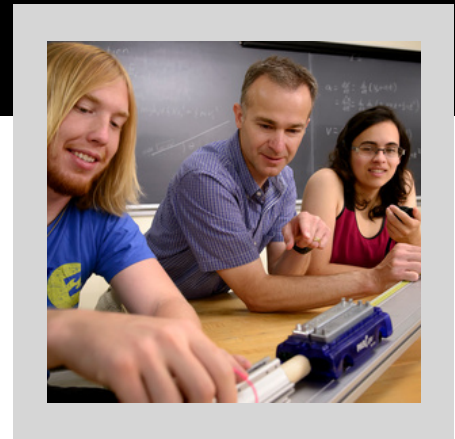


NEWSLETTER



Welcome!

At the University of Wyoming College of Engineering and Physical Sciences Department of Physics and Astronomy, we offer a welcoming, personalized educational experience that broadly prepares students for challenging careers in space sciences, nanotechnology, quantitative finance, engineering, environmental sciences, optics, computer technology, energy policy, science law, and many other fields.



Trending This Summer



Astronomy REU
May 20 - July 26, 2024



**Teton Stem Academy for
High School Students**
June 16-23, 2024



**Summer Odyssey:
Summer Solstice**
June 17-21, 2024



**Windy Ridge Foundation
Astro Camp**
June 16 - 22, 2024



Quantum Summer School
June 18-20, 2024



**UW Summer High School
Institute (HSI)**
July 7 - 27, 2024

MEET OUR FACULTY

FACULTY

- Jinke Tang, Chair
- Richard Barrans
- Michael Brotherton
- TeYu Chien
- Yuri Dahnovsky
- Daniel Dale
- Meredith Joyce
- Chip Kobulnicky
- Rudi Michalak
- Max Moe
- Adam Myers
- Ron Pepino
- Alex Petrovic
- Mike Pierce
- Jifa Tian
- Ed Seidel
- Yu-Tsung (Rem) Tsai
- Wenyong Wang

ADJUNCT FACULTY

- Gabrielle Allen
- Hannah Jang-Condell
- Pu Du
- Paul Marquard
- William Rice
- Zhaohui Shang
- Tim Slater
- Ed Synakowski
- Jim Verley

LECTURERS

- Ron Canterna
- Paul Marquard
- Jim Verley

EMERITUS

- Ron Canterna
- Paul E. Johnson
- Ray Kunselman
- Terry Roark
- David Thayer

Save the Date

**THE
POWER OF 1** 

**OCTOBER 23-24, 2024
NOON TO NOON**

[Give here](#)

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Physical Sciences Building
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Laramie, WY 82071



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www.uwyo.edu/physics

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MESSAGE FROM THE DEPARTMENT HEAD

Greetings Alumni, Friends, Students, Faculty and Staff!

What a year! Lots of great things happened last year. If you didn't hear them, here is a re-cap.

We had our first ever Rebka, Hafele Einstein Distinguished Lecture last fall. Professor Daniel Kennefick from the University of Arkansas gave the inaugural speech A Brief History of Gravitational Wave Emission. The Lecture Series is supported by a generous gift from Patrick & Nora Ivers.

World Quantum Day was April 14. We had a special celebration with one of outstanding alumni Chris Wood. Dr. Wood is a CTO at Infleqtion, a major laser and quantum company based in Boulder, CO. He delivered a nice talk aimed at our majors entitled, "From Lander, Wyoming to Quantum Computing, and all the cool Quantum stuff at Infleqtion." It was well attended and well received. Just a heads up, next year is "World Quantum Year". Stay tuned for activities that we will be planning.

Two experimental condensed matter physicists, Drs. Alex Petrovic and Yu-Tsung (Rem) Tsai, joined us last year. Computational astrophysicist, Dr. Meredith Joyce, is joining the faculty in August. Also joining us in August is Dr. Ron Pepino, who is a FTRC Assistant Lecturer. We are also happy that Conrad Vogel has returned to UW to take care of WIRO.

Danny Dale received one of the most prestigious UW faculty awards, "the George Duke Humphrey Distinguished Faculty Award for 2024". Danny was also elected as a Trustee of the American Astronomical Society (with the entire membership of the AAS voting). This is a major responsibility and honor.

Aysenur Bicer received the "Ellbogen Lecturer" award for 2024. Unfortunately, she and her husband Ali will leave us to join their alma mater TAMU. We wish her the best.

TeYu Chien was promoted to full professor, and Jifa Tian was promoted to associate professor with tenure. Jifa has also been appointed by VPRED Parag Chitnis as the Interim Direct of the newly established Center for Quantum Information Science and Engineering (C-QISE) at UW.

For Spring 2023 student awards, the "CEPS Honors Book" went to Gabby Graham and Tera Swaby, the "Graduating Senior Award" went to Gabby Graham. "The Cinnamon Award" went to Kaycee Conder and Xander Larsen. "The Outstanding TA Award" went to Andrea Daly, Chase Smith and Theodora Zastrocky. "The Wayne Needy Outstanding Research Award for Graduate Students" went to Even Cook, Lauren Kim, David King and Theodora Zastrocky. Congratulations to all!

P&A graduate students Lauren Kim and David King were the recipients of the "Best Poster Award" at the 2023 Front Range Advanced Magnetism Symposium, which was held on September 16, at the University of Denver. Congratulations to Kiana for receiving funding for her project "Munich Astronomy Collaborative Meeting" from the Center for Global Studies! She received the award in addition to a check of \$2,000. In addition, let's congratulate Lizzie Bair, first-year physics student, for an internship this summer at the National Renewable Energy Laboratory (NREL) in Golden, CO!

Let's thank Burnett Family Charitable Foundation for establishing the Lowell and Joan Burnett Student Enrichment Fund for Physics! This is a generous gift of \$500K counting the match from UW.

Oh, I should mention that the Department of Physics and Astronomy has received the "5+ Club Award" for graduating students in physics teaching during the 2022- 23 academic year, placing UW among the top one percent of institutions nationwide. See below for details.

Finally, [please stay in touch with us and let us know about your career path](#). We post these updates on our [alumni webpage](#). Also, please send us your email if you are interested in receiving an electronic copy of these newsletters.

Have a great new academic year!

Jinke Tang
Department Head





GET TO KNOW ASSISTANT PROFESSOR ALEX PETROVIC

Alexander Petrovic grew up in Somerset, an area of the United Kingdom best known for cider and legends of Avalon. He read Natural Sciences at Clare College, Cambridge, before escaping to Geneva, Switzerland, where he completed a Ph.D. in Øystein Fischer's quantum condensed matter research group. During this period he built a helium-3 scanning tunnelling microscope inside an 11 Tesla magnet, using this unique instrument to obtain the first images of a superconducting vortex glass. The system was designed to have a liquid helium autonomy time of eight days, which conveniently allowed Alexander to vanish into the Alps on a mountain bike or snowboard during spectroscopic image acquisition.

His next destinations were Singapore and Malaysia, where he designed the first ultra-low vibration milliKelvin laboratory in south-east Asia and nurtured his interest in topological solitons. This episode coincided with an explosion of interest in worldwide particle-like topological spin excitations: magnetic skyrmions. After some time spent working on heterogeneous low-dimensional materials (including the first demonstration of disorder-enhanced superconductivity in a quasi-1D system), Alexander combined his experiences in spin and flux topology to create a new class of "hybrid" chiral magnetic/superconducting thin films hosting equilibrium skyrmion-vortex pairs under certain conditions, these exotic solitons may be capable of mediating a local phase transition to a topological superconducting state, with a non-Abelian anyone capable of robustly encoding quantum information bound to each vortex core.

In Wyoming, Alexander is setting up a laboratory to synthesize a new generation of atomically-precise thin film multilayers, with the goal of achieving local control over the symmetry of the superconducting order parameter. He will characterize these novel hybrid materials using a blend of magnetometry, susceptometry, ac transport and microwave absorption spectroscopy.

In the future, he also hopes to develop a new variant of broadband scanning probe microscope, capable of mapping local quantized spin resonances as well as the spatially-varying complex impedance in a wide range of quantum materials.

MEET NEW ASSISTANT PROFESSOR OF PHYSICS YU-TSUNG (REM) TSAI



With a passion for 2D material and magneto-optical studies, Assistant Prof. Yu-Tsung (Rem) Tsai brings 15 years of experience and a proven track record of publications such as Nature Nanotechnology and Advanced Materials. Adept at international lab-based training (Asia and USA) as well as leading a research group in Germany, Europe, he consistently delivers research results by acquiring up-to-date science advances and asking key questions. Known for open communication, Rem is committed to lead the 2D Optic research team in University of Wyoming. With a blend of cultural understanding, he thrives in dynamic environments, driving innovation and fostering collaboration.

