Dr. Carol A. Christian

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US Citizen

Education

BS. Physics, University of Dayton, Dayton OH (1972)

M.A. Physics and Astronomy, Boston University, Boston MA (1974)

Ph.D. Physics and Astronomy, Boston University, Boston, MA (1978)

Professional experience (full time)

10/1995- present: Space Telescope Science Institute – home of Hubble Space Telescope (HST) and James Webb Telescope

- HST Outreach Project Scientist (2012 – current)

a) Ensure the scientific integrity of material produced by the News Production Team and serve as science advocate for HST researchers in the Press Release Process. Participate in scientific review of news and outreach materials, and support the refinement of scientific review of news articles and public press releases. b) Support the Institute's Science Community engagement initiatives regarding for HST including crafting and review of materials and periodic review and revision of the HST science websiter. c) Serve as the HST Mission Office point of contact for HST Public Outreach activities. d) Create the plan and collaborate on the execution of the Science Engagement Support system for the Roman Space Telescope to be launched in late 2026.

- Community Missions Office (2002 – 2012: Deputy 2005-2012)

Responsible for: a) Oversight of the existing portfolio of technical personnel that support the general astronomical community (especially NASA missions and other astronomical facilities). Manage budgets, timelines, deliverables and reporting on STScI products and applied expertise, b) Participation in the pursuit, fostering, planning and executing new business opportunities, c) Preparation of materials, presentations, exhibits, and web resources to inform the scientific and technical communities regarding STScI capabilities, products and services. d) Create opportunities for citizen science projects using HST and STScI Archive data.

- Head, Development, Technology and Innovation (2000-2002)

Examine processes and procedures within STScI and create mechanisms for improving productivity, reducing cost, finding innovative solutions and improving service to users

- Head, Office of Public Outreach, NASA Origins Forum Director (1995-2000)

Establish and manage formal, and informal education programs, teacher training, public understanding of science, online outreach support, Hubble Space Telescope news management, management of grant programs

- ***Special posting 2003-2006:*** Department of State: Science and Technology Policy Advisor (full time 2003-2004, part time 2004-2006)

Manage new technical projects including deployment of Geographic Information systems and satellite imaging support to embassies and consulates, review and revise federal technology and security policies especially for remote access to department information and resources, serve as consultant on science and technology as pertaining to foreign policy.

	9/1989-10/1995: Associate Research Astronomer, NASA Extreme Ultraviolet Explorer, UC Berkeley EUVE Guest Observer, Archive Manager and Mission Operations Scientist (100% 1989-1992, 60% 1992-1994, 100% 1995) ***9/1992-9/1994:*** Project Manager, Earth Data Systems, industry funded national distributed information system demonstration system (40%) time ***8/1981-9/1989*****:** *Resident Astronomer, Canada France Hawaii Telescope*
Professional activities	Current: International Aeronautical Federation Space Education and Outreach Technical Committee, Space Astronomy Committee, Committee for the Cultural Utilization of Space. International Astronomical Community Education Committee and Committee on Diversity and Equity Prior: Large Synoptic Survey Telescope EPO Advisory Committee Zooniverse Citizen Science Advisory Committee, Chair Cosmo Quest Citizen Science Advisory Group AAAS (2010 – 2014) Kavli Journalism Awards Panel American Institute of Physics, Diplomacy Fellow Selection Committee (2009-2015; Chair 2013-2015) Astronomical Society of the Pacific Board (2006 - 2010) Awards Committee, Audit Committee, Strategic Planning Committee American Astronomical Society Council (2003-2005) Astronomy Education Board (1997 - 2000, 2010 - present) Langley DAAC User Group (1999-2011) SIRTF Community Working Group (member) & Chair, Archive Working Group (1998-2001) NASA OSS Education Council (member) & Chair of Education Resource Archive/Catalog Group (1997-2000) Selecting Official – NASA IDEAS & HST GO Cycle E/PO Grants (1995-2000) Bishop Museum Exploration Exhibit Advisory Group (1998-1999) NASA OSS Education Implementation Task Force (1994-1996) Architectural Team – NASA OSS Origins Strategic Plan Team (1995-1996)
Astronomical professional membership	American Astronomical Society International Astronomical Union Astronomical Society of the Pacific American Association for the Advancement of Science International Aeronautical Society
Expertise	Astrophysics: Research on stellar populations, open, populous and globular clusters Earth Science: Use of Earth observing imagery and photometry, application of Geographic Information Systems Education: Expertise in K-12 curricula, standards, evaluation and systemic reform; informal science education methodologies, standards and evaluation, public engagement in science, Citizen Science Management: Leading diverse teams, team building, familiarity with Federal acquisition.

Website	Professional Website: http://www.stsci.edu/~carolc 3D Astronomy Research Website: http://www.stsci.edu/~carolc/3dastronomy/3D-Astronomy.html

3D Astronomy

Anyone scientists, science interested persons and members of the general public can better appreciate the universe by viewing not only spectacular imagery but 3D renditions of objects such as galaxies, star clusters, exoplanets, planetary systems and models of individual stellar structure. But what if you cannot see? Astronomy historically is viewed as a visual science, but using tactile 3D models stimulates the imagination, allows us to make representations of the astrophysics we observe and also share this with others. This project addresses the need for assistive materials for individuals with Blindness and Visual Impairment (B/VI) as well as any other individual who can make use of tactile representations of astronomical data. Therefore, the specific objective is to develop 3D prints of astronomical data derived from observations obtained with HST and other facilities. The new 3D prints to be created now are part of a larger program called the Career Exploration Lab, or CEL, developed by C. Christian and T. Madura (San Jose State University). Through the CEL we will assist educators in using the materials and also conduct camps for students with B/VI during the summers as a continuation of the previous camps held in a variety of states.

The project: The methodology to be used to produce 3D prints of our desired objects is derived from our proven technique to produce and test 3D prints for star clusters and galaxies (Figures 1 and 2) derived from the analysis of HST data. Our innovative process uses custom software to transform the data into solid 3D tactile objects with patterned (Christian, et al. 2015; Grice et al. 2015). Within the JHU Institutional Review Board certification process, we informally tested the materials for scientific integrity and usability in several venues (museums, STEM events, and other invited workshops and conferences for assistive technologies. We also distributed the previous prints publicly (https://tinyurl.com/Tactile3DAstro). The tested prints are used in CEL camps and shared internationally through the International Astronomical Union. This project extends the available suite of materials for the CEL by designing, creating, and testing different astronomical subjects; that is, exoplanets, multi-wavelength data and more robust 3D prints of star clusters.

Sample HST image and 3D print of the star cluster Westerlund 2

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