

**TOP STORY: CSU'S SPS CHAPTER PREPARES FOR THE 2025 SIGMA PI SIGMA PHYSICS AND ASTRONOMY CONGRESS IN DENVER CO.**

This year the Sigma Pi Sigma ( $\Sigma\Pi\Sigma$ ) Physics Honors Society together with the Society of Physics Students (SPS) will host 2025 Physics and Astronomy Congress in downtown Denver Colorado on Oct 30-Nov 1. The



Congress is the world's largest conference for undergraduates interested in physics and astronomy. Supported by the American Institute of Physics (AIP) this event is expected to bring more than 1200 undergraduates, some alumni and faculty, and established scientists and leaders in physics and astronomy for three days of exciting physics, professional development

and career guidance workshops, direct interaction with renowned scientists and Nobel Laureates, tours of physics research centers in



Denver metro area, and networking. This year's conference is 18<sup>th</sup> Congress of the Sigma Pi Sigma since it first convened in 1928 on the campus of Davidson College. This unique event grew from a gathering a few chapters to tri-annual modern congresses that

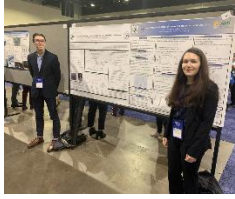


bring together thousands of physics and astronomy undergraduates from hundreds of institutions. The theme of 2025 congress is "*Supporting our Phase Shifts*" and its goal is to help physics and astronomy students to shift into the next phase of their career, independent of what it is. The highlights



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of the 2025 Congress include five plenaries with outstanding plenary speakers (Jocelyn Bell Burnell, Eric Cornell, Sara Horst, Donnel Walton, Juliane Polard-Larkin), seven tours (NIST, NREL, NOAA, USAFA, Colorado School of Mines, UC Boulder, Colorado State), 17 workshops (e.g. Resume Clinic, National Lab Panel, Physics Outreach, Be a



Shark, Grad School Panel, Careers in Sustainability, Climate Physics, Science Communication, Physics for Humans, Medical Physics Panel, etc), two poster sessions with art exhibits, one chapter showcase, one graduate school fair, and one dance party (for details see: <https://students.aip.org/congress>).

CSU's chapter of SPS has sent three delegations of CSU students to the last three Congresses. Each delegation had a direct monetary support from CSU Physics alumni and friends (Thank you very much from the bottom of our hearts!). Most of CSU students that participated in the previous congresses (2016, 2019, and 2022) have described them as a life-changing experiences!

In 2016, eight undergraduates (C. Gunder, D. Terrano, I. Tzuper, S. Tietjen, T. Dobrila, D. Adams, W. Myers, C. Tolbert), two graduate students (J. Flaherty, A. Smith), and Dr. S attended the 15<sup>th</sup> Congress themed *"Unifying Fields"* in San Francisco, CA. The team toured together Stanford Linear Accelerator Center (SLAC), listened to plenaries by distinguished scientists (James Gates, Patrick Brady, Jocelyn Bell Burnell, Eric Cornell, Persis Drell) and took pictures with them, participated in workshops, went to a graduate school fair, presented five research posters (won an award for Ilona's!), Samantha Tietjen with Drace Adams and Cameron Tolbert wrote an article about SLAC tour for the Radiations magazine (<https://students.aip.org/radiations/slac-touring-the-eighth-wonder-of-the-world>) and, we all explored



San Francisco's Golden Gate Bridge, Russian Hill, Cable cars, Ghirardelli Square, the Fisherman's Wharf.

In 2019, seven undergraduates (S. Tietjen, A. Scherer, T. Lincheck, M. Alberto, Z. Almusawi, J. Thompson, R. Livellara) and Dr. S went to 16<sup>th</sup> Congress themed *"Making Waves and Breaking Boundaries"* in Providence RI. The team split to tour various sites (Woods Hole Oceanographic Institute, Optikos company, and Naval Submarine Base in New London, CT), attended the plenary sessions (by John Mather, Jocelyn Bell Burnell, Ellen Williams, Sandeep Giri, Jami Valentine Miller) and asked questions there, went through several workshops, got inspired by demos done by Bill Phillips (Physics Nobel Laureate) at Brown University (which led to the successful Marsh White proposal for outreach by CSU's Andrew Scherer <https://www.spsnational.org/awards/marsh-w-white-outreach-award/2021/cleveland-state-university>), presented five research posters, had a table at the SPS chapter showcase, and, of course, explored both Boston and downtown Providence.



