

Space Research at Boston University



The *Center for Space Physics (CSP)*, founded in 1988, has 17 faculty, 18 professional PhD researchers, 26 graduate students, and 3 full-time staff.

The CSP constitutes a collaboration between science (CAS) and engineering (ENG) faculty at Boston University under a common mission: to advance our understanding of the atmospheres, magnetospheres, and plasma environments of our solar system.

This region of space holds special interest because of its relative accessibility through space-based and ground-based sensing techniques, supported by theoretical and numerical modeling, and a variety of advanced data analysis strategies.

Advantages of University Space Research

Space is Cool – working in space gets people enthused

Student Training – we graduate a steady stream of undergrad. and grad. students who go on to work at NASA and other space agencies

Teaching – our local activity in space research is well known, and attracts students to our classes

University Prestige – ditto to the wider community

Significance to Human Civilization – we live in the golden era of the exploration of the space environment, and we are active participants

CSP Foundation: 1988 - early 1990's

The original Center had just a few grants combined between the Colleges of CAS and ENG:

Areas of work included:

- Ground-based magnetometers
- Ground-based earth airglow measurements
- Theoretical modeling of the thermosphere
- Chemical releases in ionosphere (CRESS satellite)
- Sounding rockets – Earth aeronomy

CSP Growth: 1990's – 2000

The Center expanded into new areas, in particular by hiring mid-career faculty:

- Mobile ionospheric observatory / ionosphere simulations
- Earth magnetosphere simulations
- Sounding rockets moving into astrophysics
- Ground-based studies of Io, the Moon, and Mercury
- Terriers University-class scientific satellite
- Earth-orbiting charged particle measurements

CSP Development: 2000 - 2010

Period of expansion for the Center, new areas / large awards:

- Award of CISM, NSF Center for space weather modeling
- Cluster mission energetic particle instrument
- Modeling of planetary ionospheres
- Instruments on LRO and RBSP missions
- Science data center for IBEX mission
- Expanded use of Hubble Space Telescope for planetary observations
- Development of small satellites involving dozens of students

CSP Re-Development: 2010 - present

Renewal of faculty and expansion into new areas:

- Sounding rockets – testing nulling interferometer for exoplanet detection and measuring Venus D/H ratio
- Mars MAVEN mission – several people involved in orbital mission studying escape of atmosphere into space
- Expanded set of earth airglow observatories – 13 at present
- Modeling of heliospheric boundary plasma interactions
- Theoretical modeling of all planetary ionospheres
- Renewal of Earth auroral and magnetospheric research