Lab update: Advanced Raman microscopic system has been set up within three months including five multi-laser lines, sub-micron spatial resolution, angle-dependent Raman, and helicity-resolved Raman capabilities. A 9-tesla cryogenic station for low-temperature magneto-optical studies on low-dimensional samples will be delivered at the end of year 2024.



LEARN MORE ABOUT ASSISTANT PROFESSOR MERIDITH JOYCE

Dr. Meredith Joyce will begin a professorship at the University of Wyoming in August 2024. Dr. Joyce uses theoretical models to understand the present-day behavior of stars as well as the evolutionary history of the Milky Way. She works primarily with the MESA (Modules for Experiments in Stellar Astrophysics) stellar structure and evolution software instrument. She has been part of the MESA developers team since 2019.

Dr. Joyce's current research projects include the study of evolved, variable stars like the nearby red supergiant Betelgeuse and reconstructing the evolutionary history of the Milky Way through age-metallicity relations in the Galactic bulge. Dr. Joyce is a world expert in one-dimensional stellar modeling and instrumental systematics and has recently authored an projects related to stellar physics, working closely with asteroseismologists, nuclear astrophysicists, and spectroscopists.

Dr Joyce completed her Ph.D. at Dartmouth College, USA, in 2018 and has since held research positions and residences on five continents. She has done a pre-doc at the University of Cape Town and South African Astronomical Observatory, South Africa; a postdoc at Australian National University, Australia; held a visiting residence at the Institute for the Physics and Mathematics of the Universe at the University of Tokyo, Japan; held the Lasker Data Science Prize Fellowship at NASA's Space Telescope Science Institute and a visiting residence at the Kavli Institute for Theoretical Physics in Santa Barbara, United States. She is joining Wyoming from Konkoly Observatory in Budapest, Hungary, where she previously held a Marie Curie Widening Fellowship. She enjoys a large, international network of collaborators who work in many different sub-disciplines.

Plans: I'm excited to spend my first semester helping to build the new curriculum in the School of Computing. I will be seeking highly motivated students (graduate and undergraduate) interested in stellar and/or Galactic astrophysics to join my research group.

MEET NEW ASSISTANT LECTURER OF PHYSICS RON PEPINO



Ron Pepino received his Ph.D. in theoretical quantum optics at JILA and the University of Colorado at Boulder. His love for teaching led him to become a liberal arts college professor at Florida Southern College, where he's spent the last eleven years inspiring students. However, his love for the mountains brought him back to the Rocky Mountains as a Lecturer for the department. Here, Ron hopes to keep working with and inspiring the next generation of physicists.

RESEARCH GROUP NEWS

Dr. TeYu Chien Research Publication

Possible coexistence of magnetism and paramagnetic singularity in lightly Fe-doped WTe₂

Dinesh Baral, Rabindra Basnet, William R. Scougale, Raz Q. Rivlis, Dinesh Upreti, Yuri Dahnovsky, Jin Hu, and TeYu Chien

Topological semimetals possess nodal or nodal-line phases where conduction and valence bands touch at points or lines in momentum space, respectively. Such band touching is symmetry protected and gives rise to exotic and interesting electronic properties. Coupling topological order with magnetism provides a platform for exploring time-reversal (TR) symmetry breaking topological physics, such as axion electrodynamics, inverse spin-galvanic effect, and the quantized anomalous Hall effect. The Weyl semimetal (WSM) requires breaking either TR symmetry or lattice inversion symmetry (I). By doping inversion-symmetry-broken WSM with magnetic dopants, one can expect to create a WSM with both symmetries breaking simultaneously. Here, structural, electrical, and magnetic properties of Fe_xW_{1-x}Te₂ ($x=0$ and 0.011) are reported. It is revealed that, with a small Fe doping concentration ($x=0.011$), a ferromagnetism is induced at low temperature (<10 K). Scanning tunneling microscopy and spectroscopy measurements in Fe_{0.011}W_{0.989}Te₂ further reveal only substitution and no intercalated dopants being observed. The probabilities of the Fe substitutions at the two nonequivalent W sites are quantified with equal probability. The dI/dV point spectra indicates that the Fe substitution in WTe₂ manifests itself as electron doping regardless of doping sites. The results clearly reveal the possible coexistence of magnetism and Weyl points in the lightly Fe doped WTe₂ at low temperature. This provides an ideal system for further study on the interplay between the topological Weyl points and the TR symmetry breaking.

<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.109.245419>

Dr. Jifa Tian Research Group

Exciting updates for Dr. Tian's Research Group:

1. 2024-05-01: ZhuangEn's paper "[Tunneling current-controlled spin states in few-layer van der Waals magnets](#)" is now published in Nature Communications. Also see [UW news](#), [Phys.org](#), [ScienceDaily](#), and [more](#).
2. 2024-04-26: Piumi successfully defended her PhD dissertation. Congrats!
3. 2024-03-04 to 03-08: Four members (including Piumi, Sabin, Kayley and Prof. Tian) of Tian research lab attended the APS March Meeting 2024 in Minneapolis, MN. See pictures [here](#).
4. 2023-12-15: Prof. Tian (Interim Director of C-QISE at UW) and Dr. Michael R. Norman (Director of the Argonne Quantum Institute) co-hosted the [UW-ANL Quantum Materials & Devices Workshop](#). This online event aims to jump-start the collaboration in quantum science and technology between the two institutions.
5. 2023-12-13: Prof. Tian attended the Quantum Summit 2023, held in San Antonio, Texas, which was organized by Arizonan State University.
6. 2023-11-13: ZhuangEn successfully defended his PhD dissertation. Congrats!
7. 2023-11-07: Prof. Tian was awarded the NSF RII Track-4 EPSCoR Research Fellowship (\$300,000).
8. 2023-09-05: Prof. Tian has been awarded a grant from DOE ([UW News](#)).

RESEARCH GROUP NEWS

Dr. Maxwell Moe

I've really enjoyed my first two years as assistant professor at the University of Wyoming! I was raised in Fort Collins, CO, completed my three bachelor's degrees at CU Boulder, earned my Ph.D. at Harvard University (dissertation title: "How I Learned to Stop Worrying and Love Eclipsing Binaries"), and spent a few years as an Einstein Postdoctoral Fellow at the University of Arizona. It's great to be back along the Front Range.

My research focuses on the formation and evolution of binary stars and how binaries sculpt exoplanet demographics. Most of the bright stars we see in the night sky are binary, and they can evolve to produce a plethora of astrophysical phenomena such as thermonuclear supernovae, gamma-ray bursts, and binary black hole / neutron star mergers that emit gravitational waves. I've worked with four UW students this past year:

(1) Second-year graduate student Megan Frank and I are analyzing peculiar eclipsing binaries in the nearby Large Magellanic Cloud galaxy. One of the binary components contains a helium star, i.e., the helium core of a massive star whose outer hydrogen layers have been stripped due to binary interactions, and it will soon explode as an elusive Type Ib/c supernova.

(2) Second-year graduate student Andrea Daly and I are measuring the spectral energy distributions of nearby Sirius-like binaries. Sirius is the brightest star in the night sky (yes, I'm serious) and contains a faint white dwarf companion, the remnant core of a now dead star. We are analyzing extremely young Sirius-like binaries whereby the hot white dwarf emits an ultraviolet excess with the goal of finally pinning down their birthrates.

(3) Third-year graduate student Chase Smith and I recently submitted a paper to the *Astrophysical Journal*, "The Spin-Orbit Alignment of Early-type Astrometric Binaries and the Origin of Slow Rotators". We are the first to show that most massive binaries have rotation spins well aligned to their orbits, but also discovered that the primaries in close binaries comprise the previously unexplained slow rotator population in the observed bimodal rotational velocity distribution. During their formation, the close secondary accretes most of the mass from the circumbinary disk, quenching angular momentum flow away from the primary.

(4) Graduating senior Caleb Eastlund and I measured the occurrence rates of wide binaries in different star-forming environments. Previous studies (going back to the 1993 dissertation work of Nobel laureate Andrea Ghez) found a mysterious excess of young wide binaries. Caleb and I showed that the apparent excess is in fact an artificial selection bias.