In 2022, six undergraduates (P. Herron, J. Miller, C. Douglas, J. Forester, J. Stefanov, J. Tomaras) and Dr. S participated in the 17<sup>th</sup> Congress “100 Years of Momentum” that celebrated 100 years of Sigma Pi Sigma Physics Honors Society in Washington DC. The team split to tour various sites (NASA Goddard, University of Maryland, Green Bank Observatory - read a reflection about this trip by Jordan Miller with Patick Herron in the Spring 2024 SPS Observer: <https://students.aip.org/observer/a-night-at-green-bank-observatory>), listened to great plenaries (by James Gates, Eric Cornell, John Mather, Sara Horst, Juliane Polard-Larkin, K. Renee Horton, Rush Holt Jr), presented six research posters, attended workshops, highlighted our chapter at the SPS chapter showcase, enjoyed the centennial party, and, of course, had a great bonding experience exploring national monuments in Washington, DC.



All three trips (2016, 2019, 2022) to the Sigma Pi Sigma Congresses were made possible by donations from CSU physics alumni and friends (most coming from through the CSU’s Giving Day Fundraising). Thank you very much for making these life-changing experiences possible for CSU students!!! Additional help came from the National SPS, CSU’s Student Government Association, CSU’s College of Sciences and Health Professions, and CSU’s Physics Department.

**PLEASE CONSIDER DONATING TOWARDS 2025 PHYSICS AND ASTRONOMY CONGRESS in DENVER CO  
USING CSU’S GIVING DAY DRIVE**



**THE NEW DRIVE OPENS ON FEBRUARY 27, 2025, AT 12 AM AT:**  
<https://www.csugivingday.com/giving-day/94308/department/94342>

**THANK YOU IN ADVANCE ON BEHALF OF OUR STUDENTS**



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## CSU NATIONALLY: PHYSICS PROFESSOR CONTINUES HIS WORK TO IMPROVE CLIMATE AND WEATHER MODELS THROUGH IMPROVED SIMULATIONS



Dr. Thijs Heus, an associate professor in the Department of Physics, is leading Cleveland State’s activities funded by two new grant awards, which together total over \$1 million in funding, focused on improving climate and weather modeling.

In collaboration with Dr. John Peters of Penn State University and CSU postdoctoral researcher Dr. Girish Raghunathan, Dr. Heus is investigating both shallow clouds and deep convective thunderstorms under a project titled, “Contrasting Shallow and Deep Convection over Bankhead National Forest.” The goal is to apply lessons learned from one field to the other, with a focus on mixing between clouds and environment, the onset of rain, and transition of one type of clouds to the other. The team will combine large-scale climate models with highly detailed simulations using the recently updated MicroHH model. The MicroHH simulations will utilize observations from the Department of Energy measurement site in the Bankhead National Forest in Alabama. Dr. Heus developed part of the original MicroHH model with support from Cleveland State’s Faculty Research and Development (FRD) program. Dr. Peters and Dr. Heus are both members of Site Science Team for the Bankhead observatory.

Dr. Heus is also part of a team led by Dr. Tim Wagner of the University of Wisconsin-Madison and including collaborator Dr. Dave Turner from the National Oceanic and Atmospheric Administration (NOAA) that is working on a project titled “Characterizing Boundary Layer Processes During Transition Periods with Observations and Modeling.” The work focuses on the morning and evening transitions of the atmospheric boundary layer (i.e., sunrise and sunset). During these periods, temperature and turbulence in the atmosphere rapidly changes, which causes challenges for weather and climate modeling. The details of the atmospheric flow depend strongly on the interaction with the land, including moisture content and vegetation among other factors. The study of these interactions also utilizes the MicroHH model and observational data from the Department of Energy’s Bankhead National Forest site and the Southern Great Plains site in Oklahoma.

Early results from this grant include the PhD work of 2024 CSU graduate Dr. Tessa Rosenberger, who developed an improved method of detecting heat and moisture variability in a changing atmospheric boundary layer, and studies on how the atmosphere responds to rapid changes, such as the solar eclipses we saw last year.

CSU’s High Performance Computing Resource, the Viking Cluster, is powering the modeling and data analysis performed by Dr. Heus’s lab.

