throughout the last academic year. The show included categories for drawings, paintings, mixed media, glass, ceramics, sculpture, and photography. An awards ceremony and reception were held to celebrate the achievements of everyone exhibiting.

CWC INBRE

Professor of Chemistry and Physics, **Dr. Bill Finney**, along with **Kirsten Kapp**, Professor of Biology; **Tara Womack-Shultz**, Professor of Biology; **Kate Patterson**, Associate Professor of Mathematics; **Lucy Graham**, Instructor of Biological and Physical Sciences; **Claudia Troxel**, Instructor of Biological and Physical Sciences; **Mara Gans**, Instructor of GIS and Expedition Science; **Matt Herr**, Professor of Computer Technology; and **Charles Palmer**, Instructor of Software Development accompanied 14 students to the INBRE Spring Meeting and Undergraduate Research and Inquiry Across the Disciplines (URID) Thursday, April 24 through Sunday, 2025 at the University of Wyoming in Laramie.

CWC's participation in Wyoming INBRE for approximately 20 years has transformed the lives of many students - some of whom have returned to our community as medical professionals. In support of CWC's Mission, this program has provided students and faculty much beyond participating in real, hands-on scientific research. For students, this has built long-lasting connections to their peers, and exposure and direction towards career paths previously unknown to them - transforming their lives. For our faculty, it has provided strong connections to their colleagues across the state to promote student success. It inspires our students towards academic excellence, thereby serving as role models for their peers. It allows our college to collaborate closely with Wyoming's other institutions of higher learning and helps us increase the scientific literacy of the state's workforce - building capacity for the possibility of new economic opportunities. More than 20 students participated in these projects at Central Wyoming College this year.

Students working with Lucy Graham and Claudia Troxel presented their work on the effects of wildfire smoke on lung cell cultures. With the increasing incidence of wildfires,

it is of both local and global importance to understand the potential inflammatory and cancer-causing effects on the respiratory system - and the potential beneficial and prophylactic effects of sagebrush smoke on human epithelial cells.

This year's work focused on two parallel projects. One was developing a new chamber to expose cell cultures to controlled amounts of smoke, with ways to quantify the levels of smoke that the cells were exposed to. The second was to expose cell cultures to smoke for different time lengths and to look at the proteins expressed in the cell cultures to see if there are signs of changes that could indicate cancer-inducing effects. With next year's funding - Graham and Troxel hope to continue this project, working out reproducible protocols that will allow them to investigate this further.

Kirsten Kapp has continued her long-running (since 2015) research project on microplastic pollution in freshwater environments. While much attention has been paid to this type of pollution in Earth's oceans, this poses similar problems in our local environment. These tiny plastic fragments don't just impact aquatic life - they can make their way into our bodies from the water we source from these watersheds, the air we