This past year, I received three small research grants (\$75k total) to continue research with students. I also served the department in various capacities: Society of Physics Students advisor, graduate student recruiting, and organize weekly lunch meetings where faculty, graduate students, and undergrads discuss major results from the past week of journal articles. I have now taught four courses (grad Stars, grad Planets, junior/senior Astrophysics; and non-major Astronomy) where I really enjoyed incorporating active learning and modern pedagogy. For example, this past semester I taught ASTR-1000, a 3-credit course without a separate lab section where we instead brought hands-on demonstrations into the classroom and made frequent trips to the planetarium. I'm looking forward to full-time research this summer and cycling through these four classes again in the future.

Go Pokes!
Maxwell Moe

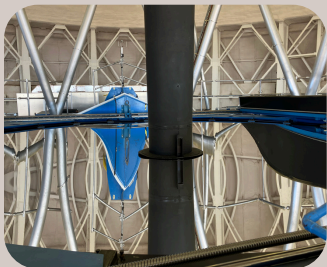
RESEARCH GROUP NEWS

Dr. Adam Myers' Research Group

Professor Adam Myers' research groups' major focus continues to be the Dark Energy Spectroscopic Instrument (DESI), a state-of-the-art mapper on the Kitt Peak 4-meter telescope that is obtaining spectra of ~50 million celestial objects over a 5-year survey. The DESI collaboration, which includes hundreds of scientists from around the world in addition to Myers' group, published the largest 3D map of the Universe ever constructed in April of 2024. This 11-billion-light-year map was reported on in popular news outlets such as The New York Times, The Guardian, and Science News, as evolving structure in the map hints for the first time that the "dark energy" that drives the recent acceleration of our Universe might be dynamic in nature. Evidence prior to the Year 1 DESI release suggested that "dark energy" should be expected to be static throughout the history of the cosmos.

In the last year, Lucas Napolitano published his first peer-reviewed work as first author "Detecting and Characterizing Mg II Absorption in DESI Survey Validation Quasar Spectra" (2023,AJ, 166, 99) with Agnesh Pandey as second author. Lucas was a co-author on 5 other papers related to his work on DESI. Yufeng Luo published 3 papers related to previous work at his alma mater and obtained a summer internship to work at Argonne National Lab. Harrison Leiendecker obtained a NASA Space Grant Graduate Research Fellowship to support his work. Dixon Reid and Salma Borchani obtained Wyoming Research Scholars Program and Thomas Jefferson Scholarships, respectively.

In addition to his more typical research activities, Professor Myers was invited to visit a number of major observatories while observing in Chile earlier this year, with a view to gathering ideas for next-generation spectroscopic mappers once the DESI survey concludes. Among other facilities, Myers visited the 8.1-meter Gemini South telescope and the nearly completed Vera C. Rubin Observatory (see photo) that will soon host the 8.4-meter Simonyi Survey Telescope. The Gemini South mirror had recently been recoated, and, as can be seen in the photo below, the surface was staggeringly reflective up-close!



Gemini

Recent members of Myers' group include graduate students Lucas Napolitano, Harrison Leiendecker and Yufeng Lou and undergraduate students Dixon Reid, Salma Borchani and Agnesh Pandey. Students in Myers' group typically have input into identifying and classifying the targets in the sky that DESI observes, and on helping to run day-to-day operations for the DESI survey.



Rubin

But students also work on a broad range of topics in astronomy and cosmology, including applications of Machine Learning methods, studies of distant black holes, characterizing the large-scale structure of the universe, and modeling disks of potentially planet-forming material around stars.

FACULTY AWARDS



Dr. Dale Receives UW's George Duke Humphrey Distinguished Faculty Award

Danny Dale recognizes that the best mentors are those who learn alongside their students; is noted by faculty as a good research collaborator; and builds personal connections, according to his students.

These attributes -- recognized by University of Wyoming faculty and students alike -- have earned Dale, a professor in the UW Department of Physics and Astronomy and an associate dean in the College of Engineering and Physical Sciences, the George Duke Humphrey Distinguished Faculty Award.

Named for UW's 13th president, who served from 1945-1964, the George Duke Humphrey Distinguished Faculty Award recognizes teaching effectiveness, distinction in scholarly work and distinguished service to the university and state.



John P. Ellbogen Meritorious Classroom Teaching Award

Dr. Aysenur Bicer was awarded on May 9, 2024, at the University of Wyoming President's Commencement Dinner. Classroom teaching at the University of Wyoming is a cherished skill, and this Ellbogen award recognizes the University's best every academic year.

Promoting Intellectual Engagement (PIE) Award

In addition to the John P. Ellbogen Meritorious Classroom Teaching Award, Dr. Bicer was awarded Promoting Intellectual Engagement (PIE) Award. This award is for instructors who inspire excitement, inquiry, and autonomy in first-year courses.

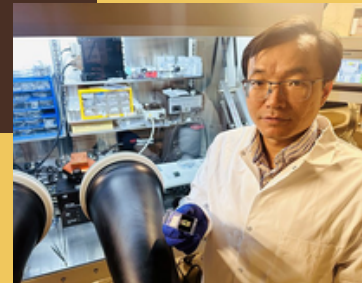
NEWS UPDATE

UW Researchers Unlock Potential of 2D Magnetic Devices for Future Computing

A research team at the University of Wyoming created an innovative method to control tiny magnetic states within ultrathin, two-dimensional (2D) van der Waals Magnets – a process akin to how flipping a light switch controls a bulb.

Our discovery could lead to advanced memory devices that store more data and consume less power or enable the development of entirely new types of computers that can quickly solve problems that are currently intractable," says Jifa Tian, an assistant professor in the UW Department of Physics and Astronomy and interim director of UW's Center for Quantum Information Science and Engineering.

Their paper "Tunneling current-controlled spin states in few-layer van der Waals magnets" was recently published in Nature Communications.



RESEARCH GROUP NEWS

Dr. Mike Brotherton's Research Group

Professor Michael Brotherton and his research group continue to investigate the mysterious quasars, the shining cores of distant galaxies powered by black holes, which are the most luminous objects in the universe. His group includes graduate students Jacob McLane, Amy Cavanaugh, Theodora Zastrocky, Kaiwen Zhang, undergraduate Liam Royle-Grimes, and high school student Padmalakshmi Ramesh. He has also been employing recent Wyoming graduate Aidan Ferguson.

Brotherton, in collaboration with Jaya Maithil who earned her PhD at the University of Wyoming and now works at the Harvard-Smithsonian Center for Astrophysics, were awarded 29 orbits of time on the Hubble Space Telescope to conduct "A Major Overhaul of Ultraviolet Black Hole Mass Prescriptions" for quasars. Observations have begun as of May 2024.

Theodora Zastrocky has recently published a large, significant paper reporting new mass measurements of the black holes powering 14 active galactic nuclei. The work is based on data from WIRO, the Wyoming Infrared Observatory, and included major contributions from fellow graduate student Jacob McLane. Theodora was also awarded a graduate student fellowship from the Wyoming NASA Space Grant Consortium.

Brotherton was awarded a School of Computing fellowship that he is using to compute dynamic models for the gas orbiting the black holes of active galaxies. Aidan Ferguson is leading this work based on world-class data from the WIRO telescope.

Padmalakshmi Ramesh, mentored by Brotherton, recently placed second in the physics and astronomy category of the 2024 Regeneron Science and Engineering Fair. Her project is investigating WIRO observations of a flaring quasar to determine if the event was caused by the tidal disruption of a star passing too close to the central black hole.

Dr. Danny Dale's Research Group

MEET THE TEAM

Graduates

- Kiana Henny
- Aldair Bonilla
- Steffanie Peterson
- Tony Weinbeck
- Chase Smith

Undergraduates

- Gabby Graham
- Kaitlyn Schultz
- Kaycee Conder

ALUMI NEWS

Jessica Sutter started a faculty position at her alma mater of Whitman College in Spring 2024.

STUDENT ORGANIZATION



MEET THE TEAM

Faculty Advisor: Dr. Max Moe
President: Ethan Cotter
Vice President: Kayley Galbraith
Secretary: Liam Royle-Grimes
Treasurer: Kaycee Conder

In the past, the advisor was able to take undergraduates to conferences or national science centers. Most recently, they went to the world's largest physics meeting the APS March meeting (this time in Las Vegas), and the SPS National Congress in D.C. In 2023 they were able to go to the 4 corner meeting in Logan, Utah in late October. The benefits of traveling are manifold: Rapport building with majors and adviser, a taste of science, a taste of student presentations at conferences, an opportunity to network, get information about grad schools, compare notes with students from other universities, meet famous scientists, a good test for whether one identifies as a physicist/astronomer.

