CosmoQuest: Citizen Science with a Virtual Research Center

@CosmoQuestX

Where do you want to explore today?

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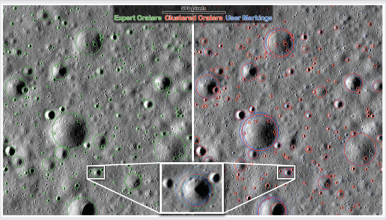
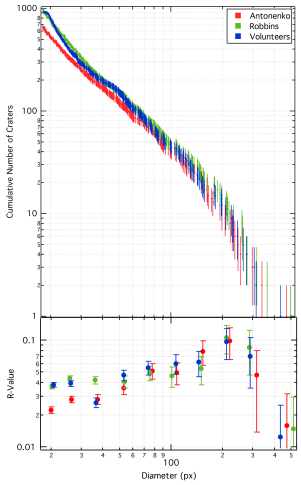
The CosmoQuest virtual research center is working to create a community of people – members of the public bent on advancing our understanding of the universe. Working with NASA's Dawn, LRO, MESSENGER, and STScI teams, this facility is developing citizen science projects that accomplish needed tasks for mission science teams. It also provides a rich educational context through online classes, virtual star parties, community collaboration areas, and the development of classroom curricula. At CosmoQuest, we seek to provide the public with an experience that parallels the experiences of scientists within research facilities, and in this way create a community of science within the public.

Do Science

At CosmoQuest, scientific research takes the form of guiding members of the public through image annotation tasks. Using LRO, MESSENGER, and Dawn surface images, people work to map scientifically interesting geomorphological features, aiding mission scientists in mapping surface ages and identifying crater blanks, faults, and other features. Each of these projects is coordinated under a team of scientists who work to verify data quality and publish results.



Preliminary analysis of a small region of NAC frame M140859973LE: (left and right show the same field). Expert crater identifications (left) and user identifications (right) for craters >18 pixels in diameter. User identifications (blue) are processed to find craters confirmed by multiple people using a clustering algorithm (red). Inset shows all three sets overlaid for one large and two smaller craters, illustrating good agreement between the expert and aggregate user results. *N.B. Different parts of this image have been seen by different numbers of people, ranging from 3 to 7. This leads to many real craters not yet being confirmed (in red).*

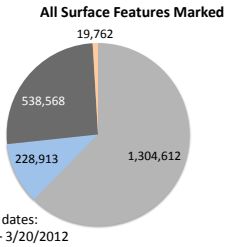


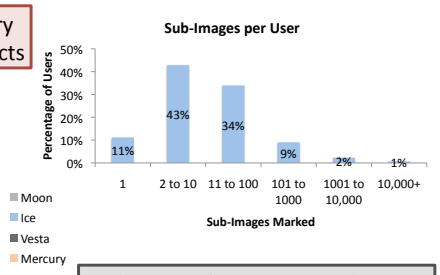
In the figure at right, expert crater counts with MoonMappers are compared to those of volunteers where $N_{vol} \geq 7$. The volunteer data match the expert data at least as well as the experts match each other for craters greater than 23 pixels. (Robbins, Antonenko, et al. in prep.)

Citizen Scientists

The CosmoQuest facility seeks to recruit a community of people who consistently work to learn and do science through long-term interactions within the site. After the first year year, we find that 57% of the citizen scientists analyzed more than 10 images, 30% came to the site multiple times, and 32% have participated in more than one science project. The most efficient way to drive citizen science traffic has thus far been Twitter posts about citizen science. We also find that 34% of the people who visit the site in relation to Google Hangouts are transformed into registered community users. A major research effort has recently begun to understand what motivation factors affect initial engagement and mitigate prolonged engagement.

32% of CosmoQuest users try multiple citizen science projects





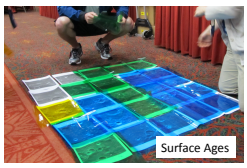
Launch dates:
Moon – 3/20/2012
Ice – 4/13/2012 (ended 7/9/2012)
Vesta – 9/8/2012
Mercury (beta) – 12/4/2012

After their first day, 29% of users return for more mapping

http://CosmoQuest.org

Learn Science

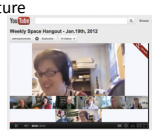
CosmoQuest is also working to foster the next generation of scientists and scientifically literate citizens by creating standards based classroom curricula to accompany its citizen science projects, allowing teachers to bring current NASA data, new NASA discoveries, and authentic science experiences directly to their students. CosmoQuest's first educational unit, TerraLuna, lets students explore the processes involved in the formation of the earth's and Moon's surfaces, leading up to their participation in real lunar science as they map the Moon's surface with MoonMappers. Designed for middle school students and aligned to US and EU teaching models, TerraLuna guides students through lessons on cratering processes, surface age dating, differences in the surfaces as a function of the rocky body's physical characteristics (e.g. surface gravity), and solar system evolution.



CosmoAcademy – online course offerings using Google+ Hangouts technology

Current/Upcoming Offerings
- CQX099 – The Big Bang and Our Dark Future

Previous Offerings
- CQX001 - Solar System Science
- CQX002 - The Sun and Stellar Evolution
- CQX003 - Galaxies & Galaxy Clusters
- CQX004 - Introduction to Cosmology



Hangouts on Air

The model of regular seminars is replicated using the Google Hangouts on Air; however, discussions are moderated, with a science communicator or educator facilitating the dialogue to make sure real time questions are conveyed and to ask additional questions to make sure information is clarified to the appropriate level for mainstream audiences as needed. In addition to seminars, blog and social media posts summarize relevant science papers and announcements, and link the public to open access resources.

+Virtual StarParty

Astronomy Cast

Learning Space

Weekly Space Hangout

... and more.

Public Hangouts archived to YouTube channel: 145,135 views and 252 videos

Daily interactions via blogs, forum, social media

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CosmoQuest *is a production of* ***the Center for STEM at SIUE*** *&* ***Astrosphere New Media****, in association with* ***Universe Today****,* ***Bad Astronomy****, &* ***numerous partner organizations****. To find out how your organization can get involved, email* **getinvolved@cosmoquest.org**