

# Out-of-this-World Engineering

**September 26, 2018**

**Presenters: Brooks Mitchell and Keliann LaConte**

The webinar will begin at 2:00 p.m. (MT) and will be recorded.

**While you're waiting:**

- 1) Introduce yourself in the chat box
- 2) Click audio "Join by Computer" – you won't have microphone access
- 3) On the bottom toolbar, click on "Chat" and "Q&A"

# Today's Agenda

- Introduction and Reminders
- Hands-on Activity #1: “Soda Straw Rockets”
- Hands-on Activity #2: “Mars Engineering”
- Hands-on Activity #3: “Eggstronaut Drop”
- Q&A

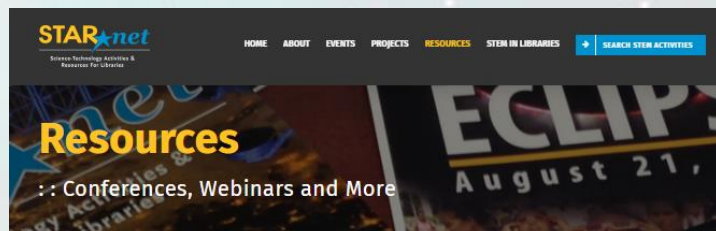
# Poll Question

- Introduction and Reminders
- Hands-on Activity: “Crater Creations”
- Vivian White (Astronomical Society of the Pacific)
- A Quick Look at Lunar Trek
- Q&A



# Join STAR Net!

[www.starnetlibraries.org](http://www.starnetlibraries.org)




Professional development  
resources, including webinars,  
newsletters, blogs, forums, videos,  
and much more!

**Curated Resources For Professional Development**


Building the capacity of public libraries and library staff to deliver engaging, inspirational, and educational STEM programs has the potential to transform the STEM education landscape across the country. What started in libraries some years ago as independent experiments in STEM programming has become a national STEM movement.

Across the country, libraries are redefining their roles. They're becoming primary centers of informal learning, especially STEM learning. And this critical transition is being carried out by many dedicated librarians. To help them, the STAR Library Education Network (STAR\_Net) is providing resources to support their efforts to develop new skills and provide quality STEM programming.


*Collaboration is the key to transforming libraries into STEM learning centers*




Conferences




Webinars




Newsletters




Online Forums




STAR\_Net Blog




2017 Solar Eclipse



Exhibition Posters



Books, Videos & More!



Guides, Facts & Tips

**Recent Blogs**

- Watercraft Design
- The Dirt on Soil
- Do You Have Your Solar Eclipse Glasses? Great – Now Try Them Out!

**Upcoming Events**

- Discover NASA Exhibition (AZ)  
May 3 - July 28
- Summer Learning - Build a Better World  
May 15 - August 31
- Discover Tech Exhibition (CO)  
May 31 - August 25

[View All Events](#)

# STEM ACTIVITY Clearinghouse

For example:  
[DIY Sun Cookies](#)

STEM Activity Clearinghouse

Search

STARnet Science-Technology Activities & Resources For Libraries

CS Cornerstones of Science awakening curiosity, enriching lives

Collections 2017 Total Solar Eclipse

ATTRIBUTES

2017 TOTAL SOLAR ECLIPSE There are 7 items.

Showing 1 - 7 of 7 items

**Content Area**

- ☐ Earth Science (0)
- ☐ Astronomy and Space (0)
- ☐ Chemistry (0)
- ☐ Physics (0)
- ☐ Engineering (0)
- ☐ Mathematics (0)
- ☐ Technology and Computing (0)
- ☐ Health Science (0)

**Age Group**

- ☐ Family (0)
- ☐ Infant (0-2) (0)
- ☐ Pre-K (0)
- ☐ Early Elementary (0)
- ☐ Upper Elementary (0)
- ☐ Tweens (9-12) (0)
- ☐ Teens (0)
- ☐ Adults (0)

**Time to Complete Activity**

- ☐ Under 10 minutes (0)
- ☐ 10-20 minutes (0)
- ☐ 20-40 minutes (0)
- ☐ 40 minutes to 1 hour (0)
- ☐ 1-2 hours (0)
- ☐ 2-4 hours (0)
- ☐ Long Duration (days to months) (0)

**How Big, How Far, How Hot, How Old?**

This is an activity about scale. Participants will arrange imagery of Earth and many other space objects in order of their size from smallest to largest, their distance from Earth's surface, their temperature from coolest to hottest, and/or their age from youngest to oldest.

