

The background of the entire page is a dark blue color with white topographic contour lines. These lines are more densely packed in the bottom-left corner, creating a sense of depth and terrain, and become more sparse towards the top-right.

# **UW SCIENCE INITIATIVE PROGRAMS**

## STRATEGIC PLAN UPDATE

SPRING 2024

EXTENDED  
VERSION

# GOAL 1

## Catalyze Active, Inclusive, Evidence-based Teaching Statewide

LAMP continues to grow the community network of college educators committed to transformative, student-centered active learning. In May of 2024, LAMP graduated the 6th class of college educators trained in evidence-based, active pedagogies. This class of 34 educators brings the total number of trained Wyoming educators to 164. Every day these educators create engaging learning experiences for hundreds of students and are aided by LAMP Learning Assistants (LAs). LAs facilitate discussion, design activities, perform formative assessment and write their own statement of teaching philosophy. In January of 2024, 7 distinguished LAMP graduates were selected for participation in a yearlong ELC (Educator Learning Community), and they are in the process of completing SoTL studies that focus on everything from launching TBL in an entry-level psychology course to determining the impact of active pedagogies on calculus students' vertical achievement.

*"Throughout our many yearlong training programs, we have collected assessment data on our LAMP fellows' achievements. We have used these data to inform changes in our andragogical practice. For example, we launched the 2023-2024 training with a semester's worth of online learning prior to the Summer Institute. This allowed the educators to build their philosophies from the ground up, aligning their fundamental values with their student learning outcomes, pedagogies and assessments. This prevented the Summer Institute from being overwhelming (as it had been in the past) and allowed the instructors to truly immerse in their experience of problem-based learning (PBL), experiential learning and team-based learning (TBL). They came away from the Institute with a robust start on their instructional strategies. These strategies were formally submitted by nearly all LAMP instructors and our assessment of these strategies allowed us to realize that a majority of our fellows achieved a majority of the learning outcomes (e.g. developing active learning curriculum)."*

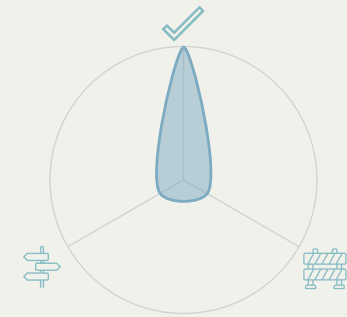
### Trail Conditions:

**Making progress** - The LAMP Fellows program has trained instructors from UW and 6 of WY's community colleges. Throughout academic year 23-24, the LAMP Fellows training has centered the development of fellows' teaching philosophies, helping fellows master learning outcomes. LAMP has continued to nurture 3 Educator Learning Communities (ELCs) for college educators at WY community colleges. These focus on inclusive pedagogies such as universal design for learning and are funded by the Howard Hughes Medical Institute Science Education Program as part of the Inclusive Excellence 3 initiative.

**Barriers to progress** - A very high demand for the LAMP Fellows and LA programs have put programs at saturation, and it is not feasible to grow the annual number of participants further.

**New opportunities and directions** - Due to resource constraints, we have formulated a more appropriate goal related to educational research, focusing more on nurturing the SoTL research of LAMP Professors and Learning Assistants. This may, in fact, be a much more robust goal because it deeply involves more LAMP participants and is not centered solely on the LAMP Director.

**Newly hired STEM teaching faculty (at UW and all 7 community colleges) and incoming teaching graduate students will be trained in active, inclusive, evidence-based pedagogies by the LAMP yearlong Fellows program.**



**Making progress**

- We are broadly excelling in this goal, training instructors from UW and 6 of the WY community colleges, as well as graduate students across many disciplines at UW.

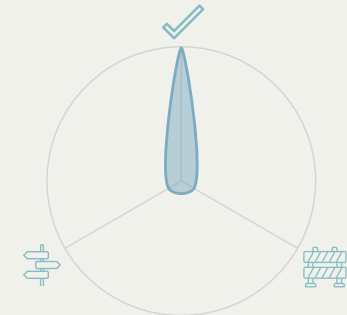
**Barriers to progress**

- Participation in the LAMP yearlong Fellows program is at saturation, and it is not feasible to grow it further.

**New opportunities and directions**

- Because of program saturation due to very strong interest, growth metrics are now inappropriate.

