowski, Todd Lombardi, Katherine Schaefer, Deepesh Sigdel, Ryan Smith, Dylan Weaver

Green Chalk Award

David Beckwitt, graduate student in the Department of Physics and Astronomy, is this year's recipient of the Green Chalk Award from the College of Arts and Science. Nominations are only accepted from current A&S undergraduate students and the awardees are chosen by the entire body of the A&S Student Council. Representatives of the A&S Student Council and Associate Dean Nicole Monnier, surprised David with the award during a regular PAGSA meeting.

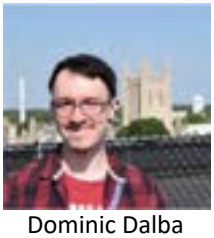
Our New Graduate Students


Mohamed Abousetit


Abeeb Ajibade


Bipin Bhattarai


Jenna Bologa


Dominic Dalba


Tony Dorhauer


Bradley Faison


Dilan Gamachchige


Indeewari Herathlage


Pavel Medina


John Miles


Dayton Simpkins


Kishlay Singh

Student News

PAGSA

PAGSA Officers L to R:
David Beckwitt (President), Dallar Babaian (Social Events Chair), Charles Mentzer (Vice President), Creighton Lisowski (Secretary), Dylan Weaver (Educational Communications Chair), Teja Teppala (Outreach Officer), Dillon Balthrop (Treasurer)

With Covid-19 mostly behind us, PAGSA (Physics and Graduate Student Association) came back strong this year with objectives to improve student-faculty relations, increase the frequency of social events, provide support for mental health challenges, and bring opportunities to our graduate body that would otherwise be unnoticed.
Our entire department started the year with a bowling night out, with a fantastic turnout of students and faculty! With such a great start, our monthly social events, such as game and movie nights, were terrific at keeping the department connected leading up to our Spring picnic, in which almost the entirety of the department came with students receiving awards throughout. Journal club events, dubbed TAP Hour, were a hit with the department, and the less formal conversations with invited faculty have led to graduate student-advisor pairs.

When Fall started, a massive, department-wide Orientation Banquet welcomed the new cohort, followed by our annual Fall Welcome Picnic, each hosted by PAGSA. To help support the incoming cohort, the new peer-based mental health support system, PhysAssist, was formed to provide a forum to receive help from more senior graduates who obtained Counseling Resource training with Mizzou. Along with mental health, PhysAssist has had many P&A graduate mentors matched with 1*st*/2*nd*-year mentees to provide research and academic guidance. Additionally, our senior TAs developed the TA Archive on Canvas and, in conjunction with faculty, led the TA training to assist newer TAs, giving information on how to do labs, common questions to expect, and lab setups.

PAGSA strived to reach out to the community and led outreach efforts at Rock Bridge High School, Jefferson Middle School, and hosted an open house in the P&A department for elementary-aged children. We began advocating for minority workplace rights through the Coalition of Graduate Workers and our PAGSA's new Equity Taskforce. Furthermore, we've started engaging in inter-departmental events to promote collaborative work and community enrichment.

With all of this behind us, it's exciting to see what's in store for PAGSA this next year! Thank you to all our officers, committee chairs, and program directors for their incredible work in giving back to our community.

News contributed by PAGSA president David Beckwitt

follow “Mizzou Physics and Astronomy Graduate Student Association” on Facebook

PAGSA Bowling night: students and faculty

Society of Physics Students

This semester, very similar teams of undergraduate students are working together to lead the Society of Physics Students, MU Student Astronomical Society, and Sigma Pi Sigma in different roles, allowing us to cooperate with ease; we're looking forward to a year of inter-org events. The Society of Physics Students recently held our third meeting of the semester in conjunction with MUSAS, looking to balance our academic interests with some rest and relaxation by watching the sci-fi movie The Hitchhiker's Guide to the Galaxy. We previously hosted an SPS 'Welcome' event and were invited to do some Q&A with the Undergraduate Seminar in Physics class. Our last meeting consisted of pizza and physics Jeopardy! Try answering one of our harder questions: This lesser-known particle physicist worked on the Manhattan Project, improved Fermi's theories about beta decay, and disproved the conservation of parity.....[Answer: Who is Dr. Chien-Shiung Wu?]

Additionally, we're hoping to have a little safe fun with liquid nitrogen and talk about the 2022 Nobel Prize in Physics at some of our upcoming meetings this fall. SPS meets every other Monday from 6-7PM in the Physics Lounge or Library.

News contributed by SPS President Emma Burton

MUSAS Treasurer Max Sanson prepares to use Professor Kosztin's water bowl to demonstrate standing resonance in water at a spring SPS meeting.

Sigma Pi Sigma

Eight undergraduate students and three graduate students were inducted in the MU chapter of Sigma Pi Sigma this spring. The new members are: (undergraduates) Riley Satterfield, Logan Murray, Logan Chambers, Nick Gardner, Matthew Dygert, Alli Salamone, Maximus Sanson, Nathan Holtmeyer, (graduates) David Beckwitt, Dallar Babaian, Teja Teppala.

