

# 2022-23 ANNUAL REPORT



# REVOLUTIONIZING SCIENTIFIC EDUCATION AND DISCOVERY IN WYOMING

The University of Wyoming's Science Initiative enables world-class research and education that will strengthen the foundations of Wyoming's present and future economy. Through integrated, interdisciplinary science, Wyoming's current and future researchers and entrepreneurs will revolutionize areas of Wyoming's economy including mineral extraction, agriculture, tourism, resource management, and emerging technology, while also preserving Wyoming's greatest natural resources and unique biodiversity. The Science Initiative will provide UW students with a flexible, pioneering skill set, giving them the resources to invent a Wyoming future whose details cannot be fully known.

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## WHO WE ARE

**Mark Lyford**, Executive Program Director, UW Science Initiative; Senior Academic Professional, Lecturer, Botany

**Greg Brown**, Executive Operations Director, UW Science Initiative; Professor, Botany

**Rachel Watson**, Director, Learning Actively Mentoring Program; Senior Academic Professional, Lecturer, Chemistry

**Jamie Crait**, Director, Wyoming Research Scholars Program; Assistant Academic Professional, Lecturer, Botany

**Karagh Brummond**, Co-Director, Engagement and Outreach; Instructional Professor, Honors College

**Erin Klauk**, Co-Director, Engagement and Outreach; Assistant Lecturer, Geology & Geophysics

**Jay Gatlin**, Interim Director, Center for Advanced Scientific Instrumentation (CASI); Department Head and Professor, Molecular Biology

**Tabatha Spencer**, Executive Business Manager, UW Science Initiative

**Ryan Goeken**, Information Specialist, Sr., UW Science Initiative

**Jay Fahlsing**, Administrative Associate, UW Science Initiative

## LETTER FROM THE DIRECTORS

Dear Friends of the Science Initiative,

This past year was an incredibly exciting time for the Science Initiative (SI), with the notable action of the Wyoming State Legislature to fund completion of the Science Initiative Building through a one-time appropriation of \$12.5M and to provide additional ongoing funding to finalize the Science Initiative Programs for Phase 1. With the Phase 1 resources and facilities now in place as originally envisioned by the Governor's Top-Tier Science Programs and Facilities Task Force, the Science Initiative is poised to make exciting advances to support the education, research and service missions of the University of Wyoming to best serve our state.

Raising the research profile of the core science departments at UW was a signature piece of the SI plan. Completion of the SI Building over 2023-2024 will expand research spaces, particularly for those in the physical sciences, as well as provide additional critical research support centers, notably the Model Organism Research Facility. New monies will enable the launching of several new programs to advance the research capabilities of the SI faculty – a PhD Fellows program, a competitive seed grant program, resources to maintain and upgrade shared instrumentation in the Center for Advanced Scientific Instrumentation, as well as necessary staff lines to manage and maintain the facilities in the new building. Reaching Top-Tier status in research benefits more than just our research mission, as our undergraduate Wyoming Research Scholars will work side-by-side with our faculty in answering cutting-edge interdisciplinary research questions as part of their education, and much of this research will address the needs of our state.

The SI Programs that were initiated back in 2015 will now be able to expand and create new opportunities for our students, faculty, and community members around the state. The Learning Actively Mentoring Program (LAMP) continues to inspire our Wyoming instructors in Higher Education. Of particular note, LAMP Director Rachel Watson is the lead on a multi-institutional Howard Hughes Medical Institute grant that brings \$1M to UW to develop statewide partnerships with community college STEM faculty to work towards increasing student access to and success in STEM. The Wyoming Research Scholars Program (WRSP), directed by Jamie Crait, will offer research opportunities to more students through both one-on-one mentored experiences with our faculty, as well as developing Course-Based Undergraduate Research Experiences in partnership with STEM departments. Notably, just this past year, 37 of our WRSP students presented 16 papers at conferences and were authors on 13 peer-reviewed publications. Our Roadshow and Community Engagement programs, co-directed by Karagh Brummond and Erin Klauk, continue to expand our K-12 collaborations through teacher- and curriculum-specific classroom activities, and also through an incredibly successful new effort called STEM Days. These STEM days bring a wide variety of hands-on activities to an entire school, which student groups rotate through over the course of a day. Finally, we are incredibly excited by the success of the now annual UW STEM Carnival which showcases all the amazing STEM departments, programs and facilities on the UW campus, which is supported through a partnership with the UW President's Office. Please come to the UW campus on Sept. 6, 2024 to partake in the day!

We hope you enjoy reading about the incredible work of the Science Initiative and that you are as excited about the new opportunities to come as we are!

Best Regards,  
Greg Brown & Mark Lyford

Executive Directors of the UW Science Initiative

## GIVE TO THE SCIENCE INITIATIVE

HELP SUPPORT STUDENT SUCCESS IN THE CLASSROOM, IN THE LABORATORY, AND AROUND THE STATE:

[www.uwyo.edu/giveonline](http://www.uwyo.edu/giveonline)



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## ENGAGEMENT



The SI Roadshow brought active learning to

2,262

K-12 students during

19

outreach and inreach events in schools and other venues

The SI Roadshow facilitated K-12 teacher professional development at

2

separate training events, providing teachers with hands-on opportunities for experiencing and developing active learning curriculum



The Roadshow collaborated with the Engineering Outreach Program, Mobile Makerspace, Science Kitchen, and School of Computing to offer STEM Days at Hanna-Elk Mountain and Saratoga schools. These STEM Days include a plethora of different hands-on activities for students of all ages and expose them to a wide variety of science disciplines and applications.

## LEARNING ACTIVELY MENTORING PROGRAM (LAMP)

LAMP Fellow Pam Langer was awarded the **Ellbogen Lifetime Teaching Award.**

LAMP Fellow and SI Roadshow Director Karagh Brummond was awarded the **Ellbogen Classroom Teaching Award.**

**4 of 17 Professors** named "Top Prof" by Mortar Board Seniors were LAMP Fellows - Kassandra Willingham, Joe Russo, Ginka Kubelka, and JJ Shinker.

LAMP-trained professors taught

3,653

students in UW active learning courses



LAMP Director Rachel Watson leads the Wyoming portion of the HHMI Inclusive Excellence 3 (IE3) team, which works to create inclusive education in STEM fields and facilitate transfer among UW, NWC, EWC, LCCC, WWCC, and Casper College. The Wyoming team manages nearly \$1 million of the HHMI IE3 grant and has established a faculty learning community at NWC, facilitated a student academic showcase at NWC, and will soon establish faculty learning communities at other WY community colleges.

## WYOMING RESEARCH SCHOLARS PROGRAM (WRSP)

WRSP included 52 scholars from 9 US states and 1 other country



33

WY scholars from

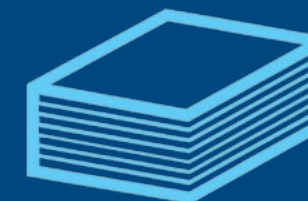
11

WY counties

WRSP scholars did

13,430

hours of research



WRSP scholars contributed to

13

articles published in peer-reviewed journals

In a final evaluation survey for graduating students, on average, WRSP scholars reported a

**GREAT GAIN**

in confidence in ability to do research and contribute to science

"I feel the primary strength of WRSP is the support and resources it provides that advisors often cannot. While a sore subject, monetary funding is a large boundary to devoting time to research, and WRSP helps to mediate this. As well, the research resources such as poster and presentation workshops on top of the general support from the staff is incredibly valuable."

## OTHER HIGHLIGHTS

Along with the Office of the President, the SI hosted the inaugural **STEM Carnival** at UW on Friday, September 16, 2022. The event celebrated the opening of the new Science Initiative Building and featured a wide range of presentations and hands-on activities. These activities were led by 37 participating units, ranging from UW academic units, outreach programs, research laboratories, university museums, local businesses, and more. 500 K-12 students from schools in Laramie, Albany, and Carbon counties, along with many community members and UW students, attended the event.

This spring, the Wyoming legislature approved full funding for Science Initiative programs, moving us from 23% funded to 100% for the coming fiscal year. This will allow us to expand current programming and begin full programming for the PhD Scholar Program and the Faculty Innovation Grant Program. This funding will also allow the SI to fully staff the Center for Advanced Scientific Instrumentation (CASI) and the Student Collaborative Research, Outreach and Learning Laboratory (SCROLL). The Wyoming legislature also approved funding to finish all shelled-out portions of the SI Building, including SCROLL, the Model Organism Research Facility (MORF), and other supplemental research spaces on the ground floor.



18

UW students gained research experience in the fourth year of Course-based Undergraduate Research Experiences (CUREs)

# RESEARCH AND EDUCATIONAL FACILITIES UPDATE

## ACTIVE LEARNING CLASSROOM (ALC) IN THE SCIENCE INITIATIVE BUILDING

During the Fall 2022 and Spring 2023 semesters, the ALC has been full to the brim with students taking part in team-based, problem-based, and other active learning strategies. In total, 2,086 students were enrolled in 19 classes that met in the ALC. These courses included courses in the following programs: Chemistry, Kinesiology, Life Sciences, Microbiology, Molecular Biology, Plant Sciences, and Zoology & Physiology. The courses offered included 1 section of Agroecology, 2 sections of Animal Biology, 5 sections of General Biology, 1 section of General Chemistry I, 1 section of General Ecology, 2 sections of General Microbiology, 1 section of Genetics, 2 sections of Human Anatomy, 1 section of Integrative Physiology, 1 section of Medical Microbiology, and 1 section each of Organic Chemistry I and II. 16 of these 19 courses were 1000 or 2000 level courses, as well.

## FIVE INSTRUMENTS ADDED TO CENTER FOR ADVANCED SCIENTIFIC INSTRUMENTATION (CASI)

To date, CASI has been equipped with 5 instruments:

1. Micro-CT Scanner - purchased with state grant funds through the Wyoming Innovation Partnership and the Wyoming Data Hub
2. Spinning-Disk Confocal Microscope - purchased with INBRE grant funds
3. X-Ray Diffractometer - purchased with INBRE grant funds
4. Transmission Electron Microscope (TEM) - purchased with funds through the UW Office of Research and Economic Development (ORED)
5. Focused Ion Beam Scanning Electron Microscope (FIB-SEM) - purchased with state grant funds through the Wyoming Innovation Partnership and the Wyoming Data Hub

The first 3 of these instruments were installed during the Fall 2022 semester, and the electron microscopes were installed in late spring and summer of 2023. A team of UW faculty and administrators are also working on acquiring a High-Throughput Plant Phenotyping System for use in agricultural applications. So far, researchers from multiple departments have been using installed instruments heavily to research everything from brain growth and development, multinucleate cells, cell nucleus scaling, and characterization of porous covalent organic frameworks. Dr. Todd Schoborg of Molecular Biology has also used the Micro-CT scanner in partnership with two start-up companies, Backyard Brains and Unlocked Labs, to provide neuroscience education to elementary-age students and assist in the development of probiotics for the treatment of gout and kidney stones.