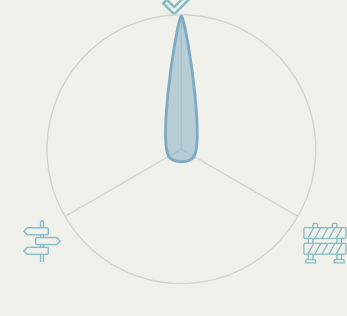
**All LAMP-trained fellows will develop an informed written or multimodal teaching philosophy.**



**Making progress**

- Throughout the 2023-2024 LAMP Summer Institute and Yearlong Training, we have centered the development of fellows' teaching philosophies, and are on track to fully achieve this goal. This particular methodology for curriculum design (informed by prior program assessment) has had other positive outcomes, as more LAMP fellows than ever before completed and submitted their instructional strategies (>80%, and this is expected to reach 90%). More LAMP fellows also mastered each of the training's learning outcomes.

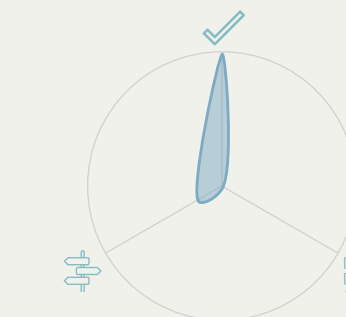
**LAMP-trained fellows will design and implement evidence-based curriculum that aligns with their teaching philosophy and incorporates one or more active, inclusive learning modality. They will assess how this curriculum allows achievement of clear, measurable learning outcomes.**



**Making progress**

- As stated above in goal 2, the centering of teaching philosophy development has helped LAMP fellows master each of the training's learning outcomes, which range from writing clear, measurable learning outcomes to designing active learning curriculum.

**LAMP-trained fellows will share their process of instructional design, active, inclusive learning experience, and student learning assessment (facilitated by LAMP) with other practitioners both within and outside of the Science Initiative.**



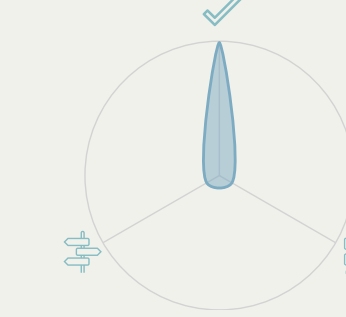
**Making progress**

- We are broadly achieving this goal, with metrics close for the number of LAMP-trained educators admitted to the ELC.

**New opportunities and directions**

- Metrics related to the number of SoTL projects published and presented by LAMP-trained educators may need adjustment. In order to determine need, we are developing a systematic strategy for measuring SoTL publications.

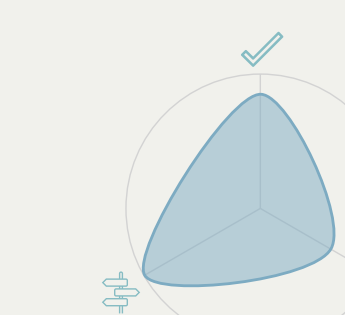
**In collaboration with the Wyoming Inclusive Excellence team (funded, in part by Howard Hughes Medical Institute (HHMI) Science Education Program), LAMP will expand the Educator Learning Communities (ELCs) to Wyoming community colleges.**



**Making progress**

- We have exceeded the specific aims of this goal in that we have continued the learning community at NWC, have launched another at LCCC, and will launch a third at WWCC in late Spring 2024, as well as two more at Casper College and EWC in Fall 2024. Curriculum in these ELCs is specifically tailored to inclusive excellence outcomes.

**Continue to conduct educational research but place an emphasis on SoTL research conducted by LAMP Professors and Learning Assistants in their active learning classrooms. Conduct educational research (that is broader than SoTL), with an emphasis on what is working in active learning classrooms, to investigate relationships between teaching practices and student success, literacy, engagement, and feelings of inclusion. (see next column for more details)**



**Making progress**

- The new, re-worked goal (see to left) is being fully nurtured. In fact, SoTL by the LAMP instructors has shown we are achieving Goal 8 (related to improving retention and pass rates for students).
- The LAMP Director and others are still working on publishing a study related to inclusion in active learning classrooms, as well as a case study related to active learning modalities and student affective response to them.

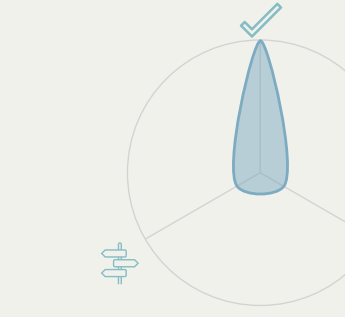
**Barriers to progress**

- The main challenge to executing this goal remains that the LAMP graduate student is funded part-time (not full-time), constraining their time to GA-ing for the LA Best Practices course and assisting in very basic ways with research.

**New opportunities and directions**

- We will need to pivot this goal due to resource constraints mentioned above, creating a more appropriate and participatory goal to nurture the SoTL studies of LAMP fellows and LAs. See to left for the re-worked goal.

