"Everyone was so helpful. I had a bump in the road but I guess all scientists do. Wow, science is so cool! :)"

Expanding Your Horizons Workshop
February 14, 2019
Santa Fe, NM
Final Report

by

Kari Sentz, *EYH Program Committee Member*
Jan Frigo, *EYH Co-Chair*
Josefina Salazar *EYH Chair*

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1 What is EYH?

The Expanding Your Horizons Network is a non-profit organization of educators, scientists, mathematicians, engineers, parents, community leaders, and government and corporate representatives. Our mission is to encourage young women to pursue science, technology, engineering, and mathematics (STEM) careers. Through the Expanding Your Horizons (EYH) Network programs, we provide STEM role models and hands-on activities for elementary, middle, and high school girls. Our ultimate goal is to motivate girls to become innovative and creative thinkers who are ready to meet 21st century challenges. We aim to change the participants' opinions about people who work in STEM careers and show the fun, interesting and variety of career choices that people in STEM can have.

EYH conferences are held around the world at over 120 locations. Over 625,000 girls have participated in EYH conferences since their inception in Northern California in 1976. Now in its 43rd year, the Northern New Mexico EYH (NNM-EYH) conference is organized by Los Alamos Women in Science (LAWIS) and is licensed by the New Mexico Network for Women in Science and Engineering from the Expanding Your Horizons Network (NMNWSE). The NNM-EYH conference alone has impacted over 13,000 girls! We focus in particular on the 5th-8th grades to positively affect attitudes at a critical age with the potential to impact choices on considering math and science pre-requisites in high school for the possibility of a STEM major. Additionally, the NNM-EYH also features a concurrent Teacher's Conference where teachers are supported with new opportunities to better promote STEM in the classroom. This year's NNM-EYH took place on Thursday, February 14, 2019 at the Santa Fe Convention Center.

There is a long-term vision for the EYH program to actively generate interest in STEM fields by young women through engaging workshops and STEM mentors. Cultivating this interest in youth can lead to stable, productive, and stimulating careers in the future. Participants will leave the event knowing the possibilities of what they can do in the future and that it is endless. Sometimes just one person believing in you can be the impact needed for a lifetime. The important role that STEM fields play in personal and national economy is shown in recent statistical studies. In 2012 in the midst of the most significant economic crisis since the Great Depression, there are 3.2 million permanent employment opportunities that cannot currently be filled in the United States. The vast majority of these unfilled positions are STEM occupations and are the fields of future employment opportunities. According to the U.S. Department of Commerce, STEM occupations are projected to grow by 8.9% from 2014 to 2024 in contrast to 6.4% growth in non-STEM oc-

cupations. (See Figure 1) The STEM workforce enjoy higher salaries earning 29% more than their non-STEM counter-parts in 2015.[4] In addition STEM workers have less unemployment, greater gender pay equality, and a large impact on a nation's competitiveness, economic growth, and overall standard of living.

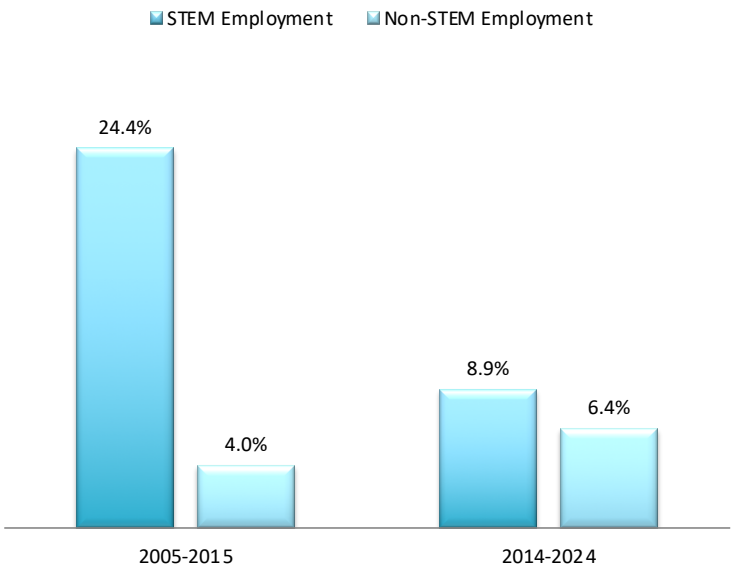

Figure 1: Recent and Projected Growth in STEM and Non-STEM Employment from the Department of Commerce [4]

2 Women in STEM

Despite these clear benefits in salary, stability, and career opportunities, women held less than 24 percent of STEM jobs in 2015. This contrasts with the fact that women constitute close to half of the general workforce. These stark statistics are shown in Figure 2. The US Department of Commerce Economics and Statistics division speculates on possible explanatory factors such as the lack of female role models, gender stereotyping, and less flexibility for working mothers in STEM fields. Regardless of the causes, the 2011 US Commerce Issue Brief on Women in STEM calls for the need to encourage and support women in STEM. While these numbers have slightly improved since the 2009 census we still find that only 14% of engineers are women and the number of women in computing has fallen from 35% in 1990 to

24% in 2015.

