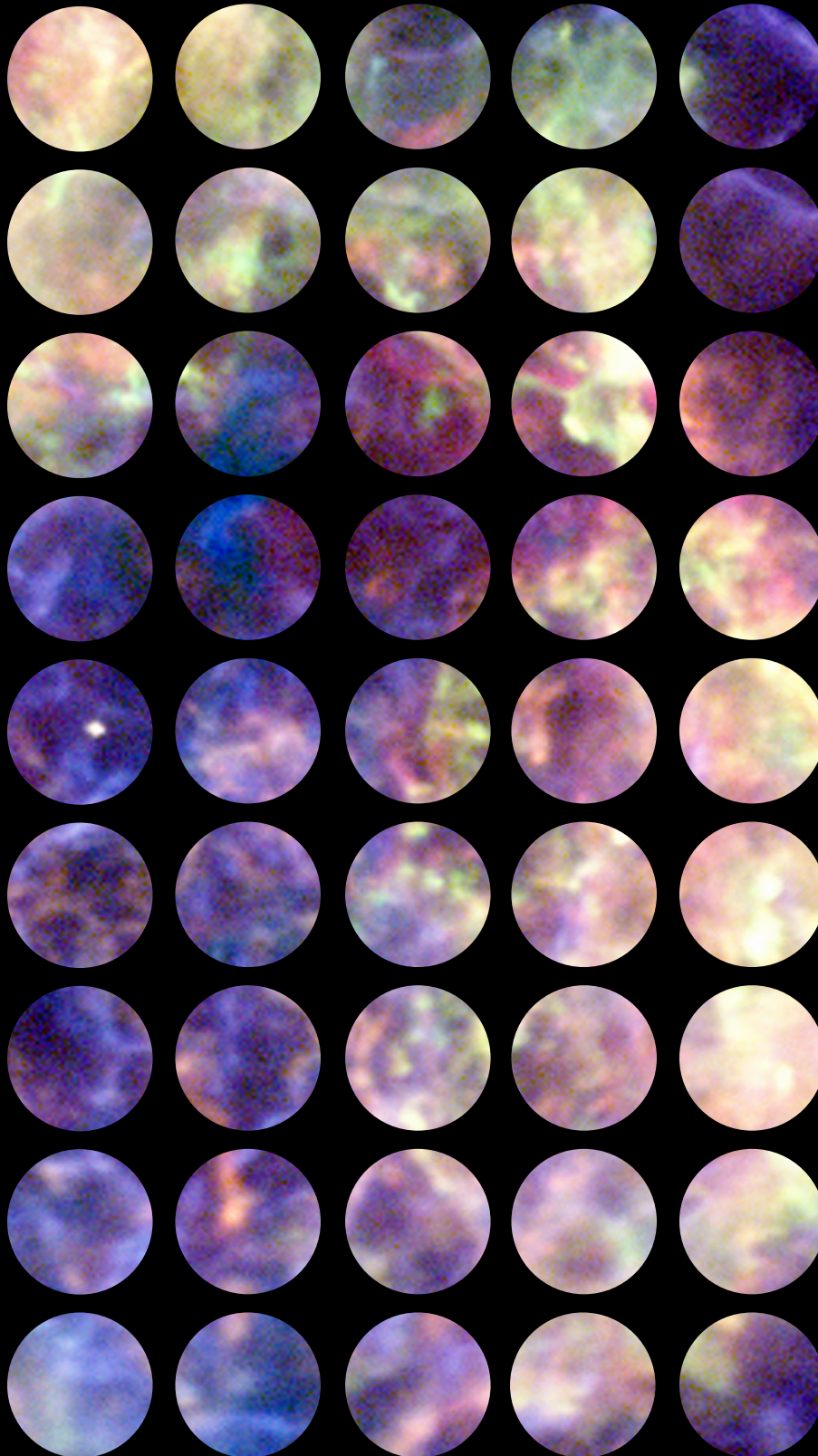


# CONNECTING CHANDRA



The Chandra Public Engagement and Communications group is unique in its abilities to create innovative programs that promote scientific awareness and learning. We seek to make Chandra, placed within X-ray astrophysics, space science and science as a whole, relevant and accessible to the widest possible audiences.

We have helped formalize the thread of “public science,” developed best practices through scholarly publications, and demonstrated the broad reach of our programs through rigorous evaluation practices.

Public science, akin to public art, seeks to place scientific content in unexpected and non-traditional spaces for science communications.