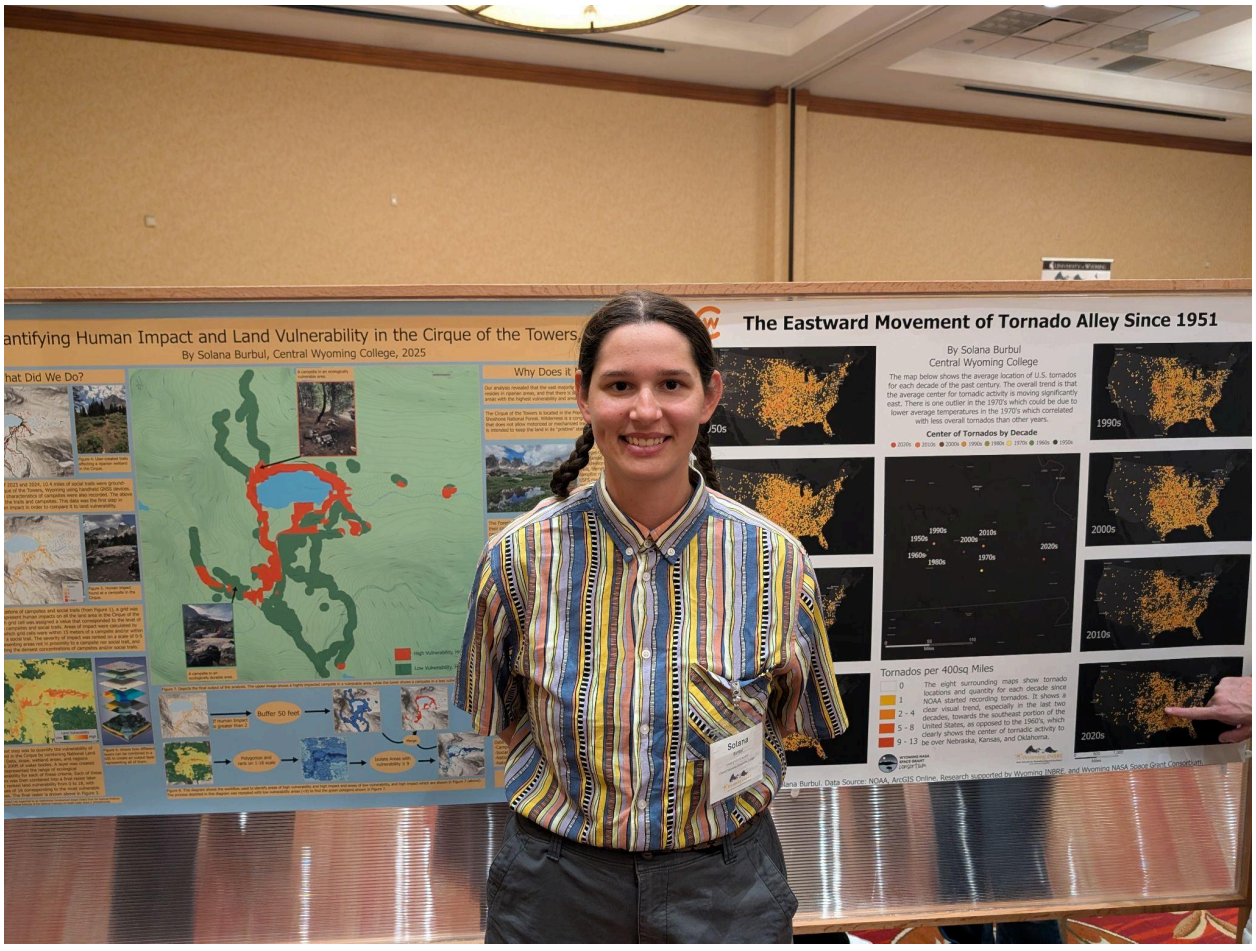
breathe, and the animals we eat. This year, students worked to establish a monitoring strategy for microplastics on Flat Creek in Jackson, WY. With support from Wyoming NASA Space Grant Consortium in addition to Wyoming INBRE, Kapp and her students established a sampling protocol, identified and began sampling at four sites along Flat Creek last summer and through the fall. This winter, they worked in the lab on processing these samples. Kapp and her students are most interested in fibers and tire wear particles that they observe in their samples, as these are the most common forms of microplastic in environments around the world. They plan to continue this work in the coming year, as their results are of much interest to the community of Jackson and to local water resource professionals.

