

Plant Science Says



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The Department of Plant Sciences and Plant Pathology

December, 2016

PSPP Christmas Party



The Departmental Christmas party will be on Sunday, December 11, at 5:00 p.m. at the Bozeman Senior Center. Dinner will be at ~5:00 p.m.; Santa will be showing up around 7:00 p.m. and after that you will have the

opportunity to play Bingo.

Please bring a generous amount of one of the following to share: Hors d'oeuvres, a vegetable or potato dish, salad or dessert. The meat, rolls, and drinks will be provided. Please join us! Note: They do not allow alcoholic beverages as it is a city owned facility.

Talbert Receives Award

Portions of this article are courtesy of the Crop Science Society of America.

Luther Talbert was selected by the Crop Science Society of America to receive the honor of 2016 Fellow. He received this award in Phoenix, Arizona on November 21. The awards at the conference were presented for outstanding contributions to agronomy through education, national and international service, and research.

Luther Talbert is a professor at Montana State University specializing in wheat breeding and genetics. Dr. Talbert received B.S. and M.S. degrees from North Carolina State University and a Ph.D. from the University of Wisconsin. Hard red spring



Dr. Luther Talbert was recently selected as a Fellow by the Crop Science Society of America.

wheat cultivars developed under his leadership have been widely grown throughout Montana. Dr. Talbert's genetics research program has focused on traits important in the cultivar development program. These include traits associated with reliable grain yield under dryland production and traits associated with resistance to endemic insects. Dr. Talbert has published over 100 articles in refereed journals and served as Technical Editor and Associate Editor for Crop Science. Dr. Talbert's teaching effort includes graduate and undergraduate courses in plant breeding, genetics, introductory biology, and graduate student training.

CSSA Fellow is the highest recognition bestowed by the Crop Science Society of America. Members of the Society nominate worthy colleagues based on their professional

achievements and meritorious service. Up to 0.3% of the Society's active and emeritus members may be elected Fellow.

McPhee Joins Faculty



Kevin McPhee will be our newest faculty member as of January 1. He will be starting a new program in Pulse Crop Breeding.

Kevin was born and raised on a cattle and sheep

ranch near Buffalo, Wyoming, in the north-central portion of the state. Buffalo is located at the foot of the Bighorn Mountains where his grandfather homesteaded in the early 1900s. Kevin's initial interest in plants came from judging agronomy in FFA. This interest followed through as he went to college and received a B.S. in Agronomy from the University of Wyoming. Following a desire to explore the Pacific Northwest, he moved to Moscow, ID where he received his Ph.D. in Agronomy studying the inheritance of soluble sugars in dry bean seed. Kevin's next step was to join the USDA-ARS as a post-doctoral research associate working on peas. This position led into his acceptance of a new pea breeding position and an introduction to his wife of 19 years, Shelly. They consider that they met in a pea field and their first date was to go hunting in the mountains of Idaho.

Kevin moved to Fargo, North Dakota, in 2008 where he has worked on pulse crop breeding at North Dakota State University. His move to Bozeman will bring him and his family closer to both sets of parents giving his daughter, Mariah, a chance to interact with cousins and grandparents on a more regular basis. Shelly grew up in Montana and her family resides in Billings and Lewistown. Along with the opportunity to play with her cousins, Mariah is very excited to continue with her love of shooting sports and other 4-H activities as well as soccer.

At Montana State University, Kevin looks forward to developing a new breeding program on pulse crops where he will first focus on peas and then add in lentils and chickpeas. The main focus of his program will be spring pea varieties, but he also has a strong interest in winter peas that could help diversify crop rotations in Montana.

PSPP Celebrates Fall 2016 Graduation

The College of Agriculture will host a graduation reception in 125 Linfield Hall from 4:00 to 6:00 p.m. on Friday, December 16, honoring all of the College's Fall 2016 graduates. Appetizers and refreshments will be served and all College of Agriculture faculty and staff are invited to attend. A program celebrating the graduates will begin promptly at 4:30 p.m.