**Undergraduate, graduate and post-baccalaureate students will be trained as LAMP Learning Assistants (LAs) through a teaching practicum and a pedagogy course (Best Practices in Active Learning).**



**Making progress**

- We are broadly excelling in this goal, training students across the UW colleges.

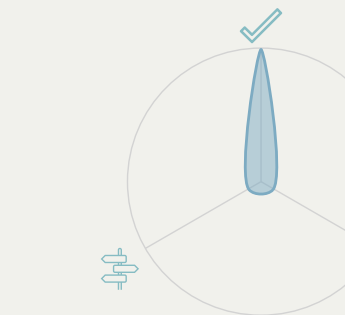
**Barriers to progress**

- The LA program is at saturation, and it is not feasible to grow it further.

**New opportunities and directions**

- Because of program saturation due to very strong interest, growth metrics are now inappropriate.

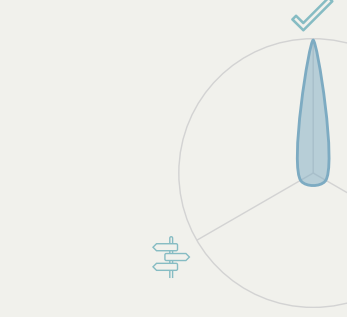
**Improve retention and pass rates of all students with particular emphasis on marginalized students in STEM classrooms.**



**Making progress**

- As mentioned above (in goal 6), SoTL done by LAMP instructors has shown we are achieving this goal.

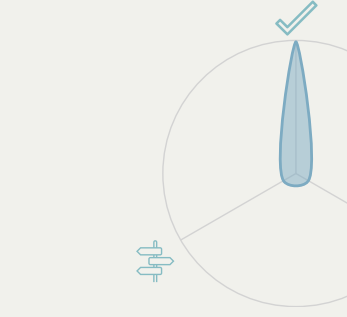
**Establish professional development/collaboration opportunities for community college science instructors across the state with the goal of impacting Wyoming learners (K-community) as they transition through educational levels.**



**Making progress**

- The WWCC ELC (in collaboration with the HHMI team) will explicitly nurture the building of high school relationships, facilitating educational development opportunities for Rock Springs High School. Therefore, we are primed to create a strong positive affect network (High School-Community College-UW) in Rock Springs.

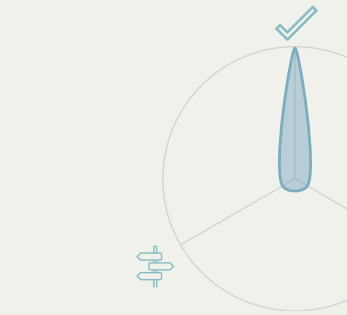
**Visualize and describe the impacts of LAMP training on educators' campus, statewide, national and international social connectedness as well as on their affective feelings of connection through community, their engagement in future learning (educational development) and self-assessment capacity.**



**Making progress**

- As part of the work funded by the HHMI IE3 grant, the LAMP Director, along with UW educators Rosemary McBride and Reshmi Singh, have published both an institutional ethnography and a social network analysis of rural-serving community college STEM faculty in Wyoming.

**LAMP will grow revenue by engaging select paying individuals and teams external to the Wyoming college network.**



**Making progress**

- In each of the two recent LAMP classes, we have had one participant from out-of-state, and both have paid to be a LAMP Fellow.


# GOAL 2


## Provide Research Opportunities for Undergraduate Students


The Wyoming Research Scholars Program (WRSP) provides UW undergraduates with high-impact experiential learning as they engage in mentored research with UW faculty. Students can begin research as early as their freshman year, gaining skills in framing research questions, data analysis, and sharing findings. The program also focuses on community building, offering curricular and co-curricular activities to build connections and skills in communication, ethics, and outreach. WRSP Director Jamie Crait reflected on the past year and student engagement in the program:

*“WRSP students and their mentors have demonstrated a steady increase in productivity via their rate of peer-reviewed publications and presentations at professional conferences. Our students also continue to be important faces and voices of undergraduate research across the state. Many Research Scholars come from Wyoming communities and return to share their experiences with people back home. In addition to the WRSP, in fall 2023, 18 students enrolled in the LIFE 1101 Course-based Undergraduate Research Experience (CURE), Introduction to Ecological Research, and took part in guided ecological research in the Medicine Bow National Forest. This course, and subsequent CUREs we hope to develop, help expose a greater number of students to research and are important for integrating experiential education into the broader curriculum at UW.”*