[Open Activity](#) Report broken link

**Content Area**  
Earth Science  
Astronomy and Space

**Age Group**  
Family  
Upper Elementary  
Tweens (9-12)

**Time to Complete Activity**  
10-20 minutes

**Difficulty Level (by content)**  
Medium

[View Details](#)

**How Can the Little Moon Hide the Giant Sun?**

This is an activity exploring the concept that distance affects how we perceive an object's size, specifically pertaining to the size of the Sun and the Moon as seen from Earth.

[Open Activity](#) Report broken link

**Content Area**  
Earth Science  
Astronomy and Space

**Age Group**  
Early Elementary  
Upper Elementary

**Time to Complete Activity**  
40 minutes to 1 hour

**Difficulty Level (by content)**  
Easy



Like an activity and think other library staff should know how great it is? Didn't like an activity or have modifications to make it better? **Make sure to leave a review!**

# Upcoming Conferences

[www.starnetlibraries.org/resources/conferences](http://www.starnetlibraries.org/resources/conferences)

- **Association of Science and Tech Centers (ASTC)**
  - 9/29 – 10/2
- **New Mexico Library Association Conference Pre-Conference**
  - 10/31
- **Young Adult Library Services Association (YALSA)**



# Night Sky Network



Find a club:

<https://nightsky.jpl.nasa.gov/clubs-and-events.cfm>

# Solar System Ambassadors



- NASA Milestones
- Speakers
- Hands-on Activities
- Celestial Viewing
- Your suggestions...

<https://solarsystem1.jpl.nasa.gov/ssa/home.cfm>





Contact ASCE at [outreach@asce.org](mailto:outreach@asce.org)

# FREE STAR Net Resources

*(take a picture of this slide!!)*

**175+ Activities Specifically for #STEMINLIB**

<http://clearinghouse.starnetlibraries.org/>

**Upcoming and Archived Professional Development  
Webinars**

<https://www.starnetlibraries.org/resources/webinars/>

**Monthly Newsletter**

<https://www.starnetlibraries.org/resources/newsletters/>

**Upcoming STEM Events**

<https://www.starnetlibraries.org/upcoming-events/>

**STAR Net Blog (for library staff and written  
by library staff!)**

<https://www.starnetlibraries.org/blog/>

**Partnership Resources**

<https://www.starnetlibraries.org/stem-in-libraries/collaboration/partnership-opportunities/>

**Community Dialogue Resources**

<http://www.starnetlibraries.org/resources/community-dialogues/>



A full-page background image showing an astronaut in a white spacesuit standing on the lunar surface. The astronaut is facing away from the camera, looking towards the horizon. To the left, an American flag is planted in the ground. The ground is covered in footprints and lunar dust. The sky is a deep black.

# What's Next?

## **Universe of Stories**

Summer 2019

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*NASA@ My Library* and *STAR Net* are partnering with the Collaborative Summer Library Program to support 16,000 libraries.

**Please join us!!**



# A Universe of Stories – 2019

## Summer Reading

- Summer Reading Theme Webinar Series
  - *Universe of Stories Kick-off Webinar: Week of October 22nd*
- Space Science Activities
- Universe of Stories Clearinghouse Collections
- Multimedia Resources
- Professional Development STEM Resources

# InOMN – 10/20/18

InOMN Webinar

[www.starnetlibraries.org/resources/webinars](http://www.starnetlibraries.org/resources/webinars)

Free InOMN Poster

<https://moon.nasa.gov/resources/173/international-observe-the-moon-night-poster/>

Register your program!