Graduates from Plant Sciences and Plant Pathology will receive the following gifts: Plant Systems graduates- "Malt: A Practical Guide from Field to Brewhouse (Brewing Elements" and "For The Love of Hops: The Practical Guide to Aroma, Bitterness and the Culture of Hops (Brewing Elements)"; Horticulture Science graduates- loupes (magnifying glass); Landscape Design graduates- "The Artful Garden: Creative Inspiration for Landscape Design"; and Plant Biology graduates- loupes. All of the graduates will receive a cowbell and pin from the College of Agriculture and a coffee mug.

The Fall 2016 Commencement Ceremony will begin at 9:00 a.m. on Saturday, December 17, at the Brick Breeden Fieldhouse. Following are the names of all the PSPP graduates.

Undergraduates:

Biotechnology- Plant Systems

Karl Owen

Environmental Horticulture- Horticulture Science

Andrew Abate

Taylor Carter

Tanner McAvoy

Annalise Scheppers

Cara Still

Carson Thomas
Devon Wagner

Environmental Horticulture- Landscape Design

Lucas Beyer
Maggie Crowley
Nathan Hood
Elizabeth Ritchie

Plant Sciences- Plant Biology

Kendra Hertweck
Megan McGill

Congratulations to each of you and we wish you the best in all your future endeavors!

Graduate Students:

Masters in Plant Pathology

Elisa Boyd
Carmen Murphy

Scholarships

The following scholarships were awarded to PSPP majors at the recent College of Agriculture Banquet.

Donald and Laurie Becker Plant Sciences Scholarship - Elizabeth Richie, Tavin Schneider, Tyler Zinne

Bill and Anita Jones Scholarship - Brittney Brewer, Cara Hencratt, Megan McGill

BMCF Agriculture Business Scholarship - Alyssa Brewer

Thomas D. Campbell Memorial Scholarship - Alisha Bretzman, Cara Still

Cashman Family Scholarship- Maggie Crowley, Dylan McDowell

CHS Foundation Scholarship- Sam Bronec

Leonard Chvilicek Memorial Scholarship- Emma Jobson

College of Agriculture Student Grant- Alisha Bretzman

Clyde and Helen Erskine Fund for Excellence in Agriculture Scholarship- Tyler Zinne

Robert F. Eslick Memorial Scholarship- Andrew Burkhardt

Gallatin Garden Club Scholarship - Tanner McAvoy, Cara Still

Dr. Bob Gough Memorial Scholarship - Dylan McDowell

Gough Family Scholarship - Megan McGill

Frank M. Harrington Memorial Scholarship - Dylan McDowell

Kamut International Organic Agriculture Scholarship - Cara Hencratt, Kyle VanZweden

James and Florence Keith Alpha Zeta Scholarships - Tyrel Hoferer

Charlie "Cup" King Scholarship - Christian Guenthner

Samuel C. and Hazel West Litzenberger Scholarship - Christian Guenthner, Joseph Jensen, Tanner McAvoy

Ralph B Millice Memorial Scholarship - Dylan McDowell, Megan McGill, Elizabeth Ritchie, Cooper Spicher, Jessica Tesch

H. Elwood Moris Memorial Scholarship - Dylan McDowell

Newman/Abbot Nutrition Undergraduate Scholarship - Tyrel Hoferer, Cara Still

Arthur H. and Margaret C. Post Scholarship - Tavin Schneider

Ralph Parker Memorial Scholarship - Sam Bronec, Christian Guethner, Connor Hodgskiss, Cooper Spicher

John and Grace Schutter Agricultural Scholarship - Alisha Bretzman

George S. Severson Agricultural Scholarship - Thomas Grubb

August and Mary Sobotka Memorial Agricultural Scholarship - Jessica Tesch

Wagner Heritage Scholarship - Bailey Christoffersen, Taylor Hilyard

Congratulations to all of you!

