Expanding Your Horizons
Summary Report
October 21, 2017

STEM Conference for
5th-8th Grade Girls
Santa Fe and Northern New Mexico

Presented by:
STEM Santa Fe

www.STEMSantaFe.org
Motivating Young Women in Science + Technology + Engineering + Mathematics

Can you name more than ten female scientists and engineers? Did your mathematics and science class mention more than two female in that profession? Most people cannot and teachers are still slowly incorporating more females and people of color into their curriculum. Thanks to the leadership of STEM Santa Fe, 165 girls can name at least sixteen historical females in STEM and have met and interacted with sixteen more STEM professionals!

While it is impossible to track the lasting impact of attending an EYH conference, we were reminded of how deep it can be this year. Our Steering Committee was joined by a former EYH-Santa Fe participant who is now a high school senior. This student was so inspired by her attendance while in middle school that she volunteered to help more girls have similar experiences. Thank you Lily Nathanson for inspiring US. You, and girls like you, are the reason we continue to plan and implement this conference!

Conference Mission

The mission of Expanding Your Horizons (EYH) Network is to inspire girls to recognize their potential and pursue opportunities in science, technology, engineering and mathematics (STEM). Through EYH conferences, we provide STEM role models and hands-on activities empowering girls to see themselves as future participants in STEM-related careers. Our ultimate goal is to motivate girls to become innovative and creative thinkers ready to meet 21st Century challenges.

Conference Schedule

8:00-9:00  Check In
9:00-9:50  Welcome and Keynote Address
10:00-11:10  Workshop I
11:15-12:25  Workshop II
10:15-12:15  Adult Workshop
12:30-1:30  Lunch, Raffle, and Group Photo
1:30-3:00  STEM and College Fair
2:30-3:00  Pick Up
Jessica Perea Houston was born in Los Alamos and raised in Santa Fe, NM. Her upbringing influenced her current interests in STEM; Jessica’s father worked as an engineer at the Los Alamos National Laboratory and her mother, an educator, taught high school and directed many unique project-based learning programs in Santa Fe. With the encouragement of her parents, both Alumni of New Mexico State University (NMSU), Jessica began college seeking a degree in chemical engineering at NMSU. Her interests in biological engineering led to her participating in undergraduate research experiences on campus during her senior year. Upon receiving her B.S. degree from NMSU in 2000, she was excited to continue to work on research in bioengineering, thus began graduate school at Texas A&M University (TAMU), College Station, TX. In 2005 she received her Ph.D. in Chemical Engineering from TAMU. Her graduate research involved working at the University of Texas M.D. Anderson Cancer Center and Baylor College of Medicine, in Houston, TX. At these medical centers, she helped develop a first-generation optical imaging system for breast cancer detection. After graduate school in 2006, Jessica and her husband, Dr. Kevin D. Houston moved back to New Mexico taking positions as postdoctoral fellows at the Los Alamos National Laboratory. They were excited to return to New Mexico to raise their three children, Joaquin, Kaleb, and Kyraluna. In 2009 Jessica accepted a faculty position at NMSU, which she sees as “coming full circle” in her journey in STEM. She is now an Associate Professor at NMSU in the Chemical & Materials Engineering Department. She is an advisor to the NMSU Biomedical Engineering Society, teaches biomedical engineering, process control, and fluid dynamics. Her research interests include flow cytometry and fluorescence dynamics. Some notable honors she has received include: the Synergy-One award (NMSU College of Engineering) Outstanding Junior Faculty (NMSU Hispanic Faculty and Staff Caucus); Early Career Award (NMSU Research Council) NSF CAREER grant (National Science Foundation); and named Scholar (International Society for the Advancement of Cytometry). Jessica is happy to be a part of the 2017 Expanding Your Horizons Santa Fe Conference and is very much an advocate for women and underrepresented minority participation in STEM.
Thank you to our VOLUNTEERS

Without your enthusiasm and willingness to help, this conference could not have run this smoothly! THANK YOU!