### Trail Conditions:

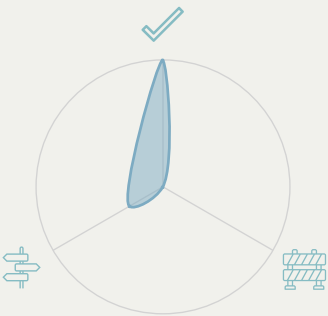
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**Making progress** – WRSP has grown in its marketing strategies this past year through campus partnerships. We also continue to re-launch co-curricular activities to aid with retention. The WRSP and LAMP directors are also working with campus leadership on experiential learning, helping to advance the implementation of CUREs.
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**Barriers to progress** – A large number of students in the program makes it challenging to maintain good contact with all students and increase capacity for more scholars. Current USP requirements also make it difficult to build out a full 3-semester CURE sequence.
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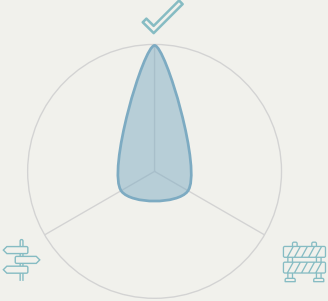
**New opportunities and directions** – To help students flexibly enter the program, we will begin advertising the program earlier in the year and may have two application periods during the year. The LIFE 1101 CURE has now been built into the Botany curriculum.

### Increase the number of undergraduate students at UW involved in high-quality, productive research experiences by 100% (original SI Task Force Metric #1).



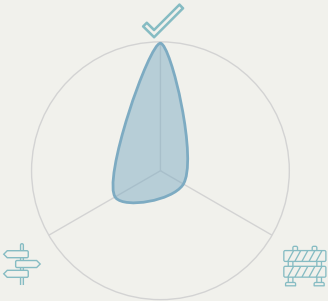
- Making progress**
- We advertised the program more widely via our RSO, in classes, via UW news, and through departmental emails.
  - The SI is hiring a second administrative associate to help support a larger number of scholars.
- New opportunities and directions**
- We may open the WRSP application in both fall and spring semesters next year to provide students with multiple entry points.
  - Several Anthropology students enrolled in the program, which was a department not represented heavily before.

### Recruit promising Wyoming high school students and community college transfer students (with special focus on underrepresented students) to UW.



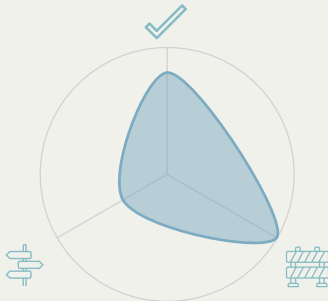
- Making progress**
- Similarly to the above goal, we improved our advertising for the program.
  - We will begin promoting the program annually at the UW STEM Carnival in the fall.
  - WRSP is collaborating with REDD to produce a video about the program.
- Barriers to progress**
- Because of the large number of students in the program, we rely heavily on individual mentors and scholars to promote the outcomes of their work.
- New opportunities and directions**
- We are working on annual press releases about scholars’ research productivity.

### Retain current UW students in STEM fields through graduation and beyond.



- Making progress**
- We increased co-curricular activities for students, such as bringing back the STEM Speed Mentoring event.
  - The WRSP director held more mandatory one-on-one meetings with students in the fall.
- Barriers to progress**
- Wyoming Undergraduate Research Coalition RSO has remained a small group, despite the student leaders’ hard work, but we will work with Student Affairs to assist with this.
- New opportunities and directions**
- We plan to highlight student employment data at an exhibition next year.

### Build a robust, multi-semester, Course-based Undergraduate Research Experience (CURE) program by 2026.



- Making progress**
- We advertised CURE opportunities at Saddle Up and to UW faculty.
  - The program director continues to work with the AMK director to use that facility for a future, place-based CURE.
  - The WRSP and LAMP program directors are part of the Experiential Learning Next Gen USP committee - CURE sequences could help fulfill this gen-ed requirement.
- Barriers to progress**
- Current USP requirements make it difficult to link our first-semester CURE to a second course in the sequence.
- New opportunities and directions**
- The LIFE 1101 CURE that has been offered for multiple years has now been built into the Botany curriculum.

