

Timmy Telescope Solar Astronomy Outreach



**Bringing Informal
Science to the
Public at No Cost**

- ***Museums***
- ***Schools***
- ***Parks***
- ***Libraries***
- ***STEM events***
- ***Conferences***
- ***Special Events***



2018 Summary

Special thanks to:

A special thanks to **Stephen W Ramsden** for his support, encouragement and friendship over the past several years. Timmy's programs would not have been as popular without his assistance.



We wish Stephen good luck with his new venture, ***Sunlit Earth***.

Clear skies buddy!

Roger, Linda & Timmy

WHERE WAS TIMMY IN 2018?

78
events in NM

- Albuquerque, NM
- Belen, NM
- Estancia, NM
- Glenrio, NM
- Los Alamos, NM
- Los Lunas, NM
- San Antonio, NM
- Santa Fe, NM

855 volunteer event hours*

*does not include travel time or set-up

27
events outside NM

- Arkansas
- Colorado
- Pennsylvania

7,826 volunteer miles



9 Library Events

17 Community Events

49 Museum Events

20 School Events

10 Park Events

105 events ~ 18,475 visitors

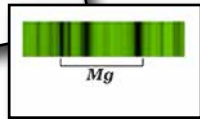
WHAT'S NEW THIS YEAR?



NEW BOARD

NEW SPECTROSCOPY BOARDS

- Spectroscopy History 1885-1927 featuring the Women of Harvard, known as the "Harvard Computers"
- Applications of Spectroscopy ALMA's analysis of NGC 253
- Expanded hands-on activity with spectroscope



new shirt for Timmy



NEW BOARD

NEW SIGN

SPECTROSCOPY: HISTORY 1885-1927

Harvard Observatory director Edward Charles Pickering hired over 80 women as technicians to perform scientific and mathematical calculations by hand. They became known as the "Harvard Computers".
This was more than 40 years before women gained the right to vote. They received global recognition for their contributions that changed the science of astronomy. Due to their accomplishments, they paved the way for other women to work in scientific and engineering careers.



WHAT DID THEY DO:

- They studied glass photographic plates of stellar spectra created by using a spectroscope. Using a simple magnifying glass, they compared positions of stars between plates, calculating the temperature and motion of the stars.
- They measured the relative brightness of stars and analyzed spectra to determine the properties of stellar objects.
- These plates were gathered from observatories in Peru, South Africa, New Zealand, Chile and throughout the USA.

Harvard University Plates Digitization Project
Harvard College Observatory's Plate Collection (also known as the Pickering Plates) is the world's largest archive of stellar glass plate negatives. Taken between the mid 1800s and 1900s, each a just 10x16cm, the collection grew to 100,000 and is currently being digitized.



WHAT DID THEY DO:

- "What, if not, but girls, may look the white and blue marks, and the spectrochemical measurements and analysis for the women computers on glass plates of stars and planets."

WHO WERE THEY:

- Some had college degrees, others received on the job-training. A few were permitted to receive graduate degrees for their accomplishments.
- They worked for 25 cents an hour, six days a week in a small cramped library.
- Many of these women received numerous awards and honors for their contributions. Notable among them were:
 - **WILLIAMINA FLEMING (1857-1911)** - developed the Pickering-Fleming Star Classification System. She classified 10,000 stars and discovered 57 novae, 52 novae including the November Auriga, and 310 new variable stars.
 - **ANTONIA MAURY (1866-1952)** - devised her own star classification system, but it was largely ignored as too cumbersome. She and Pickering discovered spectroscopic binaries.
 - **ANNIE JUMP CANNON (1863-1941)** - extended earlier schemes for classifying stars. Her method, now known as the Harvard Classification Scheme (OBAFGKM), is still used today. Throughout her 40 year career she classified almost 400,000 stars.
 - **HENRIETTA SWAN LEAVITT (1868-1921)** - focused on the brightness of variable stars. Still used today, her period-luminosity ratio became a reliable measure of stellar distances. Edwin Hubble used her work to describe an expanding universe.
 - **CECILIA PAYNE-GAPOSCHIN (1900-1979)** - discovered that stars are made mainly of hydrogen and helium. Also established that stars could be classified according to their temperatures, as well as their spectra.



