



8:00-9:00 Registration

Student Schedule

- 9:00-9:45 Welcome/Team Activity
- 9:45-11:15 Workshop 1
- 11:15-12:30 Lunch / Fair / Speaker
- 12:10-12:30 Keynote Speaker
- 12:30-2:00 Workshop 2
- 2:00-2:30 Closing Remarks

Teacher/Sponsor Schedule

- 9:00-10:00 Janelle Vigil-Maestas -
LANL STEM Education and Resources
Monica Martinez-Archuleta -
Parent Engagement in Math
- 10:00-11:30 DNA Barcoding: an interdisciplinary science
Prisca Tiasse (Biodidact)
Part 1. How to collect DNA data
- 11:30-12:30 Lunch / Fair
- 12:30-2:00 Part 2. Analyzing DNA data from a general database
- 2:00-2:30 Closing Remarks

2015 Workshop Descriptions and Presenter Biographies

KEYNOTE SPEAKER – Sara Brown

Sara Brown is an Assistant Professor of Forestry at New Mexico Highlands University. She teaches wildfire science and ecology courses, and enjoys working on research problems in the field with her students. She earned her Ph.D. in ecology from the University of Wyoming, her MS in environmental science and regional planning from Washington State University and her BS in environmental science from Willamette University. From 1996-2007, she worked for a variety of federal land management agencies in fire suppression and fire management. She worked on a type-2 fire crew, a helicopter crew, a hotshot crew and as a smokejumper. During her time working in fire suppression, she became aware of the importance of integrating scientific research into land management decisions. Her applied research program provides opportunities for both graduate and undergraduate students.

WORKSHOPS

“Computational Thinking”

Melinda DeHerrera, IT/Networking

Room: Ohkay Owingeh

A little bit of computer programming, and whole lot of critical thinking. For the last five minutes I would like to put dry ice into a bucket of water to show the effects of the ice evaporating as my department is the Gas Facility.

Melinda DeHerrera is a senior year full-time IT Engineering student. She raised her family and is now back in school acquiring a higher education. She works part time as a UGS at LANL for the OS-PT Gas Facility department. She loves working at the laboratory and will graduate December 2015 with BA in IT Engineering.

“Crystal Craziiness”

Elaine Jacobs, Geology

Room: Ballroom D2

Do you love crystals? Have you wondered about the processes that control their form and color? This workshop is designed to explore the wonderful world of crystalline minerals. We will make origami models, explore crystal symmetry, see what they look like under the microscope, explore their use as an art media, and grow our own crystals. If you are intrigued by the dazzling world of crystals, this is the workshop for you!

Elaine Jacobs grew up in New Mexico and has always loved being out and about exploring the local landscape. Early on, she couldn't decide if she wanted to be an archeologist or a geologist. In high school she volunteered for the National Forest Service and made maps of Ancestral Puebloan sites. During this time Elaine received a grant to study Native American game traps. This was her first research project! She went on to attend Carleton College in Minnesota and Duke University in North Carolina. Her interests gravitated toward geology at these schools where she was able to learn about fossils, ancient rocks of the Canadian Shield, and the beautiful metamorphic minerals found in the Appalachian Mountains. After college, she worked for the National Park Service at various locations including Glacier National Park, Rocky Mountain National Park, and Bandelier National Monument. Elaine has a master's degree in Geology from Colorado State University. She has made several paleotopographic maps that show the landscape southeast of the Valles caldera before and between eruptions that initiated around 1.6 million years ago. She came to Los Alamos National Laboratory in 2007 as a Graduate Research Assistant and is now a Research Technologist in the Earth and Environmental Sciences Division.

“Extracting DNA from Strawberries”

Karen Davenport, DNA Extraction

Room: O’Keeffe

A short discussion on DNA (what it is and where we find it) followed by three or four hands-on activities including extracting DNA from strawberries using household tools and kitchen chemistry.

Karen Davenport grew up in Oklahoma and have always ben interested in science. She is married and has three grown children. She attended the University of Oklahoma, Texas A&M University and Lesley University where she studied biochemistry and genetics and education. She has worked in cancer research, plant genetics research, genomics research and education during her career. She enjoys books, movies, time with family and friends, and occasionally still rides her unicycle.

"Computer Science-Hour of Code"**Laura Davey, Programming****Room: Pojoaque**

Let's use code to join Anna and Elsa as they explore the magic and beauty of ice. You will create snowflakes and patterns as you ice-skate and make a winter wonderland that you can then share with your friends! Girls will "pair program" their way through the Hour of Code "Frozen" tutorial and program with Angry Birds. <http://code.org>

Laura Davey is a computer scientist at Los Alamos National Laboratory. She works on the design and implementation of the software which monitors the health of LANL's super computers and their networks and facilities.

"Let's go to the River! Understanding the Middle Rio Grande Environment"**Susan Coulter, River Ecology & Restoration****Room: Kearny**

In this workshop we will discuss the middle Rio Grande Bosque and surrounding environment by building a model of what the river looked like thousands of years ago. We then illustrate the changes that have been introduced in the past several hundred years and what that effect has been. We then talk about recent changes being implemented to restore some of the natural processes to the river.