- <https://moon.nasa.gov/observe-the-moon/register/>

Upcoming InOMN Dates:

- October 20, 2018
- October 5, 2019
- September 26, 2020



# Engineers and Space

## Education and Experience Requirements and Basis of Ratings

### Basic Education Requirements for All NASA AST Positions:

**“Only rocket scientists work at NASA”**

Successful completion of a graduate professional or doctoral program or unconditional acceptance for university admission to a graduate program with a plan of study in an appropriate field of engineering (not engineering technology), physical science, life science or mathematics is required. The degree must include or be supplemented by course work appropriate to the AST specialty for which application is made; refer to the section, "Appropriate Fields of Study," under each AST specialty. (In some cases a graduate degree in an appropriate field or unconditional acceptance as a candidate for an advanced degree in an appropriate field by an accredited institution may be submitted. For applicants qualifying on the basis of graduate education and/or experience, any of the undergraduate majors shown below is acceptable if the required graduate study and/or professional experience is closely related to this type of work and provides the knowledges, skills and abilities required in the position being filled.)

### General Listing of Appropriate Academic Fields of Study for Aerospace Technology Positions:

Aeronautical Engineering	Geophysics
Aeronautics	Industrial Engineering
Aerospace Engineering	Materials Engineering
Astronautical Engineering	Materials Science
Astronautics	Mathematics, Applied or Pure
Astronomy	Mechanics, Applied or Engineering
Astrophysics	Mechanical Engineering
Biomedical Engineering	Metallurgical Engineering
Ceramic Engineering	Metallurgy
Ceramics	Meteorology
Chemical Engineering	Nuclear Engineering
Chemistry	Nuclear Engineering Physics
Civil Engineering	Oceanography
Computer Engineering	Optical Engineering
Computer Science*	Physics
Earth and Planetary Science	Physics, Applied or Engineering
Electrical Engineering	Space Science
Electronics Engineering	Structural Engineering
Geology	Welding Engineering