Service-Learning Studio Integrates Landscape Performance

By Rebekah VanWierren

This fall, students in HORT 432 Advanced Landscape Design have been part of a national initiative to integrate landscape performance principles into landscape design education, a new requirement for programs wanting to be accredited by the Landscape Architectural Accreditation Board and the American Society of Landscape Architects. This past summer, I received a grant from the Landscape Architecture Foundation (LAF) to develop a new curriculum focused on measuring how a particular landscape performs, to quantify environmental, economic, and social benefits. To apply these skills and newly explored knowledge, the service-learning studio has been working with the City of Bozeman Water Conservation Division on designing and demonstrating landscape alternatives that contribute toward water resource resiliency, among many other benefits. Currently, about one third of Bozeman's total treated water goes toward irrigation, primarily used by single-family residential properties. The students learned about the ways the City and watershed will face increasing water quality and quantity challenges, based on climate change and population growth projections. In our final design project, students have compared conventional and sustainable



Tour of Westscape Wholesale Nursery to learn about the challenges and opportunities for establishing native plant systems.

landscape scenarios by calculating landscape performance functions for both baseline parcels and future design scenarios related to irrigation, stormwater, carbon sequestration, biodiversity, maintenance and construction costs, energy use, and human well-being. Upfront in the course, students analyzed the ecology and lifecycle of designing landscapes through field explorations, guest lectures, and discussions around four themes: water, vegetation and soil, energy, and human health and well-being. This content helped students build understanding and rationale based on empirical research. LAF and their Landscape Performance Series resource

(landscapeperformance.org) was an excellent toolbox for students in this part of the course. We were also lucky to have a guest lecture from Dr. Lavin!

[Please join us for the student's final presentations and review:](#)
[Project: Landscape Design Scenarios for Water Conservation in the Middle Rockies](#)
[Where: MSU, Plant BioScience Building 108](#)
[When: Friday, December 2, 1:10-3:30 PM](#)



Student's participated in Greater Gallatin Watershed Council's Fall Tour at Story Mill Park to learn about our watershed context and ecological design strategies.

Native Plants Engage, Inspire, Recruit

By Florence Dunkel

It began with "the ask." The rules of AGSC 465R Health, Poverty, Agriculture: Concepts and Action Research are that when one of the communities-of-focus request research or service of the MSU student team, we deliver. Our Northern Cheyenne site mentor of MSU students for 9 years, Meredith Tallbull, asked us to engage and inspire his Lane Deer High School students about Plant Sciences on the MSU-Bozeman campus.

Meredith explains that his students are like bonsai plants that if given the right nutrients, i.e., an encouraging environment; inspiring ideas and possibilities; and appreciation of Native culture; his students will thrive in science, especially plant science.

AGSC 465R students led by PSPP graduate student and part Native American himself, Durc Setzer developed a fast-paced 24 hours of introduction to MSU Native Americans, plants, and professors. They arrived November 17, 2016, in a brightly decorated Morning Star van after a snowy, icy journey from Lane Deer,



From left: Meredith Tallbull (Lane Deer High School [LDHS] Science Teacher)(Standing), Kinsey James (LDHS para-professional teacher), Fredericka Blackelk, Florence Dunkel, Abigail Headswift, and Jada Strangeowl gather in Dunkel's office in Marsh Laboratory to discuss her team's African plant research: How a village uses neem to manage and eliminate malaria, how MSU students helped mothers choose plants from their village gardens to avert stunting and micronutrient deficiencies in their children's diets, and how, in the same village, the Northern Cheyenne taught the MSU team the importance of telling stories to teach about native plants, malaria, and nutrition (photo by Durc Setzer).

Montana. We began in Plant Bioscience room 108 with a venison dinner and all the trimmings, followed by basic discussion about Native Science and Western science and a film created by the Northern Cheyenne and Malian villagers on the same topic. Homestays in professor homes followed.

