

# Event Program

**Spring 2020**

**Expanding Your Horizons**  
motivating young women in science + mathematics

**February 26, 2020**

Santa Fe Community Convention Center  
201 West Marcy Avenue  
Santa Fe, NM





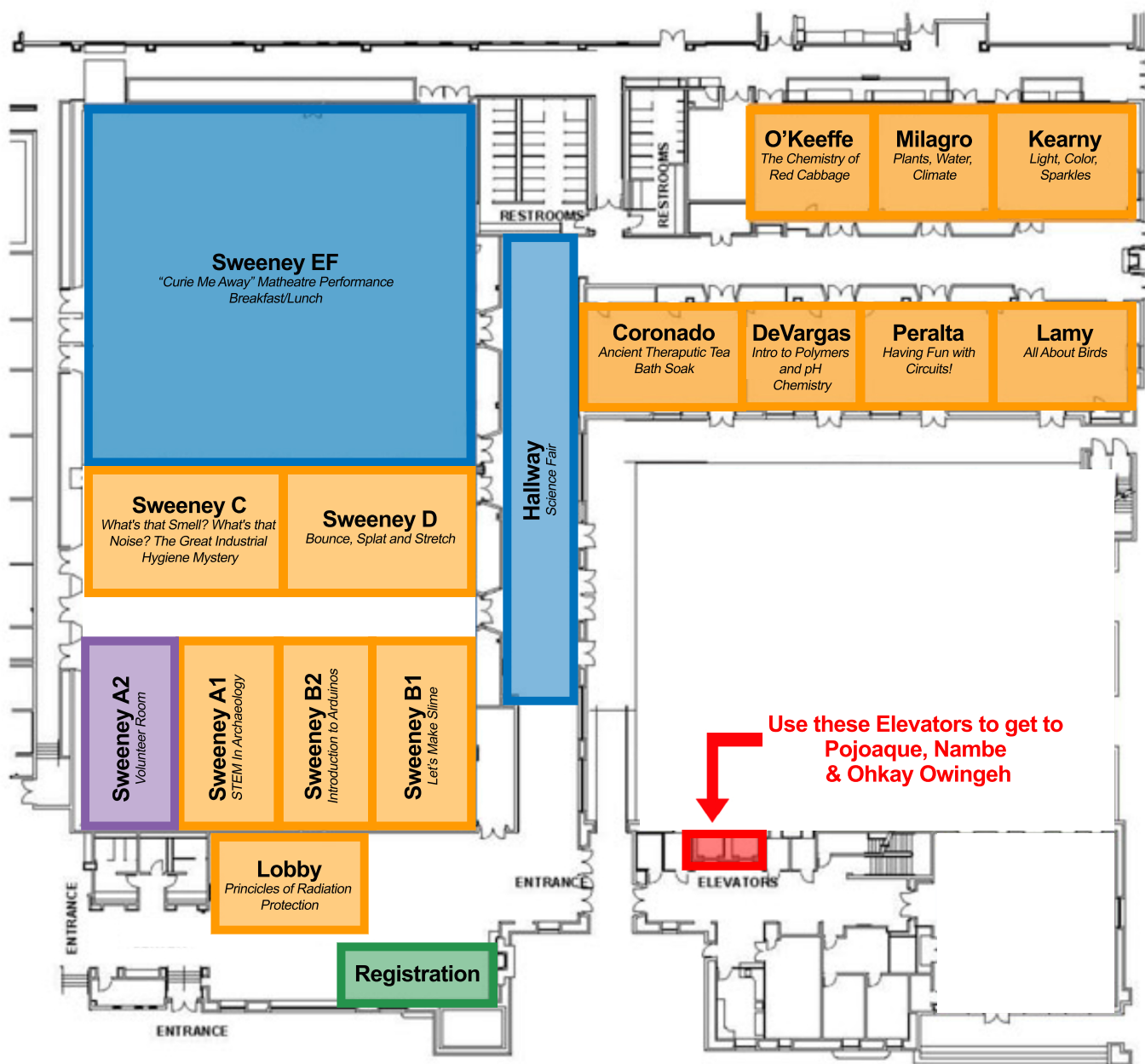
### Student Workshop Schedule

07:00-8:00	Volunteers arrive / Continental Breakfast
08:00-09:00	Registration/icebreaker-thank you notes
09:00-09:10	Welcome / Introduction
09:10-10:10	"Curie Me Away" Matheatre Performance
10:15-10:25	Presenters photo/Group photo
10:25-11:40	Workshop I
11:45-12:45	Lunch / Science Fair
12:50-02:05	Workshop II
02:10-02:30	Raffle/Closing Remarks/Dismissal