FOR MORE INFORMATION
Classroom: How the Ladies of the Harvard Observatory Took the Measure of the Stars by Debra Solov

IT'S ALL ABOUT LIGHT!



Observing the Sun in different wavelengths





“
 My favorite part of your set up
 was the electromagnetic spectrum
 game. I enjoyed looking through
 the telescopes and seeing the sun's
 clouds. The periodic table was very
 informing and interesting. You guys
 are good at explaining the
 different things you presented.
 Thank you for coming. 🐶

~ 6th grade student



Several groups made their own Sun hats!



Timmy Telescope Solar Astronomy Outreach ~ 2018



PLAN B

No observing outside due to cloudy skies and rain, but plenty of activities inside.



Inside “observing” with an image of the Sun across the room. For many, this was their first experience using a scope.



The “UV Light detectors” changed color showing that you can get a sun burn on a cloudy day.

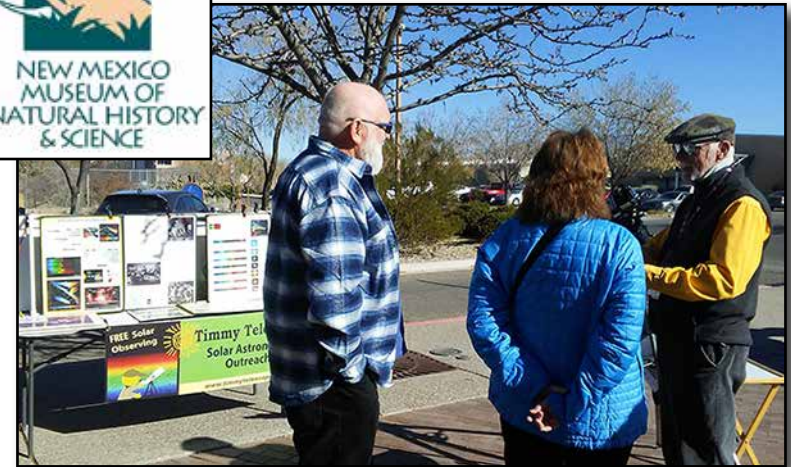
COMMUNITY EVENTS

- Astronomical League Midstates Conference, AR
- American Heart Association STEM-H Day, NM
- Central NM STEM-H Science Challenge, NM
- Colorado Springs Cool Science Carnival, CO
- Explora Chem STEM Day, NM
- Festival of the Cranes, NM
- Get Outdoors Day, PA
- G.I.R.L Extravaganza, NM
- Los Alamos Science Festival, NM
- National Night Out, NM
- Philadelphia Science Festival, PA
- New Mexico Science Festival, NM
- Rocky Mountain Star Stare, CO



MUSEUM VISITS

- Explora, Albuquerque, NM
- National Museum of Nuclear Science & History, Albuquerque, NM
- New Mexico Museum of Natural History & Science, Albuquerque, NM
- Rocky Mountain Dinosaur Resource Center, Woodland Park, CO



SCHOOL VISITS



- Albuquerque High School, NM
- ABQ School of Excellence, NM
- Ellicott MS, CO
- Emerson Elementary School, NM
- Inez Elementary School, NM
- Los Lunas Family School, NM
- Montezuma Elementary School, NM
- Oak Grove Classical Academy, NM
- Painted Sky Elementary School, NM
- Rt 66 Elementary School, NM
- School of Dreams Academy, NM
- Vanguard School, CO