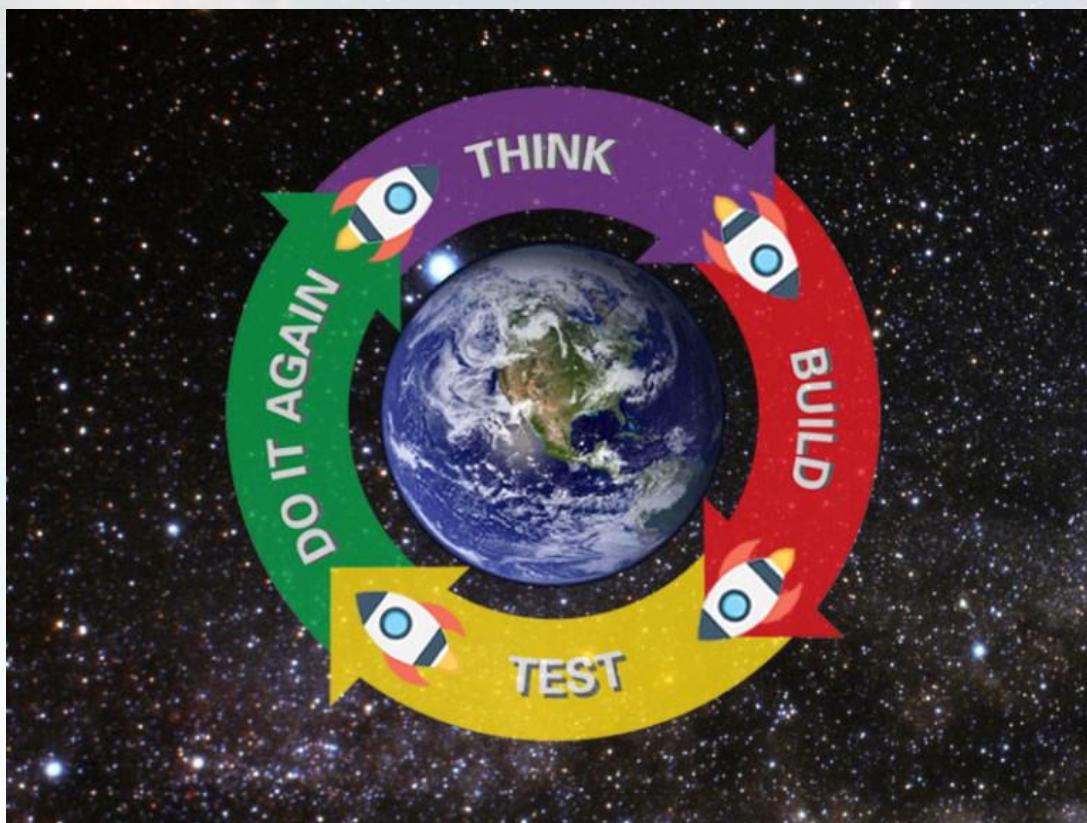


# Rubik Sheth – Faces of Space Tech

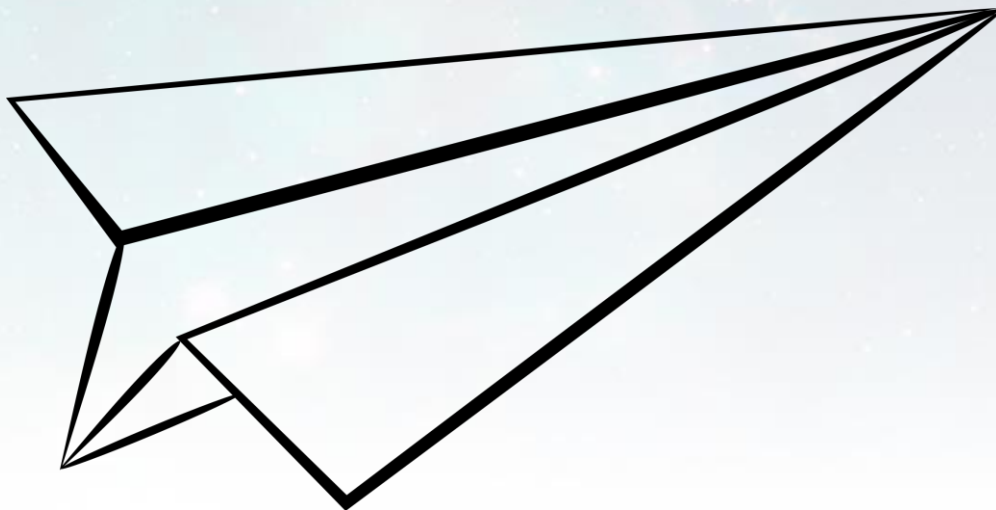
**Rubik Sheth**

Project Manager, Advanced  
Thermal Technologies

# Engineering Design Process ...in SPACE!



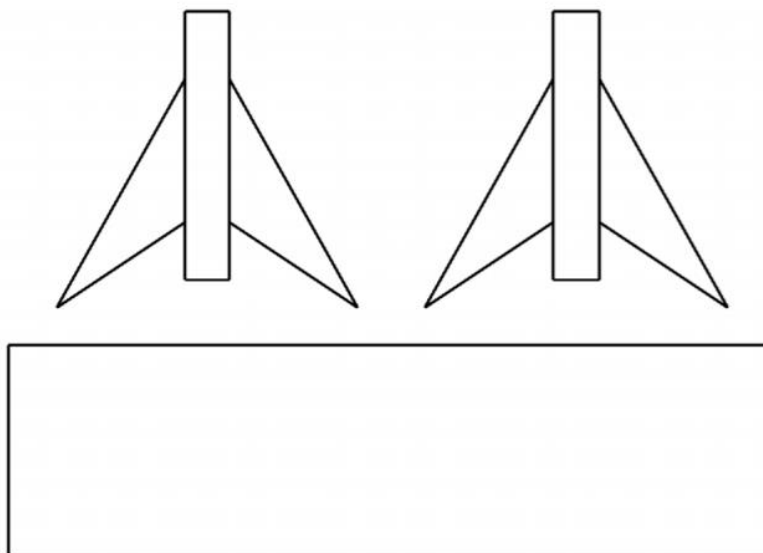
# **What is a simple engineering activity you can do with just a piece of paper?**