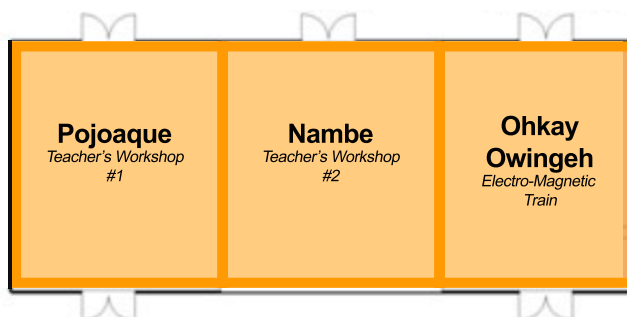
### Teacher Workshop Schedule

08:00-09:00	Registration/Speaker
09:10-10:10	"Curie Me Away" Matheatre Performance
10:15-11:15	<b>Workshop 1: Art with a Spark – Explora</b> Can a painting light up an LED? Can a sculpture power up a motor? Create a painting, build a sculpture, weave a pattern or sew a design that functions as simple circuitry in this hands-on art + science workshop facilitated by Explora educators.
11:15-12:15	<b>Workshop 2: Easy Household Chemistry Experiments – Genna Waldvogel</b>
12:20-12:50	<b>Lunch/Speaker/Fair</b>
12:55-1:55	<b>Circuit Playground Express – Veronica Camarillo-Morris</b>
02:00-02:30	<b>Closing Remarks</b>

## SANTA FE COMMUNITY CONVENTION CENTER - FIRST FLOOR



## SECOND FLOOR



## 2020 Workshop Descriptions

---

### KEYNOTE PRESENTATION

---

#### **“Curie Me Away!”**

**Presenter: Matheatre - Sadie Bowman**

**Room: Sweeney EF**



A radioactive musical based on the science, life and discoveries of Marie Curie. Core chemistry concepts (compounds and reactions, groupings on the periodic table, transmutation, radioactive half-life) are reinforced through lyrical metaphor in a biography of discovery. With emotional range, a powerful message for women in STEM and their collaborators, and lots of science—it's the radical story of a persistent woman who changed our understanding of the universe.

*At the 2006 Minnesota Fringe Festival, Sadie Bowman and Marc Gutman premiered a highly unlikely smash hit: Calculus: The Musical! It was the product of a funny math teacher and a smart comedian, and it struck a resounding chord in the education world. Bowman and Gutman toured an early version of the show to schools throughout the US and Canada, then Know Theatre of Cincinnati produced an eight-year tour with their own actors. In 2016, Bowman and Gutman were joined by actor/writer/one-time-astrophysics major Ricky Coates to reboot the now classic Calculus musical and in this configuration, Matheatre continues to grow.*

*Now a 501(c)(3) entity with international reach, Bowman and Coates tour full time with four full scale productions that promote scientific literacy and intellectual curiosity. Marc Gutman and Rosalie Norris Gutman provide administrative support and music production from our home base of Minneapolis, MN. We now work with museums and science centers, libraries, and planetaria in addition to high schools and colleges. We now travel beyond North America, building relationships with students and science fans worldwide. We offer workshops to educators and science communicators and are producing a dramatized nonfiction podcast about math and science history, coming in 2020. Matheatre is a member of ASTC (Association of Science and Technology Centers).*

*As of 2019 statistics, Matheatre reaches over 18,000 individuals every year and growing. Based in the United States, we travel worldwide to museums, colleges, high schools, libraries, theatres and any place science and arts can collide. Our professional theatre artists perform for and work with educators, students and laypeople to enrich science communication with the power of story. We believe that scientific literacy, curiosity, and imagination are necessary components of a healthy society, and these are values we seek to promote through our work.*

