NASA/HEAT Rice U Status Report – October 2021

Patricia H. Reiff, Rice University

- ***Underserved Student Event: Houston Hispanic students - Oct 2, 2021***

The Houston STEM event was held at the Lone Star Flight Museum on October 2. We had planned for 400 hispanic students plus adult chaperones (teachers or parents); however, with the pandemic, Houston ISD is not allowed to send the students to field trips via their busses. The parents or teachers had to bring them. This has meant that only 185 students and parents have pre-registered for the event, so we are changing our preparations appropriately. The event featured a tour of the museum and booths highlighting STEM careers, including engineering companies, the military, Metro, and Universities. Rain was forecast (and happened) so the exhibits were moved indoors, and there were some "no-shows" because of the weather. Lunch was provided to the students and their chaperones, thanks to the sponsors (West Point Alumni Association and Gathering of Eagles).

Photo: Dr. Reiff demonstrating the 3D magnetosphere and other magnetism demos to the GEOSTEMFEST.

The website was https://goestemfest.org and the registration closed September 27 with 185 registrations. The Rice booth demonstrated the 3D magnetosphere model and other physics demos, including a Wimshurst machine to generate sparks from turning a crank (that was very popular in the Reach for the Stars exhibit) and a demonstration of magnetic eddy currents using a large copper plate and a very strong magnet.

Each participant also received a pair of solar eclipse glasses and a flyer describing where to go for additional eclipse information – to our websites http://space.rice.edu/eclipse and http://texaseclipse.net

Participants:
Students: 185   (100% economically disadvantaged, 95% Hispanic)
Parents and teachers: 45 (60% Hispanic)
Exhibitors: 45
Informal Educators: 6
Materials distributed: eclipse glasses and handouts (200 each) (glasses paid for by corporate partner MTPE, Inc.)

- *Annular*

Eclipse and Artemis Animations Now Being Distributed

The final annular and Artemis animations, created by famed artist Don Davis using realistic models and lunar textures, are now complete and posted to the websites in small "preview" size, which is accessible from our eclipse animation web page or directly from YouTube. These are now available free to planetarians and the public in resolutions up to 4K.
We sent out notices to our eclipse planetarians list and have provided digital copies to 43 planetariums and other educators so far.

Planetarians can sign up to get any of our animations for free here:
https://forms.gle/sS8q31qFSDRnhnbX7

Annular eclipse animation info and links: https://space.rice.edu/eclipse/eclipse_animations.html
Note the links to the individual pieces have changed from last month since we now added audio and subtitles.

1. "Annular Eclipse Geometry": Animation of the geometry of an annular eclipse, showing the umbra not quite touching the earth, leaving only the penumbral shadow.
   Fisheye: https://youtu.be/fGOlglFmwFo
   Flatscreen: https://youtu.be/PI8Ayp7mKC0

2. "Annular Eclipse Closeup View": A closeup of the phases of the annular eclipse, much like the "Total Eclipse from the Earth" We did two versions of this – this one with moving clouds and a dark area to represent a hand-held solar filter. This one is the cloud version:
   Fisheye: https://youtu.be/jOM6SlpHQvc
   Flatscreen: https://youtu.be/icHkUeuiCp4

   "Annular Eclipse Filtered View": Same as #2, but with entire background black, as if you are looking through a filtered telescope or binoculars. No clouds cross the sun.
   Fisheye: https://youtu.be/9Dbr5cniyJQ
   Flatscreen: https://youtu.be/PS0QurWI6XY

ANIMATIONS (PREVIEW SIZED)

Annular Eclipse geometry
animation shows the umbra not quite reaching the earth, then swings camera to look at the moon covering most of the Sun, leaving a ring

720x720 fisheye MP4 | 1280x720 flat MP4

Annular Eclipse closeup view
animation shows shows the filtered eyepiece view with the clouds moving with halo rainbows. Like one might see by holding a piece of solar filter against the sky. Sky darkens during annularityg

720x720 fisheye MP4 | 1920x1080 flat MP4

Annular Eclipse filtered view
animation shows filtered eyepiece view of an annular eclipse but with only the black background (i.e. view with eclipse glasses on)