A very special THANK YOU to our Group Guides
Adriana Reyes Newell, Amanda Burns, Cecilia Clark, Claire Noonan, Diane Romonosky, Ellie Mullin, Ernestina Martinez, Hope Cahill, Jan Frigo, Judi Kahl, Kate Burns, Kate McIntosh, Lisa Winter, Louise Yakey, Mary Elliott, Anna Romero, Tina Montoya, and Tracy Sadler.

You are the greatest positive impact on participants! Thank you for cheering them on as they challenged themselves, laughing with them, and helping them believe that they can pursue anything they wish in their future!

Thank you to our Workshop Presenters and Co-Presenters!
Amy Reed, Greg Wainwright, Charlotte Rowe, Danielle Marias, Debbie Post, Erica Fogerty, Joanna Mudge, KarenAnn Caldwell, Charlotte Stalker, Kateryna Artushova, Carmen Velasco, Sumant Avasarala, Nabil Shaikh, Laurie Waters, Ondine Frauenglass, Paige Prescott, Raeanna Sharp-Greiger, Maria Nappi, Sandy Frost, Lucia Short, Sarah Shrum, Santana Rael, Maggie Merrigan, and Vanessa Job; plus Big Thanks to our Keynote Speaker Jessica Perea Houston.

For many of our participants, you are the first STEM professional that they have ever met! Thank you for inspiring them to see themselves in similar work!

Thank you to our MC!
Many thanks to Shannon Steinfadt!

You were an amazing presence to have at the conference! We appreciate deeply your sense of humor and ability to connect with our participants!

***We apologize if we forgot anyone… or misspelled anyone’s name.
Thank you to our Photographers!
Many thanks to Maqueita Eleazer and Vincent Harrild for documenting the day! Thank you to Enchantment Aerials not only for amazing us with your drone’s capabilities but also for taking amazing group photographs!

STEM and College Fair Participants
We had 30 volunteers that came with the following STEM groups to share what a future in a STEM career can look like:

Enchantment Aerials, Explora, Girls Inc. of Santa Fe, LANL Magnet Lab, Los Alamos National Laboratory, Math-A-Museum, Mesalands Community College Dinosaur Museum and Natural Sciences Lab, National Center for Genome Research, New Mexico State University, New Mexico Tech, NMSU-Dona Ana, Northern New Mexico College, Santa Fe Community College, Santa Fe Master Gardeners, Simtable, Supercomputing Challenge, The Fractal Foundation, Dr. William Bruno, Dr. Julie Jung, and Dr. Renee Johansen.

Thank you for showing our girls that STEM career can take you in any direction.

Thank you Friends of EYH
Sabra Roybal with SFPS, Fran Nawrocki with SFCC, Tracy Roberts with SFCC, Art Jensen, Ed Barker, and Ismael Gomez.

No job is too small; you stepped up exactly when we needed you the most.

Steering Committee
This year’s Steering Committee volunteered hundreds of hours! The committee was compromised of both veteran members and new members. Without their tireless efforts, this conference could not have happened.

Mary Jensen and Alishiya Kapoor: Registration coordinators
Shirley Aune and Katie Teague: Volunteers coordinators
Jenn Baker and Laurel Winter: Workshops coordinators
Lily Nathanson: STEM and College Fair coordinator
co-Chair, Lina Germann
co-Chair, Kate Gomez
Gold Sponsors

Los Alamos National Laboratory/Los Alamos National Security, LLC
LANL Foundation
Sandia National Laboratories

Silver Sponsors

Hestia Fund of Santa Fe
New Mexico EPSCoR
Los Alamos National Bank
Santa Fe Community College

Bronze Sponsors

Flow Science
Souder, Miller & Associates
Los Alamos Women in Science
American Association of University Women of Santa Fe, NM
New Mexico Network for Women in Science and Engineering

Driving Organization

Expanding Your Horizons is one of several conferences that is organized and implemented by STEM Santa Fe, a local 501(c)(3) organization. STEM Santa Fe was founded by Lina Germann in 2016. Its mission is to advocate for, develop and provide STEM programming, mentoring and resources for all youth, especially under-represented groups in STEM, to realize their potential and expand their opportunities in a dynamic world.