(this article is reprinted from the CSU’s Office of Research page: <https://www.csuohio.edu/research>)

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## PHYSICS GIVING DAY SCHOLARSHIP AWARDED TO JACOB FORESTER AND GRACE MILLER

Thanks to generous support from the Physics Dept alumni and friends during the 2024 CSU's Giving Day, each semester the department awards one Giving Day Physics Scholarship. A recipient is chosen by the undergraduate curriculum committee based on students' academic merit, contributions to the department, and research achievements. The 2024-2025 academic year recipients are Jacob Forester and Grace Miller. Below each of them expresses their gratitude for the scholarship support:



**Grace Miller** (BS Honors Physics and BS Honors Math candidate, Spring 2025; SPS co-president/treasurer; physics undergraduate TA; undergraduate researcher with Dr. Bickel), Spring 2025 recipient of the Giving Day Physics Scholarship

*"I would like to thank all of the Cleveland State Physics Alumni and friends who have contributed to funding this scholarship. Receiving the Giving Day Scholarship will allow me to focus strongly on academics this upcoming*

*semester, as well as make a seamless transition to graduate school this fall. I am overly grateful to be a part of such a fantastic department; The unwavering support from peers, faculty, and alumni has made a large impact on my career as a scientist. Thank you again to anyone that contributed to making the Giving Day Scholarship a possibility!"*



**Jacob Forester** (BS Physics and minor math and minor computer science candidate, Spring 2025; SPS co-president; physics undergraduate TA; undergraduate researcher with Dr. Heus), Fall 2024 recipient of the Giving Day Physics Scholarship

*"Receiving the Giving Day Physics Scholarship in the Fall of 2024 enabled me to succeed in a 15-credit hour, upper division physics and computer science course load. Without the scholarship, my financial stress would have been significantly greater, and I would have had to allocate less time towards school and more towards work - your help*

*allowed me to focus on my education. I am very grateful and honored to have received the scholarship."*

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## RECENT GRADUATE HIGHLIGHT: MS PHYSICS GRADUATE ENTERS PHD PROGRAM IN OPTICAL SCIENCE AND ENGINEERING AT THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE



Paranthaman Subramaniam earned a Master of Science in Physics degree from Cleveland State University (CSU) in the Fall 2024, specializing in Optics and Materials. During his time at CSU, he conducted research under the guidance of Dr. Sebastian Sensale Rodriguez (Physics), Dr. Petru Fodor (Physics), and Dr. Chandra Kothapalli (Chemical and Biomedical Engineering). His academic journey included hands-on experience in advanced optics, particularly through the Advanced Optics Lab led by Dr. Kiril Streletzky. He also worked as a graduate teaching assistant for the Physics Department and participated in the 2024 Eclipse outreach

by CSU's Physics Department graduate students at the at Natividad Pagan academy in Cleveland.

Building on this strong foundation, Paranthaman has embarked on a new path, after being accepted into the Ph.D. program in Optical Science and Engineering at the University of North Carolina at Charlotte. At the University of North Carolina at Charlotte, Paranthaman is dedicated to completing his doctorate while advancing cutting-edge research in the field of optoelectronics.

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A LETTER FROM A RECENT MS PHYSICS GRADUATE, ISAAC OPPONG YEBOAH, A NEW PHD MATERIAL SCIENCE & ENGINEERING STUDENT AT UNIVERSITY OF HOUSTON



Physics Department at CSU played a pivotal role in shaping my academic and professional growth. The rigorous coursework and research opportunities provided me with a strong foundation in optics and materials science, allowing me to develop the analytical and problem-solving skills essential for my research in photocatalytic materials. The department's commitment to fostering a collaborative and intellectually stimulating environment encouraged me to push boundaries and explore new frontiers in material characterization and energy applications. One of the most impactful aspects of my time at CSU was the mentorship and guidance from faculty members. My advisor, Dr. Sensale Rodriguez, provided invaluable support, challenging me to think critically and approach problems from a multidisciplinary perspective. His expertise and encouragement gave me the confidence to undertake complex research projects, preparing me for the demands of a PhD program.

Additionally, my experience as a Teaching Assistant at CSU allowed me to refine my ability to communicate complex scientific concepts effectively. Teaching undergraduate physics labs not only strengthened my understanding of fundamental principles but also reinforced my passion for mentoring and inspiring the next generation of scientists. The support from faculty and peers in the department created an environment where I could grow both as a researcher and as an educator.

Beyond academics, the research opportunities at CSU exposed me to advanced computational techniques and experimental methods, which have been instrumental in my transition to the University of Houston. Working on projects related to dielectrophoretic devices, and nanoparticle trapping expanded my expertise in applying the fundamentals to my research. These experiences laid the groundwork for my current research in photocatalysis and energy materials, equipping me with the necessary skills to navigate the challenges of cutting-edge scientific inquiry. Moreover, the sense of community within the department made my journey at CSU truly special. The encouragement from faculty, staff, and fellow students created an environment where I could thrive. Whether it was early mornings in the lab troubleshooting experiments equipment or engaging discussions in SPS seminars, every experience contributed to my growth as a scientist.