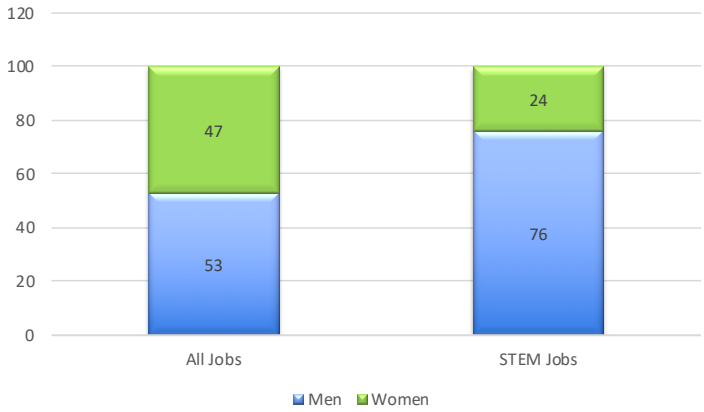

Figure 2: Relative percentages of employment by gender as discussed by the Department of Commerce [5]

2.1 Minority Women in STEM

These numbers become even more discouraging for the representation of Hispanic, African-American, and Native American Women in STEM fields. A 2013 report from the American Association of University Women found that African American women constitute 1% of engineers and 3% of the computing workforce. Hispanic women hold only 1% of jobs in each discipline. Native American women represent only a fraction of 1% [1]. This is the problem that EYH strives to address presenting young students positive female role models who are passionate about their scientific work in STEM fields. The students who have diverse backgrounds and differing educational opportunities are engaged through fun hands-on STEM activities.

3 STEM Interests

To open up young minds to the world of STEM, we take special care to present a wide range of STEM topics in youth-oriented workshops such as physics, chemistry, computer science, robotics, environmental science, minerals, math, accounting, etc. We truly want the participants to walk away feeling that STEM is fun and interesting and to feel more empowered to follow their interests. Key to this empowerment is

the relaxed, interesting hands-on experiments the students participate in and the personal connection they develop with their STEM role models. Some of this comes across in the word cloud based on our student participants' feedback in Figure 3.

Figure 3: EYH 2019 Word Cloud

4 Who's Participating

4.1 The Participating Schools

Some students came from over 120 miles to participate in this year's EYH conference at the Santa Fe Convention Center. We had students from all over northern New Mexico: Española, Los Alamos, Dixon, Pojoaque, Albuquerque, Santa Fe, Kewa, and Taos . Our participating schools are shown in Figure 4.

Figure 4: EYH Participating Schools

A few years ago we found out that transportation was one of the main reasons why some schools could not attend the event. EYH leadership responded with the investment of 20% of the budget for transportation costs as well as the enormous help of EYH volunteer Karen Kelley to bring students from all over northern New Mexico. Just look how far they've come to attend our EYH conference in Figure 5. The school that traveled the longest distance of 123 miles was Haaku Community Academy from the Acoma Pueblo!

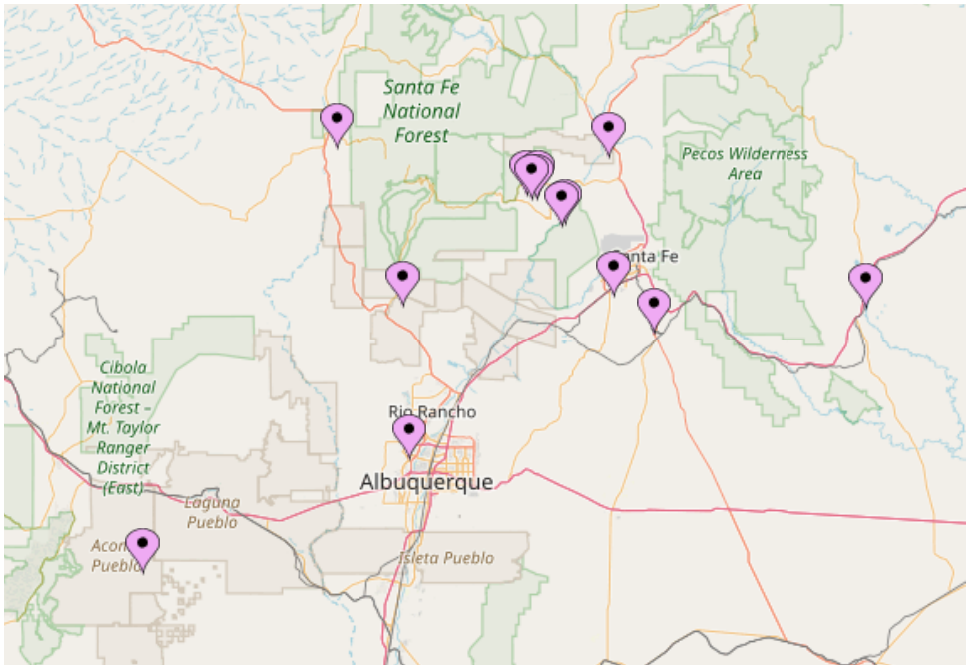

Figure 5: How Far They Travel to Get to EYH

4.2 Student Demographics

EYH 2019 reached out to underrepresented areas and demographics with an impressive participation by minorities shown by over 69% of the total participation being underrepresented minorities in STEM.