# ASTROPHYSICAL RESEARCH CONSORTIUM MEMBERSHIP CONTINUES

The Apache Point Observatory (APO), including 3.5 m, 2.5 m, and 1.0 m telescopes, is located in the Sacramento Mountains of New Mexico near Alamogordo. Since July of 2017, with the financial support of the Science Initiative, UW has been one of eight members of the Astrophysical Research Consortium (ARC), giving UW astronomical researchers access to the 3.5 m ARC telescope at APO for 40 half nights per year. Access to this telescope has opened up new kinds of science programs to UW faculty and students, as it has a suite of optical and infrared spectrographs with capabilities not available at UW's WIRO telescope.

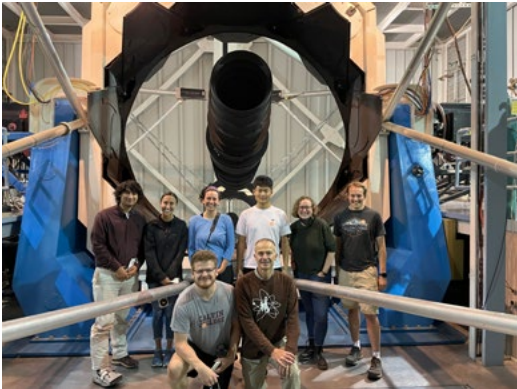
PhD student Amy Cavanaugh is completing a large four-year investigation of the near-infrared spectral properties of quasars (galaxies with large black holes at the centers) using the Triplespec instrument on the 3.5 meter telescope. This will constitute the data set for her PhD thesis under Professor Michael Brotherton and will be a primary reference for the near-infrared properties of quasars and how they are related to underlying physical parameters like black hole mass and accretion rate.

PhD student Jacob McLane has been using the Triplespec instrument for 4 years to pioneer the field of measuring the masses of supermassive black holes in the centers of active galaxies using infrared light. This work will constitute a portion of his PhD thesis under Professor Michael Brotherton and is being done in collaboration with Benjamin Boizelle (APO partner member Brigham Young University), a productive team-up that has let our groups combine telescope time and share observing duties.

PhD student Evan Cook, with Prof. Chip Kobulnicky and Prof. Max Moe, has been using the Echelle Spectrograph on the 3.5 meter telescope for two years to measure the masses of contact binary stars - double star systems that orbit each other so closely (every 5-10 hours!) that their atmospheres merge into one peanut-shaped envelope. Such systems are destined to merge into one star, creating a class of explosive events called Luminous Red Novae. Evan's work tests the end stages of close binary stars and informs new theories for the evolution of close binary stars proposed by collaborator Prof. Larry Molnar at Calvin University in Michigan.

PhD student Nikhil Patten is using the APO KOSMOS spectrograph to measure the temperatures and masses of energetic stars with temperatures of 20,000 to 40,000 Kelvin. Such stars burn through their nuclear fuel in only 10 million years, ending their lives in spectacular supernova explosions so bright they are seen across the universe. Nikhil's measurements will help astronomers understand the final fate of massive stars, the type of explosion they undergo, and whether their collapsed cores will form black holes or neutron stars...material so dense that a teaspoonful would weigh millions of tons. Eight Research Experience for Undergraduates summer interns will use APO with Nikhil and Prof. Kobulnicky this summer to create the largest survey of these stars yet undertaken.

Wyoming's participation in the Apache Point Telescope Consortium over the last four years has helped produce five ongoing PhD dissertations, seven journal articles, one successful grant proposal, and dozens of poster presentations at conferences. Five to seven UW graduate and undergraduate students travel each year to Apache Point, NM in September to receive training on its instruments and operation.





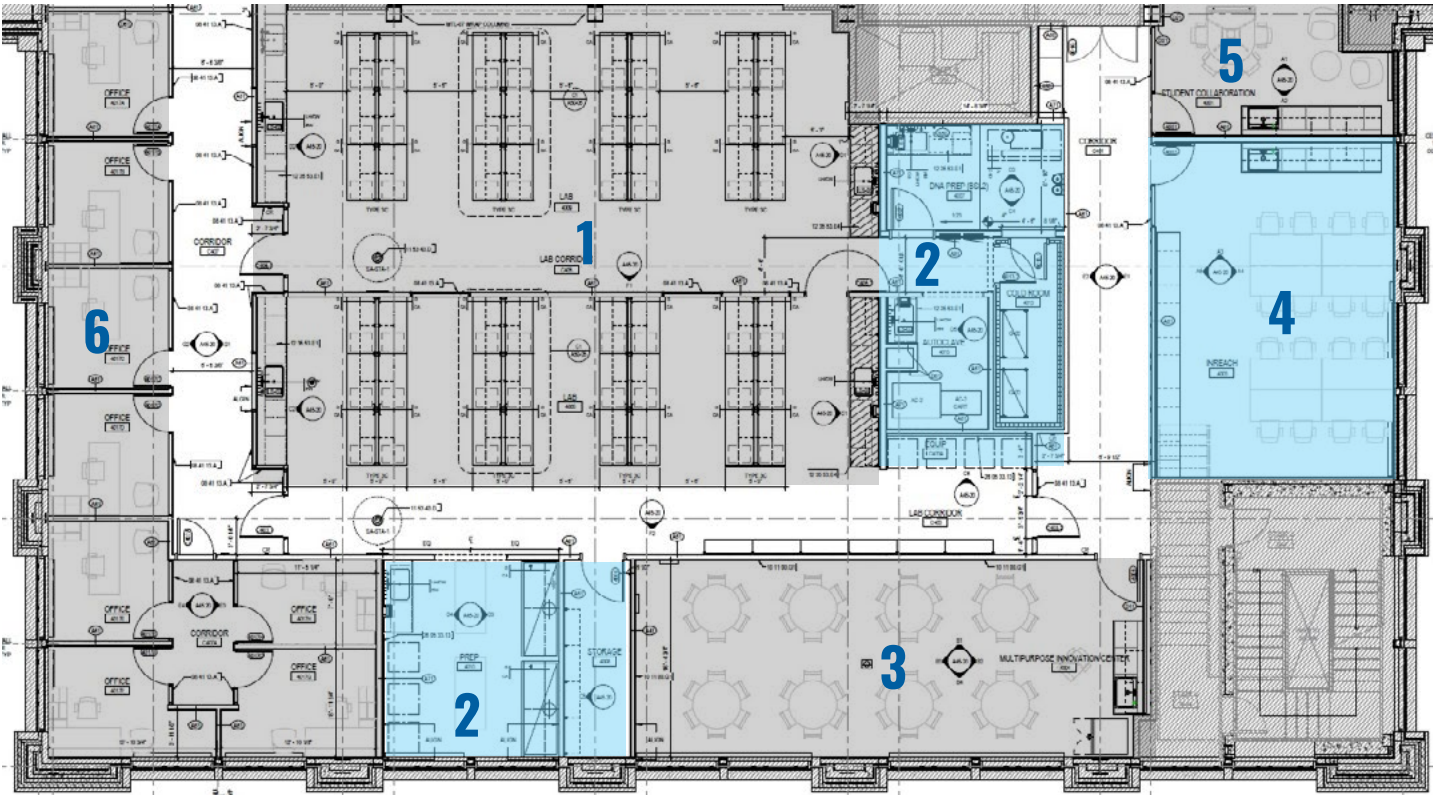
# STUDENT COLLABORATIVE RESEARCH, OUTREACH, & LEARNING LABORATORY (SCROLL)

When the Science Initiative Building was initially completed in March of 2022, SCROLL, located on the 4th floor of the building, was left shelled out, but plans to finish this space are coming to fruition. SCROLL will include:

- 1. Interdisciplinary laboratory space and computational labs that can be used by undergraduate students to conduct course-based and individual research.
- 2. A 35-seat multi-purpose innovation center that will serve as a training space to instruct LAMP Fellows, LAMP Learning Assistants, and Science Initiative Roadshow student researchers in active learning techniques.
- 3. Space to facilitate in-reach visits from Wyoming K-12 schools.
- 4. A collision space where students can study, practice for presentations, and interact more informally with peers across disciplines, fostering the creation of new ideas and enhancing student life and learning outcomes.

Throughout the 2022-2023 academic year, feedback from multiple constituencies was used to refine the floorplan for SCROLL. Faculty members from multiple departments (that would likely be using the laboratory space to teach CUREs) were consulted in the organization of lab benches, storage, and prep rooms in this space. Outreach coordinators from the Science Kitchen (a cooperation between the Department of Physics and Astronomy, Wyoming NASA Space Grant, and Wyoming INBRE) gave feedback on how to structure the outreach space for diverse types of learning experiences.

The floorplan below is the most recent, updated version of SCROLL. Construction of the space began in August of 2023 and is planned to be completed in fall of 2024.