Susan Coulter grew up in southern Illinois and received her Bachelor of Science in Computer Science in 1985 from Missouri Science & Technology. In 1992 she started working at LANL and has held several different positions there. In 2005 she joined HPC Division as a Compute Cluster System Administrator. From there her focus moved to the high speed interconnects required for these large compute clusters to function at the incredibly fast bandwidth required. Her interests include being a trained docent at the Albuquerque BioPark Zoo and all aspects of the natural world.

"Light, Color, and Sparkles"**Laurie Waters, Light Spectra****Room: Coronado**

The students will explore the electromagnetic spectrum from infrared to ultraviolet. We will use prisms to separate sunlight into component colors, and also examine scattering, reflection and refraction of light beams made visible through cloudy water. The water box can also be used to demonstrate why the sky is blue during the day and red in the evening.

Laurie Waters is a nuclear physicist specializing primarily in radiation transport computer simulations. She worked at Los Alamos National Lab for 22 years, retiring from the lab in 2012. She now does contract work for several customers in the same field.

"Robots!"**Cheryl Brabec, Robotics/ Nuclear Engineering****Room: De Vargas**

Explore the world of robotics and how they interact with their environment. Participants will get to create their own robotic devices.

Cheryl Brabec is a current PhD student at Los Alamos National Laboratory with the University of Texas. She studies Robotics and Nuclear Engineering, and hopes to get more robots involved with dangerous tasks.

“Plants, water and climate: How fluid mechanics affects biology”

Sanna Sevanto, Physics/Climate/Plant Phys/Ecology

Room: Milagro

Learning about how trees use water, how that affects the climate and how water use of trees determines where they can grow. Hands-on task is to measure hydraulic conductivity of samples from different trees and then compare and discuss the results together in the end. Each group will be divided to pairs or small subgroups that measure one tree.

Sanna Sevanto is a research scientist at Los Alamos National Laboratory. She has a master’s degree in material science and a PhD in applied physics from the University of Helsinki, Finland. Her interests in biomechanics and the environment have lead her to apply the knowledge of physics to studying plant physiology and plant responses to environmental stress. Before beginning her career at LANL in 2009 she spent three years studying plants at Harvard University and teaching atmospheric thermodynamics and fluid mechanics at the University of Helsinki. Her current research focuses on understanding how different environmental stresses kill trees and how plant structure affects their vulnerability to environmental stress. Being a former member of the Finnish ski-orienting team, Sanna is an active participant in all kinds of endurance sport events from long distance running to triathlons, which she took up in Los Alamos. But outside science cross-country skiing and fine arts are the topics closest to her heart.

“Super Science Shenanigans”

Sheri Lopez, Physics/Mechanical Engineering

Room: Peralta

The workshop will be conducted using hands on science experiments, such as baking soda rockets, blacklight responsive non-Newtonian dough, do-it-yourself rock candy, and seeing DNA.

Sheri Lopez is an undergraduate student currently studying physics and mechanical engineering. She hopes to obtain a masters in engineering and a PhD in Aerospace engineering and apply her knowledge to improving current particle detector technology.

“Video Games for Scientific Problem Solving”

Kari Sentz and Elise Elfman, Computer Science/Math

Room: Nambe

Ever hear that video games are a waste of time? Video games can be a fun and highly effective way to educate and even solve hard problems. This workshop explores using video games to teach, communicate, and solve wickedly difficult scientific problems. Come prepared to play!

Kari Sentz became a scientist for the opportunity to play around with cool ideas from machine learning and artificial intelligence. It comes as no surprise that this led to gaming and game technology as a means of education, communication, crowdsourcing, and scientific problem solving. Working in game technology Kari to meet her co-presenter, *Elise Elfman*, who is a technical artist and game creator.

“Tails of a Veterinarian”

Gretchen Yost, Veterinary Science

Room: Ballroom B2

Participants will discuss medical cases, interpret radiographs (x-rays), learn how to administer injections (to very willing stuffed animals) and even get to practice suturing. We will also discuss career opportunities with a veterinary degree and the science and math components required to become a veterinarian.

Gretchen Yost graduated from Auburn University with a degree in electrical engineering. After working as an engineer in Florida for eight years, she decided to change course and follow her dream of becoming a veterinarian. She received her DVM degree from the University of Florida and then moved to New Mexico to practice small animal medicine. She was an associate veterinarian at Cottonwood Veterinary Clinic in Espanola for seven years before becoming the Medical Director at the Espanola Valley Humane Society from 2008 to 2012. She is currently doing relief vet work and animal welfare advocacy.

“Follow the bouncing ball...into the FUTURE “

Jessica Baumgaertel & Katie Brown, Hydrogels

Room: Ballroom D1

Bendy and stretchy materials are everywhere, from our bodies to space shuttles! We will introduce a class of molecules called polymers and explore how chemistry at the molecular level leads to elastic materials with properties that we can literally play with. We'll make some super bouncy balls that you can take home. We'll learn about different types of energy, and how storing energy and releasing energy makes the balls bounce so high, using the new bouncy balls you made to do some experiments!