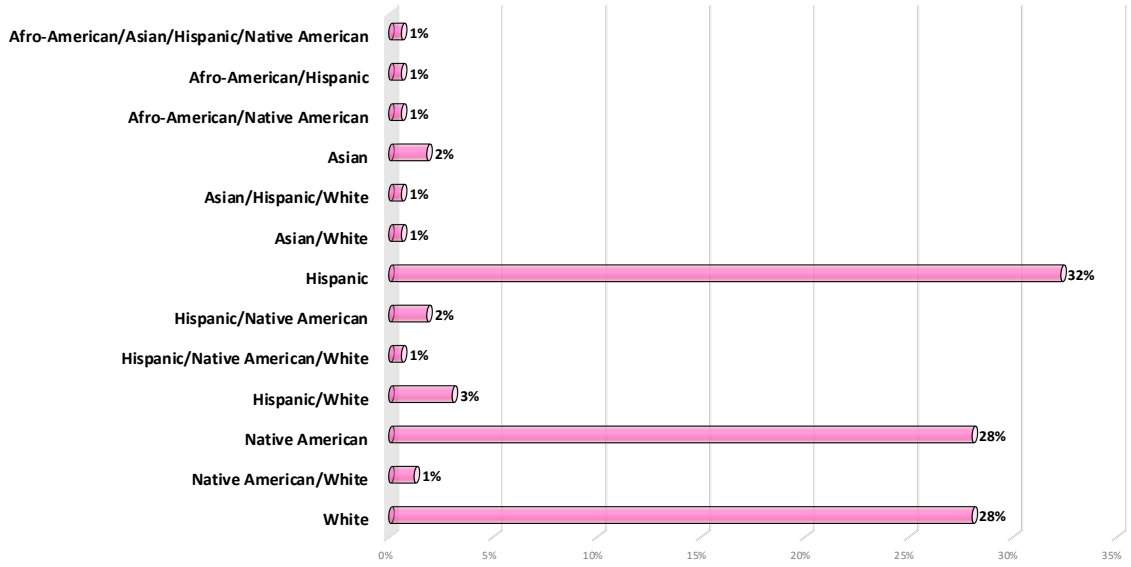

Figure 6: The Diversity of EYH Participants

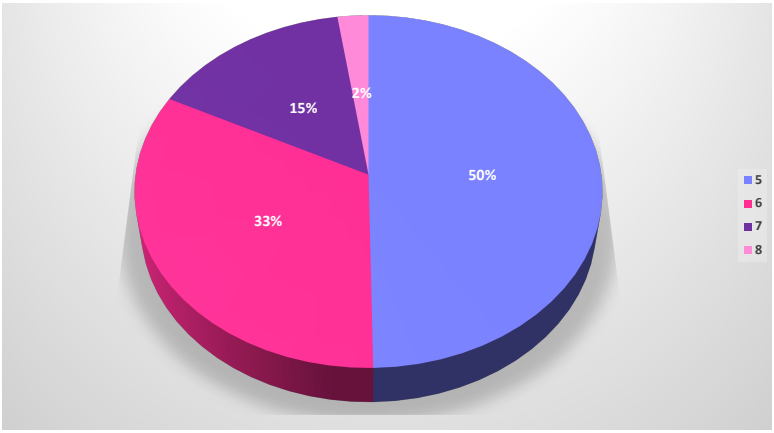

Figure 7: EYH Participation by Grade

Another focus of this year's EYH conference was to focus on critical early years for encouragement towards the pursuit of STEM fields. Here in Figure 7, it shows the predominant participation from 5th, 6th, 7th and 8th graders with 50%, 33%, 15%, and 2% respectively.

5 The Impact of EYH

5.1 Student Impact

A total of 209 participants from all over northern New Mexico made it to the event. Registration is no small feat with logistical complications stemming from registration caps, long waitlists, cancellations, and walk-ins. None of this could have been handled without the kindness, grace, and acumen by our EYH registrar Josefina Salazar.

One of the wonderful validations of the success of the EYH conference is evidenced in our registration statistics. Not only have we increased participation almost fourfold in recent years, but over the last few years we see the return of previous years participants at a rate of 20%!

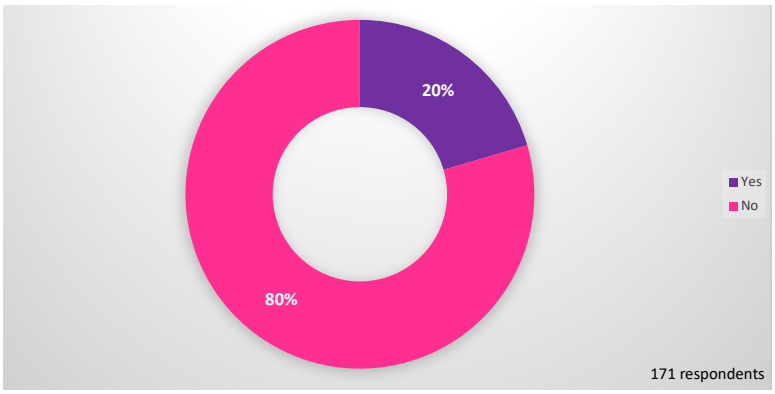

Figure 8: EYH 2019 Returning Participants

We are very encouraged by the indications of the impact the EYH conference has on youth participants. Over 96% of those polled say their attitude toward STEM fields was positively affected by their experience at the EYH conference. Over 87% of the students attending our conference expressed that they feel more motivated to take STEM classes. EYH attract students with an already positive attitude towards STEM with 97% reported as having their attitude towards STEM positively affected by EYH and 87% report having an increase in their positive attitude towards taking STEM classes in the future. For those who did not have a positive attitude before coming to the event, 92% report a positive attitude toward STEM as the result of the conference and 86% have a more positive attitude toward STEM classes in the future. These striking statistics of changing attitudes based on student feedback are summarized in Tables 1 and 2, in addition to Figures 9 and 10.

	Yes!	No
Did EYH positively change your attitude about STEM?	92%	8%
More STEM classes in the future?	86%	14%

Table 1: Changing Attitudes Towards STEM

	Yes!	No
Before today did you have a positive attitude about STEM?	**76**%	24%
Given a **positive attitude**, did EYH positively influence your attitude about STEM?	**97**%	3%
Given a **positive attitude**, do you plan to take more STEM classes in the future?	**87**%	12%
Given a **negative attitude**, did EYH positively influence your attitude about STEM?	**92**%	8%
Given a **negative attitude**, do you plan to take more STEM classes in the future?	**86**%	14%