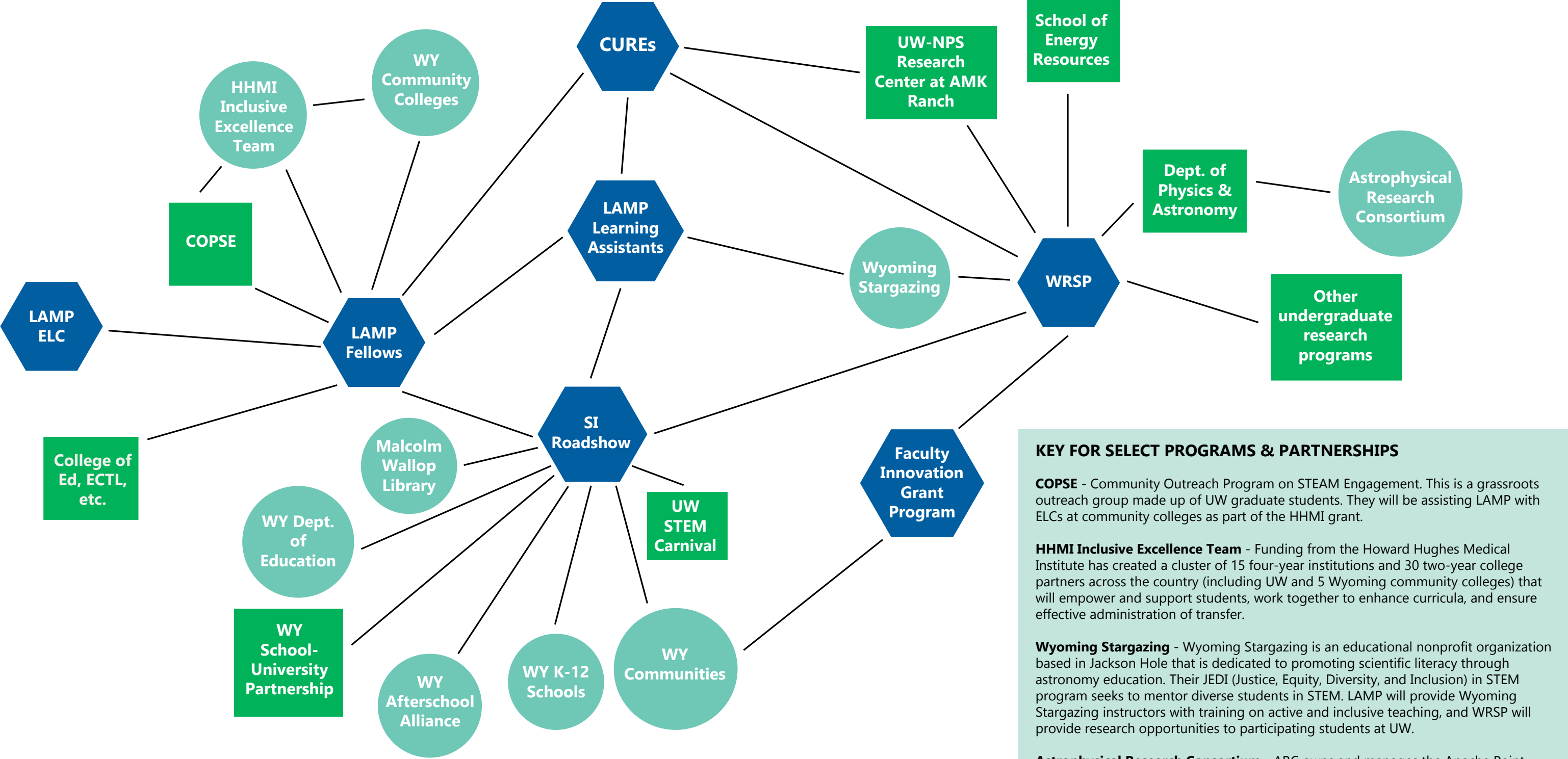


- 1. 48-seat wet laboratory
- 2. Prep spaces, storage spaces, and autoclave
- 3. Multi-purpose innovation center
- 4. Outreach space
- 5. Student collision space
- 6. Faculty and staff offices





SI PROGRAM INTERACTIONS





SI'S SIGNATURE  
PROGRAMS



# LEARNING ACTIVELY MENTORING PROGRAM

IMPROVING STUDENT RETENTION,  
SUCCESS, AND ENGAGEMENT IN UW STEM  
CLASSROOMS THROUGH COMPREHENSIVE,  
SUSTAINED MENTORING AND PROFESSIONAL  
DEVELOPMENT FOR FACULTY

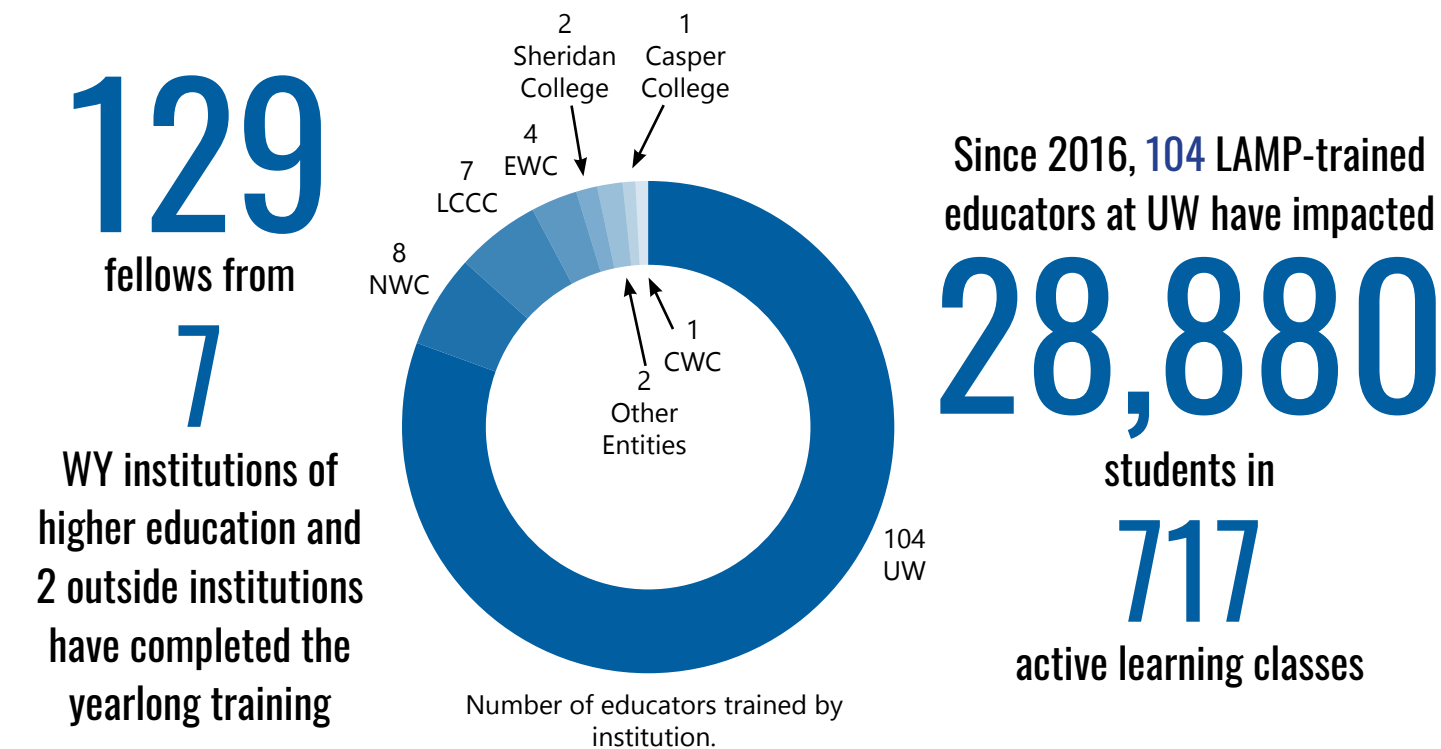


**LAMP** is a comprehensive, sustained mentoring and professional development program with an emphasis on how to best adopt active learning strategies in large-scale active learning classrooms at UW and in classrooms across the state's community colleges.

- Program Goals:
- 1. Improve student retention, success, and engagement in STEM classrooms.
  - 2. Enable all new and most existing STEM teaching faculty and teaching assistants at UW to become trained in active learning strategies.
  - 3. Conduct research on active learning in STEM classrooms to investigate relationships between teaching practices and student success, literacy, engagement, and inclusion.
  - 4. Establish professional development and collaboration opportunities for science instructors across the state, including community college instructors and K-12 teachers, to improve learning experiences for all Wyoming students.

### LAMP FELLOWS THROUGH TIME (2016-2023)

The LAMP Fellows Program is an immersive, year-long educational development opportunity designed to facilitate instructors' incorporation of active learning techniques into the STEM courses they teach at UW and at community colleges across the state. The program began in the 2016-2017 academic year and enrolled a new class of educators each year until 2020, when classes began enrolling every other year.



### PREVIEW OF LAMP FELLOWS 2023/2024

This coming year, LAMP welcomes a new class of 40 college teachers from Northwest College, Eastern Wyoming College, Casper College, Laramie County Community College, Central Wyoming College and from UW departments of Zoology/Physiology, Molecular Biology, Botany, Physics and Astronomy, Ecosystem Science, Geospatial Sciences, Anthropology, Psychology, Petroleum Engineering, Civil and Architectural Engineering, Mechanical Engineering, Chemistry, Pharmacy, Math and Statistics, Kinesiology and Health, Nursing, Electrical Engineering and Computer Science. Educators in this yearlong LAMP class will redesign their courses to incorporate student-centered active learning practices with an emphasis on Problem-based Learning (PBL).

The 2023 LAMP learners have begun their journey with immersive asynchronous curriculum. LAMP Director Rachel Watson has designed and developed WyoLearn Modules that lead the educators through the process of evolving their teaching and learning philosophy and setting the state for their curriculum design. They are enunciating their core values - the 'why' behind their teaching, mastering the writing of clear, measurable student learning outcomes, selecting aligned assessment strategies and finally, in the tradition of backwards design, selecting the active, inclusive pedagogy that allows students to iteratively practice their mastery of learning outcomes!

Armed with their deep learning from the asynchronous modules, during the summer of 2023, LAMP learners engaged in an immersive, week-long summer institute at Camp Sacagawea outside of Casper, Wyoming. At the Summer Institute, educators became learners in problem-based learning (PBL) and team-based learning (TBL) settings. LAMP mentors and learning assistants modeled these pedagogies for educators. Their reflection-rich, experiential learning, coupled with their foundational knowledge from the asynchronous curriculum, allowed them to design instructional strategies that capitalize on all that we know about student learning and inclusion.

We thank LAMP mentors and learning assistants for their help, as they are experts in pedagogy, andragogy and in disciplines ranging from Botany to Sociology. We are also honored to welcome Vice President Zebadiah Hall who will assist us in recognizing the way in which problem-based learning is an inclusive, equitable pedagogy that invites diverse ways of knowing.





