I am pleased to introduce the 2014 edition of Reflections on behalf of the University of Wyoming College of Agriculture and Natural Resources and Wyoming Agricultural Experiment Station.

Readers will recognize a change in content this year. Acting upon recommendations by the marketing committee of the Dean’s Advisory Board, the Wyoming Agricultural Experiment Station elected to make a modification to the 2014 issue of Reflections – the flagship magazine publication for research in the college. Articles describe a specific research area in each department within the college. The department with the best article as chosen by a panel of qualified judges received a cash award to be used for a research-related purpose. This same panel of judges recommended publishing a research-based article submitted by a graduate student. Other student articles submitted will be published in Ag News, the official publication of the college.

I sincerely hope readers enjoy the glimpse of the interesting, useful, and powerful research that takes place in every department of the College of Agriculture and Natural Resources.

As always, we welcome your input. Please feel free to contact me with your comments, suggestions, and questions at (307) 766-3667 or aes@uwyo.edu.

Best regards,

Bret Hess
Associate Dean for Research
Director of the Wyoming Agricultural Experiment Station

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SCIENCE POSSE

Inspiring the next generation of Wyoming scientists and mathematicians

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In classrooms across the state and in labs at the University of Wyoming, Ph.D. students with red shirts challenge students to...

Investigate the properties of polymers

Characterize herbivore and carnivore skulls

Infer an owl's diet from an owl pellet

Design a successful solar vehicle
Who are These Red-shirted Ph.D. Candidates?

They are members of the University of Wyoming Science Posse – a unique outreach program to promote science, technology, engineering, and mathematics (STEM) in Wyoming.

This cadre of STEM graduate students, called Fellows, interacts with students on campus and travels the state sharing their research and passion for science. Working with students and teachers and inspiring the next generation of STEM professionals, Fellows provide students first-hand knowledge about their research and engage them in hands-on activities related to the Fellows’ fields of study.

Fellows also work with students on their science fair projects. They connect the elements of the students’ projects to the real-life research process used in their labs, and individually or in small groups help students brainstorm and flesh out projects. See http://bit.ly/researchtalks.

Middle and high school students explore science and mathematics more in-depth during weeklong summer Exploring Science Camps. The middle school camp, a collaboration with the Teton Science Schools, is at the TSS Kelly Campus. The high school Energy Summer Institute, a collaboration with the School of Energy Resources and the EE Nano GK-12 project, is in Laramie.

What the Science Posse Provides Teachers

Science Posse Fellows help teachers answer the question, “When are we ever going to use this stuff?” as they connect what they do as scientists and mathematicians in the real world to what students are learning in classes. See http://bit.ly/possefellows.

Fellow Lisa Kunza created a lab based on her research on the nitrogen cycle for Kim O’Connor’s eighth graders in Pinedale. After the lesson, Kim commented, “I have been teaching the nitrogen cycle for years, but for the first time, I truly understand it!”

Working with the Science Posse has also given teachers confidence to extend and expand what they offer students.
Julie Eakin, a Laramie Junior High teacher, was inspired to purchase state-of-the-art Vernier probes after watching how excited her students were about using them on a field trip with Posse Fellow and ecologist Jamie Craig.

The Exploring Science Workshop for Teachers, a collaboration between the Science Posse and the NASA Space Grant Consortium, provides summer professional development in science content and pedagogy. Teachers visit UW research labs, learn about campus resources, learn about the posse’s and Space Grant’s statewide outreach, and learn how to better integrate inquiry into teaching.

**Why is there a Virtual Science Posse?**

The Science Posse travels to every corner of Wyoming, but winter travel is often problematic. When travel isn’t safe, Posse Fellows conduct virtual visits using video conferencing software. Fellows have virtually visited classes in Thermopolis, Big Piney, Cheyenne, and Meeteetse.

These virtual visits are as interactive, engaging, and effective as an in-person visit. The nitrogen lab Kunza taught to O’Connor’s students was virtual; Lisa in Laramie and the students in Big Piney all had the same equipment and worked through the experience together – 300 miles apart. To request a virtual visit, go to http://bit.ly/virtualposse.

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**Science Posse Impact**

Many of Wyoming’s 576,000 people live in small towns with little local access to research scientists, mathematicians, and engineers. From the time it was started in 2005 by Don Roth (deputy director for academics in the School of Energy Resources), the posse’s free programming has reached an average of 3,300 students per year in 113 different schools or afterschool/enrichment programs in 35 school districts in all 23 Wyoming counties.

The Science Posse’s statewide STEM outreach brings practicing scientists together with students and teachers on campus, in their schools, in person, or virtually, with lessons that connect classroom learning to the real world of science and mathematics. See http://bit.ly/posselessons.

As one teacher said, “The activities that the Science Posse brought for the students to do were great. The presentations were very interesting, and I think the students got a lot out of it. More importantly, one teaches by who they are. The posse members were terrific models of actually enjoying knowledge and learning and following their passion in productive ways. It was such a gift for them to share themselves and their knowledge with us, given their busy schedules.”

For students, learning about the Fellows’ careers in science or mathematics, seeing how the Fellows’ research has the same elements as a science fair project, being wowed by a mini-lesson on hissing cockroaches, or seeing how classroom learning is
Science Posse Fellows help teachers answer the question, “When are we ever going to use this stuff?” as they connect what they do as scientists and mathematicians in the real world to what students are learning in classes.

connected to what the Fellows do in the real world, makes science and mathematics something more than what is in the textbook: it becomes real and relevant to the students’ lives.

For teachers, working with the Science Posse’s scientists, engineers, and mathematicians in their classrooms or during professional development enhances their knowledge of both content and pedagogy. One teacher wrote on the evaluation, “Other teacher training is often an insult to our intelligence, but this one is giving us a chance to experience the activities and enrich our own learning. We are expanding our knowledge and growing as teachers. There was lots of opportunity for discussion of how to apply the methods in the classroom. The Posse members were great at explaining the science, and I got many good ideas for incorporating more science into classroom lessons. The instructors modeled what they were teaching us about how to engage and enrich learners. Each person giving us information modeled for us.”

For Fellows, their unique experiences are creating a generation of research scientists and mathematicians dedicated to and well-versed in communicating their research and its importance to the public. They also promote successful collaborative communication with members of their own fields and the scientific community.

Science Posse Fellows are selected in part because of their potential to be leaders in their fields. In 10 years, they will be university faculty members, managers in industry, entrepreneurs, and government employees who will know how to work effectively with teachers, are interested in doing so, and will encourage others to join them. Moreover, they will be a generation of leaders in scientific fields experienced in and passionate about community and school outreach. Perhaps most importantly, they will have the ability and the drive to communicate the importance, impact, and meaning of the work that they do.

One Fellow summed up the Science Posse experience saying, “I love to work with the kids! It is an amazing feeling when you can see the transformation from uncertainty to excitement. Some kids think science is boring or too hard and all of a sudden, the light goes on. That’s priceless!”

The Science Posse’s NSF funding continues through April 30, 2015. We are actively seeking funding to ensure all students and teachers access to educational and interactive outreach beyond this time and are hopeful other funding is on the horizon. If so, the Science Posse, once characterized by a member of the UW faculty as “the best ambassadors that the University of Wyoming has in the state,” will not ride off into the sunset in April of 2015.

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For Science Posse audio clips: 
http://bit.ly/scienceposse1

For Science Posse videos: 