As I embark on my PhD journey at the University of Houston, I carry with me the lessons, skills, and values instilled in me by the Physics Department at CSU. The department has not only shaped my academic path but also reinforced my belief in the power of scientific research to address global challenges. I am deeply grateful for the opportunities and mentorship I received, and I look forward to applying this knowledge to make meaningful contributions in the field of materials science and engineering.

Issac Oppong Yeboah

ALUMNUS HIGHLIGHT: A NEW PHD IN PHYSICS (RAISED AND NURTURED BY CSU) IS BORN!



On November 19, 2024, Justin Flaherty '16 '18 (BS Physics Honors/BS Math Honors, MS Physics) successfully defended his Ph.D. thesis in Physics entitled “*Reconstruction of Radio Emission Using the Askaryan Radio Array*” at the Ohio State University (OSU) in Columbus Ohio.

Justin graduated Magna Cum Laude from CSU in 2016 completing his BS Honors Physics and BS Honors Math majors. He then earned MS Physics (Optics and Materials track) from CSU in 2018. While at CSU, in addition to excelling in rigorous dual major academics, Justin participated in numerous undergraduate and graduate research projects. He conducted research on light scattering, optical trapping, and computational atmospheric physics under Drs. Streletzky, Resnick, and Heus, respectively. His research with Dr. Resnick led to Justin’s first author peer-reviewed publication. As an undergraduate, Justin served as treasurer and president of CSU’s chapter of the Society of Physics Students (SPS) for three years. He led CSU’s SPS chapter in organizing Physics Olympics, Catapult Contest, Physics Jeopardy, and other campus wide events. Justin was also instrumental in organizing a physics student conference (2015 SPS Zone 7 Meeting) at CSU. In addition, Justin was a popular undergraduate and graduate Teaching Assistant for the Physics department teaching many physics labs. For his academics, research achievements, SPS leadership, and teaching Justin won 2016 Outstanding Physics Senior Award.

During his PhD studies at OSU, Justin researched ultra-high energy neutrinos from extra-galactic sources at the Center for Cosmology and Astroparticle Physics (CCAPP) in the group of Dr. Connolly. His project focused on a search for neutrinos using radio waves in two experiments based in Antarctica. One of those experiments is Askaryan Radio Array (ARA) which is an in-ice experiment at the South Pole that looks for neutrinos year-round. In fact, in 2023 Justin was sent to the Antarctic Amundsen-Scott South Pole Station for a couple of weeks to perform maintenance on ARA experiment.

Currently, Justin is transitioning into a Postdoctoral Fellow position at the OSU in the Dr. Beatty’s group. There he will be working on the HELIX (High Energy Light Isotope eXperiment) and PUEO (Payload for Ultrahigh Energy Observations) experiments, which study cosmic rays and neutrinos, respectively. The HELIX experiment flew earlier this year out of Sweden, while PUEO is slated for launch out of Antarctica in December 2025. Justin will be assisting in the analysis of the HELIX data and getting PUEO constructed for launch.



Please join us in congratulating Justin on finishing his Ph.D. and starting his postdoc at the OSU!

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ALUMNUS HIGHLIGHT: ANOTHER NEW PHD (RAISED AND NURTURED BY CSU) IS BORN!



On September 24, 2024, Nicholas Barron '18 (BS Physics Honors) defended his Ph.D. thesis in Meteorology and Atmospheric Science titled “*Investigating the Characteristics and Dynamics of Convective Updrafts in Tropical Cyclone Rainbands*” from Pennsylvania State University, in College Park Pennsylvania.

Nick graduated Cum Laude from CSU in 2018 completing his BS Honors in Physics with Math minor. While at CSU Nick was heavily involved in undergraduate research with Dr. Thijs Heus. His main research focus was on using a Bayesian statistics model to recreate area distributions of shallow cumulus clouds from 1D measurements. This research led to a peer review publication with Nick being a first author on it. His research was also presented at multiple national conferences.

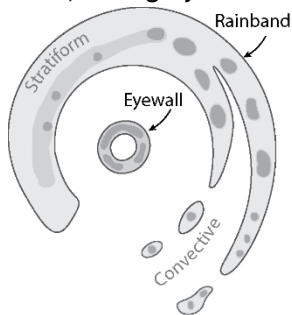
Nick went on for a PhD study in Meteorology and Atmospheric Science at Penn State University where he studied properties of convective updrafts in tropical cyclones by comparing airborne radar observations and numerical weather simulations under guidance of Dr. Anthony C. Didlake. After finishing his PhD, Nick joined the group of Dr. Brad Klotz at the National Center for Atmospheric Research in Boulder, Colorado to work on an airborne phased array radar as a postdoctoral fellow.