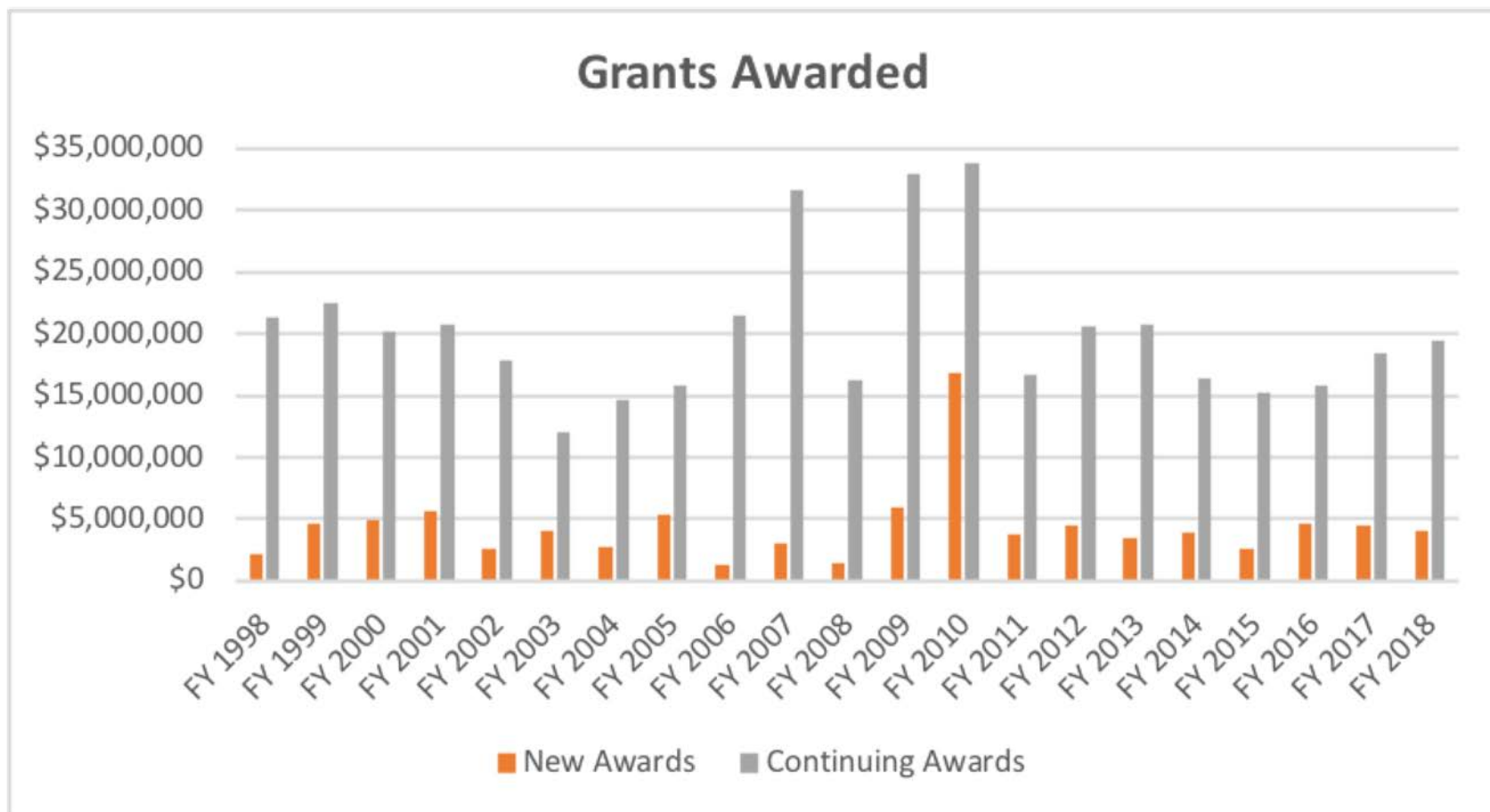
CSP Strategic Plan 2016

Strengths of CSP:

- the cross-disciplinary Science (CAS) and Engineering (ENG) nature of the Center for Space Physics (CSP),
- active participation in instrumentation and NASA mission- related research and modeling,
- hiring established mid-career scientists, and
- the development of an on-campus small satellite program