Other Supporters and Donors

Many thanks to Nambe for donating a lovely gift for our keynote speaker, Malouf on the Plaza for donating an essay contest gift, Accolades Advertising, Trader Joe’s, and FedEx.

Also many thanks to our donors of raffle prizes for the girls including: Dr. Rich Strittmatter, OpenEye Scientific, SF Botanical Garden, Meow Wolf, Sandra Bradley, Connie Deschamps, Mesalands Community College, Santa Fe Community College, Northern New Mexico College, New Mexico State University.
Workshop Description and Pictures

Light, Color, and Sparkles (Laurie Waters, PhD): Explore the wave nature of light and the electromagnetic spectrum using lasers and other amazing light transmitting tools!

You can be a Disease Detective! (Sarah Shrum): A mysterious illness is causing people to be sick after a picnic. Help break the mystery by investigating the outbreak!

Social Life of Pennies (Vanessa Job, PhD): Is it possible for 25 pennies to be placed flat so each penny touches exactly 3 other pennies? Use logic and probability to solve mysteries in this exciting workshop!

Building a Better Bridge- With Popsicle Sticks! (Zoe Ledbetter, Santana Rael and Maggie Merrigan): Be part of a team of engineers who will be challenged with designing a bridge out of 100 popsicle. Each team will be judged on structural integrity and aesthetics.

Design, Build & Test your own Landfill (Amy Reed): Design and build your own landfill using similar to those used by engineers for full-scale landfills. Learn how to choose greener alternatives to reduce waste to landfills.

Why are plants so Thirsty? (Danielle Marias): How many cups of water do plants drink a day? Use an infrared gas analyzer portable photosynthesis system to measure rates of photosynthesis and water uptake in different types of plants.

Why empty matters? (Kateryna Artyushkova PhD & Carmen Velasco): What is a vacuum and how can we use it to further our scientific knowledge? Learn about gravity, air resistance, and sound in space!

Biofuels, Algae and Microscopes (Ondine Frauenglass): Tour of the SFCC biofuels facilities and use microscopes to look at algae cultures grown in the Lab.
**DNA Detective (Joann Mudge):** Come examine DNA sequences to solve real world problems such as identifying sea monsters or tracking murder!

**The Gravity of Our Situation (Charlotte Rowe PhD):** What is gravity and how do you measure it?

**Radiation in the World Around Us (Raeanna Sharp-Geiger and Maria Nappi):** Come find out the types of radiation and where it is found in everyday life. You will even learn how to detect radiation!

**The Science of the Sun (Erica Fogerty):** Come make pinhole cameras and prisms. Learn about the constituents of light and be able to describe elements present in the sun.

**Arduino Adventures (Sandy Frost, Alia Long and Lucia Short):** Blink an LED and make noise with a buzzer while learning about the hardware and software of a single board microcontroller—the ARDUINO!

**Electricity-What is it and what can you do with it? (KarenAnn Caldwell PhD & Charlotte Stalker):** Don’t electrocute yourself! Learn how to build a meter to measure conductivity and see if water really does conduct! Then we'll learn how to etch metal using electric currents!

**Creativity and Computer Science with Micro:bits (Paige Prescott):** Using a cool new microcontroller called Micro:bits you will create fun projects.

**Hurricane Proof or JENGA tower? (Debbie Post):** Your mission: to design, build and test a strong and tall tower that can withstand a hurricane. Your challenge: time is limited, your team is small, and you have to build with just what we give you.