STUDENT ACTIVITIES

Emerging Researchers in Exoplanet Science Symposium (ERES)

Astronomy Undergraduate, Xander Larsen attended the 2024 ERES Symposium in July
Title: TOI-5389b: A Rare Brown Dwarf around an M Dwarf

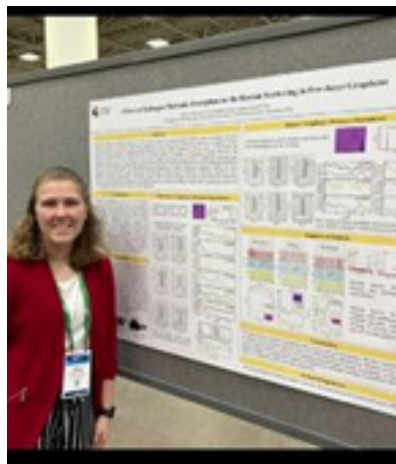
Abstract: Brown dwarfs are officially demarcated as objects between ~ 13 and ~ 80 Jupiter masses. However, there is some debate on whether or not to classify them this way (by mass) or by relevant formation mechanism, which is what this work hopes to contribute to. These objects are rare around main sequence stars ($< 1\%$ occurrence) and even rarer around M dwarfs (only 10 confirmed). The rarity and debate on classification make TOI-5389b a target of considerable interest. We use TESS sectors 22 and 48, two ground based transits from our own 0.6m Red Buttes Observatory (RBO), and ten radial velocity epochs by the Habitable-zone Planet Finder (HPF) in tandem with the EXOFASTv2 fitting program to characterize this target. We find a mass of 73.1 ± 3.1 Jupiter masses, a radius of 0.91 ± 0.05 Jupiter radii, an eccentricity of 0.096 ± 0.044 , and a period of ~ 10.4 days orbiting around a M2V star with effective temperature 3567 ± 88 K. This makes it one of the most massive brown dwarfs, nearing the edge of the hydrogen fusion limit. Therefore this target is of considerable interest in probing the nature and limits of brown dwarfs as a whole.

STUDENT ACTIVITIES



Minneapolis, Minnesota
March 3-8

APS March Meeting



Dr. Rudiger Michalak traveled with undergraduate majors, Tera Swaby, Kayley Galbraith, Ethan Cotter, Xander Larsen, Amelia Myers, Rachel Wood, and Kaycee Conder to the annual March APS Meeting in Minneapolis, Minnesota.

Kayley Galbraith presented her poster, "Effects of Hydrogen Molecule Absorption on the Raman Scattering in Few-layer Graphene" in the Undergraduate poster session on March 5. Someone from Physical Review B, a physics journal published by APS, inquired about her poster and asked to put her on their Twitter page (shown in photo). There were also several talks that she attended related to many different fields in physics including biophysics, quantum computing, 2D material science, undergraduate research and more. The talks about careers for physics students was also informative. "I had a very good time and hope to attend next year's conference in Anaheim, California," says Kayley Galbraith.

Laser Illumination Induced Superconductor-to-Semiconductor Phase Transitions in WS₂

Authors: John Drain, William Scougale, Sabin Gautam, Joseph McBride, Brian Leonard, Piumi Samarawickrama, Ji Tang, John Ackerman, Jifa Tian, TeYu Chien

Publication Date: 3/27/2024

Journal: Bulletin of the American Physical Society

Publisher: American Physical Society

Description:

The ability to precisely manipulate crystal phase transitions in 2D TMDs is advantageous for controlling their physical properties and creating devices. In these TMD materials there has been noteworthy progress in achieving structural phase transitions between 2H and 1T or 1T' crystal phases. In WS₂, the 2M phase has been recently identified as an intrinsic 2D topological superconductor, with a notably high superconducting transition temperature of 8.8 K, and a semiconducting 2H phase. However, transitions between the 2M and phases in WS₂, as well as other phases in 2D TMDs, remain poorly understood. In this study, we demonstrate local phase transitions from superconducting 2M to semiconducting 2H phases in WS₂ atomic layers via laser irradiation. Using scanning tunneling microscopy (STM), we find that the region exhibiting the 2H phase shows a hexagonal shape with a width of ~ 800nm.

Reference:

Laser Illumination Induced Superconductor-to-Semiconductor Phase Transitions in WS₂

J Drain, W Scougale, S Gautam, J McBride, B Leonard, et al.

- Bulletin of the American Physical Society, 2024 Related article

NASA NEWS

Two UW Student Teams Advance in NASA Design Challenge

Two teams of University of Wyoming students have been selected to advance to Phase 2 in NASA's 2024 Micro-g Neutral Buoyancy Experiment Design Teams (NEXt) engineering design challenge.

Seven undergraduate students in the UW College of Engineering and Physical Sciences, dubbed the UW Crater Cowboys, designed and built the Little Lunar Saddlebag, a hand carrier device that can be used to store and move tools during lunar extravehicular activity in microgravity. Team members include Maria Allen, of Parker, Colo.; Hanna Detmer, of Sheridan; Autumn Highland, of Cheyenne; Hunter Kindt, of Cody; Ivan Leon and Michael Richardson, of Green River; and Erin Poyer, of Rock Springs.

Additionally, eight undergraduate students in the UW College of Engineering and Physical Sciences, dubbed the UW Space Cowboys, designed and built the Flag Assembly with Shark-Stake and Tether, a lunar flag, flagpole and anchoring system that can be deployed on the lunar surface. Team members include Brian Baker and Jake Kravetsky, both of Jackson; Jakob Borrman, of Loveland, Colo.; Daemon Carroll, of Smithfield, Va.; Joshua Gardner, of Pensacola, Fla.; Eduardo Mendoza, of Powell; JW Mills, of Colorado Springs, Colo.; and Jacob Wells, of Cheyenne.

"I am so pleased with the efforts that I've seen these teams put forth and am proud that students from the mechanical engineering department will again be able to represent UW in the Micro-G NEXt challenges," says Kari Strube, an assistant lecturer of mechanical engineering and team adviser. "Last year, I was impressed with the dedication shown by our students, who had a successful test of their zip-tie installer, and I expect that this year's groups will perform equally well in their challenges. They both have been working hard to continue to refine their designs, and I look forward to seeing them test their finished products in NASA's facilities."

Please read more on this article [here](#).

UW SPACE COWBOYS

Within the last year, the Wyoming Space Grant conducted multiple high-altitude balloon launch events, including several with local schools here in Laramie (Whiting High School and Montessori Charter School). In addition, we sponsored a team of 9 students (the "UW Space Cowboys") during the NASA-funded Nationwide Eclipse Ballooning Project (NEBP).

One of the broad goals of the NEBP is to study how solar eclipses impact our atmosphere. Two of the students on the team, Amelia (Mila) Myers and David Gordon, are majoring in astrophysics. Physics Ph.D. student Lauren Kim helped lead the team during the project.

In October, the team traveled to central Utah to launch weather balloons during the annular solar eclipse. These balloons carried radiosonde devices that measured temperature, humidity, and wind speed up to altitudes well over 100,000 feet.

Then, in early April, the team went to Ohio to launch 32 weather balloons in 31 hours from within the path of totality during the total solar eclipse. The students presented highlights and preliminary findings from the project at the Undergraduate Research and Inquiry Day on April 20.