The next morning, students visited the MSU Native American student center and the Plant Growth Center followed by brunch during which connections were made especially with Potato Lab personnel and other PSPP faculty and students. A visit to the Dunkel lab and her team's plant research followed and then on to the Horticulture Farm for berry tastings at Durc's field plots. Dr. Ed Dratz, MSU nutritional biochemistry professor, and Dr. Holly Hunts, MSU professor of Consumer Science, served smoked salmon at the Blackstone Launchpad in the SUB and talked about the importance of plants and other foods with high ratios of omega-3 fatty acids. A visit with Dave Sands at his



PSPP Grad student, Durc Setzer, inspires Northern Cheyenne visitors at his research plots on the MSU Horticulture Farm with the taste and possibilities of a "new" Native Montana berry, Haskap. (From left, Durc, Jade Strangeelk, Meredith Tallbull).



Northern Cheyenne high school students and their para-teacher learn from MSU AGSC 465R student, Emma Kashian, how to record bioassay data in a professional laboratory notebook.

Mission accomplished: Three Northern Cheyenne high school students planning to go to college, at least two to MSU, a para-professional teacher ready to finish her degree when her three children are a little older, and the science teacher himself inspired about omega-3 fatty acids.

Montana Seed Potato Seminar By Susie Siemsen

The 51st annual Montana Seed Potato Seminar was held in Missoula November 1-3, 2016. Business reports were given for the MSU certification lab and the grower research and advisory committees, as well as from the Montana representatives to the National Potato Council and Potatoes USA (formerly US Potato Board). The next day opened with Director Nina Zidack's overview of the 2016 potato crop and included a workshop on the Economics of Potato diseases, in particular Potato Virus Y, presented by Kate Fuller, Assistant Professor, MSU; Chris McIntosh, Professor, University of Idaho; and Nina Zidack, Director at MSU. An interactive survey was taken to get grower input on the levels of risk they are willing to take when it comes to deciding on the price of seed versus disease levels in seed. Growers were informed of the latest innovations through industry sponsored presentations about products to use in treating potatoes during harvest, storage and planting, including disinfectants, nutrient enhancers and weed suppressors, as well as field and lab diagnostic kits used to detect potato viruses. Presentations on the final day addressed topics on growing practices involving new varieties, manipulating spatial arrangements of seed during planting, and making economic decisions in disease management programs. Jeff Stark, Aberdeen Research and Extension Center, Idaho; Mark Pavek, Washington State University; and Jeff Miller of Miller Research, Rupert, Idaho presented respectively. Jessica Rupp, MSU Extension Plant Pathologist introduced the growers to the latest innovative gene modification techniques such as RNAi, Talon and CRISPR



Kinsey James, LDHS para-teacher, helps MSU undergrad, Emma Kashian, wrangle immature crickets in her zucchini bioassay in Dunkel's lab focused on cricket farming.

lab and an intense discussion with him followed lunch in the Miller Dining Hall and was the favorite pick of the day for the Northern Cheyenne high school students. Closing the 24 hours was a behind-the-scenes tour at the Museum of the Rockies Enduring Peoples exhibit that is set to open in 2017. Curator of history and mastermind for this exhibit, Michael Fox, shared ideas with our Lane Deer High School visitors and several MSU Northern Cheyenne students and staff.