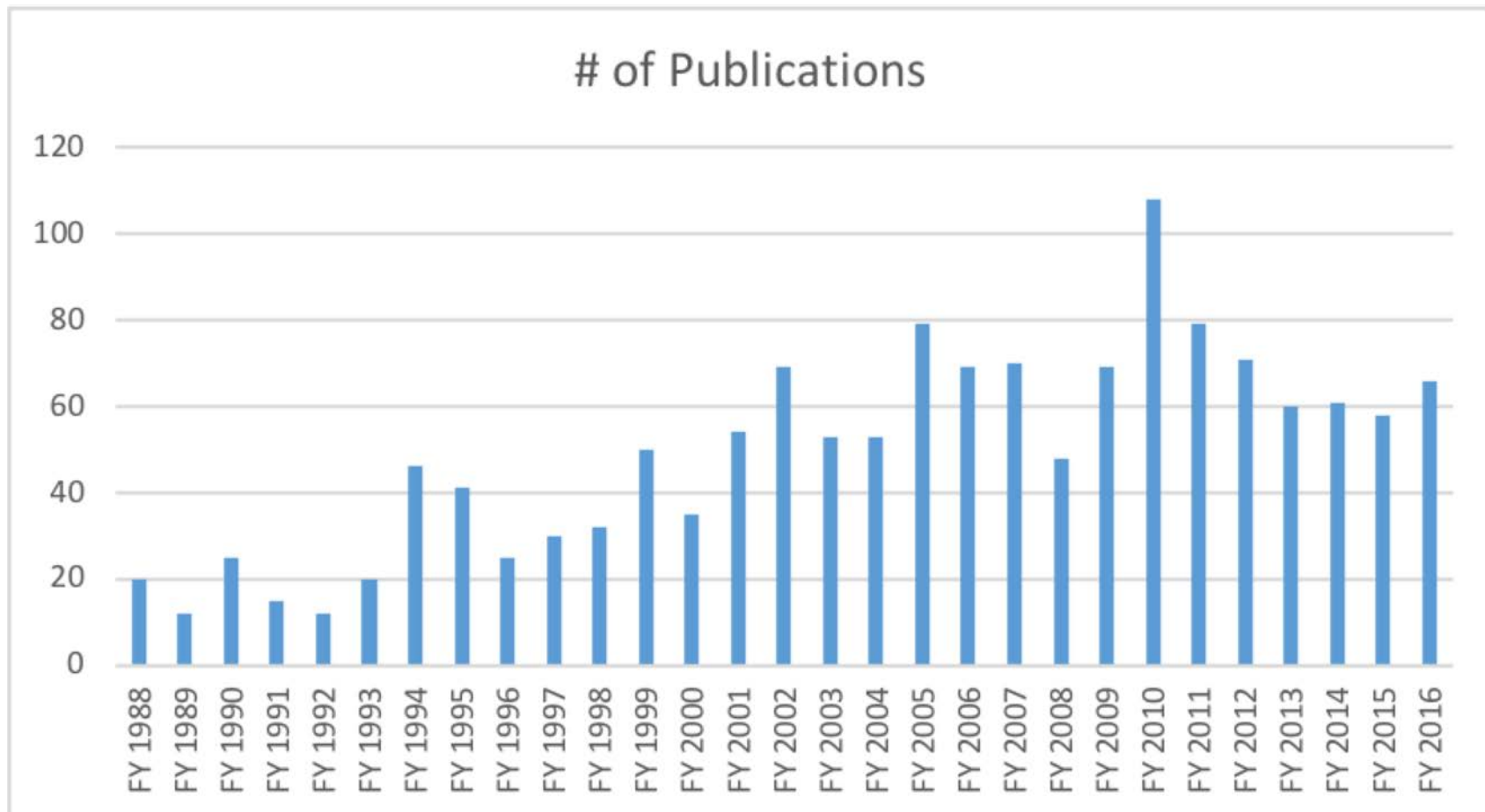
CSP Grant Awards History

Research and Teaching are what counts, but grant funding gives an indication of activity level:

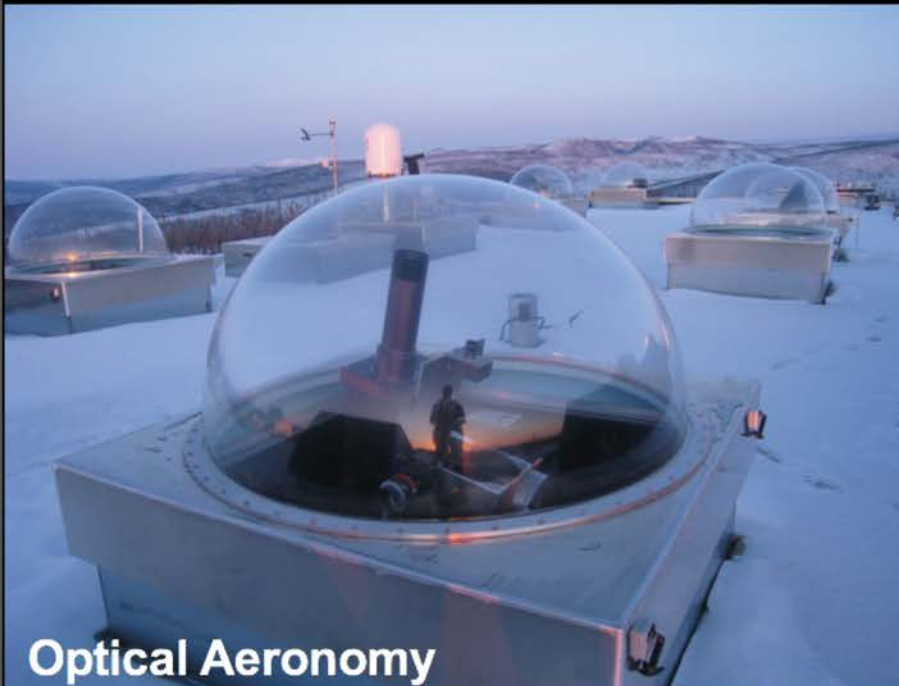


CSP Scholarship

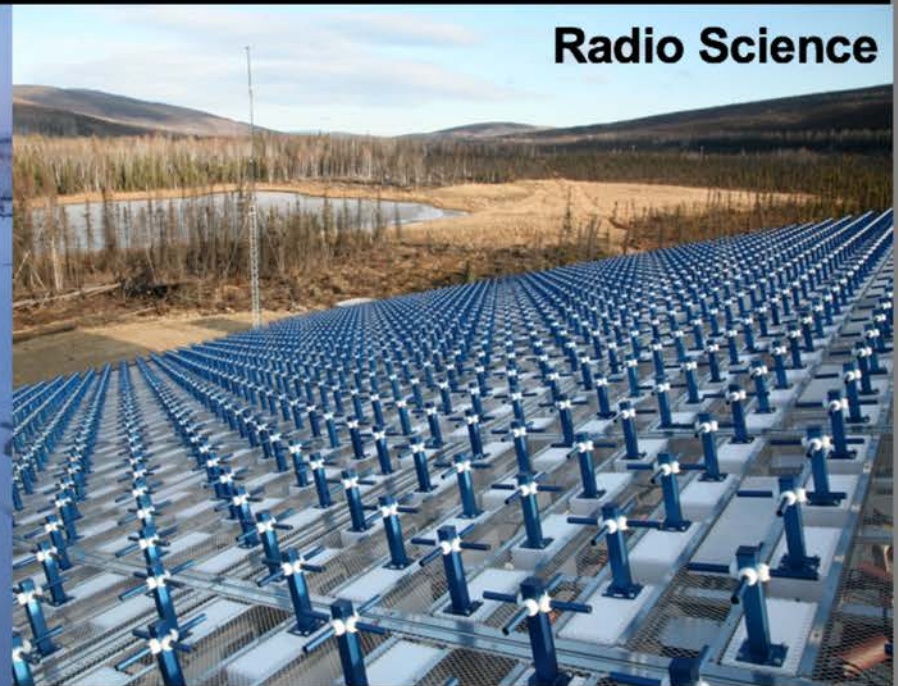
Consistent productivity over the years as seen in the numbers of papers in refereed journals:



Ground-Based Sensors



Optical Astronomy



Radio Science

Boston University has constructed and operates a number of ground-based observatories to study the near-Earth space environment from the ground. These multi-point networks span the globe from southern New Zealand to northern North America.