Table 2: Influencing Attitudes Towards STEM given Previous Attitude

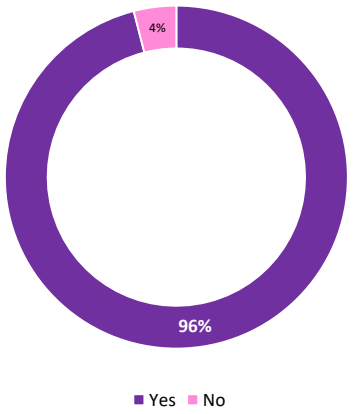

Figure 9: Changing Attitudes Towards STEM Fields

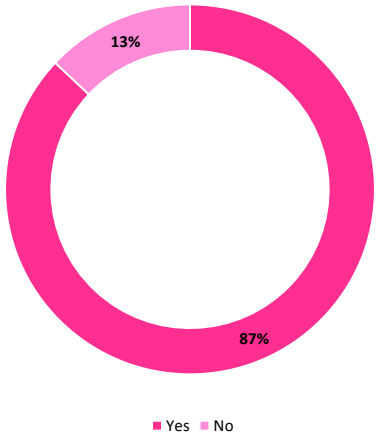

Figure 10: Inspiring the Pursuit of STEM Classes

5.2 Student Scholarships

Of the 209 students in attendance there were 65 students or 31% that received a scholarship to attend and registration fees were waived. Enabling students through scholarships prevents socioeconomic background from preventing attendance and is one of the most direct student benefits from EYH sponsorship.

6 The Day of the EYH Workshop-February 14, 2019

Mayor Alan Webber kicked off the EYH 2019 event and graciously welcomed the participants and volunteers to Santa Fe. He inspired the students with his remarks that women are increasingly taking on more leadership and managing roles in Santa Fe businesses with the example that the Santa Fe Mayor's office is predominantly led by women.

6.1 EYH Keynote Speaker

Our keynote speaker for the 2019 event was Leah Buechley who is a designer, engineer, and educator. Her work explores integrations of computing, electronics, and design. She has done foundational work in paper and fabric-based computing. Her inventions include the LilyPad Arduino, a construction kit for sew-able electronics. She currently runs a design firm, Rural / Digital, that explores playful integrations

of technology and design. Previously, she was an associate professor at the MIT Media Lab, where she founded and directed the High-Low Tech group. Her research was the recipient of an NSF CAREER Award and the 2017 Edith Ackerman award for Interaction Design and Children. Her work has been exhibited internationally in venues including the Exploratorium, the Victoria and Albert Museum, and Ars Electronica and has been featured in publications including The New York Times, Boston Globe, and Wired. Leah received a Ph.D. in computer science from the University of Colorado at Boulder and a B.A. in physics from Skidmore College.

Figure 11: Leah Buechley inspires our EYH Conference participants with her work that integrates computing, electronics, art, and design

Figure 12: Leah Buechley signing autographs

6.2 Science Fair

The lunch time activities included a Science Fair where students and teachers could engage with local businesses, government agencies, and utilities about their opportunities related to STEM. This year, twelve organizations participated including LANL, the Girl Scouts, NM State Parks, NM State Forestry Department, Forest Stewards Guild, University of New Mexico-Los Alamos, the Mathamuseum, Positive Energy Solar, Flow 3D, and the NM Supercomputing Challenge!

Figure 13: Education from the NM State Forestry

Figure 14: Exploring Nature with NM State Parks

Figure 15: Ready to Prevent Wildfires with NM State Forestry

Figure 16: Learning about Natural Resources with LANL's Environmental Stewardship Group

6.3 Student Workshops

Paramount to the EYH experience is our hands-on workshops where students get the opportunity to interact with professional women in STEM fields on interesting and engaging topics ranging from physics, light, hydrogels, chemistry, fluid dynamics, cryptography, minerals, computer science, genetics, plants, climate, lightning, circuits, industrial hygiene and so on. The following were the workshops that students participated in at the event:

- **Cryptography: How well can you keep a secret?**
  Presenter: Lissa Moore
  Co-Presenter: Alexandra DeLucia
  Can you solve a mystery in 90 minutes? Something strange is going on around here... but there are clues hiding around. Unfortunately, the clues seem to be written in some kind of code. Learn how to crack the codes and solve the mystery! You'll also learn to design your own codes and write secret messages of your own. Sending messages and information so that only the right people can understand them is important in computer science, but it turns out you can send your secrets, even pictures and sounds, safely and securely without using a computer, and people have been doing just that for thousands of years.

  Lissa Moore is a machine learning researcher at Los Alamos National Laboratory in the High Performance Computing Design group and the Ultrascale Systems Research Center. Lissa leads LANL's research efforts at the intersection of machine learning and high performance computing problems, including developing novel machine learning models for memory fault characterization, environmental sensor monitoring, and anomaly detection across the data center. Lissa's more theoretical work focuses on explainable machine learning.

- **Bounce, Splat, and Stretch**
  Presenter: Katie Brown
  Co-Presenter: Suzanne Sheehe
  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!

  Katie Brown is a scientist at Los Alamos National Laboratory. Her degree is in chemistry and she researches small-scale shock dynamics in explosives using lasers. She is originally from Minnesota and has two dogs.

- **Why don't we look just like our parents?**
  Presenter: Jessica Kubicek-Sutherland
  In this workshop we will attempt to answer the question, "Why don't we look just like our parents?" In this hands-on activity, students will be given a bag of jelly beans that represent genes for several human traits. Then, working in pairs, students randomly choose new pairs of jelly beans from those corresponding to their own genotypes. The new pairs are placed on toothpicks to represent the chromosomes of the pair's offspring, building a DNA double-helix model. Then they will draw a picture of their offspring based on the genetic code provided. Finally, students compare genotypes and phenotypes of parents and offspring for all the "couples" in the class. In particular, they look for cases in which parents and offspring share the exact same genotype and/or phenotype, and consider how the results would differ if they repeated the simulation using more traits.

  Jessica Kubicek-Sutherland is a staff scientist at Los Alamos National Laboratory in the Chemistry Division. She has a PhD in biochemistry and molecular biology. Her current research focus is on developing better ways to prevent, treat and diagnose infectious diseases.