**Sadie Bowman** - Co-Founder, Co-Artistic Director, Managing Director, Touring Performer

*Besides her years of educational theatre experience with Matheatre, Sadie has previously served as Education Manager at Know Theatre of Cincinnati and a coordinator and performer for Thinking People's Theatre of Portland, Oregon. She has been part of sketch and musical comedy groups in various cities and served as a creative contributor for educational software company ScienceVR. She holds a BA degree in Theatre Arts from the University of Minnesota, Twin Cities.*



## 2020 Workshop Descriptions

---

### STUDENT WORKSHOPS

---

#### **“Ancient Therapeutic Tea Bath Soak”**

**Presenter: Dr. Jessyca Franco-Chavez, NMD**

**Room: Coronado**

DIY Ancient Therapeutic Herbal Tea Bath to help calm nervous tension from daily activity and help combat emotional stressors. Warm Ancient Tea Bathing has been known as a traditional remedy to aid in promoting restful, relaxing sleep for relaxation and concentration. This Herbal Tea Bath will be made in a hands-on workshop aimed toward exploring the science behind nature and how botanical medicine along with other naturopathic medicine nutrients (Himalayan sea salt, magnesium sulfite) combined in a soothing combination may have a positive healing effect on body, mind & soul.

*Dr. Franco-Chavez completed her Community Health Education undergraduate degree at The University of New Mexico in Albuquerque in 2004. She then completed a Post-Baccalaureate program focusing on Biochemistry at New Mexico State University in Las Cruces, New Mexico in 2011. Dr. Franco-Chavez earned her Doctorate in Naturopathic Medicine from the Southwest College of Naturopathic Medicine in Tempe, Arizona in 2017. Although Dr. Franco-Chavez's forte is gastroenterology, anti-aging through detoxification techniques and lifestyle optimization of natural supplementation. She also has had extensive training in naturopathic integrative oncology to support patients already on a stated regimen and standard of care by their approved oncologist. Dr. Franco-Chavez focuses on lifestyle general medicine, which includes: preventative medicine, nutritional and supplemental counseling, botanical medicine, Traditional Chinese Medical diagnosis, acupuncture, physical medicine, IV therapy, minor surgery, homeopathy, gastroenterology, oncology, anti-aging, detoxification, mind-body counseling, and whole-body optimization through revitalizing the individual at the microscopic level through physical and energetic support. Dr. Franco - Chavez is also trained in Western medical diagnosis, disease processes, and pharmaceutical therapy. Dr. Franco-Chavez has held many positions and titles over the years while running her business venture in medical apparel and equipment since 2008 as the owner and operator of Scrub Fashions Boutique, embarking on a nationwide servicing website and second location now in the summer of 2018. Dr. Franco - Chavez was class president of her graduating medical class, was honored with the Southwest College of Naturopathic Medicine Leadership Award, accepted the Who's Who, 40 under 40 for the American Cancer Society Rising Star Award, has served as Team Lead for the American Association of Naturopathic Physicians in Washington, D.C at the Federal Legislative Sessions, is a member of the American Association of Naturopathic Medicine, Arizona Association of Naturopathic Medicine, New Mexico Association of Naturopathic Medicine, and Oncology Association of Naturopathic Medicine. Dr. Franco-Chavez resides between Arizona and her Native New Mexico integrating her community into incorporating healing therapies into their everyday life. She is most passionate about optimizing the body system by an individualized approach through intuitive educated therapies. Dr. Franco-Chavez has an extensive family history in Northern New Mexico and is married to Duane Vincent Chavez of the Ziegler Estates in Espanola, New Mexico where Duane's grandfather Dr. Samuel Redding Ziegler, MD was the first surgeon in the community and built the first hospital in Northern New Mexico after he saw the need base there was in rural New Mexico delivering thousands of Native New Mexicans in the area. Dr. Franco - Chavez now resides and practices out of Dr. Ziegler's estate and with the help of her husband have created “The Healing House” at Ziegler Estates a seven-acre compound focused on educating and attracting people that value the art of medicine in today's modern society.*

#### **“Introduction to Arduinos”**

**Presenter: Alia Long**

## 2020 Workshop Descriptions

---

### **Room: Sweeney B2**

Students learn to do basic coding and circuit design in a fun environment with user friendly and affordable Arduinos. These can be used in everyday home and school projects to sense and control. The number of projects they are capable of is limited only by the imagination, making a great platform to learn how computer programming is accessible to all of us.