techniques which result in altered traits such as anti-browning, low acrylamide, drought resistance and antibruising. Dr. Gary Secor, North Dakota State University, reported on the emergence of *Dickeya* species (formerly *Erwinia crysanthemii*) in North America. *D. solani* is a quarantine pathogen in the United States. *D. dianthicola* is a non-reportable, non-actionable pathogen. Chandler Dolezal, Washington State University, discussed the role of phosphorous in the soil and plants and the regulations in Washington that require homeowners to prove their soils need phosphorous before being allowed to purchase it. Drought and water disputes rounded off the topics with Ada Montague of the Montana Dept. of Natural Resources and Conservation producing a vast list of websites to monitor drought in Montana and the Honorable Russ McElyea, Chief Water Judge, Montana Water Court, discussing resolution of future disputes over water. Judge McElyea discussed the biggest difficulty in resolving future disputes is complacency and that reliance on improved technology will not be enough. Laws should be flexible enough to permit water transfers, but strong enough to protect landowners. Montana's system is that one judge can make a decree, but another judge will have the authority to enforce it. Consolidation would enable a more efficient use of money since every dollar spent on litigation subtracts from the farm's value. Montana farmers should be knowledgeable about water laws and be willing to look ahead to prevent disputes, rather than quickly react when there is a crisis. Talking with legislators now can help resolve a crisis before it happens. Water issues will never go away and it's never too late to make a good decision.

MAES Seminar Schedule

Jamie Sherman "Barley Breeding and Genetics"
12/6 - 1:30 p.m.

Mary Burrows "Management of Diseases in Montana Crops"
12/8 - 2:30 p.m. in 138 ABB

Florence Dunkel "Community-Based Natural Products for Pest Management"
12/9 - 1:00 p.m. in 108 PBB

Ryan Thum "Ecological genetics of invasive aquatic plants"
12/12 - 2:30 in 108 PBB

Li Huang "Functional Analysis of Rust Resistance in Wheat"
12/13 - 1:00 p.m. in 108 PBB

Bill Dyer "Molecular Approaches to Weed Physiology"
12/14 - 1:00 p.m. in 108 PBB

Grants

Mary Burrows, USDA National Institute of Food and Agriculture; Great Plains Diagnostic Network Montana Plan of Work.

Florence Dunkel, MSU Faculty International Research and Program Development Fund Health, Poverty, Agriculture: Sicily

New Employees

Huang Li - Chaofu Lu



Hi. My name is Huang Li. I moved here from Stillwater, Oklahoma two months ago and joined Dr. Lu's lab as a postdoc. I am originally from southern China where I did my bachelor's and master's in biological engineering

and plant molecular biology respectively. I've always been fascinated by plants, bioenergy, and agriculture. I went to the Great Plains of the United States in 2011 and pursued my PhD degree in plant science at Oklahoma State University and USDA-ARS. I really enjoyed being a member of both of their labs, as I gained interdisciplinary training in crop genetics, molecular breeding, and bioinformatics. My doctoral dissertation project was primarily focused on the genetic regulation of cell wall biosynthesis in sorghum with the aim of improving its degradability as a premier biofuel crop.

After the completion of my PhD this summer, I rewarded myself with a road trip with my family to Texas where I attended the annual meeting of the American Society of Plant Biologists (ASPB) in Austin to gain some new insights into current research. During a break between sessions, I began reading about the research being done in Chaofu Lu's lab in a DOE-USDA brochure. I was captivated and here I am!

I am excited and thankful for this opportunity to delve into the fascinating research area of oil accumulation and seed development in *Camelina*. Outside of the academic world, I enjoy reading, playing basketball, cooking spicy food, hiking, bike commuting as well as traveling and exploring the outdoors with my twenty-month-old son. I look forward to interacting more with all of PSPP and learning about living in beautiful Bozeman.

Sarah Eilers - Mary Burrows



I am the new assistant IPM coordinator. I recently moved back to Bozeman after spending the last five years in Helena. For the past ten years, I have been an ISA certified arborist

working for private companies in Bozeman and Helena. I have worked within the horticulture field for the past eighteen years. Previously, I was a teacher in Bozeman and Honolulu, Hawaii.

I have my B.A. from the University of Wyoming in Special Education. Go Cowboys! I met my husband while serving on jury duty here in Bozeman. He is a land surveyor employed by the Montana Department of Transportation. We have two boys that are four and seven years old. They are both playing hockey this season, which means we spend a lot of time at the ice arena. Before I had children I enjoyed gardening and reading a good book. I now enjoy a full night's sleep.