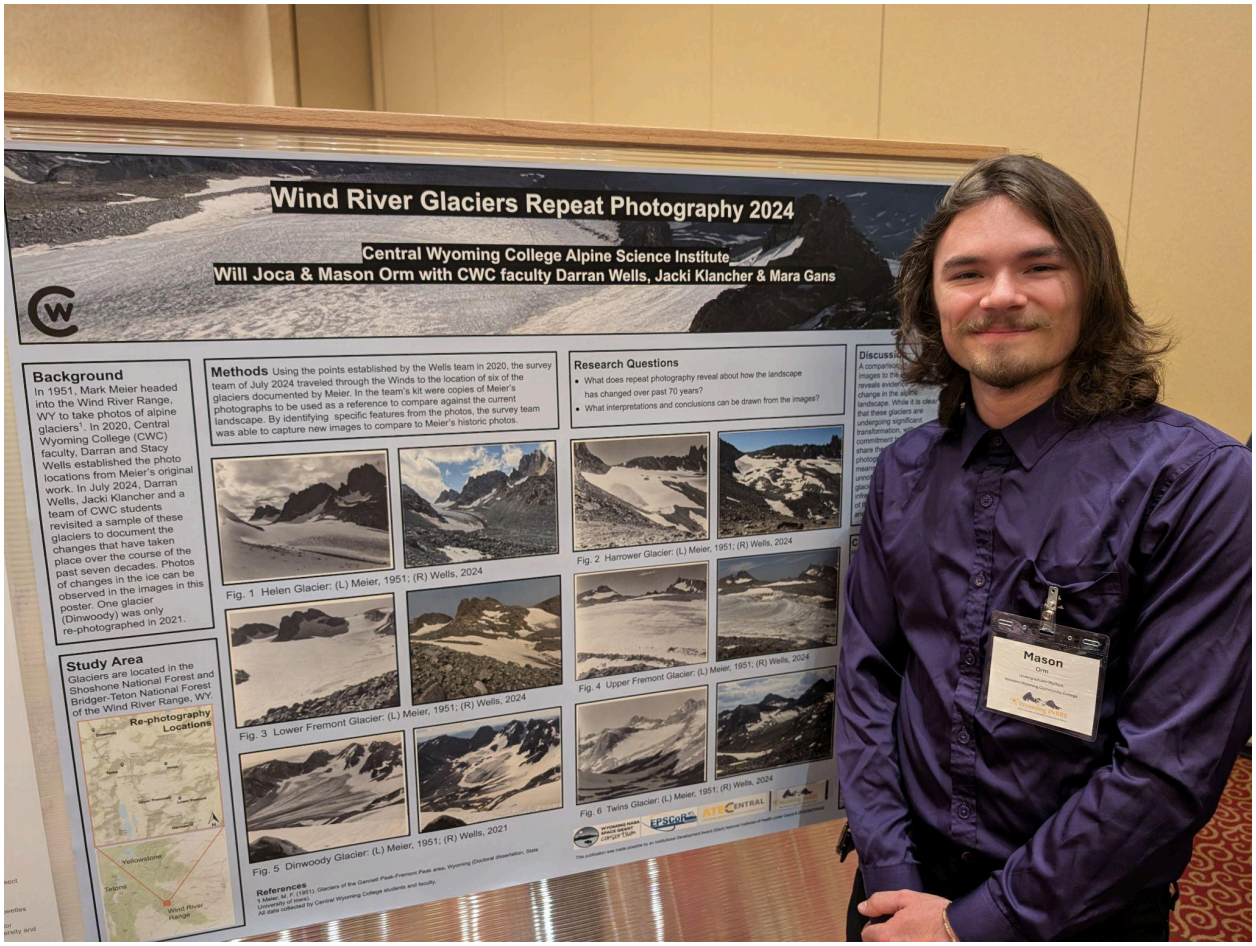
Mara Gans and Jacki Klancher continue to work on projects that intersect human and environmental health. Students built on previous work by their group to build a database documenting changes in the surface area of Wind River glaciers from 1968-2024. This is a critical effort for understanding future impacts on water availability, water quality, and public health in downstream communities.

As part of this work, Gans and Klancher, along with Professor of Outdoor Education and Leadership, Darran Wells, led a student team into the Northern Wind River Mountains to collect glacier photos - which were compared to historical images to document changes over time.

Additionally, their students also analyzed informal human recreation impacts in the Cirque of the Towers, comparing social trail and campsite locations to vulnerable wetlands. This work can help inform management strategies that protect water sources from E. coli and other pathogens.

