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WINDOWS TO THE UNIVERSE EARTH AND SPACE SCIENCE EDUCATION NEWSLETTER MEDIA KIT

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July 2013

Enjoy Summer!
 by [Debra](#)

Summer is upon us (for those of us in the northern hemisphere)! I hope we are all enjoying a pleasant break, with a chance to get out and see some beautiful sites and spend countless hours of fun. Up here in the northeast, we've had quite a bit of rain, and everything is growing fast. The eastern part of the US is moving into the high 80s, after prolonged temperatures in the 50s, and the start of the summer fire season. Hopefully, we won't see a repeat of last year's extremely high temperatures and drought over most of the US - 2012 was identified as the warmest year on record in the continental US by NOAA.

Summer brings a chance to prepare for the coming year at Windows to the Universe, and we are busy preparing for our fall conferences at NESTA in Portland, Charlotte, and Denver. We will soon send out a notice of all our sessions at the upcoming conferences, and hope we get to see many of you there. This month we will also be releasing a set of presentations that we hope will be useful to you in your classrooms while teaching on a variety of topics in the Earth and space sciences. This fall we will be offering a set of free web seminars on planetary science and astronomy associated with the Astronomical Society of the Pacific's Galileo Educators Network project (hosted by NASA), leading to the short courses we offered last fall in results and data.

Prior to the start of the fall semester, we will be rolling out a new capability for Windows to the Universe Educator Members to access course management tools and quiz capabilities in support of their classrooms. We'll keep you posted on all of these opportunities in the coming two months.

Now that you might have a chance to read something in peace, perhaps this is a good time to direct your attention to the free issues of the National Earth Science Teachers' Association's quarterly journal, *The Earth Scientist*. These openly available issues have been sponsored by organizations that share our mission to provide access to exemplary K-12 Earth and space science educational resources and professional development for educators. The issues are available on the NESTA website under the [Educator Resources](#), and are indicated by a little "Free PDF" dual graphic at the upper left of the title. Themes include the most recent issue on Earth system science (sponsored by Planet Science), the Fall 2012 issue on climate change education (sponsored by the National Science Foundation), the Spring 2012 issue on space science (sponsored by the Chandra X-ray Observatory), and more (just scroll down the page, looking for the "Free PDF" graphic).

Of course, members of NESTA have access to all of the issues, and receive them either in print (frequently including beautiful posters), or can access them online as PDFs. If you're not a member, please [join today!](#) Not only do you have access to this great publication, but you also receive NESTA's monthly newsletter, and provide support for NESTA's efforts to advance Earth and space science education at the K-12 level.

In the meantime, enjoy your summer!

Dr. Sandra Henderson: White House Champion of Change!
 by [Sandra](#)

Congratulations, Sandra!

Sandra Henderson, a former Windows to the Universe staff member, was recently honored as a [White House Champion of Change](#) for her work in Citizen Science and advancing STEM education. One of her co-leaders of [Project BudBurst](#), a national citizen science program focused on plant phenology (timing of leafing, flowering and budding) and climate change. As a start-up in 2007, Project BudBurst was housed on the Windows to the Universe web site for several years before moving permanently to the National Ecological Observatory Network (NEON). Read more about her accomplishments in the link below.

NEON press release - <http://neoninc.org/news/2013/news-science-4th-house>

White House Blog entry - <http://www.whitehouse.gov/blog/2013/06/25/science-planet-citizen-science-project-budburst>

YouTube - <http://youtu.be/51en127A8c0?2=2m43s>

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News from the Edge of the Solar System - Voyager 1

Data from [Voyager 1](#), now more than 11 billion miles (18 billion kilometers) from the sun, suggest the spacecraft is close to becoming the first human-made object to reach interstellar space (Voyager 2 is about 9 billion miles from the sun).

Voyager 1 data is now providing new detail on the last region the spacecraft will cross before it leaves the [heliosphere](#), or the bubble around our sun, and enters interstellar space. Scientists have seen two of the three signs of interstellar material they expected to see - charged particles, appearing as they zoom out along the [solar magnetic field](#), and [cosmic rays](#) from far outside zooming in. Scientists have not yet seen the third sign, an abrupt change in the direction of the magnetic field, which would indicate the presence of the interstellar magnetic field.

According to Ed Stone, Voyager project scientist at the California Institute of Technology in Pasadena, "If you looked at the cosmic-ray and energetic particle data in isolation, you might think Voyager had reached interstellar space, but the team feels Voyager 1 has not yet gotten there because we are still within the domain of the sun's magnetic field."

Scientists do not know exactly how far Voyager 1 has to go to reach interstellar space. They estimate it could take several more months, or even years, to get there. The heliosphere extends at least 8 billion miles (13 billion kilometers) beyond all the planets in our solar system. It is dominated by the sun's magnetic field and an outflow of expanding outward from the sun. Outside the heliosphere, interstellar space is filled with matter from other stars and the magnetic field present in the nearby region of the [Milky Way](#).

Voyager 1 and its twin spacecraft, Voyager 2, were launched in 1977. They toured [Jupiter](#), [Saturn](#), [Uranus](#), and [Neptune](#) before embarking on their interstellar mission in 1990. They now are to leave the heliosphere. Measuring the size of the heliosphere is part of the Voyagers' mission.

For more information about the Voyager spacecraft mission, visit <http://www.nasa.gov/voyager> and <http://voyager.jpl.nasa.gov>

Black Hole Bonanza in the Galaxy Next Door

Using data from NASA's Chandra X-ray Observatory, astronomers have discovered an unprecedented bonanza of [black holes](#) in the Andromeda Galaxy, one of the nearest galaxies to the Milky Way.

Using more than 150 Chandra observations, spread over 13 years, researchers identified 26 black hole candidates, the largest number to date, in a galaxy outside our sun. Many consider Andromeda to be a sister galaxy to the Milky Way. The two will ultimately collide, several billion years from now.

"While we are excited to find so many black holes in Andromeda, we think it's just the tip of the iceberg," said Robin Diamond of Harvard-Smithsonian Center for Astrophysics (CfA) in Cambridge, Mass., and lead author of a new paper (June 20 issue of *The Astrophysical Journal*) describing these results. "Most black holes won't have close companions and will be invisible to us."

The black hole candidates belong to the stellar mass category, meaning they formed in the death throes of very massive stars, and typically have masses five to 10 times that of our sun. Astronomers can detect these otherwise invisible objects as material is pulled from a companion star and is heated up to produce radiation.

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