

## **NSSEC Rice U Status Report – January 2020**

Patricia H. Reiff, Rice University

- ***NSSEC: NASA Space Science Education Consortium Apollo Animations***

We participate fully in the NSSEC consortium. We participate in monthly telecons in the “educational technology”, “informal education” and “higher education” groups. We have distributed (and continue to distribute) animations to celebrate the 50<sup>th</sup> anniversary of the Apollo Lunar Landings, and have put audio into the animations. These can be viewed here:

<http://space.rice.edu/apollo> and downloaded on request. So far 90 planetarians have signed up for our Apollo animations, including 31 in high resolution (4K and/or 60 fps). The animations have been incorporated into the new HMNS show “Apollo and Beyond”. More info at: [http://www.eplanetarium.com/shows/ddome/hmns/apollo\\_and\\_beyond/](http://www.eplanetarium.com/shows/ddome/hmns/apollo_and_beyond/).

- ***Education: “Reach for the Stars” STEM Festival, October 12, 2019 final survey***

We have sent out a questionnaire to the participants for feedback on the festival, and have received 61 responses so far, which represents over 80% of the girls. *Report attached, and is available at: <http://space.rice.edu/reachforthestars/>.*

Here are some highlights of the survey:

Street festival: rated 4.22 (on a 5-point Likert scale)

Keynote speech: rated 4.28

Hands-on Workshops: rated 4.29

Average interest in STEM careers BEFORE the day: 65; Average interest AFTERWARDS: 74

Overall, 89.7% rated the event as “excellent” or “very good”.

- ***Education: International Astronomy Olympiad***

This year Reiff led the USA national team to compete at the 24<sup>th</sup> “International Astronomy Olympiad”, in Piatra Neamt, Romania, October 20-26, 2019. The other team lead, Franklyn Pacheco, is creating a document highlighting the results and challenges as part of his MST capstone project. We are working with the Astronomy League to create a selection process to identify students for next year (and the mentors to guide them). We have had discussions with the Malaysian team and the Swedish team to share quizzes for the prospective team members. We have contacted some astronomers who have expressed willingness to participate.

- ***Education: “Astronomy for Teachers” class***

Four teachers are signed up for credit for the “Astronomy for Teachers” class (ASTR 503) this spring, plus another four for professional development hours. A typical Rice class costs \$6000 in tuition, but with the major cost sharing afforded by this grant, Rice only charges \$1200 per three-hour course. With this grant, we were able to provide tuition scholarships so that the teachers paid even less. (We are sharing the tuition funds so that each student only needs to pay \$200 plus fees.)

- ***Education: “Observatory Open House” January 31 (cloud date Feb 1)***

Dr. Reiff is scheduled to lead the Rice campus observatory open house on January 31. She will begin with a brief lecture and then lead the public observing in the campus 16 inch telescope.

• **Communication: NASA SPACE DAYS, SOUTH TEXAS, Jan 14-17**

We completed a major trip to bring NASA science to URM students and communities in the Rio Grande Valley, to generally poor rural schools. On January 14, we brought a 6m “Discovery Dome” to Science Night at the Collins Parr Elementary School, San Diego (TEXAS), driving down from Houston. Prof. Penny Morris-Smith of the University of Houston – Downtown helped me with these events. From 5 - 7:15 pm we reached six groups of families (20 - 40 people) per showing, for a total of 180 mostly Hispanic

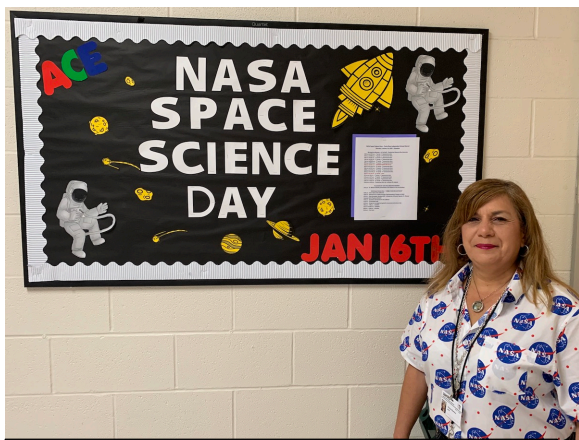


*Above: Collins Parr elementary students after the show; left: students in the dome*



Wild Ride” (2 groups of 40 students); 10:45 – 11:35: Pre-K: again “One World, One Sky” (2 groups of 40 students); 11:40 – 12:30: 5<sup>th</sup> grade: “Apollo and Beyond” (3 groups of 40 students).

