

COSMOQUEST: BETTER CITIZEN SCIENCE THROUGH EDUCATION. P.L. Gay¹, C. Lehan¹, G. Bracey¹, A. Yamani², M. Francis³, P. Durrell⁴, C. Spivey⁴, J. Noel-Storr⁵, S. Buxner⁶, W. Cobb⁹, P. Graff⁸, J. Grier⁶, T. Komatsu⁷, S. Runco⁸, ¹Southern Illinois University Edwardsville (cosmoquestX@gmail.com), ²Astrosphere New Media Association, ³Galileos' Pendulum, ⁴Youngstown State University, ⁵InsightSTEM, ⁶Planetary Science Institute, ⁷Lawrence Hall of Science, ⁸Johnson Space Center, ⁹McREL International

Introduction: In the modern era, NASA SMD missions and facilities are producing data at a rate too great for the science community to maximally utilize. While software can help, what is really needed is additional eyes, hands, and minds – help we can find in the form of citizen scientist volunteers. The CosmoQuest virtual research facility has demonstrated through published research results that classroom students and the public can, with proper training and support from Subject Matter Experts (SMEs), fill roles more traditionally filled by university students.

The research question behind CosmoQuest's creation was simple: if students and the public are provided a properly scaffolded experience that mirrors that of researchers, will they come and perform as well as our students? and can they rise up to be research collaborators? In creating CosmoQuest, we started with a core of citizen science portals, educational materials for both students and life-long learners, and collaboration areas. These three primary focuses mirror the research, courses, and collaboration spaces that form the foundation of a university department. We then went on to add the features that make a center stand out — we added seminars in the form of Google Hangouts on Air, planetarium content through our Science on the Half Sphere program, and even the chance to vicariously attend conferences through live blogging by our team members. With this design for a virtual research facility, the answer to our foundational question has been a resounding yes; the public can aid us in doing science provided they are properly trained. To meet the needs of our population we have developed four areas of engagement: research, education, media, and community.

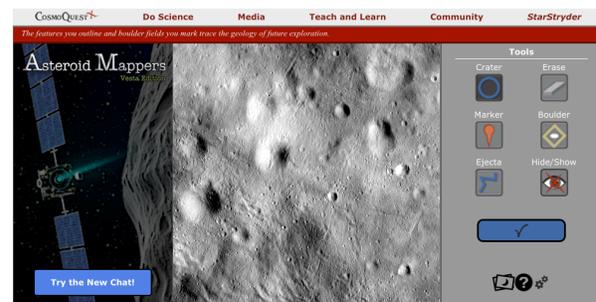
Citizen Science Research: At the heart of every research center is, to state the obvious, research. Within CosmoQuest, research focuses on engaging students and the public using Citizen Science Portals (hereafter, CSPs) to guide them in tasks that aid researchers. When people participate in citizen science projects, they are allowed to complete one image (to get their hands dirty) before being asked to participate in an interactive tutorial (one tutorial may serve to train for multiple CSPs). After completing the tutorial, participants are free to participate in all CSPs that use that tutorial. CosmoQuest is currently funded to produce three or more competitively selected CSPs per year

and will begin providing small grants to selected science teams to fund their research.

Education: Just as university students take classes and participate in research projects to gain knowledge, CosmoQuest community members are invited to take classes and participate in independent research. Through *Educators' Zone* we produce curriculum for primary and secondary school audiences. Our S-ROSES (Student Research Opportunities in Space and Earth Science) program, students are guided into using SMD data products for science fair projects. We also have adult life long learning programs through our CosmoAcademy program.

Media: Science isn't only learned in the classroom. Recognizing that modern technology turns every internet enabled device into a potential tool for learning, we have partnered with the 365 Days of Astronomy podcast and YouTube programs to push daily content to our community. We are also establishing the Projected Science program, which creates content (including stock footage) for planetariums and Science on the Sphere™ installations and YouTube.

Community: Science is a community endeavor, and discoveries are made through collaboration and discussion. Within CosmoQuest, we work to build in collaboration tools through online forums, social media, and other conversational tools.



CosmoQuest currently supports citizen science programs to explore Vesta (shown), the Moon, Mercury, and Mars.

CosmoQuest is funded through individual donations, through NASA Cooperative Agreement NNX16AC68A, and through additional grants and contracts that are listed on the About page of our website, cosmoquest.org.