# GOAL 3

## Transform Teaching, Learning, & Wyoming Communities through STEM Engagement

The SI Roadshow continues to grow and excel in bringing hands-on, active STEM learning to communities across Wyoming. This past year, we reached 5,518 K-12 students, more than doubling our reach over last year. To sustain this growth, we hired another director, Erin Klauk. The Roadshow also built capacity by focusing on creating and nurturing on-campus and off-campus connections. SI Co-Directors Karagh Brummond and Erin Klauk have reflected on ways to increase our reach across the state while building and maintaining crucial relationships with partners:

*“We are very proud of the number of students we reached this past year and the partnerships we have cultivated with external organizations. We organized training workshops for student outreach assistants, expanded our engagement efforts to K-12 teachers, preschoolers, and senior citizens, and partnered with multiple organizations to bring career awareness activities to our outreach events. Hiring Erin Klauk as our second director has been instrumental in our expansion and collaboration efforts, allowing us to increase the number of events we can facilitate, but also our communication and collaborations with internal and external partners. With this growth, there are challenges, such as the sheer number of individuals who would love a visit from the Roadshow program. To help us navigate these challenges, we have created more partnerships and secured donations from corporations to help us continue to grow and serve communities across the state in their learning and engagement in STEM.”*

### Trail Conditions:



**Making progress** - The Roadshow has reached more than double the students it had last year. New partnerships and grants have expanded our reach to new populations (new counties, preschoolers, and senior citizens). Focusing on professional development and assessment of the outreach assistant (OA) program continues to expand the impact of the program.

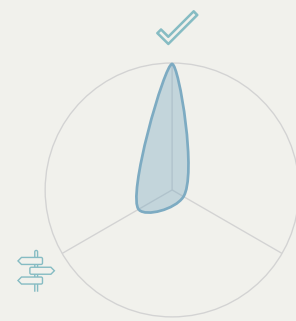


**Barriers to progress** - With a rapidly increasing scope, the Roadshow cannot meet all requests and will need to continue to grow in personnel and funding.



**New opportunities and directions** - Partnerships with entities in both the private and governmental sectors, as well as community colleges, have helped bring more awareness around career options in the sciences to Wyoming students. The development of a 1-credit course for Roadshow OAs will assist in their professional development.

The SI Roadshow will improve community access to STEM education by facilitating outreach and in-reach opportunities for faculty and students at UW to communicate and share their research across the state.



#### Making progress

- Roadshow Co-Director Karagh Brummond, along with representatives from the Science Kitchen and REDD, are leading the charge on training faculty and facilitating opportunities for Broader Impacts through a national training program funded through the NSF.
- We have significantly increased the number of OAs from 8 to 15 this year.

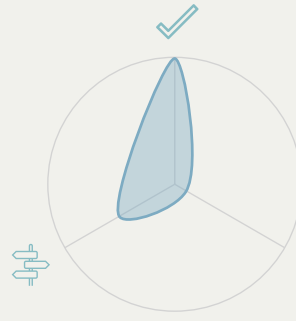
#### Barriers to progress

- Demand for outreach events has significantly increased, stretching personnel thin.

#### New opportunities and directions

- We have seen increasing collaboration with faculty from community colleges.
- The Roadshow is finalizing a partnership to oversee Americorps volunteers who provide engineering curriculum kits for K-12 educators.

Continue to develop K-12 classroom partnerships while expanding engagement opportunities to include afterschool programming.



#### Making progress

- Outreach events expanded into 2 new counties: Uinta and Niobrara.
- WY Community college faculty have begun supporting STEM Days and other Roadshow events.

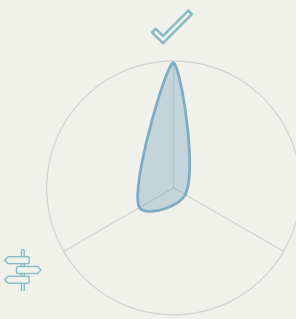
#### Barriers to progress

- There are still a few WY counties that have been difficult to reach.

#### New opportunities and directions

- The Wyoming Department of Health Aging Division awarded us a grant, “Engaging the Aging Brain in STEM”, to expand science outreach to senior citizens.
- We have begun a new collaboration with Big Brothers Big Sisters in Laramie.
- The Roadshow led activities at the Girl Scouts Day of Science in Cheyenne.

The SI Roadshow will create collaborative opportunities for undergraduate and graduate students at UW to develop engagement activities that promote best practices.



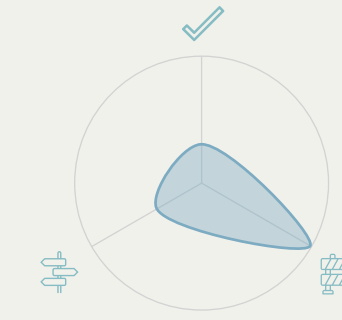
#### Making progress

- This year, we have begun providing workshops on curriculum development and assessment for OAs.
- Roadshow Co-Directors developed a “Best Practices in STEM Outreach & Engagement” 1-credit course for OAs, which will be offered each semester beginning in fall 2024.

#### New opportunities and directions

- Offering the Best Practices course gives OAs more time to work on curriculum for outreach events.

The SI Roadshow will build and improve our digital outreach and in-reach materials for K-community entities in Wyoming.