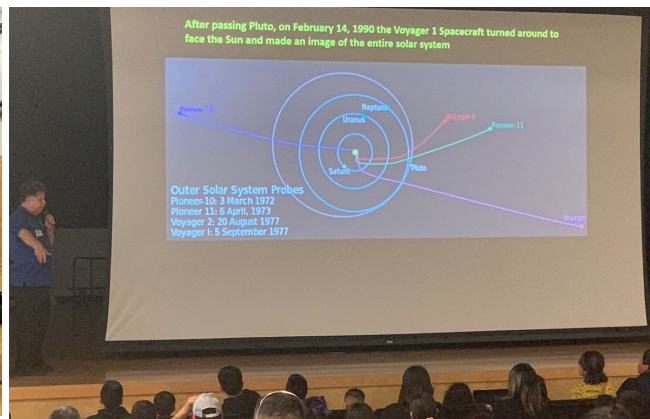
parents and children, with an abbreviated (14 minute) version of “Apollo and Beyond”, plus a quick star show of the evening sky. The next morning (Jan 15) we ran nonstop from 8 am to 12:30 pm, showing shows relevant to the age groups. 8:00 – 8:50: Kindergarten: showed a special little kids show “One World, One Sky” (2 groups of 60 students); 8:55-9:45 1<sup>st</sup> grade: again “One World, One Sky” (2 groups of 55 students); 9:50 – 10:40: 2<sup>nd</sup> grade: “Earth’s



*Above: Santa Rosa ACE program assistant Norma Martinez showing the schedule for the day*

On January 16, we participated in the “NASA Space Science Day” at Santa Rosa High School, organized by Javier Garcia. During the day we had sixteen showings of the abbreviated “Impact” to the high school students, along with a short live evening sky program (roughly 35 students every 23 minutes), then in the evening there was a special community event with Mike Zolensky of JSC giving a plenary talk on sample return missions to asteroids and comets. After the keynote, the participants in ten groups of 30 engaged in three of the ten activities, including making a dry ice comet, analyzing meteorites, and

viewing the “Impact” show in the dome. Several other local school districts participated, with a total of about 300 visitors (of which 90 came into the dome). Dean Muirhead from JSC and master teacher (and NASA Ambassador) Carol Lutsinger also participated in the event. Carol talked about the Stardust mission and showed them how to make a comet nucleus from dry ice, and Dean showed students his work in Human Space Flight Support and the Artemis Mission.



*Left: Santa Rosa High School students after a dome show. Right: Mike Zolensky of JSC speaking to the students about extraterrestrial sample returns from asteroids and comets.*

On January 17, we set up the dome at San Benito High School and reached eight groups of high school students (35-40 in each group), also showing the “Impact” show and a live star show. On January 18 we drove the 360 miles back to Houston.



*Left: San Benito High School students after a dome show. All of them fit in the 6 dome!*

Totals reached (*in person*)

<b>Location</b>	<b>Number of students (note: 99% Hispanic)</b>	<b>Number of community visitors</b>	<b>Number women/girls</b>
San Diego (elementary)	510	180	350
Santa Rosa (high school)	560	90	330
San Benito (high school)	280	0	140
<b>Total</b>	<b>1350</b>	<b>270</b>	<b>820</b>

## Rice Hosts 12<sup>th</sup> “Reach for the Stars” STEM Festival October 12, 2019

On October 12, the Department of Physics & Astronomy and Rice Space Institute, in conjunction with the Ride Family Foundation and scores of sponsor and volunteers, hosted its 12<sup>th</sup> “Reach for the Stars” STEM Festival, especially for middle school girls.

(<http://space.rice.edu/reachforthestars/>).