Flight Projects



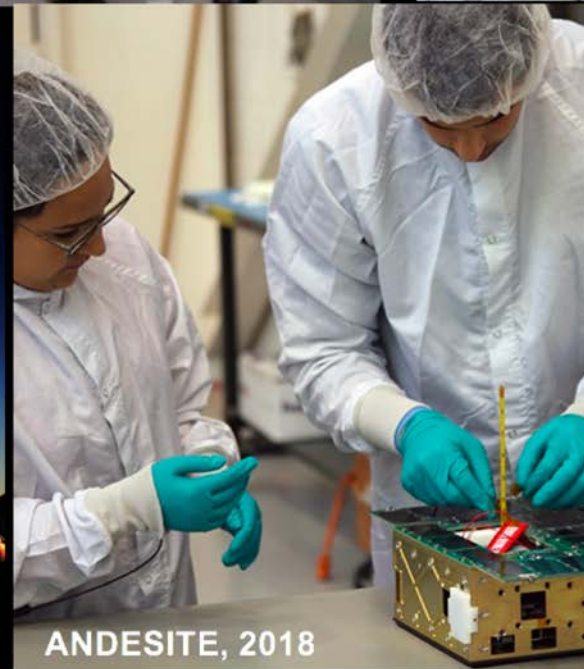
PICTURE, 2011



TERRIERS, 1999



VeSpR, 2013



ANDESITE, 2018



DXL, 2012



CuPID, 2019

Workforce Development & Outreach



The Center is active in education, producing 12 PhDs in the past 5 years. The CSP is also active in community engagement and outreach activities.

CSP 30th Anniversary Symposium June 2018



CSP Principal Investigators - It is the people who have made space physics a success at BU

Last Name	First Name	Became PI
Aarons	Jules	1987-88
Basu	Sunanda	2002-03
Baumgardner	Jeffrey	1987-88
Bertaux	Jean-Loup	2012-13
Bhattacharyya	Dolon	2018 (as PI)
Bifano	Thomas	2006-07
Brown	Keith	2016
Chakrabarti	Supriya	1988-92
Chen	Jiasheng	1995-96
Clarke	John	2001
Cook	Timothy	1988-92
Crooker	Nancy	1988-92
Dimant	Yakov	2000-01
Duggirala	Pallam Raju	1998-99
Erickson	Gary	1988-92
Forbes	Jeffrey M.	1987-88
Fritz	Theodore	1988-92
Galand	Marina	2000-01
Goodrich	Charles	2002-03

Holmfeld	Robert	1987-88
Hubbard	Allyn	2006-07
Hughes	W. Jeffrey	1987-88
Karl	W. Clem	2009-10
Kasper	Justin	2005-06
Kepko	E. Lawrence	2000-01
Kerr	Robert B.	1988-92
Lapington	Jonathan	2000-01
Li	Wen	2016
Lyon	John	2002-03
Marshall	Robert	2010-11
Martinis	Carlos	2010 (as PI)
Mayyasi	Majd	2016 (as PI)
Mendillo	Michael	1987-88
Merkin	Viatcheslav	2006-07
Moore	Luke	2011 (as PI)
Mueller-Wodarg	Ingo	2006-07
Nichols	Jonathan	2006-07
Nishimura	Toshi	2016
O'Donoghue	James	2016
Oliver	William	1988-92
Opher	Merav	2010-11
Oppenheim	Meers	1998-99
Owens	Mathew	2003-04
Pagel	Christina	2002-03

Pallam Raju	Duggirala	1997-98
Petschek	Harry	1994-95
Quinn	John	2004-05
Ruane	Michael	2006-07
Sandri	Guido	1987-88
Schmidt	Carl	2017 (as PI)
Schwadron	Nathan	2005-06
Semeter	Joshua	2004 (as PI)
Siscoe	George	1988-92
Smith	Steven	2004 (as PI)
Spence	Harlan	1993-94
Sullivan	James	1998-99
Sundberg	Torbjorn	2012-13
Sweeney	Christopher	2002-03
Vickers	James	1992-93
Vogt	Marissa	2016 (as PI)
von Holstein-Rathlou	Christina von	2016 (as PI)
Walsh	Brian	2016 (as PI)
Wilson	Jody	1997-98
Withers	Paul	2010 (as PI)
Yelle	Roger	1995-96
Young	Leslie	1995-96
Zieger	Bertalan	2012-13
Zirbel	Esther	2002-03
Zou	Ying	2017