Primary Contact: Dr. Brad N. Barlow, 363 Congdon Hall, Email: bbarlow@highpoint.edu

Description: A public outreach event focused on exposing Triad families and kids to astronomy and science through various interactive learning stations.

Website: [physics.highpoint.edu/~bbarlow/hpuniverse.html](physics.highpoint.edu/~bbarlow/hpuniverse.html)

Station Descriptions: (under construction—email Barlow if you need specific station info. quickly)

1. **Various Kids Activities & Crafts:** Younger kids will create simple artistic works representing various astronomical objects.

   **Station Leader Instructions:** This is a come–and–go station. Help kids draw pictures of stars, galaxies, and other objects using crayons, markers, glitter/glue, etc.

   **Preparation Required:**

   **Useful Link:**

2. **Spectroscopy Demo:** Visitors will explore the spectra of several excited gas tubes using diffraction grating glasses.

   **Station Leader Instructions:** This is a come–and–go station. (Further instructions will be provided later.)

   **Preparation Required:**

   **Useful Link:**

3. **Astronomy Jeopardy!** Guests can test their knowledge of astronomy and space in this Jeopardy-styled game and win prizes.

   **Station Leader Instructions:** This is a come–and–go station. You will use a laptop and PowerPoint presentation to display a series of questions to guests that looks just like the Jeopardy board. Visitors will select questions and try to answer them. To select a question on the main game board, move the cursor over one of the stars until the cursor turns into a little hand, and then click it. You’ll be taken to a slide with the question. To advance to the next slide showing the answer, move the cursor towards the edge of the slide until the hand appears, and click the mouse (or use the down arrow key). To return to the game board, once again move the cursor towards the edge until the hand appears and click the mouse. It works in PowerPoint 2011, but it doesn’t seem to work properly in PowerPoint 2008 for some reason. If they get enough correct answers, they can take one of the prizes off the table (how many correct answers are needed for a prize is up to the station leader, but be relatively lenient).

   **Preparation Required:** Once you are assigned to this station, download a copy of the Jeopardy! PowerPoint presentation using the link below to your laptop. Make sure you understand how to operate the PowerPoint (or Keynote) presentation. Note that the presentation works in PowerPoint 2011, but it doesn’t seem to work properly in PowerPoint 2008 for some reason. If you can’t get it to work on your laptop, you can use Barlow’s laptop during the event (email him about this). Make
4. **Astro Movie Theater** Visitors will watch a short video clip.

**Station leader instructions:** Viewings will be scheduled every 30 minutes (see schedule). At the start time, introduce yourself to the crowd, and give them an overview of the video they are about to watch.

**Preparation required:** Watch the video ahead of time; understand what you’re seeing in the video; prepare introductory statements; learn how to operate the project/video/computer in the station room.

**Video Links:**
- Cosmic Voyage: [https://www.youtube.com/watch?v=qxXf7AJZ73A](https://www.youtube.com/watch?v=qxXf7AJZ73A)
- Death by Neutron Star [https://www.youtube.com/watch?v=l9Ort_CL1VQ](https://www.youtube.com/watch?v=l9Ort_CL1VQ)

5. **Water Bottle Rockets:** Visitors explore some of the simpler ideas behind rocketry by launching a water bottle “rocket” to >100 ft.

**Station leader instructions:** This is a come–and–go station outside Congdon Hall. (Further instructions will be provided later.)

**Preparation required:** Understand how the water bottle rocket works and why the propulsion behind an actual rocket (think Saturn V) is different. (Further instructions will be provided later.)


6. **Robotic Telescope Observing:** Visitors can take their own images using telescopes around the world (in real time!) and look at them using the SKYNET web interface.

**Station leader instructions:** This is a come–and–go station. (Further instructions will be provided later.)

**Preparation required:** (Further instructions will be provided later.)

**Useful Link:** [skynet.unc.edu](http://skynet.unc.edu)

7. **Make Your Own Comet:** Visitors will watch (and possibly help) the station leader(s) make a ‘comet’ out of dry ice, water, ammonia, and dirt.

**Station leader instructions:** This is a come–and–go station. (Further instructions will be provided later.)

**Preparation required:** (Further instructions will be provided later.)

**Useful Link:** [https://www.youtube.com/watch?v=OGIAU2DkexE](https://www.youtube.com/watch?v=OGIAU2DkexE)

8. **Crater Demonstration:** Visitors will understand how craters are formed by throwing rocks into a container of flour/Ovaltine.

**Station leader instructions:** This is a come–and–go station. Have visitors (mostly kids) throw rocks into the container at different speeds and angles. Point out the differences in the craters as these variables are changed (ejecta, crater size, etc.) (Further instructions will be provided later.)