Please join us congratulating Nick with his Ph.D. and wishing him luck at his new position. For details on Nick’s Ph.D. research and research plans as a postdoc please see the Alumni Research Highlight.

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ALUMNI RESEARCH HIGHLIGHT: USING PHYSICS IN ATMOSPHERIC RESEARCH BY N. BARRON

I defended my Ph.D. thesis in Meteorology and Atmospheric Science from Penn State titled *Investigating the Characteristics and Dynamics of Convective Updrafts in Tropical Cyclone Rainbands*. For a bit of background, a single convective updraft can be considered an isolated thunderstorm. A tropical cyclone (TC) organizes many, many of these thunderstorms into bands of heavily precipitating thunderstorms (i.e., a rainband) that rotate around the center, or eye, of the storm (see the graphic below; dark grey contours mark convective updrafts).

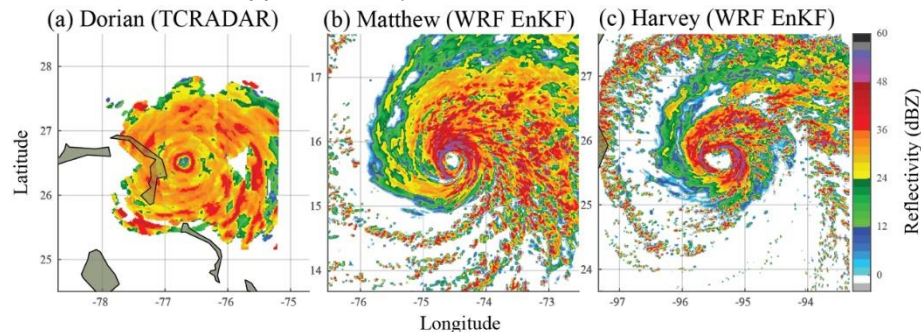


Each of these updrafts can generate a large amount of energy for TCs, primarily via condensational heating (water vapor in the atmosphere collects onto liquid water droplets in clouds) that can be advected into the eye of the storm by the inward spiraling wind. Many recent studies have proposed pathways starting from rainband convective updrafts that lead to rapid intensification, eyewall replacement cycles, and other difficult-to-predict phenomena—many of which directly change the size or intensity of the storm. While predictions of the location and time of landfalling TCs have become reasonably accurate over the past few decades, predictions of intensity are still inadequate. This is where my work comes into play; we wanted to understand how the environment (both small (< 20 km) and larger scales (~ 200 km)) controls the topology, location, intensity, and longevity of convective updrafts. We approached this problem by comparing and analyzing airborne radar observations and several high-resolution numerical weather simulations of TCs. These radar observations are the best real data available on TCs and provide two variables: radar reflectivity and velocity.

Radar is like magic—I’m amazed every day by it—and if you’ve taken Physics I and II, you all know how it works, too! First, a radar antenna emits a microwave-wavelength electromagnetic wave toward a meteorological object (a cloud, for example). An electromagnetic wave is just light (granted, light that we as humans cannot see), so the antenna, quite literally, blinks like a flashlight shooting into the sky.



A single water molecule is made of two hydrogen and one oxygen atom; atoms are made of protons (and neutrons) surrounded by a cloud of electrons, both of which are charged particles. Now, putting this all together, water molecules are polar, and like a magnet, they have a positive and negative end. So, when the electromagnetic wave illuminates them, the water molecules shift back and forth, at the same frequency as they experience the light, to align themselves with the wave. Finally, whenever charges are accelerated, they actually emit their own light—in our case, light that the antenna can measure! The amount the antenna receives is directly related to the amount of water within the observed region; this is the radar reflectivity. And, as in the Doppler shift in sound, the difference in returned frequency from emitted frequency can tell us how quickly the average water droplet (or wind) is moving relative to the radar; this is the Doppler velocity.



On the left are three plan view graphics of the radar reflectivity (or simulated reflectivity) for Hurricanes Dorian (radar observation), Matthew (simulation), and Harvey (simulation).