- **Why are plants so thirsty?**
  Presenter: Danielle Ulrich
  How many cups of water do plants drink per day? We will use a suite of demonstrations to learn how plants use water, why different plants use different amounts of water, and how that influences where plants live. Demonstrations include a balloon/bike pump demonstration and wood pieces to look at wood permeability and water transport, straw bundles, wood pieces with visible vessels, celery sticks taking up food colored water, using a portable infrared gas analyzer instrument to measure plant photosynthesis and water use on live juniper and pinyon branches, and cross-sections of a tree to look at tree-rings.

  Danielle Ulrich is a Los Alamos National Laboratory scientist who studies plant physiology and how plants will respond to future climate change. She is a first-generation college graduate and would like to inspire others to pursue science-related fields. Danielle likes to mountain bike, ski, and run.

- **Light, Color, and Sparkles**
  Presenter: Laurie Waters
  The girls will explore the wave nature of light by learning about the electro-

magnetic spectrum from infrared to visible to ultraviolet light. We will use prisms and diffraction gratings to separate white light into colors and light sticks to bring colors back together. Using laser pointers, we will examine light scattering, reflection and refection through cloudy water and smoked acrylic object prisms. We will briefly look at fluorescent objects, and write with light on phosphorescent paper. We will also look at infrared light with a special camera that attaches to an iPhone. There will also be several experiments set up around the room such as the laser microscope, and a demonstration on why the sky is blue. With more time, a data acquisition system will be set up on a PC which will allow the girls to identify various gasses from their EM spectra. The girls will also learn how to make the various types of rainbows with a glass of water and a flashlight.

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 over 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 were not any computers. She read as much as she could about science, and had friends with similar interests. She is especially interested in understanding the fundamental basics of modern physics, of which light is a very important part.

- **Fun with Snap-Circuits**
  Presenter: Heidi Morning
  Snap-Circuits are kits that include basic circuit components and guide students through several engaging projects. Some of the projects that we have done in the past include FM radios and a variety of motion sensor circuits.

  Heidi Morning received her bachelor's in Computer Engineering from California State University Bakersfield and her master's in Electrical and Computer Engineering from the University of California at Davis. She has practiced her trade through several internships at places like Lockheed Martin, Los Alamos National Laboratory, and small private industries. Currently, Heidi works at Los Alamos National Laboratory's Intelligence and Space Research division. There she seeks to create, deliver, support and exploit innovative sensing systems for space-based, airborne, and ground-based applications to address critical national security and scientific challenges

- **For the Love of Science**
  Presenter: Sheri Lopez
  Fall in love with science while learning about all the fun critters that love to love you and our earth. Create argar art out of your own, diverse microbiome in a petri dish (we will initially make them, but the results will take a few days to appear. You can take this home!). See the beauty of biological reactions while exploring bio-luminescent algae. Make your own blue lamp and learn how these bio-luminescent organisms help marine life light up the dark ocean. Lastly, explore how bacteria help you digest food as we eat some sweet, sweet Valentine's Day goodies.

  Sheri Lopez has loved science since her wee years as a tiny tot. She grew up in Pojoaque Valley, graduated from Pojoaque High School, then stumbled around early adulthood trying to figure out what she wanted to do. Luckily, science was always there for her, and she found her place in Mechanical Engineering and Mathematics. She now works for Sandia National Laboratory designing machines. She loves her job, and science, and hopes that this workshop will show you how amazing STEM can be!

- **The Chemistry of Red Cabbage: A Homemade pH Indicator**
  Presenter: Chelsea Neil
  In this workshop, I will present what pH is and its importance before demonstrating how red cabbage juice will change color when added to different household substances, such as vinegar, baking soda, lemon juice and soda, depending on their pH.

  Chelsea Neil graduated with a Ph.D. in Energy, Environmental and Chemical Engineering in 2015 from Washington University in St. Louis, where she studied arsenic-bearing mineral dissolution and secondary mineral precipitation during aquifer recharge. After graduating, Chelsea spent two years at the U.S. EPA's National Risk Management Research Laboratory in Cincinnati, Ohio, working on the development and implementation of safe and sustainable aquifer recharge operations. Chelsea began her postdoc at Los Alamos National laboratory in May of 2018. Her current research focuses on the subsurface transport of fission products.

- **Calling all Future Industrial Hygiene Heroes!**
  Presenter: Dina Siegel
  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 Siegel, CIH, CSP, CBSP, FAIHA B.S. Environmental Health, Colorado State University, 1982. M.S. Mineral Resource Ecology (Environmental Science), Colorado School of Mines, l992. Industrial Hygiene and Safety Professional IV, Chemical and Biological Safety Program Lead, Los Alamos National Laboratory

- **Lightning and Thunderstorms in Virtual Reality**
  Presenter: Michael Peterson
  "When thunder roars, go indoors" is great advice for staying safe when there is lightning around. But what would it look like if you were in the heart of nature's fury? Or high above in the International Space Station? Find out in this Virtual Reality workshop.
  Michael Peterson is currently a space and remote sensing scientist at Los Alamos National Laboratory, but previously worked with NOAA on their brand new geostationary GOES satellites - particularly its first-ever lightning detector. Dr. Peterson uses a combination of visible light observations and radio measurements to understand why lightning looks the way it does, and what flash appearance can tell us about lightning physics.

- **All about birds: identification, aging, activities, and more!**
  Presenter: Audrey A. Smith
  Co-Presenter: Jenna Stanek
  In this workshop, we will teach students the basics of identifying birds by sight and sound. They will learn different techniques scientists use to age birds and determine gender. Students will participate in hands on activities that will teach concepts of data collection for scientific studies.
  Audrey Smith has an educational background in environmental studies. She has a BS in environmental science and an MS in environmental engineering. Audrey started at Los Alamos National Laboratory as a high school co-op student. During her BS degree she had the opportunity to work with the Biological Resources Program at LANL where she received experience in wildlife biology. Audrey worked as an environmental engineer for a short time after she graduated, but soon realized her passion was for wildlife.

