

ANTHEA JANE COSTER

MIT Haystack Observatory, Westford, MA 01886 USA (617)
715-5753, ajc@haystack.mit.edu
<https://orcid.org/0000-0001-8980-6550>

Professional Preparation

University of Texas at Austin	Austin, USA	Mathematics (Plan II, honors)	B.A. 1975
Rice University	Houston, USA	Space Physics and Astronomy	M.S. 1981
Rice University	Houston, USA	Space Physics and Astronomy	Ph.D. 1983

Appointments

MIT Haystack Observatory, 2004 – present
Assistant Director, MIT Haystack Observatory, 2015 – 2024
Principal Research Scientist, MIT Haystack Observatory, 2012 – present
Research Scientist, MIT Haystack Observatory, 2004 – 2012 Technical
Staff, MIT Lincoln Laboratory, 1984 – 2003
Research Scientist, Georgia Tech Research Institute, 1983 – 1984

Relevant Experience Focus of research is physics of the ionosphere, magnetosphere, and thermosphere, space weather and storm time effects, coupling of atmospheric regions, and GNSS positioning and measurement accuracy Breakthrough contributions in ionosphere-magnetosphere research and GNSS applications; built first real-time GNSS ionospheric monitoring system; early work in monitoring tropospheric water vapor with GNSS; pioneering work in measuring ionospheric and tropospheric errors over small baselines; first GNSS observations of storm-enhanced density; major contributions to stratospheric warming and eclipse studies. Innovation in experimental design with eclipse deployments, receiver networks, utilization of cell-phones; and real-time systems. Sustained impact of GNSS TEC and scintillation Madrigal database, that has supported research in over 300+ articles, and several NASA/NOAA press conferences. Active in fostering international scientific capacity in space physics research and applications. Served on 13 PhD committees, and mentored multiple REU students.

Recognitions

- American Geophysical Union, J. Bacon-Bercy Scholarship in Atmospheric Sciences for Women, 1978 (first recipient)
- Award for best paper of session at ION GNSS conferences, 1991, 2006, 2017
- NASA Tech Briefs Innovation award (with R. Suggs, W. Cooke, P. Brown) for Meteor Properties Database, 2005
- Selected one of Fifty Leaders to Watch in GNSS, 2008, GPS World
- Fellow, Institute of Navigation, 2016
- CEDAR Distinguished Lecture Award, 2022
- Rice Space Physics Outstanding Alumnus of 1980's award, 2022

Accomplishments

200+ peer-reviewed publications including 105+ in AGU journals, co-editor 3 books. Leading role in the design, implementation, application and development of the first real-time ionospheric monitoring system based on GPS (1991), PI of the Westford Water Vapor Experiment (1995), PI of the GNSS TEC and scintillation data products in the NSF CEDAR Madrigal database. Established and ran first GPS and Ionosphere sessions at National URSI meetings from 1995-2005, with goal of introducing GPS capabilities to the atmospheric science community. Taught for 10+ years in UN-sponsored GNSS workshops aimed at underdeveloped countries; 15+ years in the NSF-sponsored incoherent scatter radar schools.

Professional Service (selected)

American Geophysical Union:

Chair of Africa Award for Research Excellence in Earth or Ocean Sciences and the Africa Award for Research Excellence in Space Science, (2024-2025); Africa Award Space Sciences (2019-2021) chair, committee member (2017-2019); Member of the Fleming Committee AGU (2007-2010); Served on Program Committee for AGU Chapman Conference on Mid-Latitude Ionospheric Dynamics and Disturbances, Yosemite National Park, Jan., 2007

Institute of Navigation: ION Fellow Selection Committee (2018-2022); Eastern Region Vice-President, (2017-2020); Officer of the Satellite Division, Secretary, (2012-2014); Council Land Representative (2004-2006); Eastern Region Member-at-Large (2001-2003)

NASA: Co-chair of the NASA Living With a Star Program Analysis Group (LPAG) (2018-2023); Member of Geospace Dynamics Constellation (GDC) Independent Review Board (IRB), (2022); Member of Senior Review of Heliophysics Operating Missions, (2017)

National Academy: Member of the National Academy Space Weather Roundtable (2022-current); Member of the Committee for Space Weather Operations and Research Infrastructure Workshop, Phase 2(2021) and Phase 1(2020)

National Science Foundation: Deputy Chair, 2016 NSF APRPP Review of the Arecibo Observatory; Co-organizer and Co-PI on NSF-sponsored workshop on "AMISR in Africa" Workshop, 2012; Member of NSF Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) Science Steering Committee, (2005-2008)

URSI/USNC: Member-at-Large, (2023-2026); Commission G Chair (2002-2005); Commission G ViceChair (1999-2002)

Public Outreach (selected)

Alaska: In 2016 deployed 10 receivers along highways going north of Fairbanks Alaska. These receivers were powered by solar power and batteries and collected data on TEC enhancements during aurora. Data were downloaded via cell-phones. In 2017 deployed specialized GNSS scintillation receiver in an Inuit village, Venetie, Alaska to monitor aurora. Presentation to elementary school students in Venetie, Alaska.

Brazil: Accompanied MIT graduate students to deploy instrumentation in Brazil (2014,2015). Project designed to download and control GPS receivers using cell phones in Manaus and São Paulo.

Peru: Accompanied MIT graduate students for the INCA (Ionosphere, Navigation, Communication and Aeronomy) Project designed to deploy RAPID systems to monitor signals from beacon satellites.

Africa: Participated in multiple (> 10) United Nations Workshops for the International Space Weather Initiative beginning in 2009. Original goals to build a knowledgeable GNSS African workforce, to encourage the use of GNSS for societal and economic development and scientific exploration.

Keynote Presentations (Selected)

- Buonsanto Lecture: "Above the Clouds, Below the Stars: Chasing Ionospheric Storms" (November 2025)
- Keynote Speaker, Kvinder i Fysik and Niels Bohr Archive, Women of NBI, Then and Now, (Nov 2024),"Lise Meitner, Her Life and the Discovery of Fission
- Keynote speaker at URSI GASS, Sapporo, Japan, August 2023, Polar Cusp Dynamics: An Ionospheric Perspective
- Keynote Speaker at the Space Weather Quantification of Uncertainties (SWQU) Spring Meeting, March, 2023, Space Weather at Haystack.
- CEDAR Distinguished Lecture (June 2022): "System Science from Above and Below: Past, Present, and Future"