For my postdoc, I am working with a new airborne phased array radar at the National Center for Atmospheric Research in Boulder, Colorado. Phased array radar are like regular radar, but instead of a single large antenna that is rotated around, many smaller antennae use constructive and destructive interference to “move” the beam. Light is a wave, so let’s imagine standing at the pond’s edge with a stone in each hand. If we drop a single stone, we will create a single pattern of ripples. If we drop two stones simultaneously, the two patterns interfere so that there will be a more prominent amplitude wave crest directly between them, propagating from the front of us. Now, if we change the “phase” of when we drop these stones (i.e., drop one, wait 1/10th of a second, and then drop the other), the angle of the high amplitude wave crest will change—if we know how quickly the wave moves, we can shift this prominent wave crest to pretty much any angle we want. With the system I am using, we have 1600 smaller antennae. This gives us about a 1.5-degree resolution for any observation within about 40 degrees of the nadir; light is much faster than a heavy antenna, enabling many different techniques for scanning the atmosphere. The other benefit of this system is that we can use horizontally and vertically polarized light, which tells us more information about not just the amount of water in the observation but the shapes and consistency (water, ice, or a mixture) of those droplets. All of this combined gives us the flexibility to study different weather systems that other stationary observation platforms cannot. Currently, I am using simulations of this radar (they are still building it) to study the thermodynamics of tropical cyclones, squall lines, and atmospheric rivers, which was prohibitively difficult with previous generations of observation technology.

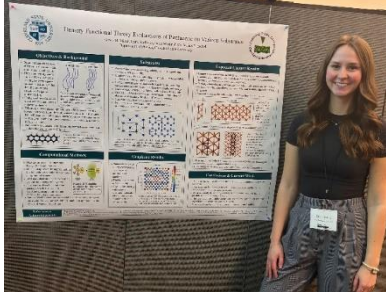
In the future, I will likely pursue academia. I love the process of research and solving problems, and the idea of running my own lab is very exciting. I also really enjoy teaching (I was awarded TA of the year in my department and college as the Instructor of Record for Introduction to Programming Techniques for Meteorology), and academia has the most natural blend of these two activities.

When I say that my undergrad was at CSU, people often raise an eyebrow, smirk, and ask, “Well, how was that?” The answer: CSU Physics was an incredible experience for me, and it really is a special program. I always tell people that it doesn’t matter where you go to school; what matters is the effort you put into your education and the professors who can channel that effort into something productive. For me, CSU Physics did just that.

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## CSU STUDENTS NATIONALLY: GRACE MILLER AND SOPHIA GREENE ATTEND APS CONFERENCE FOR UNDERGRADUATE WOMEN AND GENDER MINORITIES IN PHYSICS

On January 17th and 18th two of CSU's Physics students, Grace Miller and Sophia Greene, attended the Conference for Undergraduate Women and Gender Minorities in Physics (CU\*IP) organized by the American Physical Society (APS) at Purdue University. Both students have been awarded travel grants



from APS to attend CU\*IP. Grace presented her undergraduate research project "Density Functional Theory Evaluation of Pentacene on Cu (110)" advised by Dr. Bickel. Sophia participated in several conference panels. Please read student reflections below.

**Grace Miller** (BS Honors Physics and BS Honors Math candidate, Spring 2025, SPS co-president/treasurer) with her research poster at CU\*IP.

"Attending the Conference for Undergraduate Women and Gender Minorities in Physics (CU\*IP), is an extremely inspiring, motivating, and encouraging opportunity for any young women in science. Having the opportunity to attend CU\*IP allowed me to network with dozens of women within the field, discuss a wide variety of research, and learn from various peers and mentors. I was also able to give a poster presentation on my current research while at the conference. Overall, attending CU\*IP is very uplifting - it helped me gain confidence as a scientist and believe in my ability to succeed. I hope more CSU students are able to attend this conference in future years."



**Sophia Greene** (BS Physics 2024, MS Physics candidate Spring 2025, SPS secretary) with other panelists on How to Be an Ally" panel (second from the left).

"I attended CU\*IP as a 'Grad Leader', which meant I had the opportunity to participate in several panels over the course of the conference and was a judge for the undergraduate poster presentations. I was a panelist for "How to Be an Ally," "Applying to Graduate School," and "Research Talk: Geophysics/Planetary and Atmospheric Sciences." It was an excellent opportunity for me to become more comfortable in a public speaking role while also helping undergraduate students navigate their physics careers. It was an incredibly rewarding experience, and I felt a renewed sense of belonging. As a side note, I learned a lot about Taylor Swift, which I know isn't everyone's cup of tea, but I'm here for it."