In the 2022/2023 academic year, 44 LAMP-trained educators at UW impacted

3,653

students in

118

active learning classes

Student enrollment by discipline in LAMP fellow-taught active learning classrooms, academic year 2022/2023.

| DISCIPLINE                      | ENROLLMENT |
|---------------------------------|------------|
| Physical Sciences               | 1,369      |
| Biological Sciences             | 1,210      |
| Environment & Natural Resources | 259        |
| Engineering                     | 223        |
| Honors College                  | 151        |
| Agriculture                     | 133        |
| Psychology                      | 129        |
| Disability Studies              | 59         |
| Health Sciences                 | 50         |
| Education                       | 38         |
| Social Sciences                 | 32         |

Student enrollment by subject description in LAMP fellow-taught active learning classrooms, academic year 2022/2023.

| SUBJECT DESCRIPTION                       | ENROLLMENT |
|---|------------|
| Chemistry                                 | 1,148      |
| Life Sciences                             | 701        |
| Zoology & Physiology                      | 335        |
| Honors                                    | 151        |
| Psychology                                | 129        |
| Agricultural Economics                    | 125        |
| Physics                                   | 101        |
| Earth Systems Science                     | 92         |
| Engineering Science                       | 87         |
| Outdoor Recreation & Tourism Management   | 84         |
| Environment & Natural Resources           | 83         |
| Geospatial Information Science Technology | 81         |
| Pathobiology                              | 65         |
| Wyoming Institute for Disabilities        | 59         |
| Civil Engineering                         | 53         |
| Botany                                    | 43         |
| Speech-Language Pathology                 | 40         |
| Molecular Biology                         | 40         |
| Geography                                 | 37         |
| Gender & Women's Studies                  | 29         |
| Electrical Engineering                    | 27         |
| Architectural Engineering                 | 27         |
| Agricultural Education                    | 25         |
| Computer Science                          | 20         |
| Soil Sciences                             | 13         |
| Secondary Education                       | 13         |
| Microbiology                              | 13         |
| Pharmacy                                  | 9          |
| Petroleum Engineering                     | 9          |
| Renewable Resources                       | 8          |
| American Studies                          | 3          |
| Geology                                   | 2          |
| Social Work                               | 1          |

HHMI INCLUSIVE EXCELLENCE GRANT UPDATE

The University of Wyoming is the recipient of a 6-year grant as part of the Howard Hughes Medical Institute’s (HHMI) Inclusive Excellence 3 (IE3) initiative that will support continued collaborative relationship-building projects between Wyoming community colleges and UW. UW and 5 Wyoming community colleges are among 104 colleges and universities nationwide that have received grants through the initiative. The 104 colleges and universities are split into 15 different teams – UW and the 5 Wyoming community colleges make up one of these teams. The grant is being used among UW, Northwest College, Eastern Wyoming College, Western Wyoming Community College, Laramie County Community College and Casper College to develop faculty learning communities dedicated to building capacity to better include minoritized and historically marginalized students in STEM fields.

The grant (including all 104 colleges and universities) totals more than \$8 million over the 6-year grant period, with nearly \$1 million of the award managed by UW. LAMP Director Rachel Watson leads the Wyoming IE3 team and is a part of the national team focused on facilitating community-building dialogue. This award will be allocated to two separate endeavors: It will enable the Wyoming inclusive excellence learning community work, and it will be used to allow the entire national learning community to continue learning, relationship-building, and generating a greater understanding of inclusive excellence together.

In March of 2021, before the full grant was awarded, UW was awarded a small learning grant through the initiative that was used to complete an institutional ethnography at each of the 5 partnering Wyoming community colleges during the 2022-2023 academic year. This was completed by members of the Wyoming IE3 Research team (Reshmi Singh – Associate Professor of Pharmacy at UW, Rosemary McBride – Assistant Lecturer in the School of Teacher Education at UW, and Rachel Watson). The findings of this work allowed the team to understand the ways in which faculty members’ feelings of support and isolation are connected to their social networks and acknowledgement by administration. They also uncovered that the faculty’s focus on doing student-centered work grinds with administrative policy in some instances. This institutional ethnography is under review by the Thresholds in Education journal.

Also in 2022, the Wyoming team launched a pilot learning community at Northwest College (NWC). During the Fall 2022- Spring 2023 academic year the NWC learning community had an average of about 7 members, with some turnover. During this academic year, the learning community had weekly Zoom discussions centered on effective, inclusive pedagogy. This learning community has also led the planning for the NWC Student Academic Showcase, which took place April 28, 2023. The showcase engaged students in a professional exhibit of scholarship across the disciplines, highlighting student work involving creativity, discovery, research, innovation, and/or entrepreneurship. The event was open to the public, with special efforts being made to attract members of the local community, including K-12 students. Rachel Watson also organized a delegation of 12 staff, faculty, grad students, and administrators from UW to attend the showcase and establish connections with interested transfer students. In 2023, the graduate student outreach group COPSE decided to devote their primary focus on outreach for the IE3 work. They were heavily involved in the student showcase at NWC. They will serve as mentors, instructional assistants, learning community members, and contribute to the design and development of programs at all participating community colleges. The Wyoming IE3 team plans to establish a second community college learning community in the near future, as well.

Lastly, in the summer of 2023, a team of Wyoming representatives from UW, EWC, NWC, Casper College, WWCC, and LCCC traveled to HHMI’s Jenelia Campus, outside Washington, DC, for an in-person meeting to discuss further community-building and efforts for inclusive education and transfer opportunities.





## LAMP FELLOWS MAKE BIG IMPACTS AND ARE AWARDED WITH HIGH HONORS

Prior LAMP fellows continue to utilize their training to impact students at UW and across the state, gaining recognition for their transformative contributions. Pam Langer, Associate Professor of Molecular Biology at UW and a 2019-2020 LAMP fellow, was awarded the Ellbogen Lifetime Teaching Award, an award to recognize the long, distinguished, and exemplary career of a faculty member who has excelled as a teacher at UW. This award is only given to one faculty member each year and is the highest teaching award given by the University of Wyoming. Karagh Brummond, Assistant Instructional Professor in the Honors College, Director of the Science Initiative Roadshow, and 2018-2019 LAMP fellow, was awarded the Ellbogen Classroom Teaching Award. Along with these awards, 4 of the 17 professors named "Top Prof" by Mortar Board Seniors at UW were prior LAMP fellows. These professors were Kassandra Willingham (Assistant Lecturer of Molecular Biology), Joe Russo (Adjunct Professor in the School of Teacher Education), Ginka Kubelka (Associate Lecturer of Chemistry), and JJ Shinker (Professor of Geology & Geophysics). We also congratulate Deepthi Amarasuriya, a 2019-2020 LAMP fellow, 2020-2021 ELC member, and Assistant Professor of Physics at Northwest College, for being named the inaugural Endowed Chairperson in Science at NWC.

## EDUCATOR'S LEARNING COMMUNITY

This academic year, five LAMP fellows from UW and LCCC continued their pedagogical journey with membership in the "Leaving the Light On" Educator's Learning Community (ELC). Claire Campion, Kira Heater, Rhiannon Jakopak, Ginka Kubelka, and Diksha Shukla continued to learn together in biweekly sessions centering on discussion of two texts: "Why Students Resist Learning" by Tolman and Kremling, and "Learner-Centered Teaching" by Maryellen Weimer. Simultaneously, they have engaged in individual SoTL (Scholarship of Teaching and Learning) research, which they presented at the Original Lilly Conference for College Educators in Oxford, Ohio at Miami University, November 17-19, 2022. Claire Campion (Zoology and Physiology graduate student at UW) researched a grassroots graduate student outreach group called COPSE, assessing the changes in graduate students' motivation for outreach over time and analyzing the way in which the social network of these graduate students changed after two years of active outreach. Kira Heater (Mathematics Instructor at LCCC) led an active learning session at the Lilly Conference that assisted educators in beginning their courses by asking an important question about "what we want our learners to be able to do after completing our courses". Rhiannon Jakopak (Assistant Research Scientist in the Haub School at UW) used knowledge surveys that asked students completing field-based fellowships in the Haub School to self-assess their competence, which allows students to consider what they know and promote instructor preparedness and communication with the students about course content. Ginka Kubelka (UW Associate Lecturer of Chemistry) implemented a type of learning called team-based learning in her organic chemistry courses and used knowledge surveys to assess students' changes in self-assessed competence. Diksha Shukla (UW Assistant Professor of Computer Science) implemented student learning communities in her courses about artificial intelligence and assessed their work by monitoring curiosity scores. ELC members celebrated their accomplishments at a culminating celebration on April 21, 2023.

## LEARNING ASSISTANTS

The LAMP Learning Assistants Program began in Spring 2018 and provides UW students with opportunities to assist teaching in large introductory science courses taught in active learning classrooms at UW. Learning Assistants (LAs) act as peer mentors to help facilitate team-based and other types of learning. As many LAs are pursuing employment as K-12 STEM teachers, the program also integrates active learning into their training and gives them valuable teaching experience.

During the 2022-2023 academic year, LAMP Director Rachel Watson redesigned the Best Practices in Active Learning course which is the pedagogy course that all LAs take. Each week, the LAs consider pedagogical topics by modeling varying active learning modalities. They begin the semester with a nascent draft of their teaching/learning philosophy. After each day's class, they reflect on their learning by considering how it will impact their growing philosophy. At the end of the semester, they submit an evolved philosophy.

For their second submitted assignment, LAs can choose whether they submit an addition to the Active Learning Spectrum or whether they engage in their own Scholarship of Teaching and Learning (SoTL) project. In fall of 2022 and spring of 2023, more students than ever chose to do their own SoTL. One exemplary project was completed by four Organic Chemistry LAs. They explored the impact of the type of active learning classroom on students' success and satisfaction. The expansion of LA work into the SoTL realm has evolved the LA/Professor partnership in exciting ways. LAs are pushing professors to ask even more questions about their students' engagement, satisfaction and mastery of learning outcomes.