For some background, Sigma Pi Sigma exists to honor outstanding scholarship in physics, to encourage interest in physics among students at all levels, to promote an attitude of service, and to provide a fellowship of persons who have excelled in physics. Election is a lifelong membership and includes a year complimentary membership in the Society of Physics Students (SPS).

New Sigma Pi Sigma inductees. Front row: Emma Burton, Maximus Sanson, Riley Satterfield, Alli Salamone, Dallar Babaian, Cierra Presson. Back row: Logan Murray, Nick Gardner, Nick Childers, Matthew Dyggert, David Beckwitt, Nathan Holtmeyer

Sigma Pi Sigma is an organization of the American Institute of Physics, and a member of the Association of College Honor Societies. Founded in 1921, there are more than 90,000 historical members. Congratulations to all new members!

MU Astronomy Club

The astronomy club, MUSAS, is undertaking lots of exciting projects this year! We have begun doing monthly stargazing at the Eagle bluffs conservation area (since TBD?) where we have a special permit to stay past closing. We also are working on a t-shirt design with club members that takes inspiration from Van Gogh's starry night, as well as member-designed posters to advertise our meetings. Next semester we are planning to take a trip to the Black Mesa state park, a Bortle class 1 dark sky location. Lastly, regular meetings take place every other week in the physics lounge from 5-6PM featuring trivia nights, astronomy themed holiday activities, and other engaging events for the members. You can find more information about our meetings and sign up for email notifications on our MU Engage page (https://engage.missouri.edu/MUSAS/club_signup).

News contributed by Patrick Hayden
Officers: President, Patrick Hayden; Vice-President, Gracye Allen; Secretary, Emma Burton; Treasurer, Maximus Sanson.

Photo from first stargazing event at Eagle Bluffs.
Photographer: Patrick Hayden

Laws Observatory Outreach

Laws Observatory on top of the Physics Building continues to be used for outreach and education on a weekly basis. Wednesday night viewing for the public has been open (weather permitting) all of the past year after being closed for much of 2020 and 2021 due to the Coronavirus pandemic. The events are run by student volunteers and by **Valentine German** and **Randall Durk** of the Central Missouri Astronomical Society.

Follow "Laws Observatory" on Facebook

Wednesday evenings on the roof: (1) visitors enjoy the Mizzou skyline as well as the stars, (2) beautiful sunset view (due to smoke from fires in the west), (3) the ISS streaks by a little after 8:30 pm. ISS photo made with a phone camera by Aerospace Engineering student Vladyslav Sazhen.

2021 Physics Leaders Meeting

Due to the pandemic we once again converted the usual two-day fall Physics Leaders meeting to two single-day virtual meetings on November 12, 2021 and April 15, 2022. The fall meeting included reports by Department Chair Paul Miceli, Suchi Guha, Director of Graduate Studies and Silvia Bompadra, Director of Undergraduate Studies. Acting Dean Cooper Drury (selected as Dean a few weeks later in May) discussed both the challenges and successes in the College of Arts & Science over the last year.

The annual department awards were presented virtually:

Faculty Recognition Award Recipients (2021)
Silvia Bompadre
Dorina Kosztin
Yun Zhang

Ronald J. Boain and Catherine J. Rangel-Boain PhD Dissertation Awards (2021)
First Place: Travis Hurst
Second Place: Lisa Shepard

2021 Department of Physics & Astronomy Distinguished Alumni Award
Paul Miceli presented the department Distinguished Alumni Award to Thomas Curtright who was in virtual attendance. Dr. Curtright (BS in Physics, 1970), a theoretical physicist, was recognized for his work in in the behavior of systems under scale transformations, quantum mechanics in phase space, high-spin fields (just to name a few) resulting in seminal contributions to these and other fields of theoretical physics. He was recognized as well for his relationship with our department over the years. Dr. Curtright was again honored later in the year when he received an Distinguished Alumni Award from our College of Arts & Science. Our department is honored to have Dr. Curtright as an alumnus.

The spring virtual meeting focused on our student presentations to the leaders. Three undergraduate and three graduate students participated; all presentations were outstanding. The leaders selected the following awardees:

Undergraduate Presentations

First place (tie):
Cole Vogt (Advisor Professor Haojing Yan) for "*Revisit of Morphological Types of ULIRG Host Galaxies in the Local Universe: Irregular vs. Disky"*
Ben Krewson for "*Defect Dynamics of Quenched Stripe Patterns"*