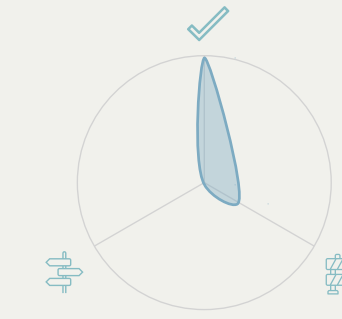
#### Barriers to progress

- Requests for outreach have been exclusively in-person. This makes it difficult to devote time to this.

#### New opportunities and directions

- The curriculum created in the OA Best Practices course could be formatted as Malcolm Wallop library content, additionally.

Establish programmatic assessment procedures to evaluate and measure the effectiveness of outreach and in-reach events.



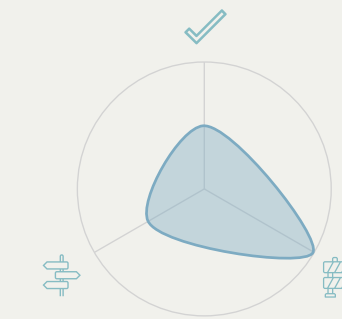
#### Making progress

- The student partnership model for professional development and assessment of the OA program will continue and be integrated into the new 1-credit course.

#### Barriers to progress

- We are planning to create a simple questionnaire to partner schools and teachers for feedback, but getting IRB approval for assessing K-12 students' learning can be difficult.

Improve knowledge about the real-world and applied connections among STEM education, basic research, and Wyoming communities for students, teachers, faculty, and community members to foster creative collaborations with one another to better Wyoming.



#### Making progress

- A focus on WY-relevant outreach continues, especially related to mining, energy, and the health sciences.
- An undergraduate honors student intern and graduate student team have developed a coloring book related to bat conservation in Wyoming.

#### Barriers to progress

- It takes a lot of time to create and sustain relationships that produce authentic, problem-solving collaborations with whole communities.

#### New opportunities and directions

- We have partnered with multiple outside partners and the WDE Career Technology Education (CTE) group to build career awareness activities into our outreach.

# GOAL 4

## Foster New & Unique Collaborations to Sustain Synergistic Impacts

Over the past year, the Science Initiative strengthened existing partnerships and established new collaborations across all of the signature programs. Each of these collaborative endeavors expands our ability to reach a broader set of constituents at UW and across the state. LAMP continues to build and improve enriching experiences for faculty participating in the Summer Institute and the numerous Educator Learning Communities, reaching instructors at UW and across the state at the community colleges. This collaboration has greatly expanded with LAMP Director Rachel Watson's leadership in a multi-institutional Howard Hughes Medical Institute Grant aimed at expanding access to STEM education in Wyoming and beyond. WRSP Director Jamie Crait continues to foster strong working relationships with other undergraduate research partners on campus, and spearheaded the reestablishment of the Speed Mentoring Event for all students engaged in research opportunities. In collaboration with other programs, WRSP has helped lead establishment of an Undergraduate Research Office. SI Roadshow Co-Directors Karagh Brummond and Erin Klauk have more than doubled the number of K-12 students and community members reached by the engaging work of the Roadshow, largely through the establishment of mutually beneficial collaborations with UW entities, such as the Science Kitchen, Mobile Maker Spaces, and the Tier 1 Engineering K-12 Programs, and numerous statewide partners, such as the Wyoming Game & Fish, Wyoming Wildlife Federation, Community College Partners, and UW Extension Offices. The Roadshow also recently expanded programming to engage with our elderly Wyoming population through a grant from the Wyoming Department of Health's Aging Division and in collaboration with facilities across the state.

- Mark Lyford, Executive Director, Science Initiative Programs

### Trail Conditions:



**Making progress** - LAMP's strong ties with our community college partners has grown with new Educator Learning Communities and through the powerful work of the HHMI grant. The positive influence on our WRSP students has benefited greatly through partnerships with our on-campus colleagues, and the work to develop CUREs with departmental partners will expand the numerous benefits of undergraduate research to hundreds of students outside of the WRSP. The Roadshow's continued expansion has been made possible largely by the collaborations developed on campus and around the state.

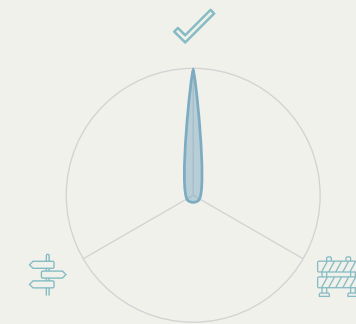


**Barriers to progress** - All programs are in high demand, and even with additional funding from the state, our ability to meet constituent interest is always limited. Securing additional resources to support personnel and the cost of operations is a priority. Collaborations can aid in this, but new funding streams through the UW Foundation and potential grant partnerships will be pursued.



