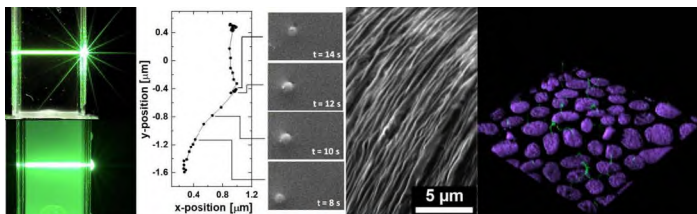


**NEWSLETTER AT A GLANCE...**

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**TOP STORY: SUMMER OF THE SOFT MATTER RESEARCH EXPERIENCE FOR UNDERGRADUATES (REU) PROGRAM SITE AT CSU/PHYSICS**

The first year of this edition of Cleveland State University's Research Experience for Undergraduates (REU) site "Synthesis, Assembly and Characterization of Soft Matter," ran from May 28, 2024, through August 2, 2024, and hosted nine students coming from six states and 9 different colleges. The cohort included 3 physics majors (from Marietta College, University of Dayton, Rochester Institute of Technology), 3 chemical and biomedical engineering majors (from U of Rhode Island, Florida State, U Mount Union) 2 chemistry majors (from Stark College and U of Texas at Austin), and 1 material science major (from U of Virginia). The students developed strong research and presentation skills by advancing their individual projects, presenting research results to the entire REU cohort and at the regional REU conference, as well as attending program specific seminars and colloquia given by the area's leading scientists in soft matter. They also explored science in Northeast Ohio with visits to nationally recognized research centers of greater Cleveland, including NASA Glenn Research Center and Kent State University.



**Summer 2024 NSF REU at CLEVELAND STATE UNIVERSITY: Synthesis, Assembly, and Characterization of Soft Matter**

The departments of Physics and Chemical & Biomedical Engineering at Cleveland State University invite you to experience cutting edge soft matter research in a supportive environment of our Research Experience for Undergraduates (REU) program, sponsored by the National Science Foundation (NSF).

**Program Dates:** May 28 – August 2, 2024

**Projects include:** electron imaging of soft matter systems; design and characterization of protein-based materials; volume phase transition in polymer microgels; assembly of anisotropic nanoparticles; imaging of polymers on surfaces; microfluidic channels and mixers; DNA origami; microemulsions in absinthe; cellular micro-sensation to fluid flow; waste to energy via chemistry.

**Support:** \$6000 stipend (for 10 weeks; housing provided at no charge); up to \$500 travel funds to CSU; \$500 conference travel funds after completion of REU.

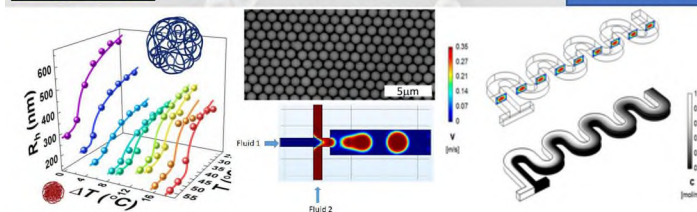
**Eligibility:** current undergraduate students who are US citizens and permanent residents. Underrepresented minorities and women are encouraged to apply.

**Priority deadline March 1, 2024**

**Contact:** Dr. Kiril Streltzyk and Dr. Jessica Bickel, [softmatterreu@csuohio.edu](mailto:softmatterreu@csuohio.edu)

**Website:** <http://www.csuohio.edu/sciences/physics/soft-matter-reu>

**Apply Here!**



**Research Highlights:** The list of 2024 projects and faculty mentors for those included:



- *Synthesis of Carbon Nanotube-based Organic Color Centers*, Dr. Geyou Ao, Chemical & Biomedical Engineering
- *Promoting Robust Crystallization of Organic Molecules via Row Surface Reconstructions*, Dr. Jessica Bickel, Physics
- *Protein-based Materials*, Dr. Nolan B. Holland, Chemical & Biomedical Engineering
- *Microfluidic Reactors and Emulsifiers*, Drs. Petru S. Fodor and Sebastian Sensale, Physics; Dr. Chandra Kothapalli, Chemical & Biomedical Engineering
- *Waste of Energy via Chemical Reactions in Multiphase Environments*, Dr. Jorge Gatica, Chemical & Biomedical Engineering
- *Flowing past cilium*, Dr. Andrew Resnick, Physics
- *Confinement effects in Polymer Grafted Nanorod Solutions*, Dr. Kiril A. Strelitzky, Physics; Dr. Michael Hore, Macromolecular Science and Engineering, CWRU
- *Crystallization of Anisotropic Particles*, Dr. Chris Wirth, Chemical & Biomolecular Engineering CWRU; Dr. Jessica Bickel, Physics

Two Soft Matter Science colloquia were presented to REU students by scientists currently working within the Soft Matter field. Each colloquium was followed by a student lunch with the guest speaker. The lunch conversations covered topics ranging from science and the REU's students' research projects to the graduate school experience and how to apply to graduate school. The colloquia given this year were: 1) "Shape Morphing Polymers," by Dr. Kevin Cavicchi, The University of Akron; 2) "Synthetic DNA Nanotechnology - reprogramming a familiar molecule," by Dr. Divita Mathur, Case Western Reserve University.

### **Meeting Established Physicists and Visiting Research Centers:**

#### **Visit to Liquid Crystal Institute.**

On July 12, 2024, the students of the CSU Soft Matter REU were taken to tour the facilities at the Kent State University Advanced Material Liquid Crystal Institute (AMLCI). Led by Dr. Robin Selinger, the students toured several AMLCI labs (Dr. Lavrentovich's and Dr. Jakil's labs) and spoke with graduate students in those labs about their research projects. Students also got to learn about the physics of liquid crystals from Dr. Jonathan Selinger and about AMLCI graduate programs from Dr. Robin Selinger and Dr. Jakli. The tour also included a visit to the Characterization Lab and Clean room led by Dr. Gao. After touring AMLCI and enjoying lunch with Dr. Robin Selinger the students were taken to one of the spin-off liquid crystal companies created by AMLCI graduates, AlphaMicron, a Global Leader in Liquid Crystal Photonics. The company's CEO/CTO, Dr. Bahman Taheri walked students through all the steps of design, production and testing of the liquid crystal goggles produced by AlphaMicron.