- **Plants and Climate**
  Presenter: Sanna Sevanto
  We will discuss and explore the ways plants influence climate, and measure plant water transport capacity on samples from different species.

  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-orienteering team, Sanna is an active participant in all kinds of endurance sport 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.

- **Hand Ergonomics and Grip Strength Testing**
  Presenter: Lori Lazaro
  This is a hands-on interactive session is designed for participants to learn about musculoskeletal disorders, hand injury prevention, and how repetition of the same hand motion can affect their hand grip strength. Students will perform a repetitive hand task, then measure their grip strength using a standard dynomometer.

  Lori Lazaro is a first-generation college student that obtained her master's degree in Public Health - Occupational Safety & Health from Texas A&M University. Her passion for science and health began when she was 12 years old and dreamed of becoming a doctor to help the injured. Today, Lori works daily in the identification and mitigation of ergonomic risk factors, which could potentially place individuals at risk for injury at Los Alamos National Laboratory. Lori works to ensure that your working environment is always a safe, efficient, and a comfortable place.

6.4 Teacher Workshops

The EYH conference also aims to inspire the student's teachers in STEM by providing a teacher workshop that provides resources for hands-on STEM involvement in their classroom and in community science competitions. EYH has enjoyed a lot of positive feedback from teachers for providing stimulating and innovative teacher workshops to introduce fun STEM educational activities to bring back to the classroom.

- **Teacher Workshop I: Clues and Codes**
  Presenters: Explora!'s Anthony Salvagno and Hali Willis
  They are all around us. Discover sequences and patterns in everyday objects, part of your body, math, and chemical reactions. What logic will you apply to figure out the code?
- **Teacher Workshop II: Easy Household Chemistry Experiments**
  Presenter: Genna Waldvogel
  This workshop will provide lesson plans, strategies, laboratory procedures and material list to get you started with easy chemistry experiments and demonstrations for all levels. Topics include chemical reactions, hydrogen-bonding, molarity, measurement and the scientific method.

  Genna Waldvogel is a civil engineer at Los Alamos National Laboratory. She works for the utilities and institutional facilities division and works for the Smart Lab Team, creating more energy efficient laboratories. Genna has a BS in Environmental Science from University of Vermont and a MS in Civil and Environmental Engineering from Carnegie Mellon University. After finishing her bachelor's degree, Genna joined Teach for America and was a high school Chemistry and Environmental Science teacher for four years at Hartford Public High School in Hartford, CT. She loves science and creating an environment in the classroom that will draw students in!
- **Teacher Workshop III: LilyPad**
  Presenter: Sandy Frost
  Co-Presenter: Veronica Camarillo-Morris
  The LilyPad is a microcontroller designed to be integrated into e-textiles and wearable projects. This workshop will cover the basics of circuits and programming and will include a hands-on project. No experience with hardware or software is expected.

Sandy Frost is an electrical and computer engineer who works as a solutions architect, developer and certified security specialist at Los Alamos National Laboratory. She was inspired by her Grandfather's love of learning and hopes to light the fire for others.

Veronica Camarillo-Morris is a proponent of technology for the betterment of humanity. Her professional background is in the integration and implementation of technology for operational efficiency and innovation. Veronica's master's is in Network Communication engineering with an emphasis in Software Defined Networking. She is most passionate about Amateur Radio, and organizations that promote STEM as well as our young women in pursuit of technical careers.

Figure 17: Teachers' enthusiasm during their workshop is infectious!

7 The EYH Evaluations

7.1 Student Workshop Ratings

Figures 18 and 19 below shows the ratings for workshop content and workshop difficulty-level based on the student evaluations. The average for workshops content was 4.1 out of 5.0 for mostly good and for difficulty-level 2.79 between

just right (3) and easy (2). It is a great challenge to appeal to the broad student base that spans the 5th-8th grade as well as diverse educational backgrounds with students across Northern New Mexico. We are thrilled by these results as they show that our presenters are creating fun and engaging workshops that are right on track with the level of difficulty.