**New opportunities and directions** - With full funding of the SI Programs in 2023, the SI Programs will grow to meet the original SI vision which has gradually evolved since the programs were initiated. Each new collaboration being fostered by each program, not initially recognized during SI planning stages, allows us to amplify the reach of the SI programs, furthering our ability to offer transformative experiences for students and faculty at UW and at the community colleges, Wyoming K-12 students, and Wyoming community members.

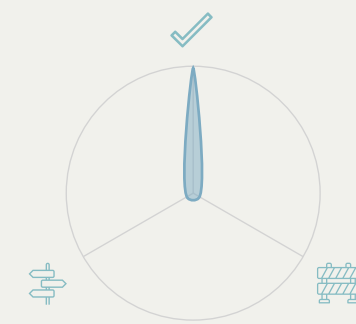
The Science Initiative will collaborate with the Wyoming Department of Education, the College of Education, the Office of Outreach and Engagement, the Science and Math Teaching Center, the Wyoming School-University Partnership, and others to design, develop, and implement holistic pedagogical and action research-based development opportunities for K-community educators.



#### Making progress

- LAMP Director was the keynote speaker at the Wyoming Department of Education's Innovation conference, and collaborates with WDE regularly.
- LAMP Director is collaborating with the Office of Outreach and Engagement to develop a program that will enable students to do meaningful outreach with statewide agencies, industries, non-profits, etc.
- LAMP Director is working to develop synergies between the After School Alliance and the work of the HHMI grant.
- The Roadshow is finalizing a partnership to oversee Americorps volunteers who bring engineering curriculum kits to STEM Days and provide these resources to K-12 educators.

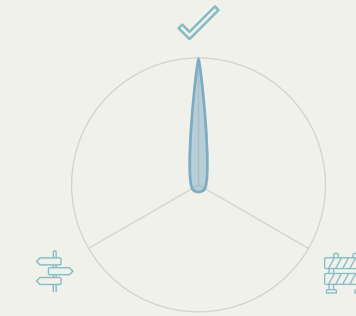
Partner with the UW-National Parks Research Station, INBRE, the Biodiversity Institute, EPSCoR, the School of Energy Resources and other programs to facilitate interdisciplinary research, provide inclusive undergraduate research experiences, and create meaningful opportunities for outreach.



#### Making progress

- LAMP Director is working with a CU Boulder PhD student, the National Parks, and the Biodiversity Institute to develop a summer program at the AMK ranch that would include curriculum around an amphibian site with documented Chytrid fungus in the national park.
- WRSP collaborates with EPSCoR, INBRE, and SER to provide funding support and training for undergraduate scholars.
- WRSP Director continues to work with the AMK director to use that facility for a future, place-based CURE.
- Roadshow Co-Director Klauk is working with SER on several grants that would develop energy-based activities for K-12 students across Wyoming.

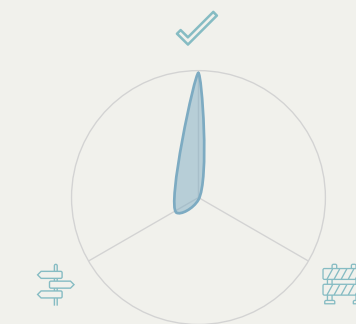
Collaborate with Wyoming community colleges and their associated communities to enhance the reach of science outreach, research, and educational scholarship programs.



#### Making progress

- LAMP has created ELCs at 3 WY community colleges.
- WY community college faculty have begun supporting STEM Days and other Roadshow events.
- The Roadshow has partnered with community colleges and the WDE Career Technology Education (CTE) group to build career awareness activities into our outreach.
- The WRSP and LAMP program directors are part of the Experiential Learning Next Gen USP committee - CURE sequences could help fulfill this gen-ed requirement.

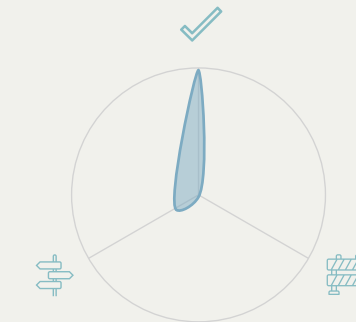
Build entrepreneurship into undergraduate research programs, pairing interested WRSP students with local scientist entrepreneurs and providing other opportunities for entrepreneurship education in STEM.



#### Making progress

- WRSP, along with other undergraduate research programs at UW, have revitalized the Speed Mentoring event.
- New opportunities and directions**
- The new Director of the Center for Entrepreneurship and Innovation will be housed in the SI Building with the purposeful intent of helping develop E&I education for our students.