**Visit to NASA Glenn Research Center.**



On July 19, 2024, Soft Matter REU students visited NASA Glenn Research Center where they were able to tour several of the center's labs, led by Dr. Jeffrey R. Mackey. The tour started in



the Telescience Support Center (TSC) from where the experiments on the International Space Station (ISS) are conducted. In fact, Dr. Mackey was running his ISS experiments from the TSC the night before. We then went on to two of Dr. Mackey's labs for the Flow Boiling and Condensation Experiment (FBCE), one phase of which is still at the ISS. We also visited Zero-G Facility and observed a drop of combustion experiment there. REU students had several opportunities to talk with students working at NASA Glenn on the toured projects and had a mini presentation on undergraduate research opportunities in the summer given by Dr. Nancy Hall, FBCE Project Manager.



**Building a Cohort through Summer Fun in Cleveland:**

During their time living on campus, the REU students had fun exploring Downtown Cleveland in their free time. For a taste of Cleveland in June, the entire REU cohort went to the annual University Circle Parade, visited the studios of The IdeaStream in the downtown Cleveland (kindly hosted by Ygal Kaufman, son of CSU Physics' Dr. Miron Kaufman). Many students also explored the Natural History Museum and Cleveland Art Museum at University Circle and the Rock'n'roll Hall of Fame downtown. In addition, many students enjoyed being outside in Cleveland attending the Pride





Parade event, visiting West Side Market and enjoying the Jazz Festival at Playhouse Square. In July, the REU students had an opportunity to see the Cleveland Orchestra at the orchestra's summer Blossom Music Center residence, where the entire cohort had a picnic on the lawn with music. Finally, another highlight of July included a trip to the Progressive Field for a Cleveland Guardians game.



**Presenting Research Findings at the NOURS conference:**



The REU summer ended with the 19<sup>th</sup> Annual Northeast Ohio Undergraduate Research Symposium (NOURS), hosted by Kent State University on July 31, 2024, which brought together more than 50 students from four REU programs in Northeast Ohio (KSU Chemistry, KSU Engineering, Akron Polymer Science and Engineering, CSU SoftMatter). At NOURS, all nine Soft Matter REU students, as well as one CSU student supported by USRA (physics major, Patrick Barrett), presented posters summarizing the results of their summer research projects. In addition, two REU students, chosen by CSU faculty and students, each gave an additional 10-minute oral presentation to the entirety of the symposium attendees. This event allowed students to compile their 10 weeks of research from the summer into an official research presentation and provided both a learning experience in preparing a formal research presentation as well as an excellent networking opportunity with students and faculty from several other colleges and institutions from across Ohio. REU students also had to complete a



formal written report on their research findings. The report, compiled over several weeks was reviewed by REU faculty advisers.

The list of final projects presented at the symposium includes:

1. **Oral and poster:** *Synthesis of Carbon Nanotube-Based Organic Color Centers*, Anna Huszar (Florida State University), Dr. Geyou Ao
2. **Oral and poster:** *Confinement Effects in Polymer-Grafted Nanorod Solutions*, David Amirsadri (University of Rhode Island), Dr. Kiril A Strelitzky, Dr. Michael Hore
3. *Analyzing Polymer-Grafted Gold Nanorods using Depolarized Dynamic Light Scattering (DDLS)*, Patrick Barrett (Cleveland State University), Dr. Kiril A. Strelitzky
4. *Synthesis and Thermo-Characterization of an ELP Diblock Intended for Use as a Hydrogel Bioink*, Dana Aramouni (Stark College), Dr. Nolan B. Holland
5. *A Reprogrammable System of DNA Origami Tiles Actuated with Electric Fields*, Anisha Jarang (University of Virginia), Dr. Sebastian Sensale Rodriguez
6. *Characterizing Mechanical Properties of Primary Cilium Using Optical Trapping*, Madeline Aszalos (Marietta College), Dr. Andrew Resnick
7. *Getting Atomically Flat Gold for Self-assembly of Organic Molecules*, Sahil Vachher (University of Texas at Austin), Dr. Jessica Bickel
8. *DNA Origami Nanostructure Fabrication*, Samantha Skerbec (University of Mount Union), Dr. Petru Fodor, Dr. Chandrasekhar Kothapalli, Dr. Sebastian Sensale
9. *Waste to Energy via Chemical Reactions in Multiphase Environments*, Madeline L O'Mahoney (University of Dayton), Dr. Jorge E. Gatica
10. *Coatings of Complex Fluids*, Veran Stanek (Rochester Institute of Technology), Dr. Chris Wirth

To read more about these projects, please read the projects' final abstracts on the website of the Soft Matter REU.

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## CSU NATIONALLY: CSU HOSTS SUCCESSFUL DEPARTMENT OF ENERGY WORKSHOP ON OPEN SCIENCE





Cleveland State University hosted a workshop on best practices in Open Science, sponsored by the Department of Energy's Atmospheric Radiation Measurement (ARM) program, and organized by Max Grover and Scott Collis of Argonne National Laboratory. Dr. Thijs Heus, associate professor of physics, was the local host.

During this workshop, PhD students and Postdoctoral researchers from across the nation came together to learn how to best use and interpret the large climatological datasets that ARM provides. The students learned about tools like radar, large-eddy simulations, and machine learning, through the use of open-source tools like Jupyter, GitHub, and XArray. Experts from different National Laboratories gave lectures on these topics, while the students worked in groups on real scientific projects, using all the tools that they just learned about.