Course Focus

Hort 232 - Herbaceous Ornamentals

By Toby Day



Herbaceous Ornamentals is a course that teaches students to identify the common and conventional industry standard houseplants, annuals, perennials, flowering bulbs and

ornamental grasses that are found in Montana and Rocky Mountain regions. Common and scientific names are tested in weekly quizzes with a final exam at the end of the semester. In addition to being able to identify the plants, students also learn about installation and cultural maintenance of the plants including soil, fertilizer, water, and light; and, in the case of perennials, USDA zonal considerations. Upon completion of the class, students should be able to walk into any local nursery and be able to identify the majority of the plants, recommend when, where, and how to plant them and how to take care of them.

Marrone Bio Innovations Receives EPA Registration for a Microbe-based Biofumigant

Muscodor albus was discovered by Gary Strobel's lab as a novel endophytic fungus about 15 years ago. Since that time many other isolates of the organism have been found and given appropriate species designations in countries around the world from China to Mexico, Malaysia, Indonesia and India.

All of the muscodors have several things in common; namely, they make bioactive volatile compounds and none have been found making any kind of fruiting body or spores. One of Strobel's many isolates of this fungus has been tested by Marrone Bioinnovations of Davis, California, and found by them to be worthy of further investigation. The company learned that the

organism possessed a wide range of bioactivity against many major plant pathogens. Initially they filed patents and also sought approval by the EPA to release the organism into the environment. In the meantime Strobel's group found *M. albus* present in two locations in the USA- Rhode Island and New Mexico which probably helped to facilitate EPA approval. The organism has a multitude of applications.

Sunscald and Sun Scorch

By Toby Day, Extension Horticulture Specialist

In December, many people focus on the ole' Christmas tree. Whether you are cutting it yourself, buying it, or just admiring it, it is amazing how much energy and time is spent on these trees. Many may know that I often grouse about the whole Christmas tree experience. They're messy, full of sap and bugs; the lights seem to always burn out (which often leads to half of the strand burning out), and precious ornaments break or become cat toys. Ugh, it is so exhausting. Not to mention the whole idea that decorating a Christmas tree likely comes from a pagan ritual of stringing entrails on trees. But that is a whole other discussion!

What I really don't understand is how much energy is spent on dead or dying Christmas trees, yet very little is done in the winter to protect the live trees in yards and gardens. You know, the ones you spent twice as much on as you did for that Christmas tree?

So, two common problems I see in landscape trees are sun scald and sun scorch. Sun scald is an issue in smooth or dark bark deciduous trees, whereas the tissue on the trunk facing south or west is damaged. Even though they are dormant, the trees can be damaged by the sun later in winter. Trees go through two types of dormancy in winter. The first is "rest," where the trees won't respond to outside or environmental influences. However, after about one-thousand hours of chilling (hours that are under 40°F generally) the tree goes into a second dormancy called quiescence.



Classic Sun Scald Damage (<http://csuhort.blogspot.com>)

In quiescence, growth will resume once all the environmental conditions are favorable. Well, when the sun is low in the horizon in winter the bark on a tree can reach 70°F or 80°F on sunny winter days. At these temperatures the cells in the living tissue below the bark metabolize. When this happens the cells bring in water. At night, the temperatures from those sunny winter days can cause the cells to freeze and explode, just like the glass ornaments that fall from high atop the Christmas tree. When the cells break, the bark often cracks and can slough off the south and west sides of the trunk. Wrapping smooth and dark bark trees with tree wrap up to the first branch will help eliminate sunscald. Think of it as decorating your outside trees!