720x720 fisheye MP4 | 1920x1080 flat MP4

Recipients of the animations October 2021:
43 Educators from Zip codes: 93291, 53233, 44028, 08816,77072, 91706, 26038, 19611, 06355, 02360, 70802, 49707, 78250, 14221, 96778, 77459, 94582, 90713, 08028, 24142, 78249, 79714, 32504, 53711, 03240, 48708, 77023, 20865, 29732
International Educators from: India, UK, Japan, France, Canada, Peru and Poland
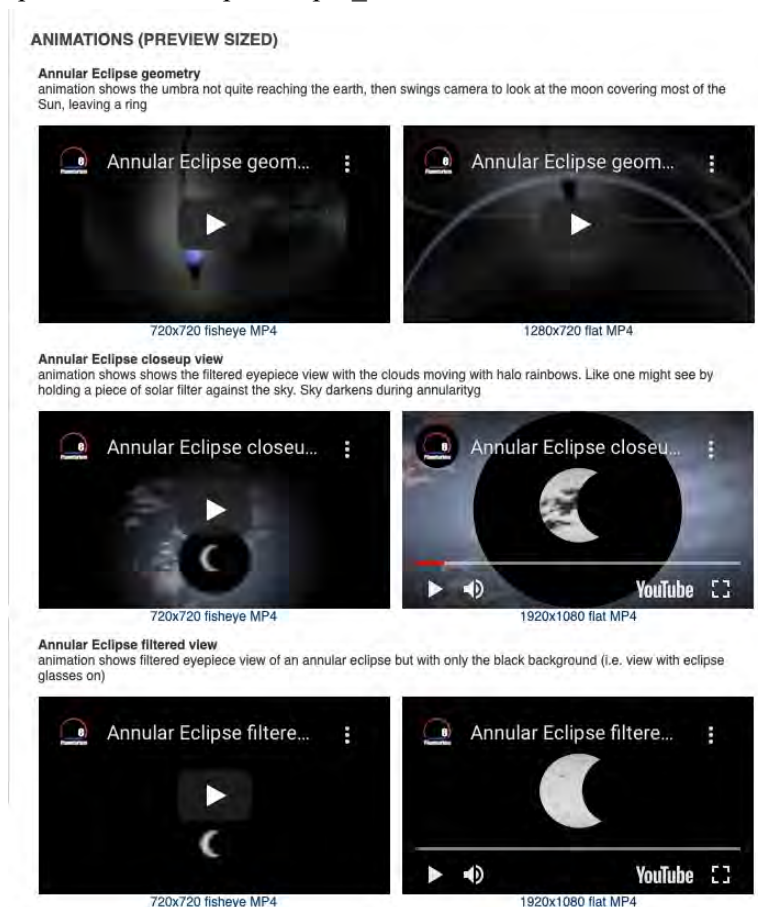
• *Keynote Eclipse Presentation to "All Houston Astronomy Clubs" (virtual) October 15*

Reiff was the keynote lecturer for the "All Clubs" night (where all 9 Amateur Astronomy clubs in the greater Houston area (from Clear Lake to Humble to Fort Bend County) meet together. This year it was virtual, and Reiff gave a talk on solar and lunar eclipses.

Participants:
General Public: ~65 amateur astronomers
Formal and Informal Educators: 20 (estimated)
(Few if any economically disadvantaged)
Almost half women.

• *International Observe the Moon Night October 16*

Reiff hosted the Rice University "Observe the Moon Night", with a lecture on solar and lunar eclipses starting at 6 pm, then observing the moon and other solar system objects starting at 7:30 pm to 10 pm. https://www.meetup.com/Houston-Secret-Science-Club/events/280947735.

Participants:
Eclipse lecture: ~45 in the eclipse lecture and at the telescope
(general public, students and families)
Observing only: additional ~45 for telescope viewing only
(general public, students and families)
Educators: 6
Roughly half women; few disadvantaged

• *Space Weather Forecast Website.*

We have finished rewriting all our image generating scripts for the space weather forecast pages. The forecast page is: https://mms.rice.edu/forecast.html and the solar wind input page is here: https://mms.rice.edu/realtime.html.

Unfortunately, at times the time codes on the live data from NOAA are bogus which makes the plots look very strange. This apparently is caused by one of their ancillary data servers. We have communicated to them the problem but it still occurs occasionally. We now have a work-around to ignore data points with non increasing time stamps. .

• *New version "Space Weather" software for Mac*
We have created a new version of the Space Weather software to get it to run in 64 bits on newer Mac's. (Our standard version runs on all Windows machines but not Mac Catalina or higher). The software is described at https://mms.rice.edu/spaceweather_software.html . We now have a functioning version available for download on request, although it makes the download package larger (by about 500 MB), since it effectively includes a runtime version of Windows. It is being tested by our teachers before we release it to the public. So far it looks very promising.