True to the nature of the course, the lectures and final projects are all available as open projects themselves. Beyond the hard work inside the classroom, the next generation of climate scientists forged bonds over sunsets at the shores of Lake Erie, the Cleveland Guardians, and everything else that Cleveland has to offer.

A few memories of the event can be found at:

[https://x.com/hashtag/ARMSummerSchool?src=hashtag\\_click](https://x.com/hashtag/ARMSummerSchool?src=hashtag_click)

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#### COMMENCEMENT REPORT: CLASS OF 2024



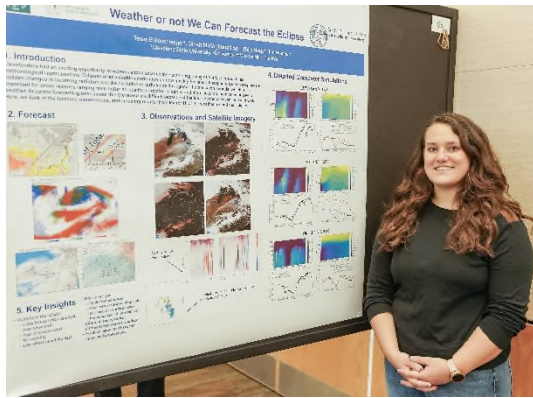
Congratulations to all physics graduates who participated in the CSU Commencement on Saturday, May 11, 2024!

The graduating class of 2024 included three students who finished our BS Physics program: James Taton, Sophia Greene, and Sebastian Squires. James is considering joining CSU's MS Physics program in the Fall. Sophia and Sebastian are already returning to CSU in the Fall to finish the graduate year of the CSU's 4+1 Accelerated BS/MS Physics program. In fact, Sophia has recently received the Ohio Space Grant Consortium (OSGC) Master's Fellowship for 2024-2025 for study toward a master's in science in Physics degree at CSU. The class also includes three students that just finished the 4+1 MS/BS Physics program and are leaving CSU for good: Patrick Herron, Jordan Miller, and Collin Douglas. Patrick will work as a Research and Development Scientist at Oakwood Labs in Solon OH. Jordan has just started as a Research and Development Scientist at Energizer Holdings Inc. in Lakewood OH. Collin will pursue a PhD in Physics at Kent State University

starting in the Fall. Finally, the graduating class also included Mathew Ogieva who has graduated from our regular MS Physics program and is currently interviewing for positions in the high-tech industry and academia.

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## RECENT GRADUATE HIGHLIGHT: DR. HEUS'S STUDENT DEFENDED HER PHD THESIS!



Congratulations to the newly minted Dr. Tessa Rosenberger on defending her PhD Thesis “Turbulence and transitions: using LES to develop observational strategies and understand an evolving atmospheric boundary layer” on May 3, 2024! Congratulations to Dr. Thijs Heus, Tessa’s PhD adviser, on guiding Tessa through her doctoral research!

Tessa completed BS in Physics at the University of Dallas in 2018. As an undergraduate, she served as SPS chapter president and was a co-founder and treasurer of the Women in STEM club. Tessa completed an REU with the College of Wooster in nonlinear dynamics an experience through which she discovered her love for research and desire to pursue a Ph.D. degree. However, she wanted to research topics with more immediate and obvious benefits to the society. As a Cleveland native, Tessa was drawn home after her BS and found herself in contact with Dr. Thijs Heus at CSU. She started her graduate studies at the CSU’s Department of Mechanical Engineering and did doctoral research with Dr. Heus. Tessa’s research developed strategies for improving atmospheric turbulence observations and looked at the atmospheric sensitivity to changes in incoming radiation all for the purpose of improving future climate and weather models. During her graduate studies, Tessa had the opportunity to become involved in science policy after taking courses in sustainable energy and environmental policy. She attended the 2023 Atmospheric Meteorological Society Policy Colloquium where she really discovered a passion for the intersection between science and policy. This new passion has led to a postdoctoral research position that Tessa is starting this fall at the Midwest Hydrogen Center for Excellence, where she will work on microgrid design at county and state level policy related to microgrids.

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## RECENT GRADUATE HIGHLIGHT: MS PHYSICS GRADUATE ACCEPTED IN DOCTORATE PROGRAM IN OPTICS & PHOTONICS



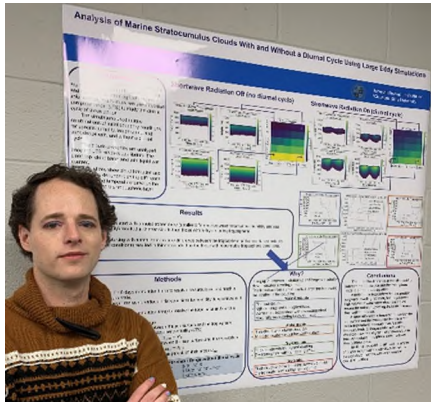
Geoffrey Nyabere obtained a Master of Science in Physics from CSU, specializing in Optics and Materials in the Fall 2023. While at CSU, he acquired comprehensive knowledge and skills of optics and its wide-ranging applications in materials science. During his master’s program Geoffrey worked with Dr. Kiril Streletzky on a research project. Geoffrey’s research focused on novel approaches for analyzing depolarized dynamic light scattering data in solutions of elongated particles and was conducted in collaboration with the lab of Dr. Mike Hore from Macromolecular Science and Engineering at CWRU. This endeavor honed his research skills, deepened his understanding of experimental physics, enhanced his data analysis capabilities, and led to a manuscript which is about to be submitted.

Currently, Geoffrey is on a new academic endeavor, pursuing a Ph.D. in the Department of Electrical and Computer Engineering at the University of Utah, specializing in optics and photonics. His primary focus is terahertz technology, a fascinating field with promising cutting-edge applications. Terahertz technology holds immense potential in various domains, including medical imaging for cancer diagnosis, high-speed telecommunications, and security screening. Fueled by curiosity and a passion for discovery, Geoffrey is driven to leverage terahertz waves to develop innovative technologies that address critical challenges and advance scientific understanding.