Sun scorch is another winter injury, primarily in evergreen trees and shrubs. Again, evergreen trees also go into quiescence and because they retain their needles (leaves), they can respire, transpire and even try to photosynthesize late in winter. However, the roots of the trees cannot get water. Couple that with

the sun beating down on them on the west and south side, the needles usually desiccate, and in the worst case, turn red and fall the following summer. For sun scorch, it is best to get as much water to those trees as possible in late winter. If we experience a chinook and the ground is bare, bring out the hose and give them some water, even if the ground is frozen (trust me, the water will get to the roots). For small or newly planted evergreens, you can also protect them from winter sun. Often, burlap can be strung from T-posts protecting the south and west side of the plants.

Give yourself a present this year and get out and protect your outside trees. Think about it when you are cleaning up all the needles left behind from holidays past and finding the recycling location for your now parched, dried-out, sad resemblance of what was once a healthy tree.

Bhutan Adventures **By Monica Brelsford - Research Associate** **in Mary Burrows Lab**

In November, I had the opportunity to visit a very small country that is between India and China, the Kingdom of Bhutan. Bhutan is about a tenth the size of Montana with 700,000 people and it is almost entirely in the Himalaya Mountains. The valleys are narrow and the mountains steep; agriculture occurs mostly in terraced fields on the slopes of mountain sides. Crops are mainly for subsistence; however, crops such as potatoes and honey are exported as high value crops to India because Bhutan crops are grown without pesticides.

Bhutan has vast lands that are protected as an essential part of the Bhutan Biological Conservation Complex system which protects 60% of the country. The government has enacted a law to maintain at least 60% forest cover for all time. Today, approximately 72% of the total land area is under forest canopy. The land is rich in plant and animal diversity and is remote and undisturbed.



A walking bridge across Paro Chhu, in the Paro valley

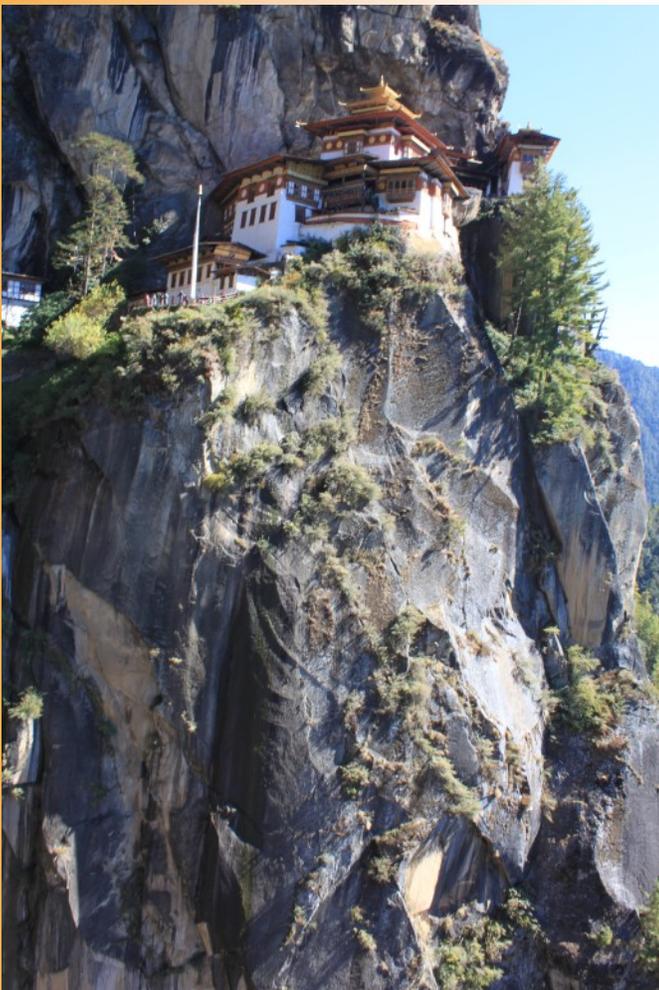


Rice harvest

My journey to Bhutan began last winter when a group of Montana contractors were invited by the Prime Minister of Bhutan to build a log home in honor of the 5th King of Bhutan. My husband has built log buildings for 30 years and is a master in his field. He took our two sons and two other log craftsmen on the first trip to build the log structure at a temporary site while the ground work and foundation were constructed at the permanent site. The home was built out of Himalayan Blue Pine which is similar to our Lodgepole Pine. The second phase of construction began in late summer when the structure was moved to the permanent site. Following the monsoon season, the inside of the structure was completed. Bhutanese workers and Montanans have worked side by side on this project for nearly a year now and it has been a wonderful experience for all involved. Great friendships have been

made and the Montana crew is welcome throughout Bhutan. The log home is nearly complete.