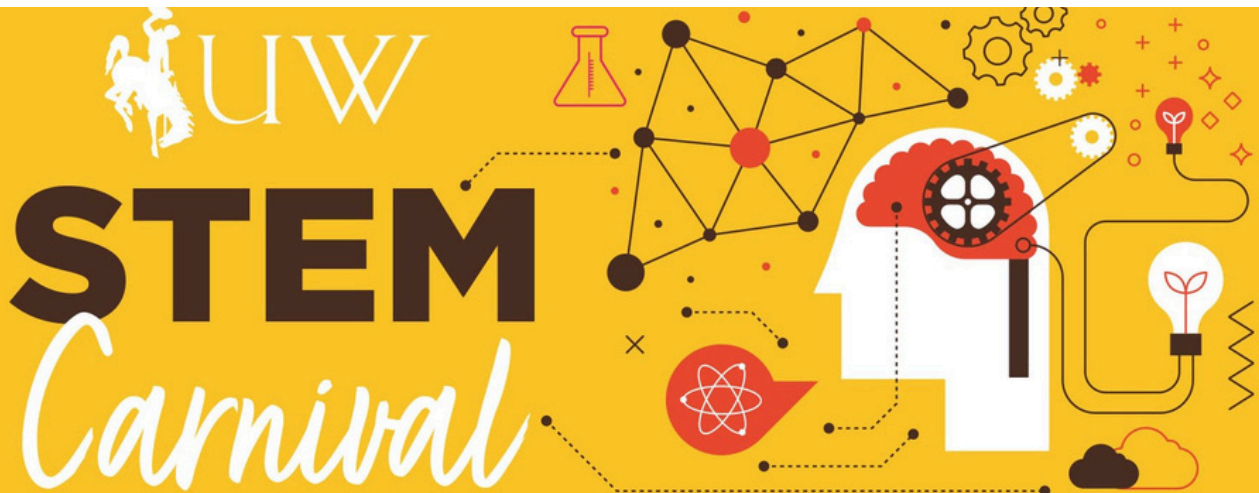
FROM THE DESK OF WYOMING STATE SCIENCE FAIR COORDINATOR ERIN STOESZ

Regeneron ISEF 2024: Los Angeles, CA

I want to report on a very successful International Science & Engineering Fair this past week. Wyoming had 3 students total representing the state (Tyler Searfoss from Greybull, WY who is the last student to qualify from that regional fair since the fair director is retiring in just a few weeks and the fair will lose its ISEF affiliation with his departure; Padmalakshmi Ramesh from Laramie, WY who was our Wyoming State Science Fair qualifier; and Asriyah Islam from Laramie who we sent as a student observer). All three students really had a fantastic time, received autographs from top scientists, spoke on a live stream with an astronaut at the International Space Station, make lots of new friends, and more.

Tyler Searfoss graduated from Greybull High School on May 18 and is planning to attend UW in the Fall 2024 and major in Political Science with some sort of science minor. Padmalakshmi Ramesh earned a 2nd place \$2000 award in the Physics & Astronomy Category competing against 68 other outstanding research projects. Padma did her research work at WIRO and was mentored by Professor Mike Brotherton in the Department. We can all be proud of her success and the great mentoring by Dr. Brotherton!

Please visit Padma and Tylers projects along with ~1300 others [here](#). Padma's project is PHYS033 and Tylers is PLNT009.



The P&A table at the STEM Carnival was voted second as one of the top three tables presented!

Congratulations on our top three STEM tables as voted on by the attendees of the carnival!

1. Animal Science
2. Physics & Astronomy
3. Haub School of Energy and Natural Resources

Learn more about UW's STEM Carnival [here](#).

DEPARTMENT NEWS

Jifa Tian and his Co-PI, **TeYu Chien**, have been awarded a three-year NSF grant entitled "Collaborative Research: Exploring Metastable Magnetic States in Unconventional Magnetic Domains of Two-dimensional van der Waals Magnets". The Partner institute for this collaborative research project is CSU, and budget for UW is \$483,605.

Alex Petrovic has been awarded a two-year \$249,889 NSF LEAPS-MPS grant entitled "Microwave Spectroscopy of Engineered Triplet Superconductors". This project seeks to develop a series of cryogenic coplanar waveguide microwave spectrometers, operating across the 1-30 GHz regime. These instruments will be individually tailored to detecting spin-symmetric superconductivity in artificial thin film multilayers. Spin-symmetric (triplet) pairing is a hotly-sought yet elusive phenomenon with applications in dissipationless magnon propagation as well as topologically-protected quantum computation.

Alex Petrovic has also received a \$53k seed grant from the Quantum Collaborative, entitled "Broadband Microwave Spectromicroscopy". This is a joint effort between Alex and a collaborator (Philip Mauskopf) at Arizona State University. The grant will explore three independent approaches to build a cryogenic impedance-matching circuit capable of operation over a broadband frequency range. Successful demonstration of this capability would enable the development of a scanning microwave microscope which functions at continuous rather than discrete frequencies, a hitherto-unattainable prerequisite for local characterization of superconducting quantum information hardware.

Aysenur Bicer our esteemed colleague, Aysenur Bicer, bid farewell to the UW Physics & Astronomy Department to embark on a new journey. Having been an integral part of our department for 5 years, Dr. Bicer has chosen to explore new horizons. Let's thank her for all her contributions and wish her well as she sets off on her next adventure. While we will miss Dr. Bicer, we are equally excited to hear about her future endeavors.

Mike Brotherton has received a Space Telescope Science Institute grant on the Hubble Space Telescope (\$31,538) titled "A Major Overhaul of Ultraviolet-Based Black Hole Mass Prescriptions".

P&A faculty member **Jifa Tian** has been appointed by VPRED Parag Chitnis as the Interim Director of the newly established Center for Quantum Information Science and Engineering (C-QISE) at UW.

Congratulation to **Jifa Tian** for another 2-year \$300K grant! NSF RII Track-4 EPSCoR Research Fellows: Exploring van der Waals Superconducting Josephson Junctions for Robust Qubits.

Daniel Dale was awarded time and funding on the Hubble Space Telescope. Here are the details of Danny's award.

Title: Resolving Gas, Star Formation, and Feedback in Nearby Galaxies with HST+JWST+ALMA

PI: Daniel Dale

Source: NASA Hubble Space Telescope

Amount: \$115k to UW (~\$1.7M in total for the larger team)

TeYu Chien received an Interdisciplinary-Collaborative Seed Grants from CEPS Engineering Initiative. The title is "Reducing the Carbon Footprint of Concrete and Masonry Structures". This is a \$25K joint project with Jenny Eisenhauer Tanner (Civil and Architectural Engineering).

Provost Carman and **Dean Wright** attended the P&A faculty meeting to present awards to Daniel Dale the **George Duke Humphrey Distinguished Faculty Award** for 2024. Aysenur Bicer was also awarded the **John P. "Jack" Elbogen Meritorious Classroom Teaching award** for 2024.

Jinke Tang, who heads the Department, has been appointed to serve as a member of DOE's Basic Energy Sciences Advisory Committee (BESAC) for a 3-year term ending at the end of 2026. The Committee, established in 1986, provides advice and recommendations on scientific, technical, and programmatic issues relating to DOE's Basic Energy Sciences Program including materials sciences, chemistry, biosciences, geosciences, engineering and underlying competencies such as computational sciences.

Daniel Dale, Associate Dean/Professor, was elected as a Trustee of the American Astronomical Society (with the entire membership of the AAS voting). What an amazing honor and significant responsibility. A wonderful level of recognition of which he is most deserving.

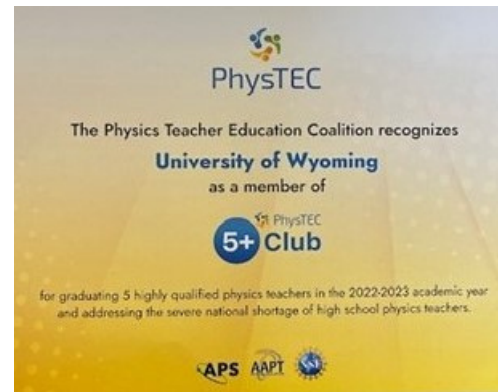
DEPARTMENT NEWS

Congratulations to Professor [Mike Pierce](#) for being awarded time on NASA's Infrared Telescope Facility. The project is called A Radial Velocity Analysis of the Classical Cepheid T Vul from Near-IR Spectroscopy with collaborators Kristin Brady and Caty Pilachowski at Indiana University.

The University of Wyoming is inviting applications for **Distinguished Postdoctoral Fellows** for conducting convergence research at the intersection of different disciplines. This year, the program will support a cohort of up to six postdoctoral fellows for two-year terms. Postdoctoral fellows participating in the program will receive professional development opportunities, including entrepreneurship-focused workshops, and mentorship from experts in at least two disciplines. Projects involving collaboration with DOE National Laboratories are encouraged. This year, the research projects will focus on AI applications in one or more of the following topics. Use of modeling, simulation, digital twins, and other approaches are encouraged in the research projects. Discover additional information and [How to Apply](#).

[Adam Myers'](#) DOE rolling grant to support planning and operations for the Dark Energy Spectroscopic Instrument was renewed by the Department of Energy for another \$240k over the next 18 months. The grant has now brought in \$640k since 2019.