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**STUDENT HIGHLIGHT: 4+1 STUDENT RECEIVES THE OHIO SPACE GRANT CONSORTIUM MASTER'S FELLOWSHIP FOR 2024-2025**



Sophia Greene, a 4+1 accelerated BS/MS program Physics student who is finishing her undergraduate degree, has recently received the Ohio Space Grant Consortium (OSGC) Master's Fellowship for 2024-2025 for study toward a Master's Degree in Physics at Cleveland State University. Sophia has been working in Dr. Heus's lab as undergraduate researcher since summer 2023 studying various stratocumulus clouds using large Eddy simulations. The OSGC Fellowship will allow Sophia to focus on her courses and research in Dr. Heus's lab while finishing the graduate year of her 4+1 MS/BS program. Sophia is considering applying for a PhD program after graduation. Sincere congratulations, Sophia!

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**STUDENT HIGHLIGHT: BS HONORS STUDENT SPENDS SUMMER AT CERN (YES, THAT CERN!)**



Double Honors Physics and Math major, Grace Miller, spent the last summer at the NSF's Research Experience for Undergraduates (REU) program in Nuclear and Particle Physics at TUNL/Duke University in Durham, North Carolina. As a part of the REU program Grace spent 6 weeks of the summer in Switzerland working at CERN (European Organization for Nuclear Research), the home to the Large Hadron Collider (LHC) and hugely respected nuclear research center in the world. During her time there she lived just over the France border in a small town called Saint Genis Pouilly and worked at



CERN's main site in Meyrin, Switzerland.

In her research Grace was measuring spin and orbital angular momenta entanglement in top quark decays produced by proton-proton collisions at the LHC. While at CERN, in addition to her research, Grace attended daily lecture series given by instructors from various institutions all over the world. The topics of lectures ranged from the mathematical foundations of particle physics to some of the cutting-edge CERN research, to accelerators and beam dynamics, antimatter in the laboratory, magnet superconductivity, neutrinos, flavor physics, cosmology, and quantum gravity.

In her spare time Grace hiked in the Alps, traveled to Paris, and even attended Taylor Swift's concert in Zurich.





**STUDENT HIGHLIGHT: MS OPTICS AND MATERIALS STUDENT RECEIVES EXCELLENT ACHIEVEMENT AWARD FOR MASTER’S RESEARCH IN NATURAL SCIENCES**



In the Spring 2024, Isaac Opong Yeboah, a graduate student working on a M.S. in Physics, specializing in Optics & Materials, has received the Spring 2024 Excellent Achievement Award for Master’s Research in Natural Sciences. He performed computational biophysics research under guidance of Dr. Sebastian Sensale Rodriguez, Department of Physics. Isaac is finishing his MS Physics degree studies in the Fall 2024. Sincere Congratulations, Isaac!

**CSU CHAPTER OF SIGMA PI SIGMA HOSTS 5<sup>TH</sup> INDUCTION CEREMONY (MAY 3, 2024)**

Join the Physics Department for the 2024 Sigma Pi Sigma Induction Ceremony!

2024 Sigma Pi Sigma Inductees:

- Mr. Vinnie LaSalvia '09  
Photovoltaics Engineer,  
National Renewable Energy  
Laboratory (NREL)
- Mr. Jim Pitchford '11  
Quality Assurance Analyst,  
RESPOND Clinical
- Mr. Ryan McDermott '15 '17  
Physicist, Radiation Oncology,  
Cleveland Clinic
- Mr. Jacob Adamczyk '20  
Physics PhD Candidate, University of  
Massachusetts, Boston
- Ms. Jordan Miller '23, '24  
(Research and Development  
Scientist, Energizer Holdings Inc.)
- Mr. Patrick Herron '23, '24  
(Research and Development  
Scientist, Oakwood Labs)
- Mr. Collin Douglas '23, '24  
(Physics PhD Student, Kent State  
University)

Friday, May 3<sup>rd</sup>, 2024  
5:00pm to 7:00 pm  
Mather Mansion

The 2024 Sigma Pi Sigma Induction was held on May 3, 2024 in CSU’s own Millionaires’s Row Mansion: the Mather Mansion. This year we inducted four alumni and three graduating students. The list of inducted alumni included Jacob Adamczyk ‘20, currently a physics PhD candidate at University of Massachusetts in Boston, MA; Ryan McDermott ‘15, a radiation oncology physicist at the Cleveland Clinic in Canton, OH; Jim Pitchford ‘11, quality assurance analyst at RESPOND Clinical in Cleveland, OH; and Vinnie Lasalvia ‘09, photovoltaics engineer at the National Renewable Energy Laboratory (NREL) in Golden, CO. Most of the four alumni came to the ceremony with friends and family to celebrate



the occasion.

In addition to inducting four alumni into Sigma Pi Sigma we inducted three graduating 4+1 MS/BS physics students: Patrick Herron (starting as Research and Development Scientist at Oakwood Labs in Solon, OH), Jordan Miller (starting as Research and Development Scientist at the Energizer Holdings Inc. in Lakewood, OH), and Collin Douglas (starting a PhD in Physics at Kent State University). They also brought their families to the event. The evening started with a reception in the beautiful halls of the Mather Mansion. The Sigma Pi Sigma induction ceremony itself was conducted in the presence of more than 50 students, faculty, alumni, and friends of the department in the Mather Mansion Dining Room. The ceremony included

- updates on the state of the department by Dr. Fodor,
- presentation of departmental awards by Dr. Fodor and Ms. Peppard,



- recognition of the contributions to the department by CSU physics alumni and friends by SPS students, Dr. Fodor, and Dr. Streletzky,
- highlights of the SPS chapter activities over the last year presented by SPS officers Grace Miller, Jordan Miller, Collin Douglas, James Taton, Patrick Herron, and Dr. Streletzky,
- and finally, introduction of the inductees by Dr. Streletzky and the ceremony itself conducted by Dr. Streletzky with the Sigma Pi Sigma charge read to inductees by Dr. Walker.