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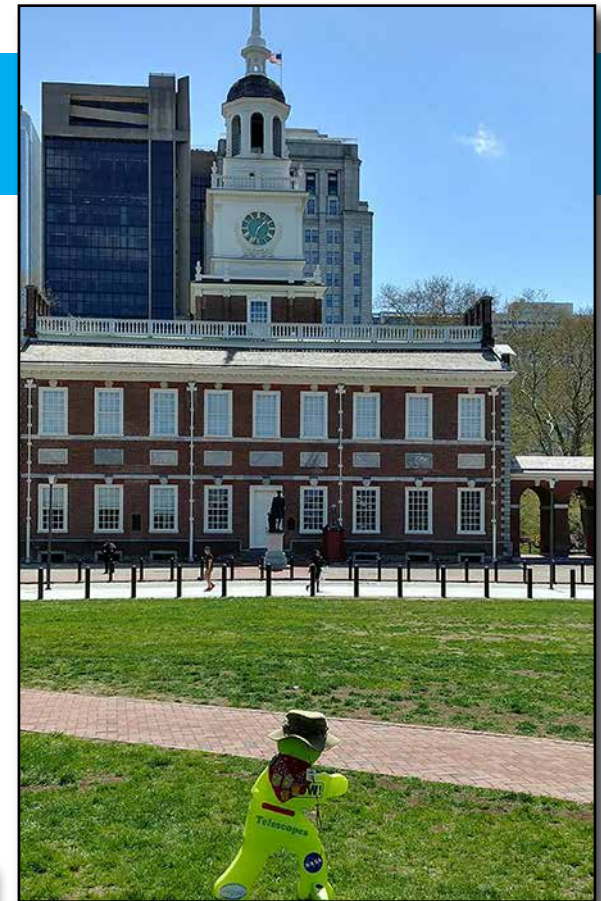
Thank you for the experience with the telescopes. It was exciting to look through a telescope for the first time. Although the telescopes were fun, I liked your posters too. They had a lot of information in them. ”

~ 6th grade student



PARK VISITS

- Clark Park, Philadelphia, PA
- Elena Gallegos Open Space, Albuquerque, NM
- Embudo Hills Park, Albuquerque, NM
- Garden of the Gods, Colorado Springs, CO
- Glenrio Visitors Center, Glenrio, NM
- Independence National Historical Park, Philadelphia, PA
- Petroglyph National Monument, Albuquerque, NM
- Whitfield Wildlife Conservation Area, Belen NM



LIBRARY VISITS

- East Library, Colorado Springs, CO
- Estancia Public Library, Estancia, NM
- Folcroft Library, Folcroft, PA

Free Library of Philadelphia, PA

- Cecil B Moore Library
- Oak Lane Library, Philadelphia PA
- Tacony Library

Santa Fe Library, Santa Fe, NM

- LaFarge Branch
- Main Library
- Southside Library



New activity showing the relative distance of the stars in the Orion constellation