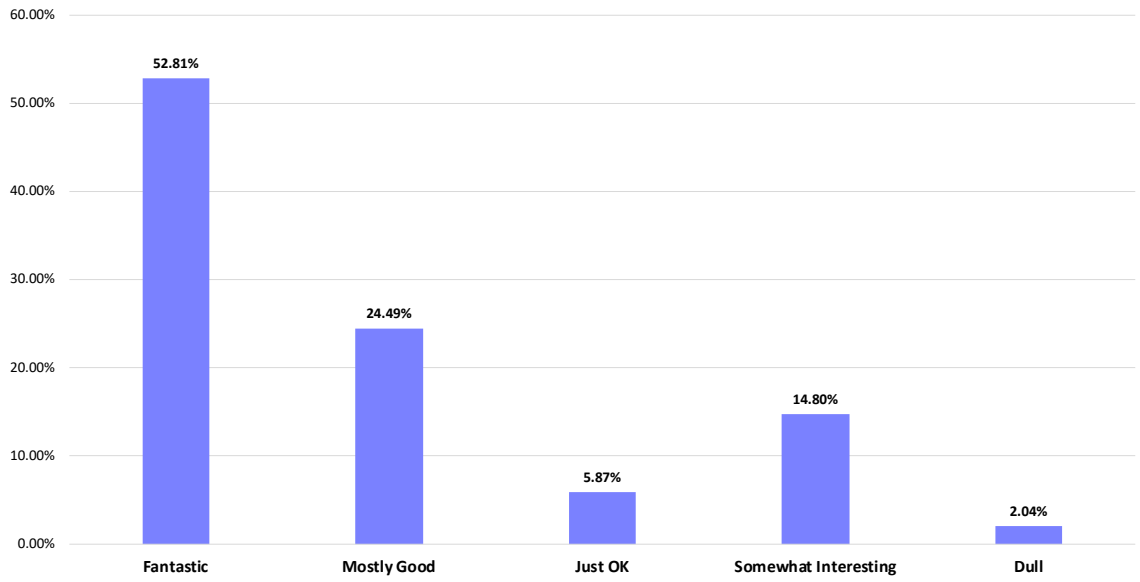

Figure 18: Student Evaluations of Workshop Content

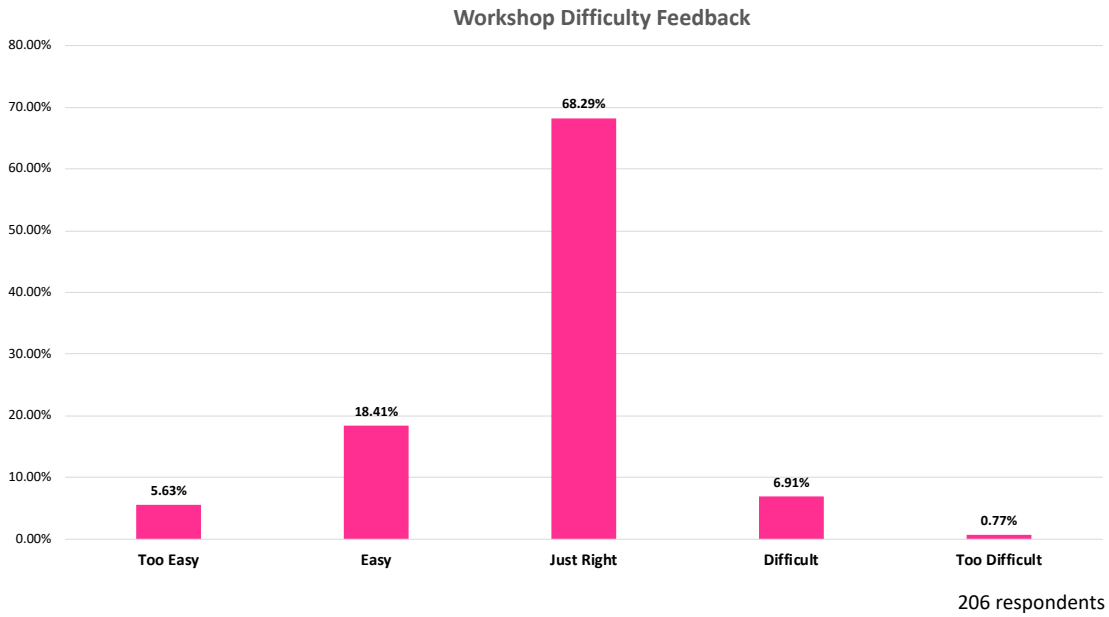

Figure 19: Student Evaluations of Workshop Difficulty

8 The Best Part of the Report

8.1 The Students' Feedback

Here are the student's answers to open-ended questions at the end of the day captured in their own words...complete with emoticons and misspellings:

What I expected was...

"I expected to do fun things"
"Not what I saw today"
"to do a cool workshop but, not make a new friend"
"I expected it to be boring but was fun"
"I Didint think it would be as fun as it was"
"to be honest I expected a dance party"
"I expected a boring class about math and a weird lunch"

“to be amazed”
“I want to learn About science”
“very different then what I expected, I was inspired” I
“ thought that it would not be fun.”
“It to be all about ONLY computers”
“I expected to be really cool, but what happened blew my mind away. AWSOME.”
“Something less nice and friendly cause Ie never been here. I also expected to learn a lot about science.”

What I got was...

“a cool workshop and a new friend”
“how to work with people”
“to go to different workshops and do fun things”
“An awesome intereactive, educational fun and interesting time!”
“do fun math and science activities”
“the most awesome time ever!”
“I got when I was codeing is fun”
“the science about thunder”
“The coolest story of technology EVER!”
“the greatest craft idea ever!”
“fun prizes and good learning tools.”
“I got that you can do much more than basic science.”
“Something REALLY nice and super friendly. I learned a lot!”
“What I got was cool session that I thought were cool and interesting”

I wish I learned more about...

“Experiments”
“chemistry’
“was how the batteries work”
“The bacteria on our body”’
“chemistry because I think it’s cool’
“How the zipper made the volume go up down”

“cupputering”
“I wish I learned more about mixing stuff and DNA.”
“Some more of Leah’s inventions”
“how to code”
“techglogy and sinces and enverment”
“I wish I learned more about lightning and how it is made”
“I wish that I learned about codeing more”
“math”
“sience”
“Techknowledgey”
“How to coad technolishy”
“everything”

Next, I willl...

“Find out more about bioluminescence”
“come back again”
“pay more attention and ask questions”
“try to focusing on working hard”
“try to learn more about math and science”
“Learn more in the field of stem and connecting arts with computer science”
“I want to learn how to use my sewing and tech together”
“Take more science classes”
“try to learn more about what Ie already learned”
“I’ll pay attention more in math”
“try and go to a science musemum or learn something new in science.”
“tell my firneds about what I learned”
“look into computer art and science. STEM got me more interested in science, then I already was.”
“learn more about and show my sister the things I got”
“Learn more stuff like bees and animals”
“want to learn how to sew electric”
“learn about are solar system”
“be more interested in Science and math.”
“Next, I will lear more about robots.”
“tell my family how much fun this was and how muich Ie learned”
“I would want to ask more of my friends to come.”

“go home and take home by bacteria and put in a warm place so it don die.”
“The best part was the cod and lookin gat the alge glow in the dark.”
“Make sure I remember this when I go to collage”

And the best part was...