**Science on a Sphere (Ed Barker PhD) Adult Workshop:** Presentation of various Science on a Sphere playlists on various scientific topics.
Outcomes
Number of STEM Workshops for girls: 16
Number of girls who participated: 165
Number of girls who registered to attend: 210
Number of student evaluation forms received: 151
Students receiving scholarship to attend: 15
Student receiving outside funding from schools/other organizations: 33
Adult workshop participants: 9
Total Number of Adult Volunteers (Including STEM & College Fair Participants): 126

Graph 1: Grade Level of Participants (based on registration sign-in)
### Table 2: Represented Schools (based on registration sign-in).

<table>
<thead>
<tr>
<th>School</th>
<th># of Girls</th>
<th>School</th>
<th># of Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academy for Technology and the Classics</td>
<td>2</td>
<td>Nava Elementary School</td>
<td>2</td>
</tr>
<tr>
<td>Acequia Madre Elementary School</td>
<td>1</td>
<td>Ortiz Middle School</td>
<td>12</td>
</tr>
<tr>
<td>Amy Biehl Community School</td>
<td>2</td>
<td>Piñon Elementary School</td>
<td>9</td>
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<tr>
<td>Aspen Magnet School</td>
<td>1</td>
<td>Pojoaque Valley Intermediate School</td>
<td>15</td>
</tr>
<tr>
<td>Atalaya Elementary School</td>
<td>1</td>
<td>Rio Grande School</td>
<td>1</td>
</tr>
<tr>
<td>Barranca Mesa Elementary School</td>
<td>2</td>
<td>Salazar Elementary School</td>
<td>5</td>
</tr>
<tr>
<td>Carlos Gilbert Elementary School</td>
<td>2</td>
<td>Santa Fe Girls School</td>
<td>3</td>
</tr>
<tr>
<td>Carlos Vigil Middle School</td>
<td>1</td>
<td>Santa Fe Indian School</td>
<td>14</td>
</tr>
<tr>
<td>Chaparral Elementary School</td>
<td>6</td>
<td>Santa Fe Preparatory School</td>
<td>2</td>
</tr>
<tr>
<td>Desert Academy</td>
<td>1</td>
<td>Santa Fe School of Arts and Sciences</td>
<td>11</td>
</tr>
<tr>
<td>Ej Martinez Elementary School</td>
<td>4</td>
<td>St Michael's High School</td>
<td>1</td>
</tr>
<tr>
<td>El Dorado Community School</td>
<td>6</td>
<td>Sweeney Elementary School</td>
<td>18</td>
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<td>ET Salazar Fairview Elementary School</td>
<td>2</td>
<td>Taos Charter School</td>
<td>13</td>
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<tr>
<td>Gonzales Community School</td>
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<td>Tesuque Elementary School</td>
<td>3</td>
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<td>Homeschooled</td>
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<td>Turquoise Trail Charter School</td>
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<td>Kearney Elementary School</td>
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<td>Wood Gormley Elementary School</td>
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<td>Milagro Middle School</td>
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<td>1</td>
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<tr>
<td>Mountain Elementary School</td>
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</tbody>
</table>

**Socioeconomic status:**

The number of students who have requested scholarships has steadily declined over the past three years. For the 2016 conference 14 attendees received scholarships and 45 received sponsorship from their school or another organization. When these two groups are combined approximately 35% of attendees received financial support to attend. This year 15 attendees received scholarship and another 33 received sponsorship from their schools. When these two groups are combined approximately 20% of attendees received financial support this year.
Evaluation of Conference Impact:

Graph 1:

STEM jobs are important professions.

Graph 2:

Understanding and using math & science is important for me to be successful in life.
Graph 3:

I plan on going to college/university.

- Strongly Agree: 77%
- Agree: 12%
- Maybe: 8%
- Disagree: 3%

Graph 4

I would like to pursue a profession in STEM.

- Strongly Agree: 44%
- Agree: 47%
- Neutral: 9%
Graph 5:

I am looking forward to taking math classes in high school.

Graph 6:

I am looking forward to taking science classes in high school.
Graph 7:

I had fun today!