Physics and Astronomy Receives 5+ Club Award for Graduating Students in Physics Teaching



The 5+ Club offers national recognition to Physics Teacher Education Coalition (PhysTEC) member institutions that graduate five or more physics teachers in a single academic year. Induction marks a significant contribution toward resolving the severe national shortage of physics teachers and indicates that the institution is a national leader in the production of teachers.

PLANETARIUM NEWS

New Shows at UW Planetarium

The UW Harry C. Vaughan Planetarium hosted "One Sky," a full-dome series of short films in June. New shows explored Norse mythology, astronomy from around the globe and Wyoming geography and highlighted the University of Wyoming Harry C. Vaughan Planetarium's lineup.

Solar Eclipse Highlights

University of Wyoming faculty, staff and students gathered on Prexy's Pasture on Oct. 14, 2023, to experience the annular solar eclipse. The UW Harry C. Vaughan Planetarium hosted a solar eclipse observation event on April 8, 2024.



Check out the UW Physics News Page for additional news, Research Articles and Newsletters.

QUANTUM SUMMER SCHOOL 2024



The University of Wyoming's Departments of Physics and Astronomy, along with Electrical Engineering and Computer Science and the Center for Quantum Information Science and Engineering, successfully organized their second annual Quantum Summer School from June 18-20, 2024. This year's event built on the foundations laid during last year's success, offering an enhanced curriculum sponsored by the National Science Foundation and the UW's Center for Quantum Information Science and Engineering.

The program opened with inspiring remarks from the Vice President for Research and Economic Development, Dr. and Prof. Parag Chitnis, setting an enthusiastic tone for the sessions that followed. Over three days, participants delved into a comprehensive exploration of quantum information science, with particular emphasis on quantum computation and sensing technologies. The curriculum was designed to cater to a broad range of backgrounds, including physics, chemistry, electrical engineering, computer sciences, and mathematics.

Esteemed speakers include:

- Michael R. Norman, Distinguished Fellow / Director for Argonne Quantum Institute, Argonne National Laboratory
- Tongcang Li, Professor of Physics and ECE, University Faculty Scholar, Purdue University
- Carl Williams, CEO, CJW Quantum Consulting
- Zlatko Mineev, Technical lead and manager of Qiskit Leap and Qiskit Metal, IBM
- Kristen Pudenz: Vice President of Research Collaborations at Atom Computing
- Corban Tillemann-Dick, CEO of Maybell Quantum and co-founder & chair of Elevate Quantum
- Michal Goldenshtein/Jason Tucker, Quantum Machines

The 2024 Quantum Summer School attracted a diverse group of attendees from institutions such as Colorado State University, Georgia Institute of Technology, and William and Mary, reflecting its growing reputation as a premier educational event in quantum science and engineering. Patrick Ivers, a long-time donor to the Department of Physics and Astronomy, attended, symbolizing the strong community support for the university's initiatives in this advanced field.

As the University of Wyoming continues to advance its mission to enhance research and educational capacities in quantum information science and engineering, the success of this summer school marks a significant step forward in nurturing the next generation of scientists and engineers. The event not only equipped participants with critical knowledge and skills but also fostered stronger collaborative ties across academic and research communities, as well as the quantum industry.

SPRING 2024 GRADUATION

Ph. D

Amy Cavanaugh-Summer 2024
David I King-Summer 2024
Piumi Samarawickrama-Spring 2124

Class of 2024

BS

Caleb Eastlund
Gabrielle Graham
Willem Growden
Cierra Rainey
Tera Swaby

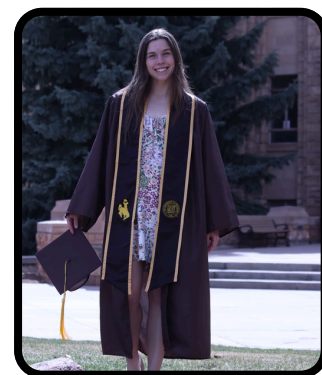
M.S.

Aldair Bonilla- spring 2024
Andrea Daly- Spring 2024
Jarred Grant- Spring 2024



Fall 2023 Graduates

Narendra Shrestha-PhD
Zhuangen Fu-PhD
Michael J. Lindman-MS
Nikhil Patten-MS
Corinne Komlodi-BS



2024 PhD Graduate Showcase: Piumi Indrachapa Samarawickrama Study Superconduction Materials

When Piumi Indrachapa of Kalutara, Sri Lanka, decided to come to UW, it wasn't just because of the academics. It was also the campus. "I adored the pictures I saw where the golden buildings of UW were covered with a snowy blanket, she says. "Coming from a tropical country, that was a heavenly view."

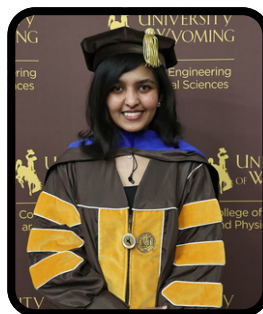
Piumi just graduated with her Ph.D in physics studying 2D materials with a primary emphasis on 2D superconducting and topological superconducting materials and their transport properties. In essence, 2D superconducting and topological superconducting materials enable energy-efficient electron transport with unique quantum phenomena, promising advancements in many technologies.

"The realm of superconductivity has always captured my curiosity," Indrachapa says. "Questions about the underlying mechanism behind it, the reasons for their absence at commonplace temperatures and pressures and what-if scenarios all fueled my fascination."

Through an analysis of how data fluctuates under the influence of various external factors, she can draw conclusions about the changes in the properties of these materials.

Once Indrachapa earns her Ph.D., she hopes to pursue her career in the semiconductor industry. "I'd love to be a part of the innovative and competitive technologies to be discovered," she adds.

When reflecting on her time at UW, she's grateful for her experience, "for me, this is nothing, but a dream come true. Though the time spent here presented its challenges, it was a beautiful journey that will forever hold a place as one of the fondest chapters of my life."

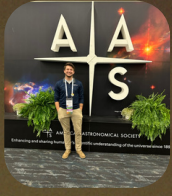


Meet Gabrielle 'Gabby' Graham. Gabby was awarded outstanding graduating senior for the University of Wyoming Physics and Astronomy Department for Spring 2024!

Gabby is from St. Louis, MO. She played on the UW Women's Club Soccer team and was named UW Club Sports Female Athlete of the Year for 2022-2023. She will be taking a gap year to work with me as a research assistant for 2024-2025. Her research will focus on the star formation properties of stellar clusters in nearby galaxies, as observed by NASA's Hubble Space Telescope and NASA's James Webb Space Telescope.

Welcome Fall 2024 Graduate Students

Caleb Eastlund- Astronomy



I am interested in getting involved with the many different outreach programs offered at UW, including the potential of continuing my work at the Harry C. Vaughan Planetarium. Outreach is, in my opinion, one of the most important parts of being a scientist. Being able to share science in an accessible and exciting way is an amazing privilege that I have been lucky enough to take advantage of over the last few years. Finally, my experience as an Undergraduate Teaching Assistant has equipped me with the skills necessary to continue that work at a graduate level as well. I look forward to the opportunity to interact with undergraduates who may be struggling just like I did and help them find the resources to help them be the best scientists they can be.

Eliza Frankel- Astronomy



I graduated from the College of Charleston in Charleston, South Carolina in May of 2023 with degrees in Physics and Astrophysics. Throughout my undergraduate career, I worked on projects about supernovae and AGN to produce a Bachelor's Essay on the molecular outflows from a redshifted, gravitationally lensed quasar. After graduating, I worked as a research assistant to continue researching AGN through Chandra observations. While on campus, I was also active in the Honors College, as well as holding multiple leadership positions in the Office of Admissions. I am excited to continue my studies at the University of Wyoming, and I'm looking forward to exploring Laramie!

Taylor Juchau- Astronomy



I grew up in an extremely secluded property in the foothills of the sierra mountains just outside of a small town that has since grown to include over two thousand people (whoa!). I moved to Humboldt where I met my now wife and I obtained my first degree in Marine Biology studying the immense diversity the Northern California rocky intertidal ecosystem a few minutes from campus. After graduating, I realized my true passion was in physics, so I got a second degree in Astronomy and now I am starting a graduate program here at UW. I enjoy being active and exploring nature as well as chilling at home and playing games with friends. I am chronically curious, tirelessly optimistic, and perpetually captivated by the nature of reality.