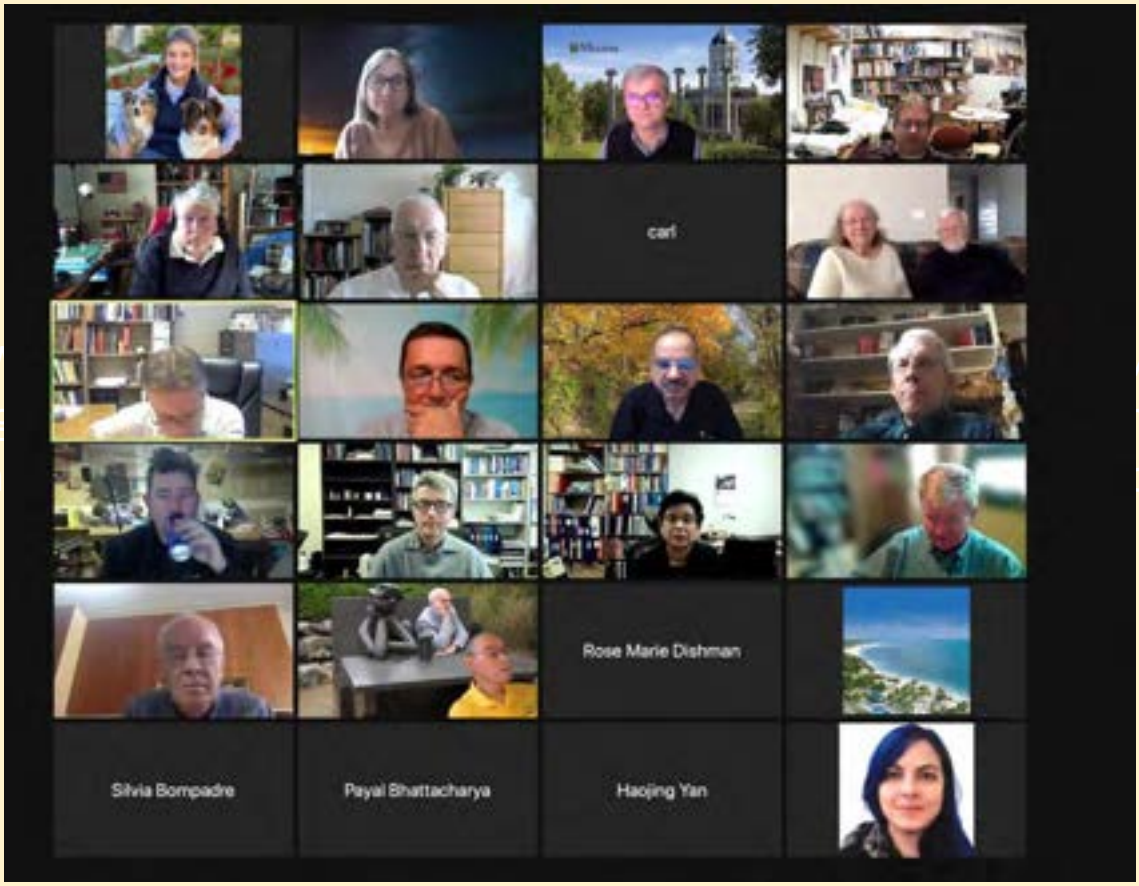
Third Place: Troy Schneider for "*Structured Glass-Ceramic Scintillators"*

Graduate Pressentations

First place: Creighton Lisowski (Advisor: Professor Ioan Kosztin) for *"Automated Detection and Identification of Membrane Proteins in Atomic Force Microscopy Images Using Machine Learning"*

Second Place: Dylan Weaver (Advisor: Professor Gavin King) for *"The Conformations and Basal Conformational Dynamics of Translocation Factor SecDF Vary with Translocon SecYEG Interaction"*

Third place: Amarnath Chakraborty (Advisor: Professor Giovanni Vignale) for **"***Faraday Rotation in Birefringent Nonsymmorphic 2D Material"*



An assortment of the virtual attendees at the fall meeting

Dr. Curtright receives A&S Distinguished Alumni Award from Dean Cooper Drury in spring 2021

Graduate student David Beckwitt received the Green Chalk Award at the same A&S ceremony. (Beckwitt with Dr Curtright)

Spooky Connection to the Nobel Prize

The 2022 Nobel Prize for Physics was awarded to three researchers (Alain Aspect, John F. Clauser and Anton Zeilinger) for their pioneering experiments inentangled photons and quantum information science. Professor Emeritus **Sam Werner** provided this photo of himself (second from left) and his good friend Anton Zeilinger (left) taken at Zeilinger's 70th birthday celebration in Vienna in 2015.

In Memoriam

Many of our alumni will remember **Sam Potts**, the previous supervisor of the Physics Machine Shop. We were sorry to learn that Sam passed away July 28th. Retiring in 2011 after 25 years at the university, he helped us design and build numerous projects over the years in our research laboratories.

If you know a young high school student interested in a science career, there are many options with a degree in physics. Have them check out our department by using the contact information to the right, and https://physics.missouri.edu/undergrad/resources

To Visit the Department Contact
MU Office of Admissions
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