

# Butterfly payload to launch Nov. 16 on space shuttle

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A University of Colorado at Boulder educational payload containing butterfly larvae that will be monitored by thousands of elementary and middle school students around the country will launch to the International Space Station aboard NASA's space shuttle Atlantis Nov. 16. Credit: Image courtesy NASA and [www.pdphoto.org](http://www.pdphoto.org).

When NASA's space shuttle Atlantis launches for the International Space Station on Nov. 16 it will carry a University of Colorado at Boulder butterfly experiment that will be monitored by thousands of K-12 students across the nation.

The butterfly payload was designed and built by BioServe Space Technologies in CU-Boulder's aerospace engineering department and will carry two butterfly habitats containing monarch and painted lady

butterfly larvae and enough nectar and other food to support them as they develop. CU-Boulder, with the help of elementary and middle school students, will compare the growth and development of butterfly larvae in the weightless environment of the International Space Station with butterfly larvae being raised simultaneously in participating classrooms on Earth.

Dubbed "CSI 03 -- Butterflies in Space," the project is the fourth K-12 educational experiment to be flown by CU-Boulder on ISS, said BioServe Director Louis Stodieck, principal investigator on the project. "One of the most exciting things about this project is that we can use the International Space Station to bring spaceflight experiments into classrooms around the country," he said. "Our continuing goal is to inspire K-12 students around the country in science, technology, engineering and math."

About 100 elementary and middle schools across the nation -- including classrooms in the Denver Public Schools and Jefferson County schools -- are receiving official classroom kits with butterfly habitats that will allow them to participate in the project, said BioServe Payload Mission Manager Stefanie Countryman. Hundreds of additional schools will be participating informally and will be building their own classroom butterfly habitats, she said.

The experiments will fly on BioServe's Commercial Generic Bioprocessing Apparatus, or CGBA, a suitcase-sized payload that has been used to carry out BioServe experiments in space since the early 1990s. BioServe has designed, built and flown over 50 different payloads on more than 35 space flight missions, including [NASA](#) space shuttles, the ISS and Russia's MIR [space station](#) and Soyuz spacecraft.

Countryman said the painted lady butterfly larvae will be six days old and the monarch butterflies will be about 10 days old at launch and will

be transferred from Atlantis to the ISS about two days later. It will take the butterfly larvae about five days to pupate and form a chrysalis, or cocoon, and another seven to 10 days to emerge, she said.

Participating teachers have been provided with classroom kits that contain the butterfly larvae and will allow the students to compare differences in growth rates, feeding, pupation and the emergence of butterflies between environments on Earth and in space.

Once the habitats are transferred into the BioServe payload on ISS, images of the larvae will be taken every 15 minutes. The images will be downlinked from the ISS daily to Earth and uploaded to Internet sites for students to view.

The butterfly experiment is sponsored in part by the National Space Biomedical Research Institute based in Houston and is being conducted in collaboration with several nonprofit educational organizations. Participating students and the public will be able to view the butterfly images online at <http://bioedonline.org/>, a science support and teacher training site of the Baylor College of Medicine's Center for Education Outreach, which developed the curriculum guide for teachers and Web site support.

The butterfly images from ISS also will be available at the Monarch Watch Web site, <http://www.monarchwatch.org>, an educational and research group at the University of Kansas, which supplied the monarch butterflies. The painted lady butterflies were provided by Gulf Coast Butterflies in Naples, Fla., and Clearwater Butterflies in Clearwater, Fla.

The Butterfly Pavilion in Westminster, Colo., located on the Web at <http://www.butterflies.org>, is providing science support and teacher training. More information also is available at Orion's Quest, <http://www.orionsquest.org>, which provides spaceflight educational

opportunities to K-12 schools. "This project would not be possible without the help and support of all our partners," said Countryman.

BioServe flew similar educational CSI payloads on shuttle missions in 2006, 2007 and 2008 that reached more than 10,000 students around the world, said Countryman.

BioServe payloads -- including biomedical and life science experiments conducted in conjunction with industrial partners -- have been manifested on every shuttle flight until the space shuttle program is retired in 2011. "Between now and then, we are seeking sponsors for our educational payloads to enhance the learning opportunities for the K-12 community in Colorado and around the world," said Countryman.

Source: University of Colorado at Boulder

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