*Alia Long is the lead for developing research in cyber-physical systems in the Advanced Research in Cyber Systems group at Los Alamos National Laboratory. Alia is a skilled Electrical Engineer with over 15 years of computing system design, hardware architecture, and cybersecurity research experience. She completed her Master of Science degree in Electrical Engineering at the University of Oklahoma, while serving as Institute of Electrical and Electronics Engineers branch chair.*

### **“All About Birds”**

**Presenter: Audrey Sanchez**

**Room: Lamy**

This ornithology workshop will teach students all about birds, their conservation need, and avian research for management recommendations. The students will be given a 15 min PowerPoint presentation that covers bird identification by sight and sound, data collection on species, age, etc., and some components of data analysis. There will be at least 4 activities after the lesson where students get to practice what they learned in the lesson.

*Audrey and Jenna are both Environmental Professionals in the Biological Resources Program in the EPC-ES. As wildlife biologists, they implement compliance requirements and perform environmental monitoring to ensure LANL operations do not impact biological resources.*

### **“The Chemistry of Red Cabbage: A Homemade pH Indicator”**

**Presenter: Chelsea Neil**

**Room: O’Keeffe**

In this workshop we will talk about what pH is, why it is important, and participate in a hands-on activity using cabbage juice as a color indicator of whether different household substances are acidic or basic.

*I am currently a postdoc in the Earth and Environmental Sciences Division at Los Alamos National Lab, where I study fission product geochemistry and transport in the subsurface. I received my Ph.D. in Energy, Environmental, and Chemical Engineering in 2015 from Washington University in St. Louis.*

### **“Let's make slime!”**

**Presenter: Jenna Lente**

**Room: Sweeney B1**

Fun activity making slime- focusing on the fact that chemistry is useful in all aspects of life, but it can be used to just make cool and fun textures!

*Jenna Lente and Chelsea Ottenfeld- Two geologists turned chemists. Both have Masters degrees in Geology from NMSU (go aggies!) and now work in C-AAC. Jenna works on the X-Ray Fluorescence Team and Chelsea works on the Thermal Ionization Mass Spectrometry Team.*

### **“What's that Smell? What's that Noise? The Great Industrial Hygiene Mystery!”**

**Presenter: Dina M. Siegel**

**Room: Sweeney C**

## 2020 Workshop Descriptions

---

Students will learn how Industrial Hygienists protect the health and safety of people where they work. These "invisible heroes" make sure our friends, acquaintances, and loved ones come home safe every day. Students will be able to use instruments that measure hazards associated with many jobs, and will solve an industrial hygiene mystery.

*Dina has been in industrial hygiene for over 30 years. She currently provides program management, technical expertise and continuous improvement in chemical safety, biosafety, and glovebox safety as an IH Professional IV at Los Alamos National Laboratory. Her current expertise includes exposure assessment, nanotechnology, chemical management, and she has general expertise in the broad spectrum of IH programs for DOE, DOD, and private industry. She is a Certified Industrial Hygienist, a Certified Safety Professional, and a Certified Biosafety Professional.*

### **"STEM in Archaeology"**

**Presenter: Cyler Conrad**

**Room: Sweeney A1**

This workshop examines archaeology and STEM, and the ways in which you can apply science and mathematics in archaeology to understand questions about our human past!

*Dr. Cyler Conrad is the archaeology technical lead at Los Alamos National Laboratory. He completed his dissertation from the University of New Mexico in 2018 and has conducted archaeological fieldwork in New Mexico, California, Thailand and Laos.*

### **"Light, Color, and Sparkles"**

**Presenter: Laurie Waters**

**Room: Kearny**

The girls will explore the wave nature of light by learning about the electromagnetic spectrum from infrared to visible to ultraviolet. We will use prisms and diffraction gratings to separate sunlight into colors and light sticks to bring colors back together. We will examine scattering, reflection and refraction of light beams made visible through cloudy water and smoked acrylic prisms. We will briefly look at fluorescent objects and write with light on phosphorescent paper. The girls will learn a simple way to make different types of rainbows with flashlights and a glass of water. The step into a rainbow demo has girls looking directly at the rainbow colors in an immersive experience. I will also set up a laser microscope, and a demonstration on why the sky is blue. Girls will also get training in the safe use of laser pointers and UV light. This year I'll have some new demonstrations on waves to introduce.