**Preparation required:** Do a little background research on craters (in particular, the parts of a crater (ejecta, rays, rim, walls, central peak, etc.). Supplies will be provided the day of the event. To set up a fresh batch of ‘landscape’ for making craters during the event, take the container(s) provided, and fill it up with ~2 inches of white flour, evenly distributed. Sprinkle a very thin layer of chocolate Ovaltine on top of the white flour until the flour can no longer be seen. After several meteor
“impacts”, your landscape will be battered, and you’ll need to fix it. Mix the existing Ovaltine and
flour together. If the mixture is still white–looking in color, you can simply sprinkle on a new layer
of Ovaltine. If the flour is too contaminated, pour it out and start with a new batch. Watch the
video below for ideas. (Further instructions will be provided later.)

**Useful Link:** [https://www.youtube.com/watch?v=xlfVzJSbD0I](https://www.youtube.com/watch?v=xlfVzJSbD0I)

9. **Hovercraft Rides:** Visitors will take turns riding on a simple, homemade hovercraft.

**Station Leader Instructions:** This is a come–and–go station inside of Congdon Hall. (Further
instructions will be provided later.)

**Preparation Required:** Understand the basic principles behind a hovercraft and learn how to
operate our homemade hovercraft. (Further instructions will be provided later.)

**Useful Link:** [http://www.llcowell.com/instructional_samples/straightforward/mneidermeier_physics/template.htm](http://www.llcowell.com/instructional_samples/straightforward/mneidermeier_physics/template.htm)

10. **Gravity Gym:** Buckets with different weights are presented to guests to help them understand how
the sizes of masses of planets affect the “weight” of objects. Each bucket has a planet label; their
weights are scaled appropriately to represent the relative surface gravities of the planets. *Geared
towards kids.*

**Station Leader Instructions:** This is a come–and–go station. Tell younger kids to be careful
with the heavier buckets (i.e., Jupiter) so that they don’t crush their toes. Make sure to explain
to visitors what the weights of the buckets are trying to get across. Start them off with the Earth
bucket. Tell them that each bucket has the same exact object inside of it. The bucket weights are
scaled specifically so that they can feel how much force it would take to pick up the same object on
the ‘surface’ of each planet. Of course, remind them that this is impossible, for multiple reasons, on
Saturn and Jupiter. Some people will be surprised that Saturn’s bucket weights about as much as
Earth’s—although Saturn does have 10 times the mass of Earth, it’s very large and has a very low
density (lower than that of water). The “weight” the object will have on each planet is equal to
weight = \( \frac{GMm}{r^2} \), where M is the mass of the planet, m the mass of the object (which doesn’t change),
r its radius, and G the gravitational constant.

**Preparation Required:** Explore your weight on other worlds using the link below. Make sure you
understand how the size and mass of a planet both affect the weight you’d experience on it (if you
could stand on its surface). Make sure you understand why the weight of an object on Saturn’s s.
Have a rough idea of how the sizes and masses of the planets compare to Earth’s.

**Useful Link:** [http://www.exploratorium.edu/ronh/weight/](http://www.exploratorium.edu/ronh/weight/)

11. **3-D Printer Demo:** Visitors will see a 3-D printer in action and learn the basics behind its
operation.

**Station Leader Instructions:** This is a come–and–go station in the storage room in Congdon
129. (Further instructions will be provided later.)

**Preparation Required:** Special training required. (Further instructions will be provided later.)

**Useful Link:**

12. **Finding Planets:** Visitors will understand the transit method for exoplanet detection.

**Station Leader Instructions:** This is a come–and–go station. (Further instructions will be
provided later.)

**Preparation Required:** (Further instructions will be provided later.)

**Useful Link:**
13. **Fabric of Space-time Demo:** Visitors will understand the basic principles behind general relativity through a hands–on exploration of the rubber sheet analogy.

**Station leader instructions:** This is a come–and–go station. (Further instructions will be provided later.)

**Preparation required:** (Further instructions will be provided later.)

**Useful link:** [https://www.youtube.com/watch?v=MTY1Kje0yLg](https://www.youtube.com/watch?v=MTY1Kje0yLg)

14. **Greeter:** Visitors will receive an event schedule and get their bearings by talking to the door greeter.

**Station leader instructions:** As people arrive to Congdon for HPUniverse Day, greet them, hand them an event schedule, give a brief overview of how to get to the various stations, and remind them that their child can get a stamp at each station in order to receive a prize (and point out where the prize table is). Keep track of how many people come in so we can know how many visitors we had by the end of the night.

**Preparation required:** None.

15. **Prize Table Manager:** Kids will turn in their event schedules and receive a prize if they visited enough stations.

**Station leader instructions:** When a kid comes up, look at their event schedule, and if there are >5 stamps on their sheet, let them choose from one of the prizes on the table. (You might want to explain what some of the prizes are.) Don’t let kids take prizes without having visited the learning stations.

**Preparation required:** None.