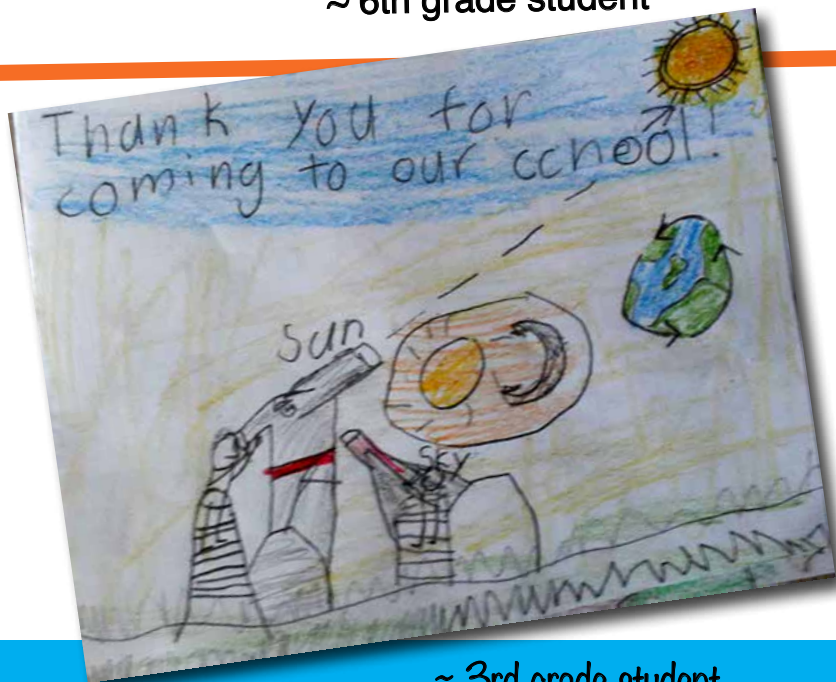
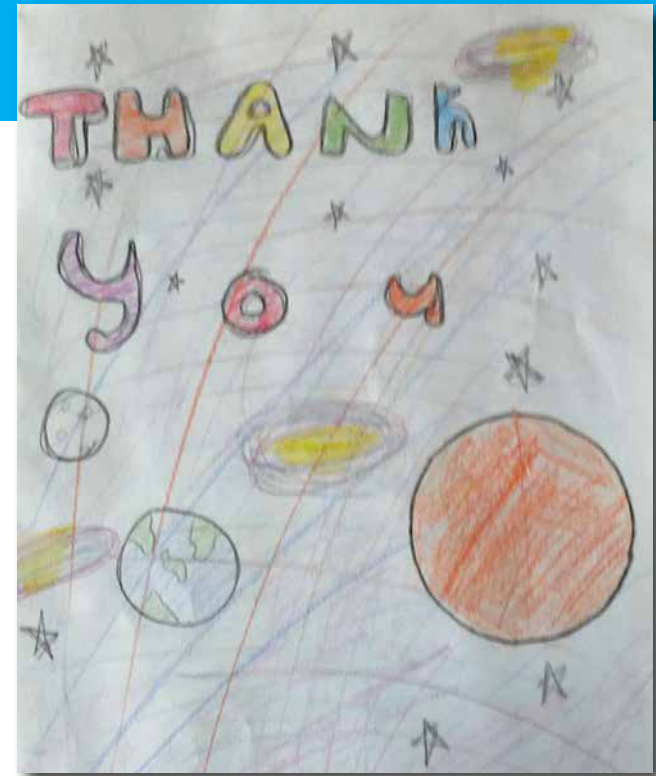


This is why we do outreach

“

Thank you Mr. Telescope for giving us the opportunity to try out the telescopes that were pretty amazing. I really enjoyed being able to see the sun live through a telescope. I feel I learned that the Sun is so important to us and that if we ever lost the sun Life wouldn't be the same in our lives. Once again I hope you give that experience to other students in the future to be able to experience what my class experience. 🙏

~ 6th grade student



~ 3rd grade student

“

Thank you for everything it was so amazing. It was so cool looking at the sun with those glasses and I'm gonna save those BEADS! Also it was facsincating. I want to be a astronomer when I grow up! 🙏

~ 4th grade student



more photos on *Where's Timmy*: www.timmytelescope.com/Timmy.html



“ I wanted to thank you both for the wonderful Solar Astronomy program that you presented at East Library on October 19, 2018, to our Homeschool audience. I know that kids and parents alike truly enjoyed the presentation, from the thoughtful and accessible introduction of the subject matter, to the fun of the UV-detecting bracelet activity, to the excitement of looking through solar telescope and spectroscope and into the sky. The information boards were also very much appreciated and pored over, particularly by our older students. I feel like I learned so much! 🐾

Librarian, East Library, Colorado



Timmy Telescope Solar Astronomy Outreach

2018

“ Thank you for educating us on the Sun and stars. Thank you for going out of your day to come out and show us the Sun from your amazing telescopes. Thank you for showing us the facts that we had never heard before. Thank you for making us feel like scientist studying the Sun. 🐾

Sincerely,
Avid students (9th grade)



Timmy Telescope Solar Astronomy Outreach 2011 - 2018

945 events ~ 171,270 visitors

11 states

- *Arkansas*
- *Arizona*
- *Colorado*
- *Idaho*
- *New Jersey*
- *New Mexico*
- *New York*
- *Oregon*
- *Pennsylvania*
- *Texas*
- *Washington*



6,934 volunteer event hours*

**does not include travel time or set-up*

**80,125+ volunteer
miles**