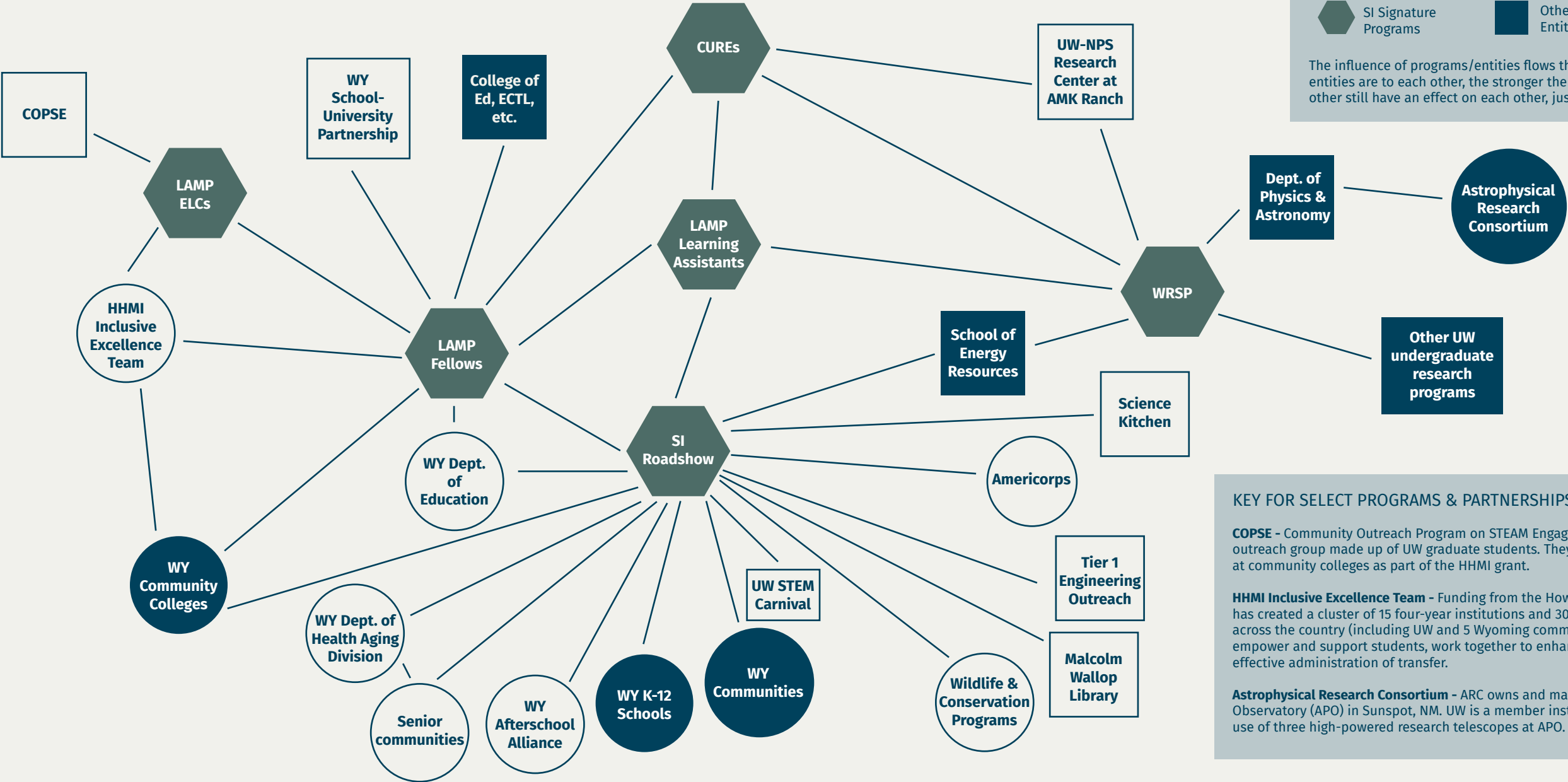
Increase accessibility to undergraduate research opportunities through partnership with research programs across campus and support of the new Undergraduate Research Office.

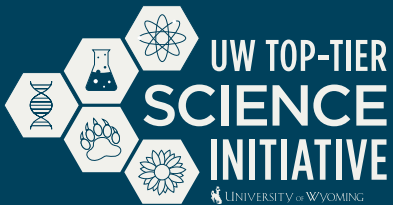


#### Making progress

- An undergraduate research website was created by REDD, helping students find resources about and opportunities for research
- New opportunities and directions**
- Roadshow Co-Director Brummond has served on a committee to develop a new office to be housed in REDD which will, in part, establish and oversee an Undergraduate Research Office.

# Expanding our Interactions





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**SCIENCE**  
**INITIATIVE**  
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