# Soda Straw Rockets

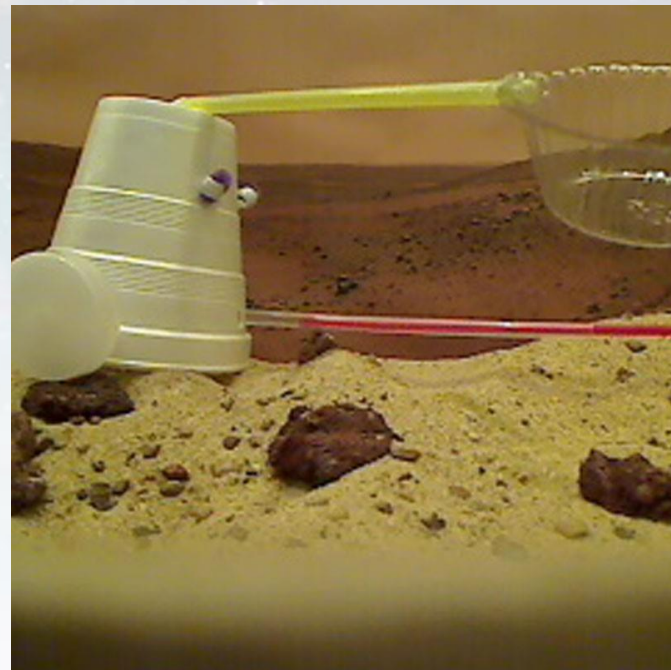
- **Materials**
  - Rocket template
  - Pencils
  - Scissors
  - Tape
  - Straw
- **Design Challenge**
  - Create a rocket that can be launched from a soda straw
  - Modify the design to see how the changes impact the rocket performance.



# Mars Engineering

Each team's mission is to design and build a rover out of the materials available that can pick up, move, and set a rock down into a (fake) scientific instrument on the rover body, like the Sample Analysis at Mars (SAM) instrument onboard the Curiosity rover.

This test will mimic a function that may be used by a real rover, such as Curiosity, as it explores and tests rock samples.



# Mars Engineering Materials

*Mandatory:* variety of tape, scissors, markers, glue, foil, 3 small rocks

*Miscellaneous Craft and Everyday Items:* Straws, pencil top erasers, beads of various sizes, foil cupcake holders, screens, wooden miniatures, aluminum foil, plastic wrap (of all colors), old CDs, pipe cleaners, toothpicks, wire, wire cutters, Legos, construction paper (variety of colors, black), tinsel, ribbon, fabric, gauze, wood dowels/skewers, rubber bands, shiny streamers, etc.

*For Rover Wheels:* Wooden spools, large buttons, bottle caps, plastic cups (sturdy), empty (clean) Play-Doh® containers, old CDs, etc.

*For Rover Body:* Pint-sized milk containers, coffee cans, soup cans (tape any sharp edges), paper or Styrofoam cups, or other objects for the spacecraft body, empty DVD cases, black plastic or biodegradable seedling (plant) trays, empty egg cartons, cereal boxes, 2-liter soda bottles, different-sized Styrofoam blocks, other empty plastic or cardboard containers/boxes, etc.



# **Tips for Engaging Girls in STEM**

- Encourage a growth mindset.
- Praise children for their effort (not intelligence).
- Encourage children to persist despite obstacles.
- Expose children to successful role models in math and science.
- Provide opportunities for developing spatial skills.

# Erik Ordñez, Materials Engineer



# Eggstronaut Drop



View larger

## Eggstronaut Drop

In this classic activity, patrons engineer a space capsule that will protect an egg that is dropped from a specific height.

[Open Activity](#)

[How-to Video](#)



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[Send to a friend](#)

[Print](#)

### Content Area

Astronomy and Space  
Engineering

### Age Group

Family  
Upper Elementary  
Twins (9-12)  
Adults

### Time to Complete Activity

40 minutes to 1 hour

### Time needed to prep Activity

10-20 minutes

### Cost associated with Activity Materials

\$5-\$10

### Difficulty Level (by content)

Medium

### Mess Level

High

[Report a broken link](#)

[Categorized Incorrectly? Let us know!](#)



# Eggstronaut Drop Materials

- Raw Eggs
- Hard-boiled eggs (or plastic eggs)
- Paper, Pencils, Markers, crayons
- Construction materials, such as: straws, cardboard, packing material, Styrofoam, meat trays, egg cartons, string, rulers, paper towels, garbage bags, cotton, toothpicks, Dixie cups, sandwich bags, ziploc bags, cloth, etc.
- Scissors
- Tape
- Drop Cloth
- Ladder (or balcony)
- Paper Towels
- Weighing scale (optional)