Chase Smith- Astronomy



Since coming to UW, I've gained extensive experience in both research and academics. I had the opportunity to work with Dr. Moe and study the spin-orbit alignment of early-type visual and astrometric binary stars. The goal of the project was to characterize two different types of binary star formation mechanisms as a function of a given system's separation distance. I also utilized my findings to propose a hypothesis for the formation mechanism of "slow-rotators", a population of early type stars spinning much too slowly given their spectral type. I hope to continue researching stellar astrophysics at UW, and to continue to grow and develop myself as a scientist and as a person.

Adam Tedeschi- Astronomy



I have always aspired to a career in observational astronomy. This is especially true now, as the field has been reinvigorated with the detection of exoplanets, deeper understandings of black holes and gravitational waves, and new and exciting tools like the James Webb Space Telescope and the forthcoming Vera Rubin Observatory (LSST). My main research interests lie in observational cosmology/galactic evolution, but more importantly, I hope to personally probe some of the awesome mysteries of the universe. As any budding astronomer should, I have strengths in coding and analyzing observational data. This should be evident from the four projects I participated in as an undergraduate and M.S. student, as well as extensive classroom training in astronomy and astrophysics.

Joshua Wanninger- Astronomy



My undergraduate experience in astrophysics and astronomy has solidified my dedication to astrophysics research. I'm genuinely thrilled by the prospect of uncovering discoveries in astrophysics in a future research career. My undergraduate commitments to academic coursework, professional development, and research opportunities demonstrate my ability to expand my astronomy and astrophysics capabilities to the graduate level. With my proven track record of successful research endeavors, effective collaboration, and dedication to advancing scientific diversity, outreach, and professional development, I am confident I will excel in Wyoming's astronomy Ph.D. program.

Aidan Ferguson- Physics



Aidan graduated from the University of Wyoming earning a B.S. in Astronomy and Physics, 2023. Along with earning his degree, he has been involved with multiple research projects under Professors Michael Brotherton and Michael Pierce. Under Dr. Brotherton's tutelage, he utilized the 2.3m telescope at UWyo's WIRO to collect spectroscopic data for the Seyfert I galaxy NGC7469. Aidan also has assisted Dr. Pierce in building the support structure for both a half-ton infrared instrument and its' companion secondary mirror, both to be mounted on WIRO. In addition, I am constructing a stepper motor-ball screw system to be mounted with the secondary mirror. He also researched large baseline optical interferometry as a viable plan for telescope design for Dan Goldin.

Mohammad Alheeh- Physics



Hello! My name is Mohammad Alheeh, and I am excited to join the University of Wyoming as a PhD student in condensed matter physics. I have a Bachelor's degree in Physics. I love all kinds of sports, including cycling, swimming, martial arts, kickboxing, and running. I also love trying new things (legal, of course!).

Since I was born, I have been in awe of the universe and the rules that govern it. My astonishment has never faded, and I am deeply interested in understanding how the universe works. I am passionate about all areas of physics and eager to explore them further.

Daniel Codoluto- Physics



Learning and rational thinking are a treasure. I am driven by the pursuit of knowledge and understanding. Currently I hold a master's degree in physics earned at the University of Texas at Dallas. I hope to continue to pursue physics and earn my physics Ph.D. to better prepare me for industrial society. I have experience in condensed matter systems, nanomaterials, superconductors, cryogenics, vacuum systems, thermoacoustics and lithography. Experience in such areas has helped me become well rounded and familiar with many important concepts in physics. Familiarity in such useful areas is beneficial for becoming an expert in physics and finding future positions in today's technical workplace.

Joshua Ejeka- Physics



Joshua is a graduate student committed to addressing global energy challenges through innovative research. This fall, he will begin his doctoral studies in physics, focusing on experimental condensed matter physics. His research interests revolve around developing low-cost, efficient, and durable cutting-edge 2D materials for energy applications. His research portfolio includes projects aimed at improving solar cell performance, utilizing magnetic nanomaterials, and thin films for optoelectronic applications. He has published his work in prestigious academic journals and presented at esteemed conferences, thereby advancing knowledge in the field.

Natwar Joshi-Physics



In pursuing my graduate studies in physics, my primary goal is to join the esteemed academic community at the University of Wyoming, renowned for its robust and dynamic Condensed Matter Physics group. This group, specializing in low-dimensional structures, carbon nanotubes, magnetoresistance, and electron spin resonance has captivated my academic interests due to its extensive focus on experimental and theoretical investigations. The department's diverse research portfolio in experimental and theoretical condensed matter physics further excites me, spanning topics such as quantum dot sensitized solar cells, carbon nanotubes, electron spin resonance, spin and charge transport in 2D materials, correlated electron systems, spintronics materials, luminescent materials for PV solar concentrators and white LEDs.

Scott Orr-Physics



It is my hope to build upon my undergraduate experience by attending graduate school at the University of Wyoming. I consulted with the physics faculty at UW prior to graduation and through the fall regarding my continued interest in physics and desire to make contributions within the field. These discussions have been encouraging and strengthened my interest in pursuing further education. Quantum mechanics and semiconductor research are areas of interest and I recognize that multiple faculty members have performed intensive studies in that specialty, making it my primary selection for graduate study. I would suggest that based on research information presented through the University of Wyoming website, Dr. Jinke Tang and Dr. Wenyong Wang are conducting research which most closely corresponds with my current goals. I appreciate the quality of the research facilities at the University of Wyoming together with the diverse specialties represented in the faculty.

Nawaraj Pokhrel-Physics



The fact that this nation offers top-notch education and numerous research opportunities is what initially drew me there. I do hope that the University of Wyoming will strengthen my capability to work as a researcher and achieve success in transforming the world by contributing to the field of science and technology. My knowledge and training at your university can enhance my fortitude in theoretical and experimental exploration in my country after the completion of a Ph.D. degree from this reputed academic institution

Sumiya Khan Sujana-Physics Spring Arrival



Sumiya earned her M.S. at Jahangirnagar University in 2022 and gained relevant knowledge and deeper understanding of Condensed Matter Physics and Material Science.

Department of Physics & Astronomy

2024 End of the Year Awards

Graduating Senior Award: Gabby Graham

Cinnamon Awards: Kaycee Conder and Xander Larson

Outstanding TA Awards: Andrea Daly, Chase Smith, and Theodora Zastrocky

Outstanding Research Awards for Graduate Students: Evan Cook, Lauren Kim, David King, and Theodora Zastrocky.

The Outstanding Research Awards for Graduate Students was made possible by a generous donation from J. Wayne Needy. Wayne was born and raised in St. Louis, Missouri. He graduated from Southeast Missouri State University in 1962 with a Bachelor of Science degree in Mathematics and received his Master of Science degree in 1964 from SIU. He taught physics for 31 years at the Minnesota State Community College System in Fergus Falls, Minnesota and retired in 1995. He spends most of his time backpacking in Minnesota and Wyoming.

Dr. Michalak and Dr. Dale presented the awards to:
(L to R) Gabby Graham
David King Andrea Daly

Bottom left: Lauren Kim
Center: Dr. Michalak
presents the
Tara Swaby, Gabby
Graham, Corinne
Kumlodi, Caleb
Eastlund, with Dr.
Barrans.

Far Right: Kiana Henny-
Center for Global
Studies award



WINDY RIDGE FOUNDATION ASTRO CAMP SUMMER 2024



Twenty-four select middle school students from four states have had the opportunity this summer to explore traveling to and colonizing planets during the Windy Ridge Foundation Astro Camp on the University of Wyoming campus.

Campers, who will be entering seventh or eighth grade this fall, were chosen based on demonstrated interest and academic potential in math, science, engineering and space. As part of the application process, students had to submit written essays on why they wanted to attend the science camp.

The camp is free to selected participants, includes on-campus housing and dining, and features three in-service Wyoming science teachers and five UW undergraduate students serving as camp counselors.

In 2020, the Windy Ridge Foundation made a \$250,000 gift to support the Windy Ridge Foundation Astro Camp, which aims to educate the next generation of scientists and engineers while introducing the K-12 community to science programs offered through UW. The gift provided enough funding for five years of the camp. This year's camp marks the fourth year of funding by Windy Ridge.

[Click here](#) to learn more about the Windy Ridge Foundation Astro Camp.

ASTRONOMY REU AT UNIVERSITY OF WYOMING 2024

The University of Wyoming and the National Science Foundation sponsors a 10-week program in 2024, from May 20 through July 26. Each student will be trained to use our 2.3 meter telescope and to analyze both ground- and space-based astronomical data. Frequent seminars will cover recent breakthroughs in astronomy, computational techniques, preparing for graduate school, best practices for written and oral presentations, and responsible research conduct. A unique aspect of the Wyoming REU program is that all students will work together as a team on a single project.