SI'S SIGNATURE  
PROGRAMS

WRSP

# WYOMING RESEARCH SCHOLARS PROGRAM

PROVIDING UNDERGRADUATE STUDENTS WITH  
CUTTING-EDGE RESEARCH OPPORTUNITIES AND  
FACULTY MENTORSHIP

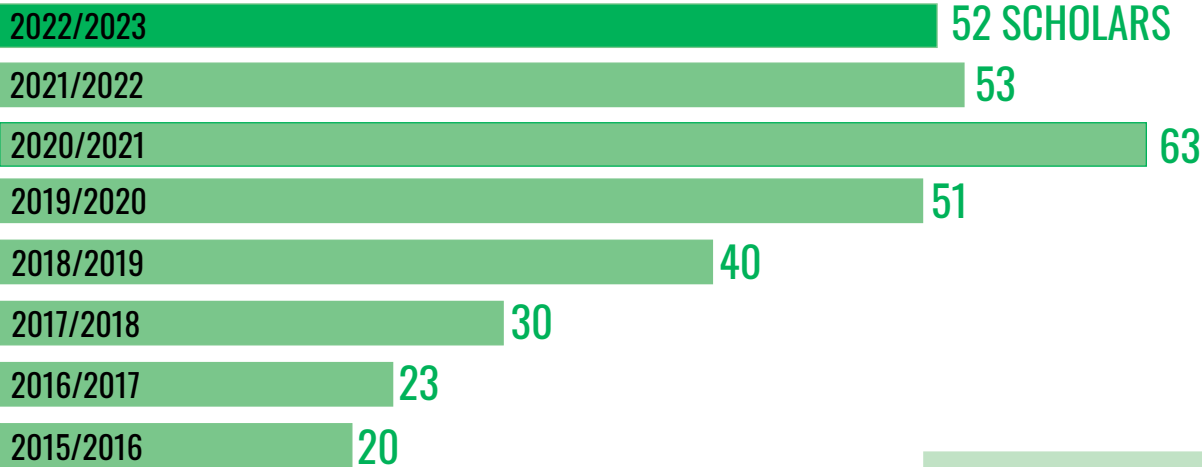




The **Wyoming Research Scholars Program (WRSP)** pairs undergraduate students with faculty mentors to participate in their own cutting-edge research project starting as early as their freshman year. Research experiences through WRSP build confidence and competence in young scholars at a formative stage in their training.

- Program Goals:
1. Attract high-achieving high school graduates and community college transfer students to UW.
  2. Retain promising students in the sciences at UW through early involvement in hands-on science research, department seminars, and public outreach events.
  3. Pair talented students with a faculty mentor who can model the scholarship, teaching, service, and outreach activities of a professional scientist.
  4. Develop transferable professional skills such as science writing, data analysis, and oral communication through participation in research and public outreach events.

WRSP SCHOLARS THROUGH TIME (2015-2023)



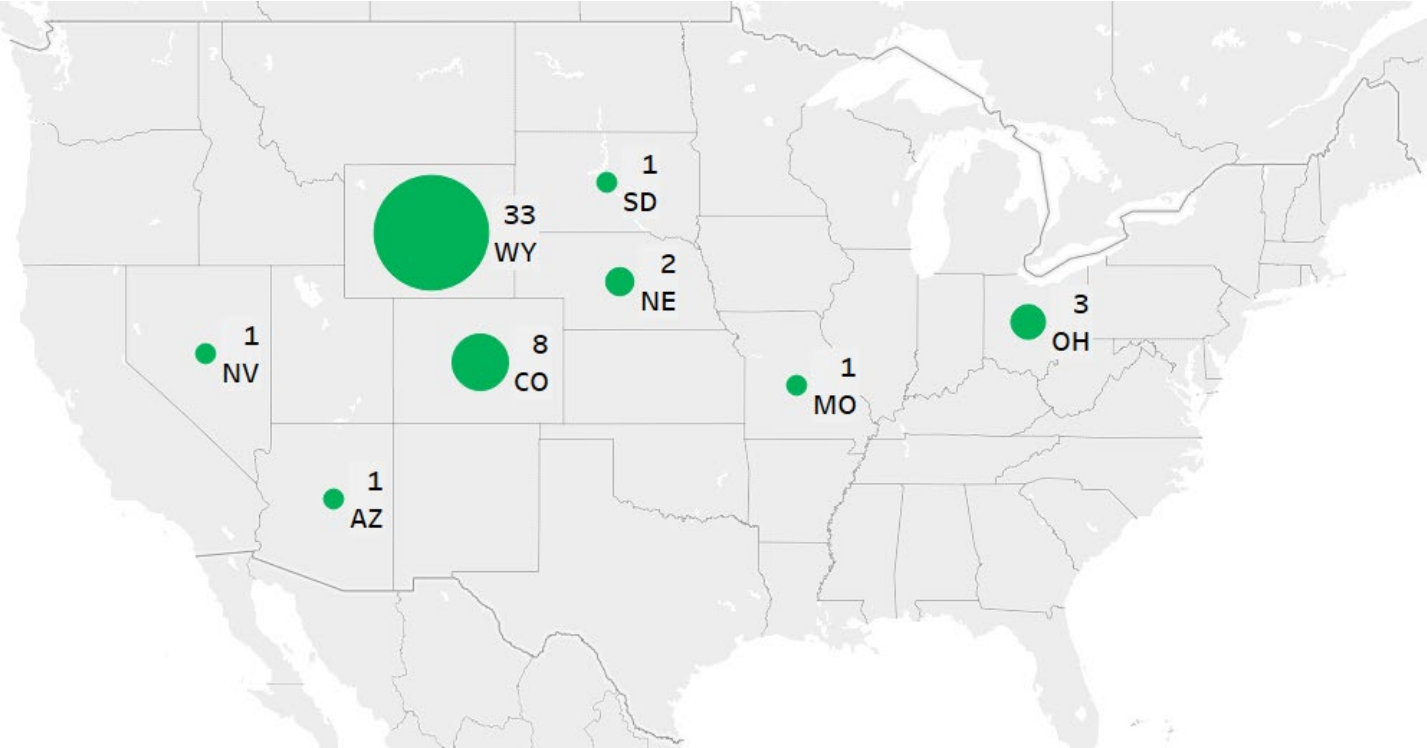
173  
total scholars

FROM 3 countries AND 30 US states and territories

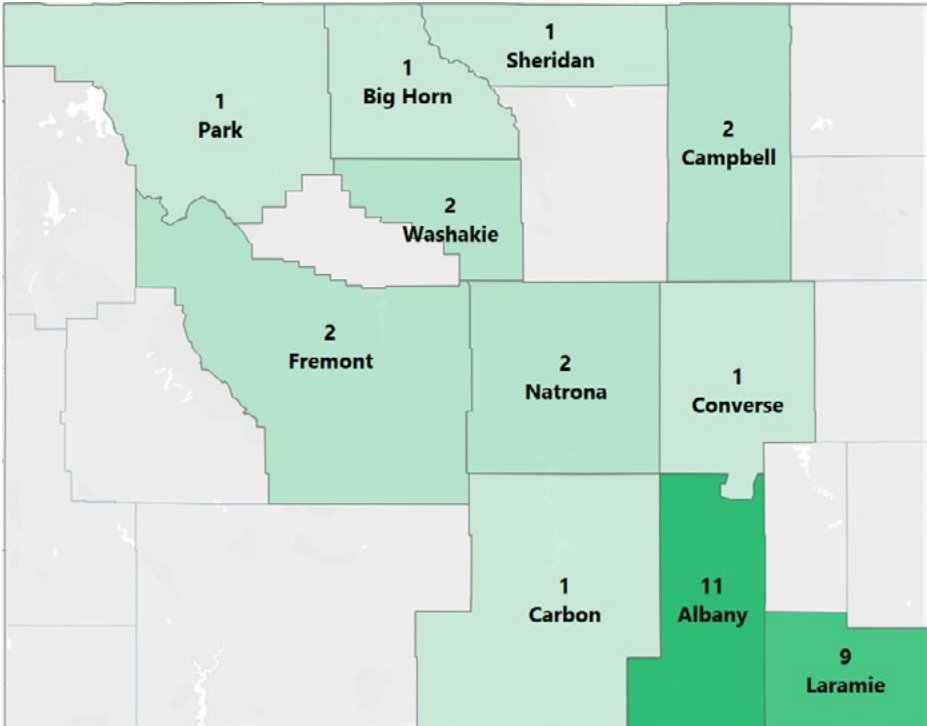
103 scholars from 20 Wyoming counties

WRSP SCHOLARS 2022/2023

WRSP scholars by state, academic year 2022/2023. Additionally, 1 scholar each from Alaska & India participated in WRSP.

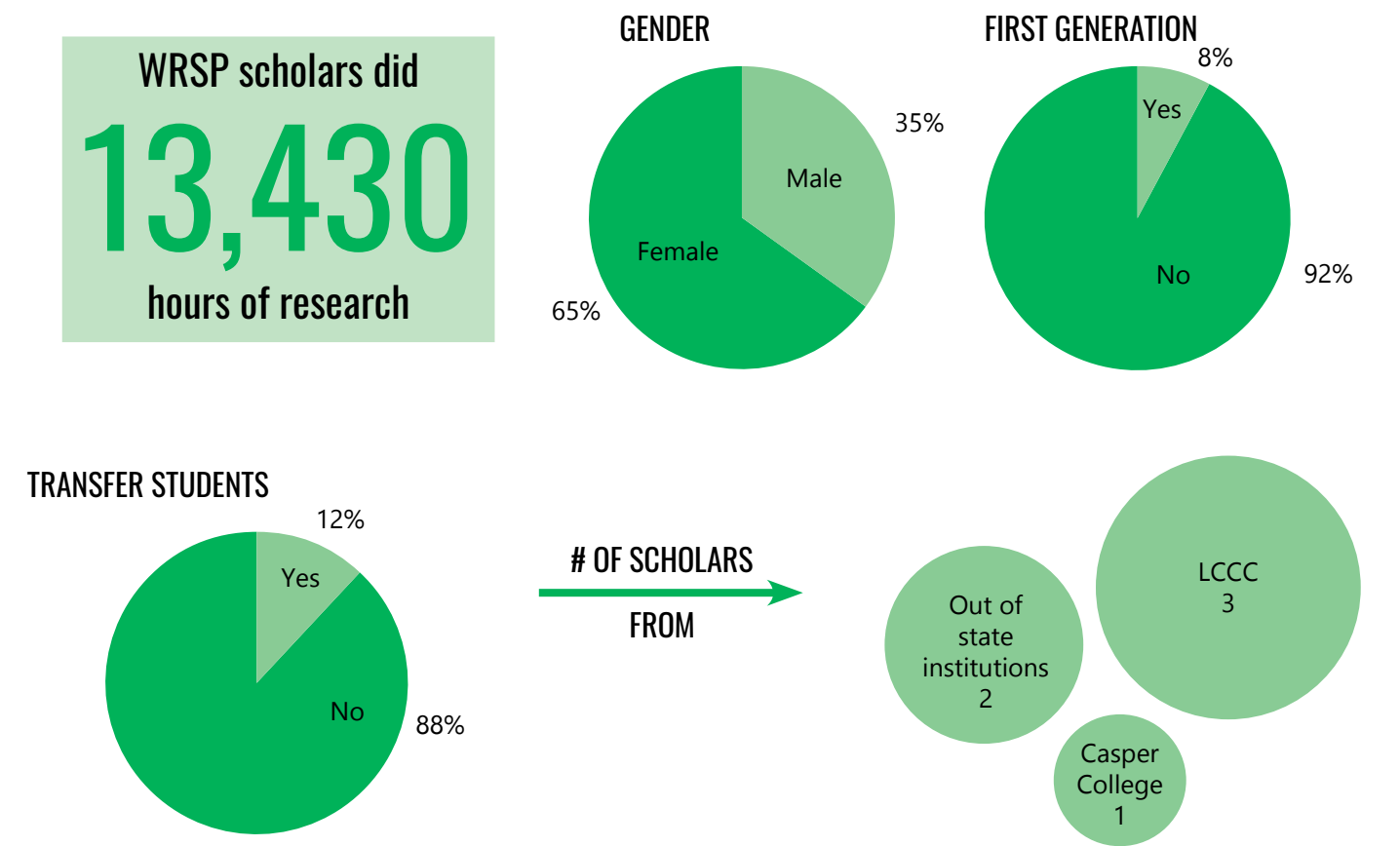


Below: WRSP scholars by Wyoming county, academic year 2022/2023.  
Right: WRSP scholars by Wyoming hometown, academic year 2022/2023.