The awards presented at the event included the Outstanding Physics Senior award to Sophia Greene, the Undergraduate Teaching Assistant Award to James Taton, and the Graduate Teaching Assistant Award to Jordan Miller. The ceremony was followed by a dinner in the Library and a photoshoot in the Drawing Room of the Mather Mansion.

The Sigma Pi Sigma chapter at Cleveland State University was established on May 15, 1969. This year marks 55 years of CSU's Sigma Pi Sigma chapter. 33 people were inducted into it between 1969 and 1975. After 1975, however, the chapter went dormant for 43 years. We revived CSU's Sigma Pi Sigma with the Induction Ceremony on Apr 27, 2018. 34 people have been inducted since 2018.

*$\Sigma\Pi\Sigma$  is the Physics Honor Society which "exists to honor outstanding scholarship in physics and astronomy; to encourage interest in physics and astronomy among students at all levels; to promote an attitude of service of its members towards their fellow students, colleagues, and the public; to provide a fellowship of persons who have excelled in physics and astronomy." Every year we induct the top of the current physics class and program's alumni and friends*

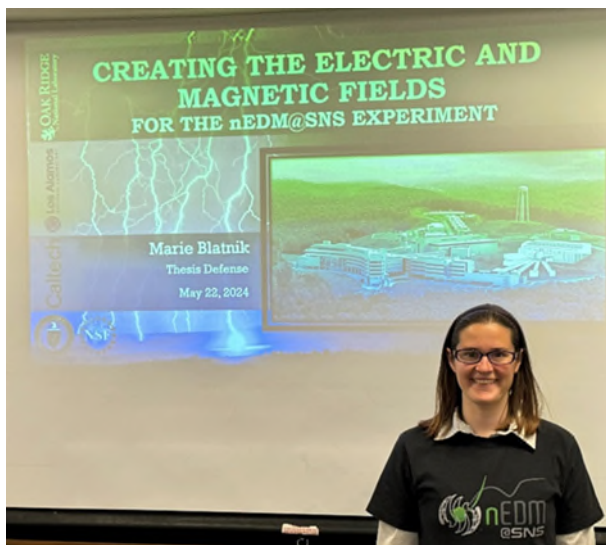


*from recent and not-that recent years who have significantly contributed to our physics department, to physics scholarship, to physics fellowship, to physics general outreach and service. We believe that strong  $\Sigma\Pi\Sigma$  chapter helps to build bridges between our department, current students, and alumni from different walks of life. Different generations of alumni in multitude of professions, current and emeritus faculty, and students assembled at the induction event might not know each other well, but they all have a common bond in our physics department. This bond creates a synergy and atmosphere in the room that not only provokes the exchange of ideas, laughs, and jokes, but also leads to real job opportunities for current students and to service/fellowship opportunities for the alumni, which in turn strengthens the department.*



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



This past spring, Marie Blatnik '15 (BS Physics Honors, BS Electrical Engineering Honors) successfully defended her Ph.D. thesis in Physics entitled "Creating the Electric and Magnetic Fields for the nEDM@SNS Experiment" at the California Institute of Technology (Caltech). Marie also just became a Postdoctoral Scholar at the Los Alamos National Laboratory (Los Alamos, New Mexico) where she will be developing a technique to use ultracold neutrons as an actinide surface probe.

CSU prepared Marie for graduate school with its course work, summer research opportunities, local SPS chapter (where Marie engaged in physics outreach), physics Teaching Assistantships (she taught intro physics labs), and its honors program

and Choose Ohio First communities. However, CSU had no nuclear physics. Marie needed to see what accelerator-based science is for herself, so she joined an REU at the University of Illinois at Urbana-Champaign, to work on the COMPASS experiment. Then she did a National Student Exchange at Stony Brook, joining the PHENIX collaboration at Brookhaven to work on particle detectors, which led her to test prototypes at the Stanford Linear Accelerator & Fermilab. She met the ultracold neutron community at a conference and fell in love with the controllable free neutrons and Los Alamos National Laboratory, where she did her Senior Design work on the electronics for the UCNA/B experiments.

Marie graduated Summa Cum Laude from CSU in 2015 and has been chasing neutrons since. Her PhD work took her to Los Alamos and Oak Ridge National Labs as part of a collaboration to place new limits on the neutron electric dipole moment to find fingerprints of extra CP violation outside of the Standard Model. Marie's work in Los Alamos was centered around creating the high voltage for this cryogenic experiment. Her work in Oak Ridge was to maximize the polarization and transmission of a cold neutron beam through the many layers of the experimental apparatus -- work for which she received an Office of Science Graduate Student Research (SCGSR) award.

Marie's favorite ways to share the joy of physics with others include Clubes de Ciencia Mexico (a program for US and Mexican researchers to teach weeklong classes on cutting-edge science) and being a Nuclear Physics Merit Badge Counselor for the Boy Scouts. Marie also enjoys whitewater kayaking in her spare time, but spare time is hard to come by as she and her husband Matt Buck have a young daughter, Jordan.

Please join us in congratulating Marie on finishing her PhD and starting her work at the Los Alamos National Lab! Long Live Physics at CSU.



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ALUMNUS HIGHLIGHT: FROM A SUMMER USRA PROJECT ON GOLD NANORODS TO A DISTINGUISHED RESEARCH FELLOW AT OAK RIDGE NATIONAL LAB



This past July, Philip Dee (BS Physics, Honors, BE Civil Engineering, 2013) became a Eugene P. Wigner Fellow at the Oak Ridge National Lab (ORNL) in Oak Ridge, TN. This position is a highly competitive and prestigious fellowship for distinguished staff at ORNL. Philip's fellowship research at ORNL will focus on developing innovative computational methods for simulating models of quantum materials, mainly using physics-informed machine learning approaches and many-body theory. These methods will help the field overcome challenges associated with the high degree of algorithmic complexity that hinders simulations of fully quantum models and leverages the world-class supercomputing resources at ORNL. Philip's ongoing research interests lie at the intersection of condensed matter theory, computational physics, and artificial intelligence.

