NASA/HEAT Rice U Status Report – September 2021

Patricia H. Reiff, Rice University

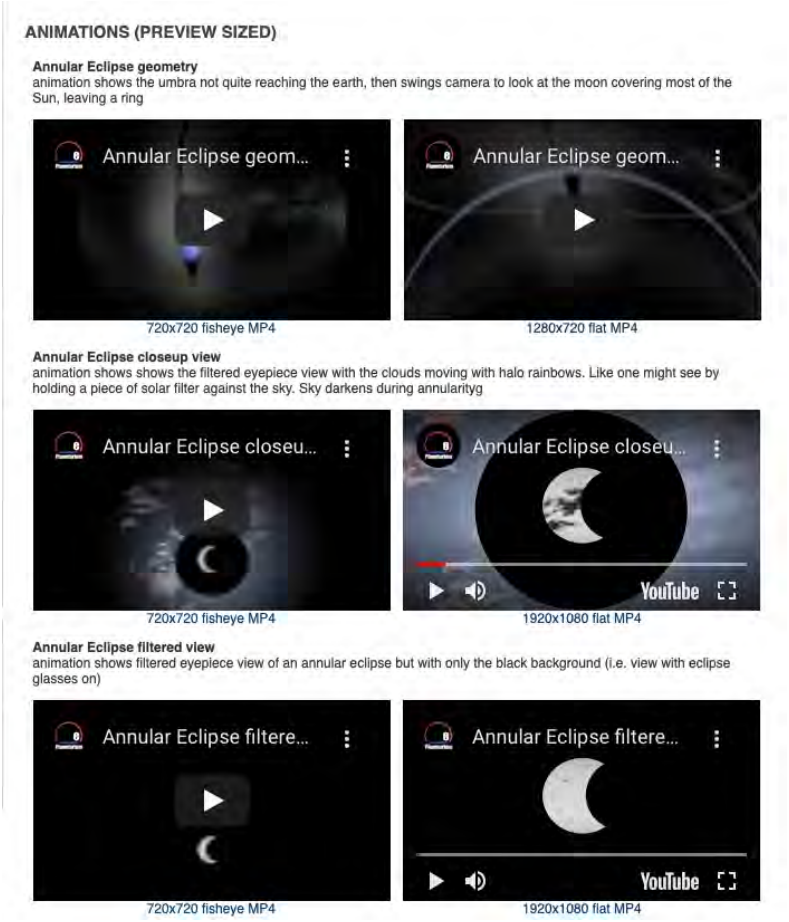
- ***Underserved Student Event: Houston Hispanic students***

Final preparations have concluded for the Houston STEM event at the Lone Star Flight Museum, scheduled for 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 busses. The parents or teachers will have 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 will feature a tour of the museum and booths highlighting STEM careers. Rain is forecast so the exhibits are being moved indoors.

The website is set up https://goestemfest.org and the registration closed September 27 with 185 registrations. The Rice booth will demonstrate the 3D magnetosphere model and other physics demos, including a Wimshurst machine (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.

- ***Annular Eclipse and Artemis Animations Complete***

The final animations, created by famed artist Don Davis using realistic models and lunar textures, were reviewed and 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 will will be free to planetarians and the public in resolutions up to 4K.



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

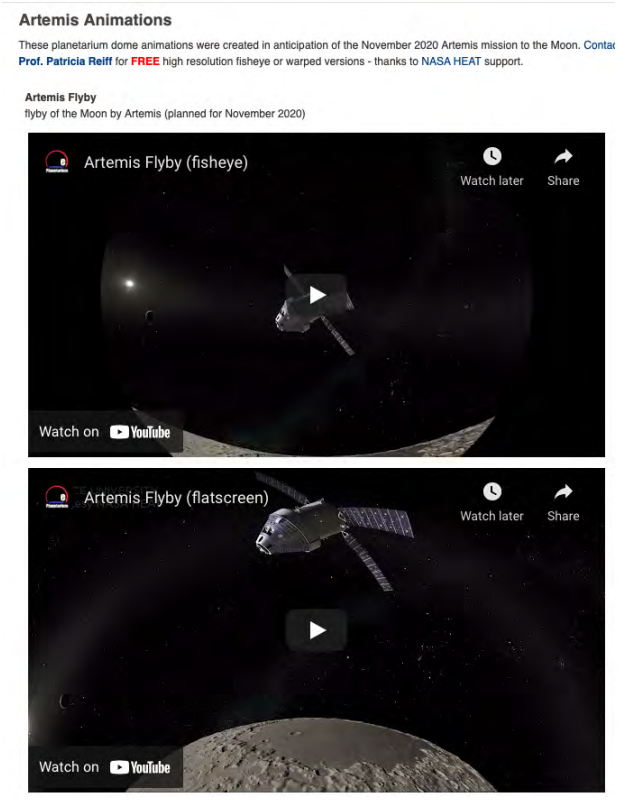
Annular eclipse animation info and links:
https://space.rice.edu/eclipse/eclipse_animations.html