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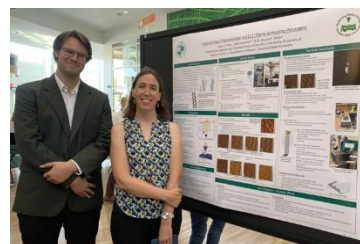
## CSU STUDENTS LOCALLY: PARTICIPATING IN ON-CAMPUS SUMMER RESEARCH OPPORTUNITIES VIA UNDERGRADUATE SUMMER RESEARCH AWARD (USRA) PROGRAM

Each year since early 2000s, CSU sets aside a big chunk of money (~\$250k) to support summer undergraduate research on campus. The money are distributed on a competitive basis through Undergraduate Summer Research Award (USRA) for which faculty submit proposals. The funded proposals hire undergraduates for summer research on campus. Each summer several physics majors or inspiring physics majors get hired by physics faculty.



In 2024, at least four students worked with physics professors on the USRA projects. Physics major Jacob Forester worked with Dr. Heus on the project titled “*Effects of Shear on Turbulence Kinetic Energy Distributions Around Shallow Cumulus Clouds*”. Physics minor Colin Lathwell worked with Dr. Sensale Rodriguez on the project titled “*Characterizing the Dielectric Properties of Biomolecules through Molecular Dynamics Simulations*”. Jaxon Riley worked with Dr. Bickel and her REU student on the project titled “*Engineering a Reproducible Au(111) Flame Annealing Procedure*”. Patrick Barrett worked with Dr. Streletzky and his REU student on the project titled “*Analyzing Polymer-Grafted Gold Nanorods using Depolarized Dynamic Light Scattering (DDLS)*”.

On September 19, 2024, all USRA students had to present a poster on the results of their summer projects at the Undergraduate Summer Research Award Poster Session. The Physics Department run a poster competition among physics projects at this event. This year the posters were judged by Dr. Walker, Dr. Fodor and Ms. Peppard. The winner of the Best Summer Undergraduate Research Project award was chosen to be Jaxon Riley. Congratulations, Jaxon! As a Choose Ohio First (COF) student, Jaxon was also invited to present his poster at the COF Student Scholar Showcase in Columbus OH on Apr 2, 2025.



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#### FROM SPS NATIONAL NEWS: A MESSAGE FROM THE SPS AND SIGMA PI SIGMA DIRECTOR, ALEJANDRO DE LA PUENTE (FEB 18, 2025, REPRINTED FROM THE SPS NEWS)

I have been in the role of SPS and Sigma Pi Sigma director for almost one year. And in that time while some external factors have changed, what has not is that I grow in awe every single day because of what I see in our community. I continue to be inspired by the work being done by our volunteers who are working diligently to make sure that our societies thrive and play an important role in the journeys of undergraduate students across the country.

Buoyed by my experiences over the last year, I write this message to remind you of the commitments our two societies have to supporting all our members.

First and foremost, we are committed to nurturing a welcoming and empowering community. Positive interactions with those we meet are critical to our personal and professional growth. At SPS National, we continue to work arduously to bring you closer to each other and for you to leverage each other’s passion for our scientific interests.

Secondly, we are committed to catalyzing the conditions for you to be met where you are. We are focused on working to ensure opportunities are available to you to achieve your goals and for you, whoever you are, to become a “physical scientist or astronomer” notwithstanding the curve balls the external world throws at us from time to time.

Our community has existed for over 100 years. Our mission is clear; SPS and Sigma Pi Sigma exist to help students transform themselves into contributing members of the professional community. We remain steadfastly committed to this mission and we need your support to scale and strengthen our delivery of scholarships, internships in diverse professional sectors, leadership workshops, and countless opportunities to do science early in the undergraduate journey. Your participation in this community will help make resilient this mission and our vision for a welcoming community filled with opportunity, so that we can continue to catalyze student success in higher education, the workforce, and society.

Thank you for being part of this community and for your endless support and work,

Alejandro

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## SAVE THE DATE: 2025 SIGMA PI SIGMA INDUCTION CEREMONY

The 2025 Sigma Pi Sigma induction ceremony is scheduled to take place at the CSU's Mather Mansion on **Friday April 25<sup>th</sup>, 2025 (~4-8pm)**. More details to follow, but please reserve the date and plan to attend. We would like to catch up with you and celebrate new Sigma Pi Sigma Inductees.