*Dr. Laurie Waters got her PhD in Physics at the State University of New York at Stony Brook and worked as a nuclear physicist at Los Alamos National Laboratory for 21 years. She retired from the lab in 2012, and now does consulting work for a firm called TechSource, Inc., for places like the Department of Homeland Security. She dreamt of becoming a scientist from a very early age, back when there weren't any computers. She read as much as I could about science and had friends with similar interests. Her biggest influence was Mr. Johnson, her 10th grade algebra teacher, who encouraged her to take harder math courses. Few people back then thought that women could be scientists, but he was an exception. She loves what she does, especially the challenge of research and making discoveries. She made her personal dream come true.*

### **"Plants, water and climate: How trees' plumbing determine where they can grow"**

**Presenter: Rutuja Chitra-Tarak**

**Room: Milagro**

## 2020 Workshop Descriptions

---

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.

*Rutuja is a post-doctoral research associate at the Los Alamos National Lab, where she models tropical forests. She grew up in central India on the wilder outskirts of a small-town, Wardha, which was, incidentally, a political base for Mahatma Gandhi that influenced much of her bringing up. While her favorite subjects in school were Maths and Physics, a fascinating introduction in college to evolutionary biology drew her to biology. She followed that interest through a Masters in Biodiversity which took her to some of the most beautiful landscapes and biomes in the Western Ghats Biodiversity hotspot in India. She did a PhD in Ecology and spent several memorable years doing field work in southern Indian forests amidst elephants, tigers and ticks and was fortunate to be protected and assisted by native forest dwellers. Before joining LANL Rutuja was a post-doc at the Smithsonian Environmental Research Center in Maryland. Rutuja loves New Mexico: being in the wild, its sunshine, dancing tango and more.*

### **“Having Fun with Circuits!”**

**Presenter: Michelle Sherman**

**Room: Peralta**

In this workshop, students will learn the basics of circuit theory in order to make a Music Rhythm Operated Dancing Light using LEDs and transistors. The lights follow the high pitch beats in music, such as drum beats or electric guitar strums, and turn on and off according to the music pattern.

*Michelle Sherman is a student at New Mexico Institute of Mining & Technology. She is also the Student Government Association President for NM Tech for the 2019-2020 academic year. She will be graduating in May 2020 with two Bachelor of Science degrees with a double major in Mathematics and Electrical Engineering. Michelle earned two Associate of Science degrees in Engineering and in Physical Science from the Santa Fe Community College while simultaneously graduating from high school in May 2017. Her future career plan is to work in a problem-solving environment such as a research lab using her analytical and electrical engineering skills. She enjoys working with robots and UAVs and hopes to use these skills to enhance research on other planets. She encourages more women to seek advanced degrees in the STEM fields by being a spokesperson at every opportunity she can find.*

### **“Bounce, Splat and Stretch”**

**Presenter: Rachel Huber**

**Room: Sweeney D**

Polymers are everywhere! Both natural and synthetic, polymers are a major part of our lives, from the food we eat to the clothes we wear, and from hairspray to space shuttles. We will explore some of the properties of these bendy and stretchy molecules by making bouncy balls that you can take home!

*Rachel is a scientist at Los Alamos National Laboratory, specializing in polymer compression via gas gun driven shock. In general, Rachel throws one material into another really hard and then observes the affect on the material. This helps determine how sturdy the material is and what applications the materials could be useful in.*

### **“Electro-Magnetic Train”**

**Presenter: Loren Espada Castillo**

**Room: Ohkay Owingeh**



## 2020 Workshop Descriptions

---

Build a train made out of coiled copper wire and a train car comprised of a battery with magnets on both ends.