“making new friends”
“The “love of science” and learning the dinoHagates”
“learning about LED lights on farbic and paper”
“getting to code and learn about bacteria and dinohawlse”
“meeting new friends”
“When we made the balls with mulicules”
“when the special person come too talk to us! Cool!”
“the workshops and how hand-on it was”
“the whole thing :)”
“the cryptography work shop”
“the bowl that light up, and the cryptography”
“watering the picture on the wall go up down volume with the zipper”
“meeting new girls my age”
“how the different lily-pads would change sound when you touch them.”
“The best part was the laser.”
“red cabage chemestry”
“learning about art with science and math”
“The best part was the keynote speaker because I learned a lot about computer careers”
“I met new friends!”
“The best part was the love of science”
“The paper piano”
“The best part was doing experaments.”
“The great part was seeing the inthusiasm that the speakers shared the really cool things that that she did.”
“Learning so much about circuts.”

Anything else?

“I love this program. Please keep doing it!”
“I want you guys to continue this program, and inspire girls to do something

with a passion for it."
"I loved this so much. I want to return again next year."
"I want to learn how to make a circuit board and the wallpaper"
"This was a very fun and interesting experience. I learned a lot and will continue to have a positive attitude toward math and science"
"Shout out to the donaters! "
"I loved it! Can wait till next year!"
"This conference was amazing. I was really inspired by the teachers and the keynote speaker"

8.2 The Pictures

The student workshop experience is beautifully told in pictures:

Figure 20: Learning about the importance of industrial hygiene

Figure 21: Looking cool while exploring materials' properties in the Bounce, Splat, and Stretch Workshop

Figure 22: Clearly the Hand Ergonomic Workshop is a lot of fun!

Figure 23: Lighting up through Snap Circuits is mesmerizing

Figure 24: Learning about birds and how they fly inspires

Figure 25: Capturing interest in science!

Figure 26: Thank you! from 7th and 8th graders from Acoma, El Dorado, Santa Fe, Las Vegas, and Los Alamos

9 Making EYH Happen

Our EYH workshop would not be the enormous success that it is without the generosity of our volunteers and sponsors. We had the perfect venue of the Santa Fe Convention Center secured by Melissa Glick of Santa Fe Conference Center and sponsored by Santa Fe City Councilor Renee Villareal for us and she was so wonderful and gracious in following up to make sure all our needs were met.

9.1 Volunteers for EYH 2019

The formidable task of organizing, setting up, and executing leverages many thousands of hours of volunteer time. This year we had a total of 126 volunteers, presenters, speakers and committee members working anywhere from 8 to 100s of hours each to make this event happen.

Figure 27: A warm welcome to EYH from our volunteers!

Figure 28: EYH wouldn't be a success without our volunteers!

Planning Committee for EYH 2019

- *Chair/Registrar:* Josefina Salazar
- *Co-Chair/Public Relations:* Jan Frigo
- *IT-Computer/Network Coordinator:* Phil Rivera
- *Site Coordinator:* Zoe Ledbetter
- *Caterer/Printing Coordinator:* Jennie Harvey
- *Science Fair Coordinator:* Mary Ann Stroud
- *Teacher Workshop Coordinators:* Sandy Frost, Veronica Camarillo-Morris, Genna Waldvogel
- *Student Workshop Coordinators:* Kate Mcintosh, Laverne Gallegos-Graves
- *Fundraising Coordinators:* Jan Frigo, Hannah Ekblad, Karen Kelley, Laurie Waters
- *Volunteer/Advertising Coordinator:* Tamra Heberling
- *Registrar/Transportation Coordinator:* Karen Kelley
- *Master of Ceremonies/ Keynote Speaker Presenter/T-shirts/Prizes:* Tina Newberry
- *Photographer:* Leslie Sandoval

- *Treasurer:* Laurie Waters
- *Swag/Bag Stuffing Coordinators:* Jessica Manzanares, Tamera Heberling
- *Gifts for Volunteers Coordinator:* Nicol Tafoya
- *Data Collection Lead/Data Analysis/Reporting:* Kari Sentz
- *Website/Database:* Xiaoguang Yang
- *Procurement/DPR:* Sylvia Montoya-Wiuff/Theresa Aguilera

Figure 29: A big beautiful smile and thank you from one of our artistic EYH student participants

9.2 Sponsorship for EYH 2019

We want to thank our sponsors, LANL, LANS, LLC, TechSource, LANL Foundation, NHMFL, NMNWSE, LAWIS and the EYH volunteers for their time, resources, dedication, and commitment to this EYH event.

Figure 30: The sponsors also get a Thank You from our EYH students

City of Santa Fe, Councilor Renee Villarreal for donation of the Santa Fe Community Convention Center
New Mexico Network for Women in Science and Engineering (NMNWSE)
Los Alamos Women in Science (LAWIS)
Triad National Security LLC
TechSource Inc.
National High Magnetic Field Laboratory (NHMFL)
Los Alamos National Laboratory (LANL) - DDSTE
Los Alamos National Laboratory (LANL) - SRO
Los Alamos National Laboratory (LANL)- ALDEPS
Los Alamos National Laboratory (LANL)- ALDGS
Los Alamos National Laboratory (LANL)- ALDCLES
Los Alamos National Laboratory (LANL)- ALDW
Los Alamos National Laboratory Foundation
Los Alamos National Bank (LANB)

Institute of Electrical and Electronics Engineers (IEEE)
Rentech Computer Rentals
Sandia Office Supplies
Holmans
PlanB Network of Española
Association for Computing Machinery (ACM)
Del Norte Credit Union
University of New Mexico Los Alamos (UNM-LA)

9.3 EYH Report Acknowledgments

Thanks Hannah Ekblad and Karen Kelley for their thorough reviews and thoughtful comments of this report.

Thank you to our volunteers and sponsors for helping to make a difference!

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