At CSU, Philip conducted undergraduate research with Professors Kiril Streltzyk and James Lock, studying light scattering phenomena experimentally and theoretically under the Undergraduate Summer Research Award (USRA) program. During this time, Philip also served as a teaching assistant in undergraduate labs and led the CSU's chapter of the Society of Physics Students as its president.

Philip obtained his Ph.D. in Physics from the University of Tennessee in 2021 under Professor Steven Johnston, where he worked primarily in condensed matter theory. His Ph.D. research explored the interplay of superconductivity with other competing phases in materials, such as charge order. Philip spent two years working and collaborating at Oak Ridge National Laboratory, working on projects supported by a Department of Energy (DOE) SCGSR graduate fellowship awarded to him in 2018. There, he used the Summit supercomputer to run simulations on layered superconductors.

Before joining ORNL in the summer of 2024, Philip worked as a postdoctoral researcher in the groups of Professor Peter Hirschfeld and Richard Hennig at the University of Florida, where he collaborated with both theorists and experimentalists to develop new methods for predicting and discovering promising new superconductors. With a combination of state-of-the-art *ab initio* tools, many-body theory, data-driven high-throughput schemes, and quick experimental synthesis/measurement workflows, it is now possible to improve significantly on the long-standing difficulties in predicting new superconductors.

Please join us in congratulating Dr. Philip Dee on his new Distinguished Research Fellow position at the Oak Ridge National Laboratory.

From ORNL site: *"Wigner Fellows are typically in the fundamental sciences and demonstrate competency in advanced materials, chemistry, computational science, neutron scattering, nuclear physics, and plasma and fusion energy sciences. Dr. Eugene P. Wigner was a 1963 Nobel Laureate in physics and ORNL's first director of research and development (1946-1947)."*



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## CSU PHYSICS IS AGAIN REPRESENTED WELL AT THE APS MARCH MEETING (2024)



The tradition of reunion of the CSU Physics students, faculty, and alumni at the American Physical Society (APS) March Meetings continued in Minneapolis, MN in March of 2024. This year CSU physics was represented by one undergraduate, two graduate students, two CSU physics alumni, and three CSU physics faculty who gave in total two talks and five posters.

Physics major James Taton presented a poster “Study of mixing enhancement in microfluidic channels through extensional flows” on his summer research supported by the CSU’s USRA program and advised by Dr. Fodor and Dr. Kothapalli. CSU 4+1 BS/MS physics student Collin Douglas gave a talk “Combining Light Scattering and Small Angle X-ray Scattering for Particle Characterization” on a research project he completed with Dr. Streletzky. An MS Physics student Mathew Ogieva presented a poster on his project “DNA Origami Motifs for Fast Localized Communication” advised by Dr. Sensale.

Physics major James Taton presented a poster “Study of mixing enhancement in microfluidic channels through extensional flows” on his



Alumni Dr. Phil Dee ‘13, currently the Distinguished Research Fellow at Oak Ridge National Lab (see above), and Jacob Adamczyk ‘20, currently PhD candidate at the University of Massachusetts, Boston, delivered their oral presentations and attended every CSU student poster presentation, providing each student with detailed feedback and academic career advice. The CSU students and CSU Alumni then joined Drs. Bickel, Sensale, and Streletzky for a reunion lunch. Later CSU students together with Jacob

Adamczyk and Dr. Streletzky explored the “City of Lakes” a bit by walking down Mississippi River.

We hope to continue this great tradition of physics students, faculty, and alumni getting together at the annual APS March Meetings, so let us know if you’re headed to Anaheim in 2025! The reunion of 2024 was at least the 7<sup>th</sup> reunion of CSU students, faculty and alumni at a March Meeting. In fact, since 2018 CSU had a similar reunion at every in-person APS March Meeting (March meeting was cancelled in 2020 and was fully virtual in 2021). This statistic shows the strength of CSU physics program and perseverance of its alumni in physics!



*\* The APS March Meeting is the largest physics scientific community meeting with 10,000+ contributed and invited presentations by physicists from around the world.*

## PHYSICS TOTALITY ROCKS: BUILDING COMMUNITY AROUND THE ECLIPSE

On April 8, 2024, the path of totality of the 2024 solar eclipse went through Cleveland. CSU Physics department (under Dr. Fodor's leadership) and SPS organized, publicized, and participated in a range of public outreach events in preparation for the eclipse as well as two observation parties on April 8. The events included:

- 1) Eclipse Seminar Series in the Spring 2024
- 2) SPS Eclipse Outreach with Hathaway Brown school in the Cleveland Public Library branches
- 3) Booth at Total Eclipse Fest 2024, in partnership with Great Lakes Science Center, NASAGRC
- 4) On Campus Eclipse Observation Site in collaboration with SPS Zone 7
- 5) Outreach at the Natividad Pagan International Newcomers Academy
- 6) Eclipse Concert by the School of Music Pop/Rock Band led by Chris Vance, Music
- 7) Creation of CSU Eclipse Songs Spotify Playlist (curated by Drs. Bickel, Baumgartner)

During all these events, Physics - CSU branded eclipse observation glasses were distributed. More details appear below and at <https://artsandsciences.csuohio.edu/physics/total-solar-eclipse>

### 2024 ECLIPSE SEMINAR SERIES AT CSU:

The Series included five great talks by: 1) Ideastream Ygal Kaufman on Eclipse and Film; 2) CSU's English department Adam Sonstegard on Eclipse in the books of Mark Twain; 3) Physics Andy Resnick on Eclipse Photography; 4) Hillsdale College Timothy Dolch on student driven radio observation of the Eclipse; and 5) Nanograv's Joseph Glaser (CSU physics alum) on gravitation wave humming.