| WY CITY   | # OF SCHOLARS |
|-----------|---------------|
| Buford    | 2             |
| Burns     | 1             |
| Casper    | 2             |
| Cheyenne  | 8             |
| Cody      | 1             |
| Cowley    | 1             |
| Douglas   | 1             |
| Dubois    | 1             |
| Gillette  | 2             |
| Lander    | 1             |
| Laramie   | 9             |
| Rawlins   | 1             |
| Sheridan  | 1             |
| Ten Sleep | 1             |
| Worland   | 1             |





Primary majors of WRSP scholars, academic year 2022/2023.

| PRIMARY MAJOR                 | # OF SCHOLARS | PRIMARY MAJOR                             | # OF SCHOLARS |
|-------------------------------|---------------|---|---------------|
| Animal & Veterinary Science   | 1             | Geology                                   | 4             |
| Anthropology                  | 1             | Mechanical Engineering                    | 1             |
| Astronomy & Astrophysics      | 3             | Microbiology                              | 4             |
| Biology                       | 1             | Molecular Biology                         | 6             |
| Chemical Engineering          | 2             | Physical Education Teaching               | 1             |
| Chemistry                     | 3             | Physics                                   | 1             |
| Computer Engineering          | 1             | Physiology                                | 2             |
| Computer Science              | 4             | Psychology                                | 1             |
| Energy Systems Engineering    | 1             | Speech Language & Hearing Sciences        | 1             |
| Environmental Systems Science | 4             | Wildlife & Fisheries Biology & Management | 2             |
| Geography                     | 1             | Zoology                                   | 7             |

## WRSP SCHOLAR PUBLICATIONS AND PRESENTATIONS

The goals of WRSP include not only exposing undergraduate students to the work of a professional researcher, but giving them the opportunity and resources to actively contribute to these processes. This experience takes research from the theoretical to the practical realm and also provides students research products that greatly strengthen their prospects for further education and employment. Each semester, WRSP scholars report the products of their research, including publications, presentations, outreach, and other creative activities. This academic year, 37 scholars reported on their research activity. These data were augmented with online searches for other research products.

List of presentations and posters given at professional conferences to which WRSP scholars contributed, academic year 2022/2023. 16 presentations were given at 9 separate conferences.

| PRESENTATION TITLE  | MORE PRESENTATION TITLES  |
|---|---|
| Comparing ungulate aging methods to inform management practices   | Simultaneous transmission spectroscopy of HD 189733b from Wyoming Infrared Observatory and Red Buttes Observatory |
| Does pollinator visitation differ between operating and proposed wind farms?  | The effect of observatory localization in pulsar timing searches for gravitational waves                          |
| Investigating giant exoplanets at the University of Wyoming: Red Buttes Observatory follow up   | The influence of high evaporative conditions on peat-forming mosses in the Antarctic peninsula                    |
| Observatory position as a source of noise in pulsar timing searches for gravitational waves   | The presence of monarchs and their parasites in eastern Wyoming   |
| Observing and characterizing exoplanets at the Red Buttes Observatory using transit photometry  | Using extremotolerant derived proteins and sugars to protect biologic pharmaceuticals                             |
| Optimal sampling method to detect Mycoplasma bovis in American Bison ( <i>Bison bison</i> )   | Using intrinsically disordered proteins to stabilize biologic pharmaceuticals                                     |
| Pilot pollen study at La Prele mammoth site   | Using metal-rich absorption features for identifying relative metal content across cosmic time                    |
| Relationships between tree ring width and slope position: can the source location and species of downed wood in Gordon Gulch be identified? | Using the self potential method to describe hydrothermal systems in Yellowstone National Park                     |

List of published articles to which WRSP scholars contributed, academic year 2022/2023. 13 articles were published in 9 peer-reviewed journals.

| ARTICLE TITLE  | MORE ARTICLE TITLES  |
|--|--|
| A six year, low-resolution multibroadband transit photometry study of HD 189733b   | Source and seasonality of epizootic mycoplasmosis in free-ranging pronghorn ( <i>Antilocapra americana</i> )           |
| Behavioral traits vary with intrinsic factors and impact local survival in Song Sparrows ( <i>Melospiza melodia</i> )  | Stable polycyclic aromatic carbon (SPAC) formation in wildfire chars and engineered biochars                           |
| Donor–acceptor pyridinium salts for photo-induced electron-transfer-driven modification of tryptophan in peptides, proteins, and proteomes using visible light | TOI-1696 and TOI-2136: Constraining the masses of two mini-Neptunes with the Habitable-Zone Planet Finder              |
| Dysregulated lipolysis and lipophagy in lipid droplets of macrophages from high fat diet-fed obese mice  | TOI-3714 b and TOI-3629 b: Two gas giants transiting M dwarfs confirmed with the Habitable-zone Planet Finder and NEID |
| Monitoring AGNs with Hbeta symmetry. iii. Long-term reverberation mapping results of 15 palomar-green quasars  | TOI-3757 b: A low density gas giant orbiting a solar-metallicity M dwarf   |
| Natural and engineered mediators of desiccation tolerance stabilize Human Blood Clotting Factor VIII in a dry state  | TOI-5205b: A Jupiter transiting an M dwarf near the Convective Boundary  |
| Peptidylarginine deiminase enzymes and citrullinated proteins in female reproductive physiology and associated diseases  |  |



## WRSP SCHOLAR EXIT SURVEY

Each semester, scholars who complete their fellowship with the WRSP (most by graduating) fill out an exit survey which asks questions about learning outcomes related to their WRSP research and outreach. Also included are questions about future educational and employment plans and questions about WRSP in general. Below are some notable results from the 12 Spring 2023 graduates who completed the survey.

### On average, scholars reported a **GREAT GAIN** related to their

- Comfort discussing scientific concepts with others
- Confidence in ability to do research
- Confidence in ability to contribute to science
- Problem solving in general
- Ability to explain research and scientific findings to the public

9

scholars plan to pursue graduate education and/or employment in their field of study. Scholars remarked that the program gave them confidence in their choices for the future.

### Scholars reported that **STRENGTHS** of the program include

- Trainings on science communication
- Guidance for students that aren't sure what their academic and research interests are at the outset
- Paid experience so they were more able to focus on coursework and research

WRSP exposes undergraduates to graduate level research. To me, this alone makes the program worth it. So many students -- myself included -- are unsure about what path they want to take after completing their undergraduate degree. Programs like WRSP expose us to research, and can help us decide what to do next. The strong community WRSP has built of like-minded passionate students is also a major strength. If we would like to collaborate with other students, there is no short list of extremely qualified students to ask.

I feel the primary strength of WRSP is the support and resources it provides that advisors often cannot. While a sore subject, monetary funding is a large boundary to devoting time to research, and WRSP helps to mediate this. As well, the research resources such as poster and presentation workshops on top of the general support from the staff is incredibly valuable.

I thought giving my oral presentation at Undergraduate Research and Inquiry Across the Disciplines Day was super helpful. I'd never given an oral presentation before and was really nervous about how it would go. It went so well and was so validating to be able to share my research and see people be as engaged in it as I was.

## COURSE-BASED UNDERGRADUATE RESEARCH EXPERIENCES (CUREs)

In the Fall of 2019, CUREs were piloted at UW by WRSP Director Jamie Crait with assistance from an interdisciplinary team of instructors. CUREs have also been developed at other universities as a way to engage students in research at a "scale that is not possible through apprenticeships in faculty research laboratories" (Rodenbusch et al., 2016)<sup>1</sup>. Currently, UW's CURE program is being developed as a sequential, three-course series for freshman and sophomore-level students, moving students towards more autonomy in research. The first course in the sequence introduces students to research through developing skills in primary literature analysis, data analysis and visualization, and scholarly communication. The second course gives students deeper knowledge in a specific discipline and training in research methods. The third course focuses on applying skills and knowledge in the context of a research project. After a student finishes the series of courses, instructors help facilitate further research opportunities for students, such as working in faculty labs or participating in internships. Students who finish the sequence will also have the opportunity to serve as peer mentors for new students.

The SI has helped to develop a course-based undergraduate research experience (CURE) for first and second year students. In Fall 2022, students in the LIFE 1101 CURE engaged in research in beaver pond ecosystems in the Medicine Bow National Forest. These students are eligible to continue in our three-semester CURE sequence, allowing them to immerse themselves more deeply in their research projects and prepare them to engage in one-on-one mentored research through the Wyoming Research Scholars Program. The SI plans to create a future CURE that will focus on wildlife interactions at beaver ponds, and the first week of this course will take place the week before the fall semester begins at the UW-NPS Research Station in Grand Teton National Park. The SI is currently waiting on the new USP requirements to take effect before implementation.



<sup>1</sup>Rodenbusch SE, Hernandez PR, Simmons SL, Dolan EL (2016). Early Engagement in Course-Based Research Increases Graduation Rates and Completion of Science, Engineering, and Mathematics Degrees. *CBE - Life Sciences Education*, 15(2), 1-10.