I flew to Bhutan with my daughter and we joined my husband for a tour of portions of eastern Bhutan. We visited many Dzongs, which are massive fortress type structures that accommodate religious, military, administrative, and social activities for each district. We also visited a very remote region in the southeast of Bhutan and we were informed that we were the second group of white people to visit the area. This journey is about 19½ air miles from the town of Ha; however, it took about seven hours to get there due to the remoteness of the country side and the steepness of the terrain. We started at about 9000 feet and drove over a pass at 11,300 and the road ended at 5300 feet in the next valley over. We hiked down about 3000 feet to the government buildings



Paro Taktsang, also called the Tiger's Nest. Was first built in 1692 and is Himalayan Buddhist Sacred Site.

that were alongside the Amochu River, which is at 2680 feet. This area was tropical, and thickly forested with small villages along the hillsides. The villages grow crops for subsistence but also grow cardamom. This high valued crop is transported by small ponies to the nearest road, which is about four hours down to the river and then up the other side of the mountain.



The lead animal of a pony pack train transporting goods to the road.

We also went on a short trek for three days and two nights near the border of the Jigme Khesar Strict Nature Reserve in Southeastern Bhutan. The walk began at 9000 feet and climbed over two passes, the first 13,500 feet and the second at 14,500 feet. Along the way, we encountered pine forests with bamboo transitioning to fir forests with rhododendron, and finally, at high elevations, there were grasses and more rhododendron. Bhutan has 29 native species of rhododendron. We saw blue sheep, falcons, snowcocks, and small groups of yaks. At our destination, we could look into the reserve and see India, China, and at the third largest mountain in the world, Knagchenjunga.

All in all, it was a fantastic experience! There is a very interesting TED talk presented by the Prime Minister of Bhutan in February 2016, in which he describes his country; it is a great video - https://www.ted.com/talks/tshering_tobgay_this_country_isn_t_just_carbon_neutral_it_s_carbon_negative?language=en.

Recipe of the Month

Roquefort Pear Salad

1 head leaf lettuce,
torn into bite-size
pieces

3 pears - peeled,
cored and chopped

5 ounces Roquefort
cheese, crumbled or
feta cheese

1 avocado - peeled, pitted, and diced

1/2 cup thinly sliced green onions

1/4 cup white sugar

1/2 cup pecans

1/3 cup olive oil

3 tablespoons red wine vinegar

1 1/2 teaspoons white sugar

1 1/2 teaspoons prepared mustard

1 clove garlic, chopped

1/2 teaspoon salt

fresh ground black pepper to taste



Once again, we have really enjoyed working for all of you this year and we wish each of you a very Merry Christmas and a Happy New Year!

Irene, Tamara, Jill, and Karen

In a skillet over medium heat, stir 1/4 cup of sugar together with the pecans. Continue stirring gently until sugar has melted and caramelized the pecans. Carefully transfer nuts onto waxed paper. Allow to cool, and break into pieces.

For the dressing, blend oil, vinegar, 1 1/2 teaspoons sugar, mustard, chopped garlic, salt, and pepper.

In a large serving bowl, layer lettuce, pears, blue cheese, avocado, and green onions. Pour dressing over salad, sprinkle with pecans, and serve.

December Birthdays

Noelle Orloff

4

Doug Holen

10

Jeff Pashnick

21

Cheryl Moore Gough

23

Sue Brumfield

26