The posters are as follows:

- THE ECLIPSE AND FILM** by Ygal Kaufman, Multimedia Journalist, Western Public Radio. Tuesday February 6<sup>th</sup>, 2024, 11:30 am in SR 151. Pizza and Refreshments Provided.
- How a Single Novelist Almost Killed Mark Twain** by Adam Sonstegard, English Department, FSE. Thursday February 29<sup>th</sup>, 2024, 11:30 am in BH 202. Pizza and Refreshments Provided.
- NANOGrav – Discovering the Gravitational Hum of the Universe** by Joseph Glaser, SA, Scientific Computation Specialist @ NANOGrav, West Virginia University. Tuesday April 9<sup>th</sup>, 2024, 11:30 am in SR 151. Pizza and Refreshments Provided.
- HOW TO VIEW AND PHOTOGRAPH THE UPCOMING TOTAL SOLAR ECLIPSE** by Andrew Resnick, Department of Physics, Cleveland State University. Tuesday March 19<sup>th</sup>, 2024, 11:30 am in SR 151. Pizza and Refreshments Provided.
- Student-Driven Radio Observations of the Sun and the Ionosphere During the 2024 Total Solar Eclipse** by Timothy Dolch, Department of Physics, Hillsdale College. Tuesday April 2<sup>nd</sup>, 2024, 11:30 am in SR 151. Pizza and Refreshments Provided.

### OUTREACH TOTALITY: ECLIPSE BASED OUTREACH-TEACHING EXPERIENCE



CSU's SPS chapter partnered with Hathaway Brown (HB) - a local K-12 all-girls school and Cleveland Public Library (CPL) for a unique outreach-teaching experience. CSU's SPS was awarded its 12th Marsh W. White Award from American Institute of Physics (AIP) for the project titled "Outreach Totality: Eclipse based Outreach-Teaching Experience". Former CSU's SPS outreach coordinator, Ms. Janna Mino, currently the Director of Fellowships in Science Research and Engineering at HB and CSU physics lab coordinator, Tara Peppard were instrumental in making the project successful. The goal of the Outreach Totality was to train a team of HB's 9-12 grade students



on how to perform Eclipse outreach and facilitate combined outreach of HB students together with CSU's SPS to younger HB students and public at several branches of the Cleveland Public Library (facilitated by Marina Márquez) through the spring of 2024.

In Phase 1, called "First Sighting", CSU's SPS went to HB and introduced Eclipse outreach activities to HB high school students and taught them how to perform outreach for themselves. The HB outreach team together with CSU's SPS



then

performed Eclipse demos to the two classes of HB 1<sup>st</sup> graders (about 30 students).

In Phase 2, called "Outreach Totality", HB outreach team together with the CSU's SPS went to five branches of the Cleveland Public Library and performed outreach session for CPL after-school care program, library staff, and general public. The CPL branches covered included: South branch, Sterling branch, Collinwood branch, Rice branch, Rockport branch.

A detailed account of this wonderful SPS outreach experience can be found here:

<https://www.csuohio.edu/news/cleveland-state-university-society-physics-students-highlight-solar-eclipse-latest-outreach>

## BOOTH AT THE TOTAL ECLIPSE FEST



From April 6<sup>th</sup> and leading to the total eclipse on April 8<sup>th</sup>, 2024, the Physics Department was an exhibitor at the Total Eclipse Fest organized as a partnership by the Great Lakes Science Center (GLSC) and the NASA Glenn Center, on the GLSC grounds just across from the Rock



and Roll Hall of Fame. Over the three-day event the CSU crew coordinated by Tara Peppard and Miroslav Bogdanovski has interacted with thousands of people distributing close to 20,000 eclipse glasses to the viewers and community. Among the many fest participants, the CSU Physics Department was the only one to have solar telescopes open for public observations. This made for long but

rewarding days, with queues of tens of people at a time lining up to get a closeup peek at the Sun. A full account of the eclipse related department activities together with the memories shared below, can be found at: <https://artsandsciences.csuohio.edu/physics/total-solar-eclipse>





## ON CAMPUS ECLIPSE OBSERVATION SITE IN COLLABORATION WITH SPS ZONE 7



On Monday April 8th, 2024, Cleveland State SPS had the extraordinary opportunity to host a live viewing party of a total solar eclipse right from our campus. The party included talks, refreshments, and two observation sites right outside the Science and Research building. The talks were given by Cleveland State Physics Associate Professor Dr.

**TOTAL SOLAR ECLIPSE CLEVELAND APRIL 8, 2024**

- 11:00 am-11:30am: Coffee with CSU/SPS students & alumni [SR Atrium]
- 11:30 am-12:20pm: Dr. Thijs Heus (Associate Professor of Physics, Cleveland State Univ) "Cloudy with a chance of moonshine: Predicting the weather during a solar eclipse" [SR 151]
- 12:30 pm- 1:00 pm: Pizza Break [SR Atrium]
- 1:00 pm - 1:50 pm: Dr. Joseph Glaser (Scientific Computing Specialist, NANOGrav, West Virginia Univ) "The 2024 Solar Eclipse: A History and Local Perspective" [SR 151]
- 2:00 pm - 4:30 pm: Solar Eclipse Observation outside. Weather permitting [In front of SR]. Radio Jove Solar Eclipse Citizen Science Project & Solar Eclipse QSO Party [In front of SR]. Eclipse NASA & SPS live feeds [SR 151]

**Totally Maximum 3:15 pm**

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Thijs Heus "Cloudy with a chance of moonshine: Predicting the weather during a solar eclipse" from his work with Dr. Tessa Rosenberger, and by Cleveland State Alumnus Dr. Joseph Glaser (Scientific Computing Specialist, NANOGrav, West Virginia Univ), "The 2024 Solar Eclipse: A History and Local Perspective." CSU SPS together with students and faculty from Kettering and Wayne State Universities hosted three optical telescopes and the Radio Jove Solar Eclipse Citizen Science Project station. We were joined by >150 friends, family, and regional locals and visitors who received free CSU Physics eclipse viewing glasses.