SI'S SIGNATURE  
PROGRAMS

ROADSHOW

# SCIENCE INITIATIVE ROADSHOW

BRINGING ACTIVE LEARNING TO  
K-12 STEM CLASSROOMS ACROSS  
WYOMING



Teams of undergraduate and graduate students from UW, along with UW faculty and staff, facilitate in-person and virtual learning in K-12 STEM classrooms across the state using active learning techniques through the **Science Initiative Roadshow**. The teams from UW work with K-12 teachers to integrate learning experiences into existing curricula in order to achieve assigned learning outcomes. This collaborative approach exposes Wyoming students and teachers to innovative active learning techniques and creates links between UW and schools across the state to improve STEM teaching statewide.

### THE SCIENCE INITIATIVE ROADSHOW THROUGH TIME (2017-2023)

Number of K-12 students reached, 2017-2023. Students who took part in some in-reaches may not be included in the map as they came from various counties.

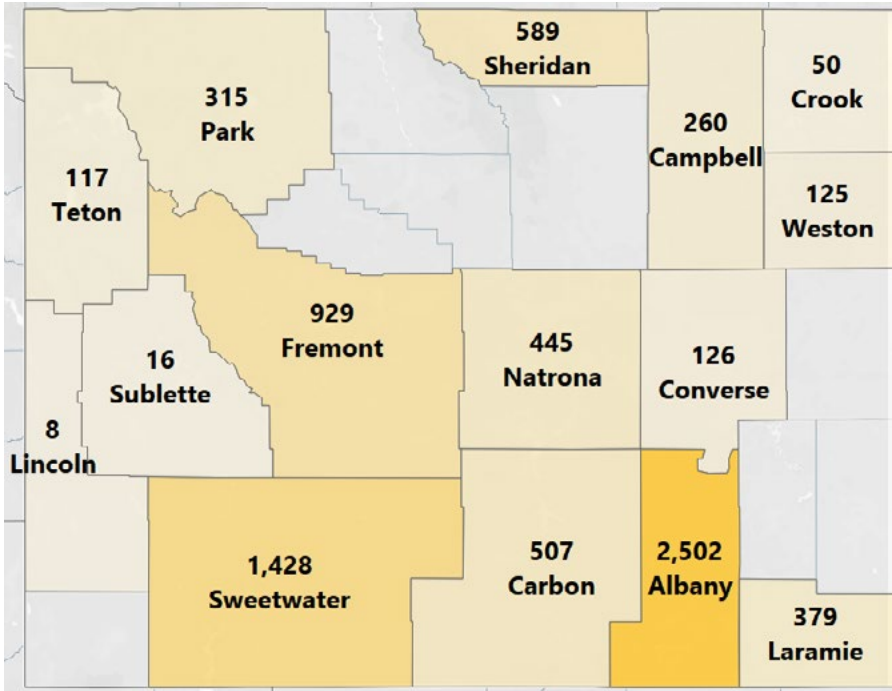
Since 2017, the Science Initiative Roadshow has brought active learning to

7,874

K-12 students from

15

Wyoming counties



84

outreach & inreach events

35+

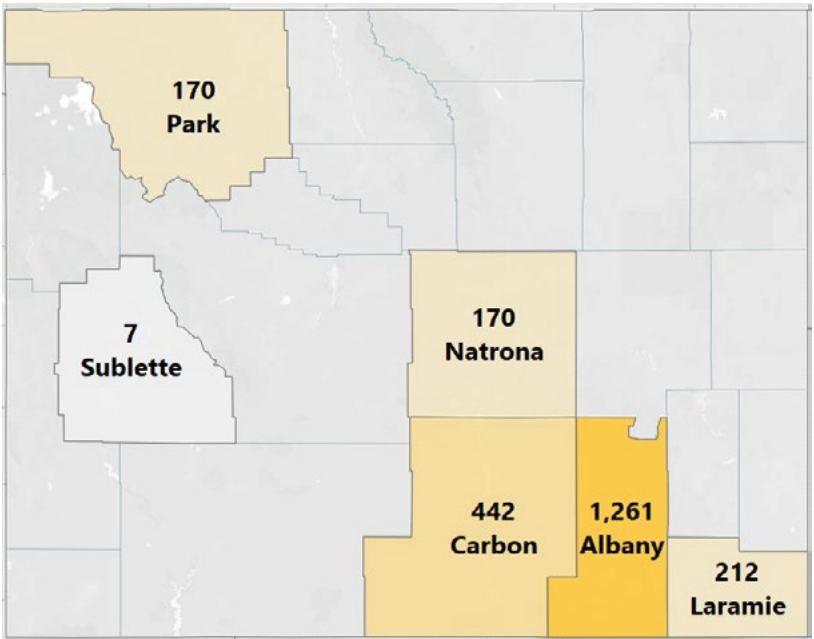
schools & afterschool programs

21

WY communities

### THE SCIENCE INITIATIVE ROADSHOW 2022/2023

Number of K-12 students reached, academic year 2022/2023. Students who took part in some in-reaches may not be included in the map as they came from various counties.



In the 2022/2023 academic year, the Science Initiative Roadshow brought active learning to

2,262

K-12 students from

6

Wyoming counties

| DATE                              | CITY     | SCHOOL/PROGRAM               | # OF STUDENTS |
|-----------------------------------|----------|------------------------------|---------------|
| 7/6/22                            | Cheyenne | Davis Elementary             | 12            |
| 9/16/22                           | Laramie  | STEM Carnival - many schools | 500           |
| 9/27 & 12/9/22, 3/28-29 & 4/14/23 | Laramie  | Laramie High School          | 716           |
| 10/18/22, 4/28/23                 | Cheyenne | Dildine Elementary           | 102           |
| 11/29-30/22                       | Laramie  | Laramie Middle School        | 128           |
| 1/6/23                            | Cheyenne | Pioneer Park Elementary      | 45            |
| 1/10/23                           | Pinedale | Skyline Academy              | 7             |
| 1/11-12/23                        | Powell   | Powell Middle School         | 127           |
| 1/26-27/23, 4/3-4/23              | Casper   | Dean Morgan Middle School    | 170           |
| 2/17/23                           | Hanna    | H-E-M Junior/Senior High     | 160           |
| 3/22/23                           | Cheyenne | Cheyenne Central High School | 40            |
| 4/18/23                           | Cody     | Heart Mountain Academy       | 43            |
| 5/10/23                           | Saratoga | Saratoga Elementary School   | 192           |
| 5/17-19/23                        | Laramie  | Snowy Range Academy          | 20            |





## THIS YEAR IN THE ROADSHOW

This year the Science Initiative Roadshow was able to hire 8 UW students as Outreach Assistants, an increase from 5 last academic year. Having this many students dedicated to outreach has substantially helped the Roadshow, allowing us to commit to more engagement opportunities and provide more interaction in the classroom, as well as contributing to this being our busiest year yet. We were able to provide rich STEM opportunities through 20 different outreach and in-reach events throughout Wyoming and on-campus. These various events incorporated STEM topics ranging from neuroscience, physics, geology and earth sciences, astronomy, ocean acidification, ecology, and more.

Along with the Office of the President, we hosted the inaugural STEM Carnival at UW on Friday, September 16, 2022. The event celebrated the opening of the new Science Initiative Building and featured a wide range of presentations and hands-on activities. These activities were led by 37 participating units, ranging from UW academic units, outreach programs, research laboratories, university museums, local businesses, and more. 500 K-12 students from schools in Laramie, Albany, and Carbon counties, along with many community members and UW students, attended the event. Next year, on September 8th, 2023, the 2nd annual STEM Carnival will showcase the Engineering Education & Research Building (EERB).

## THE ROADSHOW SUPPORTS TEACHER PROFESSIONAL DEVELOPMENT

This spring, the Science Initiative Roadshow facilitated two teacher professional development opportunities to allow K-12 teachers to explore hands-on ways of engaging with their students. On March 7, Karagh Brummond, Director of Outreach and Engagement for the Science Initiative, provided an hour-long workshop to 15 Wyoming K-12 teachers titled "Using Active Learning Techniques to Engage Students in STEM." The teachers were introduced to the Science Initiative Roadshow and the theory and data behind using active learning techniques in the curriculum the Roadshow designs for the K-12 students they visit during the academic year. The teachers were then able to experience a Roadshow activity by performing the Design an Imaginary Animal activity. After the activity there was time for conversation, feedback, and discussion about the Roadshow and the resources it offers K-12 teachers and students in the state of Wyoming. The Roadshow also participated in the Wyoming State Science Fair where we facilitated an hour-long workshop for six teachers titled, "'Seeing' Science: Exploring Technology Used to Answer Questions in STEM." This opportunity allowed the K-12 teachers to come and explore the new state-of-the-art Science Initiative Building on the UW campus to experience two of the instruments we use to answer various STEM research questions, the Micro-CT Scanner and the X-Ray Diffractometer. The Micro-CT demonstration was facilitated by Todd Schoborg (Molecular Biology) while the X-Ray Diffractometer demonstration was performed by Elliott Hulley (Chemistry).

## OUTREACH FEATURE: K-12 STEM DAYS

The Science Initiative Roadshow has continued to increase collaborations with K-12 schools to offer free STEM Days for students and teachers. STEM Days are opportunities for the Roadshow and other UW STEM outreach collaborators to travel to the school where students explore a variety of STEM activities by rotating through a number of hands-on stations. The Roadshow has been collaborating with the Hanna, Elk Mountain, Medicine Bow (HEM) Jr/Sr. High School for 2 years bringing a STEM Day to their students. This year, the school invited their elementary students as well and the Roadshow offered 7 different science-based rotating stations for the

students covering topics in neuroscience, genetics, engineering, physics, electricity, ecology, and botany. In May, the Roadshow collaborated with the Engineering Outreach Program, Mobile Makerspace, Science Kitchen, and School of Computing to offer another STEM Day for the Saratoga Elementary school. The students were able explore a plethora of hands-on activities in the sciences and we look forward to coming back for more STEM Days to come. We are excited about the possibilities to expand the STEM Days to other schools and districts to bring a wider lens of science engagement to K-12 students statewide.

## STEM CARNIVAL GALLERY



Exterior of Science Initiative Building with interactive STEM activity booths.



Mason Lee, Sr. Project Coordinator for the Biodiversity Institute, introduces students to snakes!



The Biodiversity Institute shows a selection of wildlife collections to K-12 students.



Kristin DiBona, Associate Professor of Chemistry and Founder and CEO of Wyonics, demonstrate making materials out of bioplastics.



Ramesh Sivanpillai, Senior Research Scientist for WyGISC, created a large Landsat puzzle of Wyoming that K-12 students put together.