Jessica Baumgaertel and Katie Brown are researchers at Los Alamos National Laboratory. Katie is a chemist who shoots lasers at high explosives, and Jessica is a physicist who runs computer simulations of giant lasers that make fusion energy. Katie is from Minnesota and Jessica is from Washington and both love living in New Mexico now. Katie has two dogs and a cat, and Jessica has two cats.

“BEMP Leaf Litter Lab”

Kathleen (Katie) Elder, Bosque Ecosystem Monitoring Program

Room: Ballroom A1

Describe BEMP and leaf litter (how it is collected, what it can tell us), then sort and analyze leaf litter data that has been collected from BEMP sites.

Katie Elder has been involved with BEMP since 2001 when she was a sixth grader at Bosque School. She went to college at Humboldt State University in Northern California where she got two B.S. degrees in wildlife conservation ecology and marine biology. She worked for BEMP during the summers in college and is now working for them full time. Her favorite New Mexico mammal is the North American Porcupine, which she has been lucky enough to work with through BEMP.

“A peek into the world of an ecologist: What is a lichen and why does it matter?”

Shanti Berryman, Lichenology/Bioindicators

Room: Ballroom A2

Learn the basic biology of lichens, which are two organisms growing together in one plant (a lichen and a fungus). Learn what they grow on, why they can grow in really harsh places like rock cliffs, why they are important and how lichens can be used by scientists to help us understand if our air is clean or polluted.

Shanti Berryman is a vegetation ecologist, lichenologist, and a principal of the Integral Ecology Group. Shanti's formal education includes a B.Sc. in forest ecology and a PhD in community ecology and lichenology. Shanti has more than 15 years of research and consulting experience related to terrestrial ecology, land-use planning and community engagement. Shanti's work focuses on two key areas: assessment of the interactions of human land use and ecosystem integrity, with a focus on biodiversity and land management; and, research evaluating air quality and impacts on terrestrial ecosystem health and traditional foods, involving community-led development of research objectives and study design. Shanti provides technical advice and research support to Aboriginal communities, government and industry in western Canada, Alaska and Hawaii.

“Nuclear Physics in the Atomic City”

Amanda (Mandie) Gehring, Nuclear Physics

Room: Lamy

This workshop will be an introduction to nuclear physics. Activities will include hands-on construction of nuclei from marshmallows and an interactive particle accelerator demo. We will give a brief summary of the history of nuclear physics, highlighting the many contributions by women, as well as short descriptions of work currently performed by women at the lab. Uses of nuclear technology will also be presented.

Amanda Gehring became interested in science at an early age – by middle school, she was fascinated by geology and astronomy. After being introduced to chemistry and physics in junior high, she knew she wanted to be a scientist. She earned B.S. degrees in both subjects at Rose-Hulman Institute of Technology and then a PhD in nuclear chemistry from Michigan State University. She now works as a postdoctoral research associate at LANL in the Neutron Science and Technology Group (P-23). Her work includes measuring x-ray spectra critical to stockpile stewardship as well as other projects.

“ER Medicine: SAM splinting”**Alexandra Kunkel, ER Medicine****Room: Ballroom C1**

SAM splints are an extremely effecting tool to immobilize possible fractures to either an ankle, forearm, wrist, legs etc. SAM splints can be used anywhere, but are helpful if a patient is injured outdoors and cannot get to a hospital at a prompt amount of time.

Alexandra Kunkel received her undergraduate degree from Montana State University in 2007 in Liberal Studies. She taught skiing in Montana and New Mexico from 2005-2009. In 2010, she moved to Durango, Colorado and worked at Mercy Regional Medical Center at an emergency room technician where she worked on her Nursing Degree. In the summer of 2013, she was accepted into the Emergency Room Residency Program at Christus St Vincent Regional Medical Center, where she currently works. She began volunteering with an organization out of Colorado called Health4Haiti in January of 2015, to provide free health care and over 50 surgeries to people in Gonieves, Haiti.

“Sports Nutrition”**Sara Pocernik, Health and Nutrition****Room: Ballroom C2**

Learn the fundamentals of nutrition for athletic performance; carbs/fluids/electrolytes, sports supplements, special considerations for endurance athletes, etc.

Sara Pocernik has a M.S. Nutritional Biochemistry from Tufts University; experience includes clinical dietitian Beth Israel Deaconess Hospital Boston, instructor of Nutrition at University of Puerto Rico, home nutrition support; currently providing nutrition counseling at YMCA Los Alamos.

“Ocean Density, Currents, and Ice”**Nicole Jeffery, Applied Math****Room: Ballroom B1**

Do you know what causes the ocean currents to flow from one place to another? Come experiment with ice, water and salt to find out! We will explore freezing, melting and density changes in miniature oceans, and learn how these processes relate to Earth’s climate.

Nicole Jeffery started college as a biology major, spent a few years studying chemistry and completed a degree in physics. She then discovered oceanography, the perfect mix of biology, chemistry and physics. Since finishing her PhD, Nicole has been working in the Climate, Ocean, and Sea Ice Modeling group at Los Alamos. She studies ocean flow and sea ice physics, and is currently building computer models of the microscopic plants and animals that live inside sea ice.



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