## OUTREACH AT THE NATIVIDAD PAGAN INTERNATIONAL NEWCOMERS ACADEMY



Coordinated and organized by CSU Physics Lab Manager, Tara Peppard, several CSU graduate and undergraduate physics students went to the Natividad Pagan International Newcomers Academy in March to raise interest among its student in this unique opportunity to observe the Total Solar Eclipse.



## ECLIPSE CONCERT AND ECLIPSE SONGS ON SPOTIFY



Dr. Jessica Bickel helped to organize April 5<sup>th</sup> Eclipse Concert by the School of Music Pop/Rock Band (led by Chris Vance, Music) in the Atrium of the CSU's Student Center. She introduced this concert, talk a bit about the solar eclipse and distributed CSU eclipse glasses. Additionally, Dr. Bickel together with Dr. Michael Baumgartner (Music) curated CSU Eclipse Songs Spotify Playlist in celebration of the 2024 Solar Eclipse.



## TIDINGS

- Thanks to you, *dear reader*, the Physics Department raised \$4000 during 2024 Giving Day fundraiser held on February 29, 2024. The money will support a physics major each semester for the next two years. Read about the recipient of the Fall 2024 Giving Day Scholarship in the next issue of the Newsletter. Thank you from the bottom of our hearts for supporting physics majors!
- On November 17, 2023, Dr. Streletzky helped to install Sigma Pi Sigma chapter at the Case Western Reserve University. He also inducted 38 students into the newly installed  $\Sigma\Pi\Sigma$  chapter.
- The Spring 2024 issue of *Radiations* features a story about the life-changing postcard received by University of Maryland graduate student Jearl Walker in 1971 from Philip Morrison (a physicist who had worked on the Manhattan Project alongside J. Robert Oppenheimer). Here is the link: <https://www.sigmapisigma.org/sigmapisigma/radiations/spring/2024/postcard%E2%80%99s-domino-effect-how-one-word-changed-jearl-walker%E2%80%99s>
- The Spring 2024 issue of *The SPS Observer* features a story by our alumni Jordan Miller ('24) and Patrick Herron ('24) on touring the Green Bank Observatory during 17<sup>th</sup> Sigma Pi Sigma Physics Congress in Washington DC in October 2022. Here is the link: <https://www.spsnational.org/the-sps-observer/spring/2024/night-green-bank-observatory>
- Dr. Andy Resnick's solar eclipse images from April 8 together with his detailed description were featured in the *cleveland.com*. You can find the article and pictures of a solar prominence here: <https://www.cleveland.com/news/2024/04/what-was-that-red-thing-extending-from-the-bottom-of-mondays-total-solar-eclipse.html>
- This year the Physics department lost two of its dedicated members Joseph Reddaway (administrative coordinator) and Sebastian Sensale Rodriguez (assistant professor) who left to pursue other opportunities. We miss them both and wish them both the best of luck!
- Dr. Vida Lock, the widow of Jim Lock, recently remotely delivered a eulogy in memoriam of Jim at the 14<sup>th</sup> International Laser-light and Interactions with Particles (LIP2024) Conference held in Xi'an, China in September 2024. The organizers of LIP2024 have decided to dedicate the entire conference to Jim, given his long-standing contributions to the field. The dedication says, "In memory of Prof. James Albert Lock (1948-2023): A life of honor and work of excellence." You can access the eulogy delivered by Dr. Vida Lock at the LIP 2024 here: <https://drive.google.com/file/d/1hl7JczroJ90zsmxvF2QcCinRt9eTGlClb/view?usp=sharing>



- The Summer 2024 CSU Alumni Magazine features Jearl Walker in its cover story. Please check it out here: <https://www.clevelandstatemagazine.com/print-issue/>
- On December 18, 2024, CSU turns 60 years old - read about it in the next physics newsletter.
- In October 2025, Sigma Pi Sigma will hold its 18<sup>th</sup> Physics and Astronomy Congress in Denver Co. The 2025 theme is *Supporting Our Phase Shifts*. CSU's SPS chapter and the department plan to have a CSU undergraduate delegation send there. Check out the details about the Congress here: <https://students.aip.org/congress>. Read more about it in the next issue.

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## STUDENT PRESENTATIONS/PUBLICATIONS

### ***Undergraduate Research Presentations (National & Regional) since February 2024:***

#### **American Physical Society (APS) March Meeting, Minneapolis MN, Mar 5-9, 2024:**

1. "Combining Light Scattering and Small Angle X-ray Scattering for Particle Characterization" **C. Douglas, P. Herron**, K. A. Streletzky, Mar 5 (talk)
2. "Study of mixing enhancement in microfluidic channels through extensional flows", **J. Taton**, P. Fodor, C. Kothapalli, Mar 6.

#### **19<sup>th</sup> Northeast Ohio Undergraduate Research Symposium, Kent State University, Kent OH, Jul 31, 2024:**

3. "Towards Confinement Effects in Polymer-Grafted Nanorod Solutions", D. Amirsadri, **P. Barrett**, N. Nupnar, M. Hore, K. A. Streletzky
4. "Analyzing Polymer-Grafted Gold Nanorods using Depolarized Dynamic Light Scattering (DDLs)", **P. Barrett**, D. Amirsadri, H. Sanisetti, K. A. Streletzky

### ***Undergraduate Publications since February 2024:***

1. A. Titus, **P. Herron**, K. A. Streletzky, V. Uversky, B. Zaslavsky, "Effect of Trimethylamine N-oxide on the phase separation of aqueous two-phase systems", *Physical Chemistry Chemical Physics* 26, 10546-10556 (2024).
2. **J. Miller, P. Herron**, "The Top 5 reasons to get involved in SPS", *The SPS Observer* 58, 1, 14-15 (2024).

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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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