# FINISHING OUT PHASE I

When the Governor's UW Top-Tier Science Programs and Facilities Task Force envisioned the Science Initiative in 2014, they planned to establish and build programming and facilities in two phases which collectively would drive UW's core sciences to national and international prominence. Phase I focused on building education and research facilities to support modern teaching and research endeavors, as well as developing a series of sustained programs to assist students and faculty in teaching, research and outreach success. The new Science Initiative Building, in part, will eventually support all aspects of this mission. At present, completed portions of the building include the 204-seat active learning classroom which facilitates engaging instruction in core science courses, 3 floors of shared research laboratories which foster collaborative research, a core facility (the Center for Advanced Scientific Instrumentation) that houses and maintains key high-end scientific instruments for faculty and student use across campus, and modern rooftop greenhouses to support cutting-edge plant research. Three of the ongoing programs have been partially funded since 2015, and their progress has been reported on in this annual report; the Learning Actively Mentoring Program (LAMP), the Wyoming Research Scholars Program (WRSP), and the Science Initiative Roadshow.

The 2023 Wyoming Legislative Session marked an historic occasion for the Science Initiative, with appropriations provided to complete Phase I. A \$12.5M one-time appropriation will complete three key spaces in the building that had been shelled during initial construction. First, a large open laboratory designed to support research in the physical sciences will complement the three research floors designed primarily for biological research. Second, an animal care facility (the Model Organism Research Facility –MORF) will provide researchers with certified modern facilities to ensure research integrity. Third, the Student Collaborative Research Outreach and Learning Laboratory (SCROLL) will provide an innovative and integrated suite of spaces to support the ongoing educational programs of the SI and forge connections with other STEM education and outreach units across campus.

To grow existing and initiate new SI Education and Research Programs envisioned in Phase I, the Legislature also appropriated a biennial budget of \$9.5M. LAMP, WRSP, and the SI Roadshow will all reach full funding levels to broaden the transformational experiences for faculty and students at UW and across the state. The new programs that will begin this coming year will largely support the research mission, with funds dedicated to establishing a PhD Fellows Program, a competitive seed grant program, faculty startup augmentation, and instrument purchase and repair, collectively known as the Competitive Research Innovation Program (CRIP). Finally, these ongoing funds will allow the SI to complete faculty and staff hires to support all aspects of the education and research vision. Additional personnel in the WRSP and for SCROLL will open new research opportunities for our undergraduates in both one-on-one mentored research experiences as well as furthering the development of Course-based Undergraduate Research Experiences (CUREs) that can touch hundreds more students each year. A new hire in the SI Roadshow will strengthen our existing outreach in the K-12 arena and will allow the program to facilitate more STEM engagement within our Wyoming communities. Program funds will also support key personnel, including a Director and two technicians for CASI, managers for the greenhouse and MORF, and an accountant.



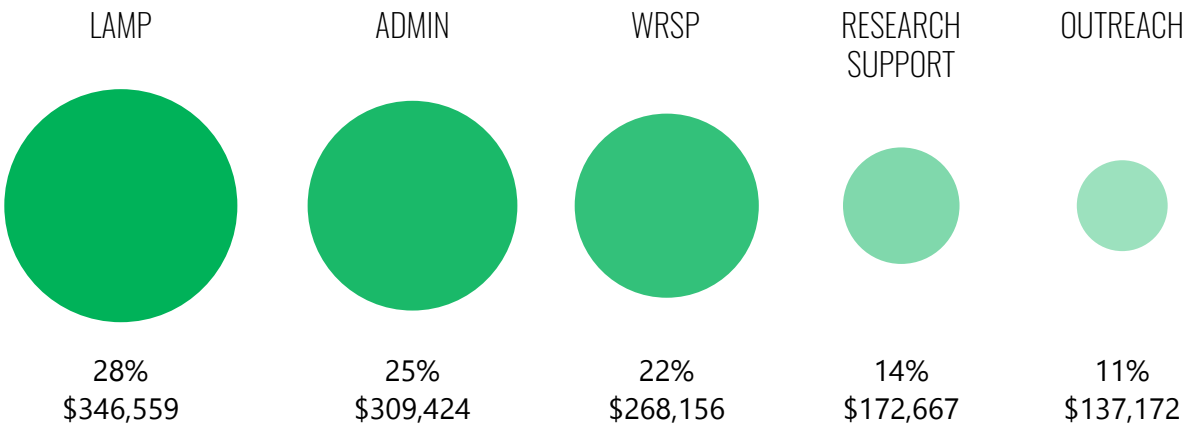


# FINANCIAL STATEMENT

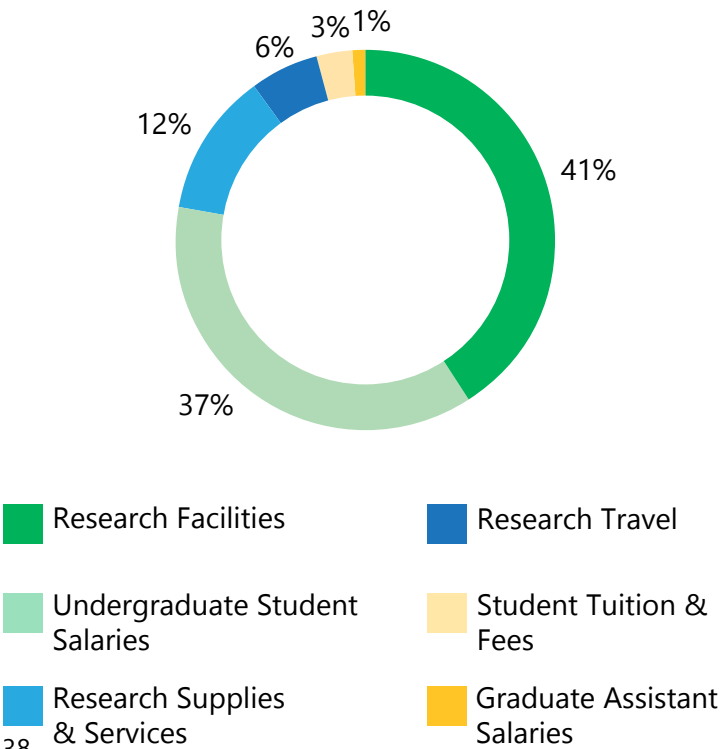
## THE PAST YEAR

Our financial goals for the year included continuing to support our active learning and student research programs and increasing outreach to K-12 students and Wyoming communities, as well as supporting emerging needs of our core facilities.

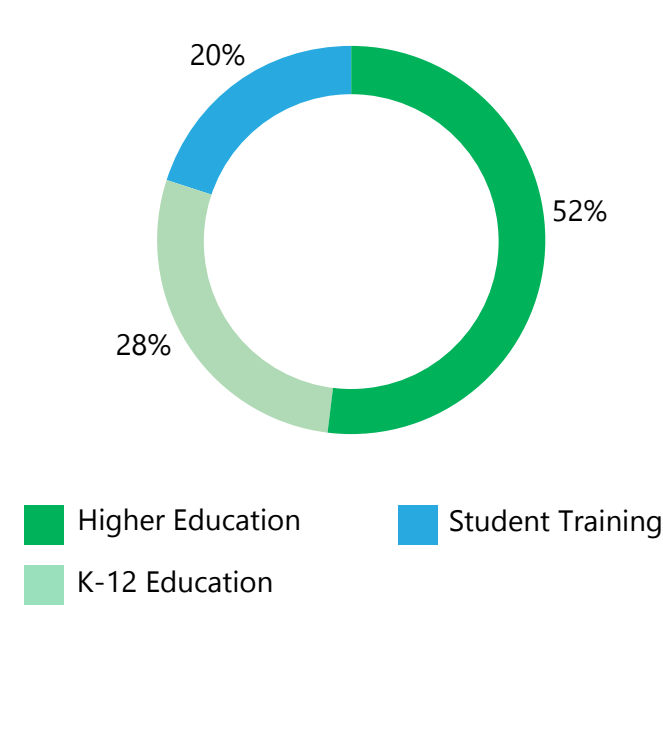
### ACTUAL EXPENSES FROM STATE FUNDING (FISCAL YEAR 2022/2023)



### RESEARCH EXPENSES BREAKDOWN



### TEACHING EXPENSES BREAKDOWN



## FY 2024

The 2023 Wyoming Legislative Session marked an historic occasion for the Science Initiative, with appropriations provided to complete Phase I construction of the SI building, and fully funding existing programming and providing funds to support new programs.

### Fiscal year 2022/2023 budget vs. new approved, full fiscal year funding.

| BUDGET SEGMENT                                  | FY 22/23 ALLOCATED BUDGET | APPROVED ANNUAL INCREASE | NEW TOTAL ANNUAL BUDGET | % OF FUNDING |
|---|---------------------------|--------------------------|-------------------------|--------------|
| Active Learning Training Programs (LAMP)        | \$308,200                 | \$91,800                 | \$400,000               | 8%           |
| Undergraduate Research Programs (WRSP)          | \$357,000                 | \$543,000                | \$900,000               | 19%          |
| Outreach and Engagement (SI Roadshow)           | \$151,000                 | \$75,000                 | \$226,000               | 5%           |
| PhD Scholars Program                            | \$0                       | \$932,600                | \$932,600               | 20%          |
| Innovative Seed Grants                          | \$0                       | \$600,000                | \$600,000               | 13%          |
| Research & Core Facilities Support <sup>1</sup> | \$126,000                 | \$1,100,000              | \$1,226,000             | 26%          |
| Program Administration & Support                | \$361,772                 | \$103,628                | \$465,400               | 10%          |
| One-time addition <sup>2</sup>                  | \$ 153,972                |                          |                         |              |
| Appropriated budget                             | \$1,150,000               | \$3,600,000              | \$4,750,000             |              |
| Totals  | \$1,303,972               | \$4,750,000              | \$4,750,000             | 100%         |

<sup>1</sup> Includes dues for the Astrophysical Research Consortium and Quantum Collaborative, Center for Advanced Scientific Instrumentation (CASI) service contracts and purchase/repair funds, CASI staffing, SI greenhouse staffing, and SI vivarium staffing.  
<sup>2</sup> Funds provided from other University sources for additional expenses.

## THE FUTURE

In the future, UW’s new Science Institute will manage the implementation of Science Initiative along with many other institutional STEM research and outreach activities. The governance of the Science Institute will allow long-term support of the Science Initiative to meet legislative intent and to leverage these state funds through private and federal sources.