2024 Summer Research Project

During the summer of 2024, our program will explore star-forming galaxies in the local universe observed by the James Webb Space Telescope, the Hubble Space Telescope, the VLT, and the Atacama Large Millimeter Array. Our science goals include characterizing stellar clusters and their impact on the gas and dust in the surrounding interstellar medium. Students will learn how to process and analyze astronomical spectra and imaging data, learn techniques in scientific programming, and become expert observers.

MEET the 2024 Astronomy REU Team:

Danny Dale

Professor Dale studied at the University of Minnesota Duluth and Cornell University. His postdoc was at Caltech before joining UW in 2001.

Chip Kobulnicky

Observational astronomer in his 21st year on the UW faculty. He also directs a summer STEM camp for HS students.

Chase Smith

Third year graduate student at University of Wyoming working with Dr. Dale and the PHANGS team.

Gabby Graham

Postbac Researcher BS Graduate from the University of Wyoming and will pursue a PhD starting Fall 2025

Elisabeth Brann

Currently a sophomore at Bryn Mawr College in Pennsylvania

Sumitra Dhileepkumart "Sumi"

Junior majoring in Physics with Astro & Astrophysics emphasis at the University of Utah

Sam Crowe

Third year UG at the University of Virginia pursuing a double major in Astronomy-Physics and History.

Kaycee Conder

Wyoming native attending the University of Wyoming and Majoring in both Astronomy / Astrophysics and Physics.

Emilio Mendez

Attending California State Polytechnic University-Pomona and Majoring in Physics and minoring in Astronomy.

Nicole Imming

Junior at Rice University majoring in Astrophysics and minoring in ecology and evolutionary biology.

Kelsey Sako

Attending Cal Poly Humboldt majoring in Physics with a concentration in Astronomy.

Zachary Pleska

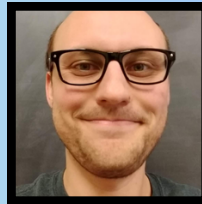
Lycoming College in Williamsport, PA sophomore majoring in Astrophysics and Mathematics with a minor in Spanish.

Jordan Turner

PhD. Spring 2021

After graduating in 2021, I took an opportunity to work as a scientific software developer and analyst at Tyto Athene in Santa Barbara, CA. I was fortunate enough to work with fellow UWYO Physics & Astronomy Dept alumni Daniel Baldwin. In 2022, I began working at the Aerospace Corporation located in El Segundo, CA. As an Engineering Specialist, I lead a team of software developers and analysts to model satellite and sensor systems for Dept of Defense customers.

My wife and I currently live in Lakewood, CA with our cat and two dogs. We made it back to Laramie most recently for the Oct 2023 Homecoming. Go Pokes!



MS Spring 2006; Doctor of Philosophy Spring 2010.
Master of Science in Teaching Fall 2013

Mark Reiser



I'm doing well! I am still working full time at the University of Montana, in the department of Physics & Astronomy. My official title(s) are essentially twofold. It's kind of a mouthful, but my primary duties are that of Lecturer (0.5 FTE), and then Planetarium Director (0.5 FTE). On the lecturer side,

I teach our introductory astronomy sequence of ASTR 131N - Planetary Astronomy (and its lab sections), and ASTR 132N - Stars, Galaxies, and the Universe (and its lab sections. I also supervise a small team of undergrads who teach a couple labs sections, as well. And then I occasionally teach an honors course, entitled ASTR 142N - The Evolving Universe. I stay pretty busy on the teaching side. There are many components to my Planetarium Director side, which is a staff position, and the full title on that side is "Planetarium Director / Recruitment & Retention Coordinator." So it's a bit of a mouthful. If you needed to shorten it to just the Lecturer / Planetarium Director, I think that's fair. I currently run a series of public shows, and then train and supervise an active student staff of about 6 - 8 students at any given time. I still do whatever I can to remain engaged with student recruitment, retention, and departmental community building initiatives, as much as possible!

My Best, Mark Reiser

Jessie Runnoe

Summer 2013
PhD Physics



I graduate from the University of Wyoming in 2013 with a PhD in Physics (I think sometimes the alumni has me in the system because I got a MS in 2010, but I stayed awhile after that). I am an avid cyclist and scheduled my PhD defense around the Laramie Enduro Mountain bike race up in Happy Jack. Since then, I have stayed in academia to pursue a career in astrophysics which has taken me around the country.

I spent three years at Penn State University, and then another three at the University of Michigan doing two postdoctoral research positions. Now, I am an Assistant Professor of Physics and Astronomy at Vanderbilt University and an Adjunct Professor of Physics at Fisk University in Nashville, Tennessee. I still bike, although I have not found any trails that I love as much as Happy Jack and Vedauwoo.
Cheers, Jessie

Alex Higley, B.S, 2022

I am currently a rising 3rd year PhD student at The Pennsylvania State University Astronomy and Astrophysics department, working with Randall McEntaffer. I have completed my coursework and passed my qualifying exam, and I plan on taking my comprehensive exam this Fall (at which point I'll be a PhD candidate).

I am the lead graduate student on a suborbital rocket mission known as the Off-Plane Grating Rocket Experiment (OGRE). Specifically, my focus lies on a preliminary flight, or a "Pathfinder" flight for this mission, scheduled for launch in the winter of 2026 from Poker Flats, Alaska. OGRE is an X-ray spectrometer that will observe Capella, with the goal to flight test EM-CCD's, polished silicon mirrors developed at NASA Goddard, and blazed reflection gratings fabricated by our lab group. However, for the pathfinder flight I'm involved in, we're utilizing the second flight module of a telescope called "JET-X" as a temporary substitute for the polished silicon mirrors until their development is complete. The first flight module of JET-X actually serves as the X-ray telescope (XRT) aboard the Swift Observatory, so it is an old, but very capable X-ray telescope. My day-to-day includes working on basically everything that goes into the rocket— from the camera software, to the design, to coordinating with collaborators and NASA, to eventually alignment and building. Right now, I am working on analyzing data that was taken during a six-week-long characterization campaign I led in Germany, as well as writing code for raytracing simulations. Since joining my lab group, I have spent six weeks just outside of Munich, Germany (it was awesome), and I've been sent to conferences in Prague, Czech Republic and Yokohama, Japan (I'm leaving for Japan this Friday!)— so lots of cool travel! I love my group and I'm happy with my rather dramatic switch to instrumentation (before this, I was working with Adam Myers on quasar spectroscopy) — however I do have a small quasar project in the works. I have not abandoned my roots entirely. ~Alex



Andy Monson, M.S. 2005–2006; Ph.D., 2009

After graduating from UWYO I moved to Pasadena, CA to start a post-doctoral position at Carnegie Observatories where I assisted in the development and commissioning of the FourStar infrared camera at the Magellan Observatory in Chile. While at Carnegie I became a Support Scientist and joined the Carnegie Hubble Program which was and still is a project aimed at measuring and refining the Hubble Constant. To continue my desire to develop instrumentation, I accepted a position at Penn State University as Assistant Research Professor and to be the systems engineer for the Habitable Zone Planet Finder (HPF) and NEID spectrographs which were developed to measure precision radial velocities to determine masses of planets in orbit around nearby stars. While at PSU I joined a photometric observing campaign to monitor transiting exoplanets from the ground using small observatories which I continue to collaborate with. After NEID was successfully commissioned (a year after the pandemic) I accepted a position at the University of Arizona as an Associate Research Professor where I am working on the Large Fiber Array Spectroscopic Telescope (LFAST). The goal of the project is to economically mass produce small mirrors (0.76m aperture) to construct a large telescope array and spectrograph with more light gathering power than any extremely large telescope (ELT) currently being planned.

Best Regards, Andy



Dr. Kathleen DeGioia Eastwood University of Wyoming, Physics and Astronomy Ph.D., 1982

Kathleen DeGioia Eastwood (published as DeGioia-Eastwood) is an American astronomer known for her research on the formation and evolution of massive stars, and for her work on undergraduate education in astronomy. She is a professor emerita of astronomy and planetary science at Northern Arizona University. [1]



Thank you, Kathleen, and John, for your support and
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In 2006, Lowell founded the Burnett Family Charitable Foundation to assist students with scholarships, local environmental causes, and scientific research. Please see [Dr. Burnett's Obituary](#) to learn more.



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