- 83% Strongly Agree
- 15% Agree
- 1% Neutral
- 1% Disagree

Graph 8:

The Keynote speaker in the morning was interesting/inspiring.

- 46% Strongly Agree
- 42% Agree
- 11% Neutral
- 1% Disagree
Comments:
We asked participants identify what the BEST part of the day was. Here is a sample of the responses:

★ The best part of today was in the beginning (Keynote address) where I got to learn a lot of two women's lives and about a really cute dog called Houdini.
★ The best part was the penny activity because I like puzzles.
★ The best part was learning how to do coding.
★ The best part of today was meeting new people and having the opportunity to learn something new. I want to come again!
★ Everything was fun today!

Adult Workshop: SOS - Science on a Sphere
Our adult workshop participants were able to experience Santa Fe Community College’s Science on Sphere first hand. Ed Barker led the group of nine through the different features and functions that SOS is capable. Participants had very positive feedback from this experience and left excited to bring students back to experience it as well!

Concluding Thoughts:
This year was our most ambitious year to date. We increased the number of participants we accepted, increased the number of workshops from 12 to 16, and increased our fundraising efforts to cover the expenses! Our Steering Committee stayed intact from the previous year plus new members were added, which allowed our efforts to grow significantly.

Our conference capacity was capped at 200. Registration this year was very exciting—it rose and swelled and then decreased gradually. While we accepted a record 210 registered participants, in the end, only 165 girls attended, with a 79% attendance rate. This is a very close number of participants as in the previous year (168). Unfortunately, the conference was held on the same day as the middle school basketball finals. Many participants could not attend EYH as a result. This was very disappointing considering the amount of effort put in place by our registration team. Not only were participants recruited from local schools, they received email, text, and postcard reminders. In the future, we will be cognizant of the local sports schedules when determining a date for 2018 and will work on better ways to manage a waiting list without jeopardizing capacity. Nevertheless, the value of EYH as an exciting STEM experience for the girls is being increasingly recognized by schools and community organizations!

The core of our mission is to encourage young women to pursue STEM careers by providing STEM role models and hands-on activities for 5th-8th grade girls. Based on evaluation results, the Fall 2017 EYH Conference was incredibly successful in this mission! Our evaluation found that the majority of participants (86%) rated their workshops as “very interesting” and they “strongly agreed” that they learned a lot! Our mission focuses on creating lasting memories.
that inspire young girls to continue to explore STEM through high school and into college. This year asked them about their current perceptions in STEM. As you can see from the results graphed above, most of the girls are looking forward to STEM-based classes in high school and had an overwhelmingly good time!

★ New this year: The Steering Committee focused on highlighting as many female STEM professionals as possible! In addition to recruiting sixteen female workshop presenters, our groups were named after female STEM professionals throughout history. Katie Teague, one of volunteers coordinators, created group signs, table signs, and a booklet to highlight those historical figures. Each participant received a booklet detailing the accomplishments of each woman highlighted. The booklet was very well received and the girls spent time pouring over each biography. The end of the booklet encouraged participants to write their own autobiography as they plan their STEM future.

★ New this year: We challenged the girls to write us an essay about the impact of this EYH conference on them. We are eagerly awaiting essay contest submissions! This is our first year asking participants to submit a reflection on their experience at EYH. The designated prizes include—a Chromebook, a piece of fine jewelry from Malouf on the Plaza, and a swag bag of goodies! The essay submissions will help guide our future planning for the 2018 event in addition to receiving some worthy testimonials.

Events that encourage females to pursue STEM education and enter STEM roles are increasingly important. We are grateful to many of our donors who increased their donation significantly! This allowed us to prepare for an increased number of participants. Without their generous donations, this conference would not exist.

We hope that we can continue the momentum of this year into the next. While this conference alone will not guarantee an increased representation of women in STEM, it is certainly the right place to start. We recognize a high need for similar events and activities throughout the year. Many thanks to all of our sponsors, supporters, donors, and volunteers for their dedication to this cause!