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/sD-stcwnhls
   Flatscreen: https://youtu.be/YhnpQyPOGHU

2. “Annular Eclipse Closeup”: A closeup of the phases of the annular eclipse, much like the “Total Eclipse from the Earth” (https://space.rice.edu/eclipse/eclipse_animations.html. 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/Zr7aLg7hnX8
   Flatscreen: https://youtu.be/icHkUeuiCp4

3. “Annular Eclipse Filtered”: Same as #2, but with entire background black, as if you are looking through a filtered telescope or binoculars.
   Fisheye: https://youtu.be/rlBeGORNH4s
   Flatscreen: https://youtu.be/m90wc4HOWRU

Artemis animation info: https://space.rice.edu/artemis/artemis_animations.html
These were created by Don Davis using HEAT funding through Rice University. He obtained a model of the Artemis spacecraft and used realistic DEM and texture maps for the moon.



1. An animation of the Artemis flyby of the Moon.

   Fisheye:
   https://youtu.be/vzc0VGcVu1Q

   Flatscreen:
   https://youtu.be/FtZXTDLsTGk

2. An animation of the Artemis orbital path. Basic path taken from NASA websites and put into 3D background.

   Fisheye: https://youtu.be/bZLapstc9kI

   Flatscreen: https://youtu.be/OyHKQ16B9iY

• ***"Space@Rice - a Personal History" Presentation to SpacePort Lecture Series***

Reiff presented the first "in person" SpacePort lecture of 2021-22, on September 17. She talked about the early history of the space program at Rice and her experiences as a graduate student during Apollo and her heliospheric research and outreach of the past 50 years, including the Founding Director of the Rice Space Institute 2000-2012. The lecture can be viewed here: https://youtu.be/oL_r5uhbNP0

Participants:
In person: ~60 in the live audience (general public)
Live via Zoom: 42 (general public)

- ***Eclipse Presentation to Planetarians***

Reiff has now made a full dome and flatscreen presentation on the upcoming eclipses that can be used in planetariums and schools. She gave a sample 45-minute presentation to the "LIPS" conference ("Live Interactive Planetarium Society") via Zoom on September 23. She will be doing two more presentations in October. The Zoom had 48 attendees and was recorded for playback to other members who could not attend in person.

Participants: 48 Colleagues (informal science educators). Maybe 60% women.

- ***Outreach Presentation to Rice University K-12 Council***

On Sept 15, Reiff gave a 20 minute presentation on "Space Outreach at Rice", which highlighted our work with NSSEC and now HEAT.

Participants: 34 Colleagues (formal science educators). Maybe 60% women; at least 4 black and 6 hispanic.

- ***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. Otherwise, the predictions using DSCOVR data input are still quite good and correctly predicted two Kp 5 storms in September.

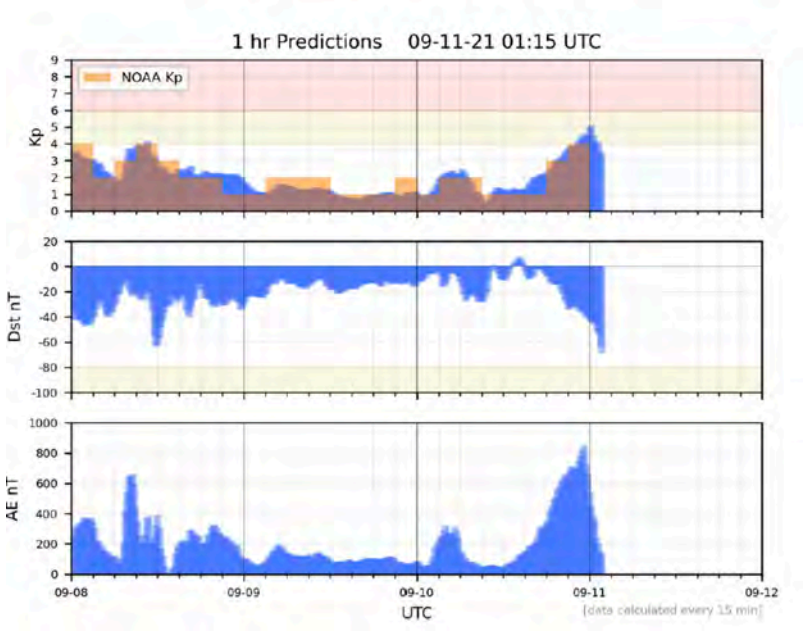


Figure: Succesful prediction of a Kp5 storm on Sept 11.

• ***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 made available to our teachers to test out before we release it to the public. So far it looks very promising.