Key impacts of Chandra public science programs include:

- Ten of millions of viewers around the globe: “viral” results at relative low cost
- Open-access materials; grassroots programs; events in free spaces for informal learning
- Participant learning gains & increased interest in astronomy and science
- New and sustained networks of science event organizers/“volunpeers”

# LIGHT

Beyond the Bulb

LBTB is a public international exhibition program that features how all types of light impact people in their everyday lives, and showcases a variety of light-based science being conducted today. This project was created for the International Year of Light 2015 (IYL), a global initiative back by the United Nations. As with our preceding public science projects, LBTB provides global organizers and volunteers with a free online repository of curated materials which functions as a toolkit to

create exhibits according to local needs and resources. Expected results include:

- Providing an engaging and informative introduction to the various forms that light takes, featured in public spaces for an everyday experience.
- Showing how Chandra and other NASA telescopes observe across the electromagnetic spectrum, including in invisible bands.
- Creating connections with broader physics, engineering, optics, and other organizations that are heavily involved with IYL.



This project connects familiar everyday experiences here on Earth with scientific phenomena found across our planet and throughout the Universe. As a public science project, HTE uses science analogies to provide multi-generational, family-friendly content in English and Spanish to community centers, libraries, and under-resourced science centers. Results include:

- HTE covers key scientific concepts such as electric discharge, atomic collisions, and lensing.

- Exhibit connects how the science of space relates to everyday life, expanding upon an existing knowledge base.
- A traveling version of the HTE exhibit has visited over 30 libraries and informal learning centers since 2012.
- Demand for the exhibit far exceeded availability, and free poster versions and additional open-access versions of HTE are provided when possible.

# FROM EARTH TO THE Universe

What happens when you place images from space with accessible captions in such public venues as parks, metro stations, shopping malls, and more? FETTU did just that, putting Chandra images and other NASA and astronomy content into context for the International Year of Astronomy 2009 and which has continued for years beyond. Results include:

- 1,000 versions of the exhibition, displayed in over 70 countries, with its content translated into 40 languages.
- Showcasing images from Chandra and other telescopes to tens of millions of viewers in public spaces around the world.
- Establishing a large network of organizations and individual volunteers capable of communicating astronomy through traditional and non-traditional avenues.



# FROM EARTH TO THE Solar System

Using the same model as FETTU, this project included content from planetary science, astrobiology, and astrophysics relevant for NASA's Year of the Solar System, which lasted from 2010-2011. Results include:

- Putting Chandra and other NASA and space images into context with diverse and active fields of planetary science and astrobiology.

- Informal public learning locations from cafes in New Zealand to malls in Canada displayed the materials.
- Allowed Chandra to create new partnerships with organizations such as NASA's Astrobiology Institute, participate in the new scientific conferences, and make other connections with outside organizations.



Our research and evaluation programs ensure that our materials are needs-based, appropriate, and relevant for our audiences. Aesthetics & Astronomy (A&A) is a series of research studies that aim to better understand how non-experts relate to and interact with astronomical images produced by Chandra and other missions. With numerous published papers, invited talks and interactions with other professionals, A&A focuses on researching and disseminating best practices. Results from 3 A&A studies include:

- Chandra website has adopted practices to enhance visitor experience based on user needs

- such as interactive layers for multi-wavelength images, annotation of object features and clickable question/answer formats.
- New awareness of how captions affect the viewer's perception and appreciation of a science image and its information.
- Chandra/NASA is seen as a thought-leader in an active line of unique research that can help shape aspects of visual and text-based science communications.



STOP is an out-of classroom enrichment program that conveys the excitement of a wide swath of science topics through a series of free wall posters and educational activities. Results include:

- Directly relating Chandra science to universal topics of speed, light, gravity force, and more.

- By targeting K-6 students, STOP places Chandra and other NASA science into a key age group that can be otherwise difficult to access for X-ray astrophysics both conceptually and due to standards requirements.

LIGHT: BEYOND THE BULB  
lightexhibit.org



HERE THERE EVERYWHERE  
hte.si.edu



FROM EARTH TO THE UNIVERSE  
fromearthtotheuniverse.org



FROM EARTH TO THE SOLAR SYSTEM  
fettss.arc.nasa.gov



AESTHETICS & ASTRONOMY  
astroart.cfa.harvard.edu



STOP FOR SCIENCE  
chandra.si.edu/edu/stop

NASA'S CHANDRA X-RAY OBSERVATORY  
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NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.