The 2019 festival hosted 502 girls, 132 teacher or parent chaperones, and 204 presenters, exhibitors, and volunteers.

The event began with a street fair from 11-1, with 28 exhibit booths covering a wide range of STEM activities. Principal sponsor Cheniere Energy had a popular booth demonstrating the LNG process.



*Above: Cheniere Energy Booth*



*Left: Lollie Garay with LabRats Robotics; above: Judy Dye with her solar telescope; right: new Space suit design from NASA*



Other exhibitors included NASA, Lunar and Planetary Institute, Baylor College of Medicine (TRISH and also the deBakey Dept of Surgery), Texas Space Grant, Mobile Aviation Lab, Solar System Ambassadors, Lab Rats Robotics, Houston Geological Society, American Chemical Society, Association of Women in Science, University of Houston and UH - Downtown, Costello Engineering and Celanese. Rice groups exhibiting included R-STEM, the Tapia Center, Association of Women in Math, Discovery Dome, Solar Telescope, Rice Physics, and Eclipse Club (Rice Rockets).



*Above: the girls enjoyed the talk on the quad in the beautiful weather*



The participants picked up their sack lunches (various sandwiches and snacks including vegetarian and vegan options) and ate under the trees. Water and fruit were provided by Gathering of Eagles.

At 1 pm the girls were captivated by a keynote speech by Dr. Ulyana Horodyskyj (Rice BS, 2007, Ph.D., University of Colorado), relating her experiences as founder of “Science in the Wild” and Commander of the HERA II NASA Mars simulated mission. The

*Left: Ulyana showing why her NASA nickname is “Skittles” with Prof. Patricia Reiff, lead organizer, enjoying the joke*

students asked her many very interesting questions about her life and experiences, and about how to apply to be an astronaut.

After the keynote, the girls attended two hands-on workshops led by women scientists, engineers, or physicians. There were 24 choices, and the girls signed up ahead of time to choose the workshops that were of most interest. Especially popular workshops were “Chemistry to Dye For” (UH); “Using a cantaloupe as a model for epidural placement” (Baylor College of Medicine) and two sessions of Mars Rovers.



*Left: girls making spectroscopes to view line emission; top: Mars robots from Space Center Houston; lower left: chemistry of dyes; lower right: speed racer design*



**Sponsors** We would not be able to host the event without the support of many companies and groups. We are especially grateful to: Cheniere Energy, the Ride Family Foundation, the Transitional Institute for Space Health (TRISH at Baylor); NASA Space Science Education Consortium; Gathering of Eagles, Association for Women in Science, Omega Engineers and several Rice departments and friends including the Department of Physics and Astronomy; the Dean of Natural Science; the Rice Space Institute. Individual donors included Prof. Neal Lane, Kimberly Harden, Doc Brown, Thomas Spencer, Louis & Elise McClutchen, Agustin Castillo, Dolores Garay, Jose Sankoorikkal, Salonica Carter, Armando Garcia, Aichi Lomeli, Elena Gloschen, Vanessa Kramer, Aretha Bruce-Belmar, and Tammie Soto. In all, over half of the participants were sponsored and paid no fees (we did collect a modest fee to cover lunch for those who could afford it).

We especially thank the many volunteers, presenters, and exhibitors without whom it could not have been held at all. The local organizing committee was Prof. Patricia Reiff and Umbe Cantú. Bear Ride helped with planning but was not able to attend this year.

**Feedback** We posted a survey for the participants. Thirty nine chaperones/teachers, which reflected 389 students responded, plus an additional 22 parents or students, making an amazing 81% response rate. We are delighted at the following statistics: On a five-point Likert scale (with 5 being the best), the participants rated the following:

Street festival: rated 4.22

Keynote speech: rated 4.28

Hands-on Workshops: rated 4.29

Average interest in STEM careers BEFORE the day: 65; Average interest AFTERWARDS: 74  
Because of preregistration, 95% of the girls we able to attend their first or second choice workshops. Overall, 89.7% rated the event as “excellent” or “very good”. The participants reflected the diversity of the city (Hispanic, white, black, Asian) but no specific ethnicity was recorded.