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## ALUMNI NEWS

- Sven Gallo'09 has recently been promoted at the University Hospitals Cleveland Medical Center as the System Radiation Safety Officer. He is working there as a Dual ABR board certified Senior medical physicist (certified in diagnostic physicist on the x-ray side and nuclear physicist on the nuclear medicine and theranostics side of things).
- Christian Gunder'17 became fermentation technology lead at Cargill in Eddyville, Iowa
- Tony Dobrila'18 now works as a Data Engineer at Marathon Petroleum
- Jacob Adamczyk'20 received Acceptance and Spotlight publication award at ICLR2025 (international ML conference). He was also awarded APS's GDS IMPACT and GSNP Student Speaker Awards. This year he is an invited speaker at Cohere 4 AI, Paul English Applied AI Institute at UMB, and Inria SCOOOL (France). He also gave CSU's Physics Alumni SPS seminar in the Fall 24.
- Niksa Praljack'20 will present at CSU's Physics Alumni SPS seminar on Apr 29, 2025
- Ngozi Williams'21 was honored as a chosen member of 2023 class of *Cleveland Jewish News 12 Under 36* for her work as co-founder and program coordinator of Jews of Color: Cleveland
- Alexander Sukennyk'22 is finishing up his MS in Computer Science at CSU in the Spring 2025

**Dear Alumni, please consider sharing your career news and updates with us. We will be happy to include the news in the next newsletter. Help us inspire next generations of students!**

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## TIDINGS

- Physics Department welcomes a new Administrative Secretary 1, Ms. LaDonna M. Simmons, who joined us in January 2025. She already decorated the Department's Office (SI 112) making it much more welcoming to students and visitors. She has also been busy updating Department's website and even started the Department's Instagram page. Please check it out here: [https://www.instagram.com/csuohio\\_physics/?hl=en](https://www.instagram.com/csuohio_physics/?hl=en)
- CSU's chapter of SPS has been recognized for the **15<sup>th</sup> consecutive time (!!!)** with the Outstanding Chapter Award highlighting its outreach, regular and popular on-campus activities, support of student conference travel, and participation in the National SPS events/publications.
- CSU's chapter of SPS has been awarded 2024-2025 Marsh White Award (\$600) for the outreach proposal "Physics Fridays at Cleveland Public Library: Light/Sound Waves Outreach with Hathaway Brown School". Under this proposal our chapter will continue partnership with Hathaway Brown for our upcoming outreach events. CSU students will train a team of HB's 9-12 grade students how to perform outreach and facilitate SPS outreach to general public at several branches of the Cleveland Public Library. This is **13<sup>th</sup> Marsh White award** of our SPS chapter.
- The Spring 2024 issue of The SPS Observer features a story by Dr. S and two SPS Zone Associate Counselors (R. Laughlin and S. Howell) "*Combating Burnout in Physics and Astronomy*". It is based on the work of the Burnout Committee of the SPS National Council and highlights the serious issue of student burnout in physics and astronomy. Here is the link to the article:



<https://students.aip.org/observer/combating-burnout-in-physics-and-astronomy>

- An international team including Dr. Thijs Heus, has released a new version of MicroHH, a computational fluid dynamics code for simulation of turbulent flows in the atmospheric boundary layer. MicroHH can simulate realistic atmospheric boundary layers, improving the accuracy of a wide range of weather and climate models. Some of the early work performed by Dr. Heus to develop MicroHH was supported by CSU's Faculty Research and Development (FRD) program, and 2020 CSU graduate Jacob Adamczyk (BS Physics Honors, BS Mathematics) contributed the ice microphysics modeling capability.
- This is a season of grad school application responses. Three of CSU physics students eagerly await to hear from a variety of physics graduate programs. At this point, Sebastian Squires ('24, MS candidate 25) got accepted into a physics PhD program at KSU, Grace Miller (BS Honors candidate 25) and Sophia Greene ('24, MS candidate 25) both got accepted into a physics PhD program at CWRU. Please continue holding your fingers for them as they still await more decisions.

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## STUDENT PRESENTATIONS

*Undergraduate Research Presentations (National & Regional) since October 24:*

**2024 AIChE Annual Meeting, San Diego CA, October 2024:**

1. "Dynamics of Polymer-grafted Nanoparticle Suspensions", D. Amirsadri, **P. Barrett**, N. Nupnar, M. Abdi, M. Hore, K. Streletzky, R. Poling-Skutvik, Oct 28, **2nd place in student poster competition**

**Conference for Undergraduate Women in Physics, West Virginia University, Morgantown WV, Jan 19-21, 2024:**

2. "Density Functional Theory Evaluation of Pentacene on Cu (110)", **G. Miller**, J. Bickel, Jan 27.

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## CONTACT US!

Have something you'd like to share? Send an email to [physics.dept@csuohio.edu](mailto:physics.dept@csuohio.edu) or call the number below! Thank you for supporting the Physics Department of the CSU!

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