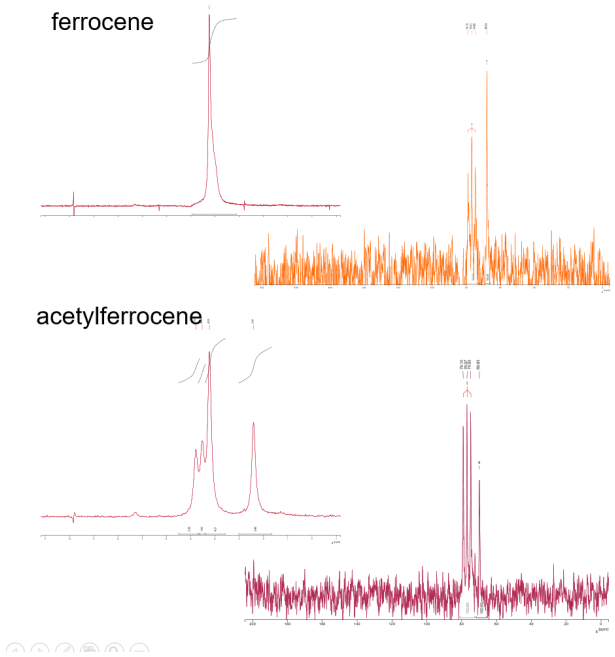
Another project involved analyzing 80 years of tornado data to study shifts in tornado locations, with implications for improving early warning systems and reducing injury and loss of life.





Matt Herr and Charles Palmer continued their work with the University of Wyoming's Professor Grace Shearrer in her study titled "Girrls Insulin Resistance and Reinforcement Learning (GIRRL)." In support of this work, CWC students identified issues and areas for improvement on a computer-controlled candy dispenser used in Shearrer's research. Their focus is on making improvements in reliability, usability, and maintainability. Students have done work in 3D modeling/printing, circuit board design, firmware/desktop programming, project management, and documentation. Students worked in paired development with review stages to perform iterative development. In an effort to increase reproducibility, firmware code was translated from C-based Arduino to CircuitPython (to match the language selected for PC application), 3D models were designed to fit on consumer-grade printers, and documentation was created. Periodic progress meetings with UW in the role of the client have been performed.

Our INBRE funding supports our classes and teaching in addition to our research projects. This spring, Wyoming INBRE provided Central Wyoming College with an additional $63,475 to purchase a 60MHz benchtop nuclear magnetic resonance (NMR) spectrometer. NMR is the gold standard in chemistry for determining the structures of organic molecules. This funding was provided as part of a multi-year project to modernize the capabilities of our chemistry teaching laboratories and provide students with hands-on training in these techniques. Chemistry faculty from across the state will work together to develop shared activities they can use in all their organic chemistry classes.



Wyoming INBRE has also provided Central Wyoming College with funds to purchase cadavers for the Cadaver Anatomy and Human Anatomy courses (see write-up in Cowboy State Daily). Of special note, Lucy Graham's husband, Tyler, was one of the first students to enroll in the Cadaver Anatomy class. Tyler participated in INBRE-funded projects while attending CWC, and now operates his own dental practice in Riverton. Students from Northwest College in Powell have also had the opportunity to participate in the Cadaver Lab at CWC as well.

This work is funded by a sub-award received by CWC from the University of Wyoming's award (under Grant # 2P20GM103432) from the National Institutes of General Medical Science of the National Institutes of Health as part of an Institutional Development Award (IDeA). Dr. Finney is pleased to announce that the University of Wyoming's competitive renewal for Wyoming INBRE was submitted this past spring and received an outstanding score upon review by the National Institutes of Health (NIH) this past summer, and we anticipate continued funding for another 5-year award cycle. Our Federal funders of basic and applied scientific research contribute enormously to the education of Wyoming's students.