Comments from students on the keynote: *“I really liked how she told us how we can make a difference in our own young lives. She was very specific and told us how she did it at such a young age, and I loved how she gave this quote : ‘Dreams don’t work unless you do.’ That really inspired me to dream big and keep working towards my goals. :)”*; *“Dreams are achievable and fun”*; *“My daughter liked how the speaker persevered and made things happen for herself. She also loved how her interests allowed her to travel the world.”*; *“The fact of how she beat and competed with males in science fairs”*.

**History** The first Rice festival was held in 2006, at the request of Sally Ride, who was the first keynote speaker. It was originally called the “Sally Ride Science Festival”. Other keynote speakers have been Eileen Collins (2007); Peggy Whitson (Rice PhD 1985) (2008 and 2018); Ellen Ochoa (2009); Wendy Lawrence (2010 and 2015); Catherine Coleman (2011 and 2014); and Barbara Morgan (2013). In 2007



*Above: Peggy Whitson sending a message to the Sally Ride Festival participants in 2007. She returned in person in 2008 and 2018.*

Peggy Whitson (Commander of Expedition 16) sent a message to the girls from the ISS which can be viewed here

(<http://space.rice.edu/reachforthestars/RideFestival/whitson.mp4>).

**Thanks to our amazing 2019 Workshop presenters:**

1: "Texas in the Dark: Eclipses 2023/2024"	Prof. Patricia Reiff	Rice University	Astronomy
2: "Telling the Tales of Whales"	Dr. Beri Brown	U. of Southern Mississippi	Biology
3: "Chemistry to Dye For"	Prof. Elene Bohouhoutsos-Brown	University of Houston Downtown	Chemistry
4: "Fun With Chemistry"	Prof. Katie Miller	Rice University	Chemistry
5: "Fire and Ice: Volcanoes and Glaciers"	Dr. Ulyana Horodyskyj	Science in the Wild	Earth Science
6: "Spectroscopy of Light"	Alison Farrish	Rice University	Astronomy
7: "Mars Roving"	Dr. Valerie Payre	Rice University	Engineering Design
8: "Building Communities"	DeKecha Shepherd	Costello Engineering	Civil Engineering
9: "Magnetic Attraction and Electric Shocks"	Dr. Elizabeth Jensen	Planetary Science Institute	Physics
10: "Let's Walk on Mars"	Dolores Garay	Lab Rats Robotics	Planetary Science
11: "Fun with Math Logic"	Patricia McMorris	Milby High School	Mathematics
12: "Using a cantaloupe as a model for epidural placement"	Connie Tran, M.D. and Karlyn Powell, M.D.	Baylor College of Medicine	Medicine/Surgery
13: "Magnetic Fluids"	Prof. Lisa Biswal Sibani	Rice University	Physics/Nanotechnology
14: "Stardust: Capturing our cosmic friends & science you can do at home!"	Paige Graff / Julie Fooshee	Jacobs at NASA/ Johnson Space Center	Planetary Science
15: "The Physics of Butterflies"	Dr. Diane Wiernasz and Dr. Maya Reese	University of Houston	Biophysics
16: "Wind and Solar Energy"	Prof. Penny Morris-Smith	University of Houston Downtown	Physics/Energy
17: "Go Speed Racer"	Ericka Lawton	RSTEM, Rice University	Physics
18: "Apollo and Beyond"	Christine Boldt	Discovery Dome, Rice University	Space Exploration / Physics
19: "Exploring the Solar system"	Drs. Jennifer Gorce, Julie Stopar and Kennda Lynch	Lunar and Planetary Institute	Planetary Science
20: "Mars Rover 2020"	Laurie Newman	Space Center Houston	Planetary Science
21: "Spacesuits: Past, Present, and Future"	Dr. Kristine Davis	NASA/ Johnson Space Center	Human Exploration
22: "How do astronauts speak STEM? World languages on the ISS"	Aimee Roebuck-Johnson & Tony Vanchu	NASA/ Johnson Space Center	Human Exploration
23: "Orion Splashdown!"	Dr. Peggy Eddy	Texas Space Grant Consortium	Space Exploration
24: "Engineering Lab Tour"	Zane Zook / Janelle Clark	Rice University	Engineering