*Loren Espada Castillo has a Bachelor and a Master Degree in Physics from the University of Puerto Rico-Mayaguez Campus. A PhD in Materials Science from the University of Texas at El Paso. She did her Postdoctoral Appointment at LANL from 200-2003 and went to work at Sandia National Laboratory Albuquerque from 2003-2016. Since then she has been back in LANL working in the Material Science and Technology Division (MST-7). Her area of expertise is in solid state physics and semiconductor where she studies how the large-scale properties of solid materials result from their atomic-scale properties.*

### **“Introduction to polymers and pH chemistry”**

**Presenter: Julie Jung**

**Room: DeVargas**

Part (1) Synthesis of polymer from milk Part (2) Experiment with pH (testing several samples with red cabbage juice).

*Julie is a postdoc at Los Alamos National Laboratory.*

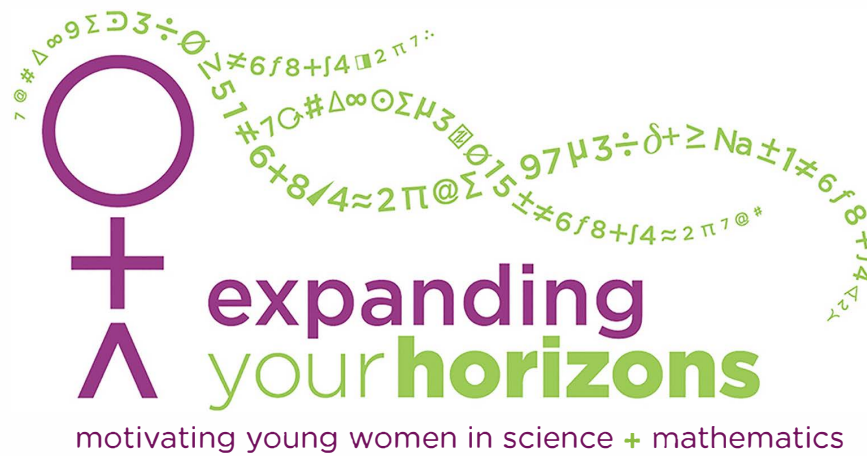
### **“Principles of Radiation Protection”**

**Presenter: Jenelle Mann**

**Room: Lobby**

In this session, we will go over the basics of what radiation is and how we protect workers and the public from the associated hazards. We will focus on using the three radiation protection principles of minimizing time, and maximizing distance and shielding in ionizing radiation environments. Additionally, we will show different consumer products that produce minimal amounts of radiation, and we will discover how different types of materials make better shields from radiation. The workshop will also include a dress out activity where students can dress out as radiological workers.

*Jenelle Mann is a Criticality Safety Analyst at Los Alamos National Laboratory. She received a PhD in Radiological Health Sciences specializing in Health Physics at Colorado State University in 2016. She also has a Master of Science degree in Radiological Health Sciences from Colorado State University and an Honor Bachelor of Science degree in Nuclear Engineering from Oregon State. Ms. Mann has experience in modeling occupational situations using Monte Carlo N-Particle Transport (MCNP), radiological emergency response equipment, deterministic dosimetry codes, plant uptake, and biological remediation.*



## **Thank you to our generous Sponsors!**

**Santa Fe City Councilor Renee Villarreal  
New Mexico Network for Women in Science and Engineering (NMNWSE)  
Los Alamos Women in Science (LAWIS)  
Triad LLC  
Department of Energy - the National Nuclear Science Administration  
National High Magnetic Field Laboratory (NHMFL)  
TechSource Inc  
Institute of Electrical & Electronic Engineers (IEEE)  
Association for Computing Machinery (ACM)  
Los Alamos National Lab (LANL) - DDSTE  
Los Alamos National Lab (LANL) - SRO  
Los Alamos National Lab (LANL) - ALDPS  
Los Alamos National Lab (LANL) - ALDGS  
Los Alamos National Lab (LANL) - ALDCLES  
Los Alamos National Lab (LANL) - Community Partnerships Office  
Los Alamos National Lab (LANL) - DDW  
Los Alamos National Lab (LANL) - ISR  
Los Alamos National Lab (LANL) - CNLS  
UNM Los Alamos  
LANL Foundation  
Flow Science Inc.  
Del Norte Credit Union  
Sandia Office Supply  
Plan B Networks Inc. of Espanola  
Holman's  
Santa Fe County Community Services  
The Healing House of NM  
General Mills**