FRANCES BAGENAL

Laboratory for Atmospheric and Space Physics
University of Colorado

Born: November 4, 1954 Dorchester, England
Naturalized US citizen (9/6/2001)

EDUCATION

1973-1976 University of Lancaster, BSc in Physics and Geophysics
1976-1981 Massachusetts Institute of Technology, Ph.D. in Earth and Planetary Sciences.

APPOINTMENTS

2015- Senior Research Associate IV, Laboratory for Space and Atmospheric Physics
2020-2023 Assistant Director for Planetary Science, LASP
1992-2015 Research Associate III, Laboratory for Space and Atmospheric Physics
1999-2015 Professor, Department of Astrophysical and Planetary Sciences, University of Colorado, Boulder
1995-1996, 1997-2001, 2005-2006, 2009-2010 Associate Chair, Department of Astrophysical and Planetary Sciences
1993-1999 Associate Professor, APS Dept., University of Colorado, Boulder
1989-1993 Assistant Professor, APS Dept., University of Colorado, Boulder
1987-1988 Visiting Scientist, High Altitude Observatory, National Center for Atmospheric Research
1985-1987 Science and Engineering Research Council Advanced Research Fellow, Space Physics Group, Imperial College, London
1982-1985 Post-Doctoral Research Assistant, Space Physics Group, Imperial College
1981-1982 Post-Doctoral Research Assistant, MIT, Center for Space Research

AWARDS

2023 NASA Exceptional Public Service Medal for contributions during Juno's Prime Mission
2021 Member of the National Academy of Sciences
2019 Fellow of the American Astronomical Society
2018 James Van Allen Lecture award, American Geophysical Union
2010 Boulder Faculty Assembly's Excellence in Research Award
2006 Fellow of the American Geophysical Union
NASA Group Achievement Awards for contributions to the *Voyager*, *Galileo*, *Deep Space 1*, *New Horizons* and *Juno* missions.

PROFESSIONAL ACTIVITIES AND SOCIETIES (past 20 years)

2022– Steering Committee, Decadal Survey of Solar & Space Physics, National Academy of Science
2020–2022 Co-Chair, Committee to address Increasing Diversity and Inclusion in the Leadership of Competed Space Missions, National Academies of Science, Engineering & Medicine
2020–2022 Giant Planets Panel of Decadal Survey of Planetary Science and Astrobiology, National Academy of Science
2016– Standing Review Board, NASA Europa Clipper mission
2009–2010 Chair of the Planetary Science Subcommittee of the Science Committee of the NASA Advisory Council
2004–2009 Chair, NASA's Outer Planet's Assessment Group
2004–2010 Editor, STATUS, newsletter of the Committee on the Status of Women in Astronomy of the American Astronomical Society
2005–2008 Astronomy Education Board, American Astronomical Society

2004–2007 Member, Committee of the Division of Planetary Science of the American Astronomical Society
2001–2002 Member Solar and Space Physics Decadal Survey Committee for the National Research Council / National Academy of Science
1998–2001 Member of the Space Studies Board for the National Research Council / National Academy of Sciences

RESEARCH

Jupiter is a planet of superlatives: the most massive planet in the solar system, rotates the fastest, has the strongest magnetic field, and has the most massive satellite system. The strong magnetic field of Jupiter traps a torus of ionized gases stripped from the volcanic atmosphere of the moon Io. Aurora are excited when accelerated particles bombard Jupiter's atmosphere. I enjoy studying the environs of planets dominated by their magnetic fields – magnetospheres – because the systems are dynamic, involve a wide range of physical phenomena, and each new space mission seems to bring surprises. I study the magnetospheres of the outer planets by combining data analysis and theoretical models. I am actively involved in NASA's New Horizons mission that after flying past Kuiper Belt Objects Pluto and Arrokoth is heading through the outer heliosphere, as well as NASA's Juno mission that is orbiting Jupiter.

NASA MISSIONS

Voyager: 1977-1989, 2023- Co-I on the Plasma Science (PLS) instrument. Worked with PLS data at Jupiter, Saturn, Uranus & Neptune. Concentrated on plasma between 5 and 30 R_J at Jupiter, and comparison with *New Horizons* in outer heliosphere.

Galileo: 1992-2003. Interdisciplinary Scientist. Concentrated on Plasma Science (PLS), Plasma Wave Science (PWS) data and plasma between 5 and 30 R_J at Jupiter.

Deep Space 1: 1997-2001. Team member of PEPE (PI. Dave Young). Analysis of data obtained on the interaction of the solar wind with the Comet Borrelly.

Cassini: While not officially involved in the Cassini Project, I have worked with Cassini plasma data (CAPS, PI Dave Young) and the UVIS data (PI Larry Esposito). The combination of data obtained on the Jupiter flyby, UVIS observations of the Io plasma torus emissions, Galileo in situ data and physical chemistry models have proven to be very productive.

New Horizons: 2001-. Co-I and Particles Theme Lead. Analysis of data obtained on the interaction of the solar wind with the Pluto system.

Juno: 2003-. Co-I and Co-Chair of the Magnetospheres Working Group and the Science Planning Working Group. Study of magnetospheric plasmasheet and coupling to Jupiter's atmosphere.

STUDENTS

Graduated PhDs: Sarah Gibson, Frank Crary, Chris Balch, David Brain, Andrew Steffl, Licia Ray, Vincent Dols, Bobby Fleshman, Mariel Desroche, Drake Ranquist, Edward Nerney

Current graduate students: Jian-zhao Wang

DEMOGRAPHICS STUDIES

2023 Bagenal F, Enhancing demographics and career pathways of the space physics workforce in the US. *Frontiers Astron. Space Sci. 10:1130803. doi: 10.3389/fspas.2023.1130803*
2020 Member, Planetary Science Survey Committee, AAS-DPS, conducted by American Institute of Physics
2010 Chair, Planetary Workforce Survey, AGU/AAS-DPS/LPSC, conducted by the American Institute of Physics

PUBLIC OUTREACH

A dozen press articles in publications such as *Sky & Telescope, Physics World, Nature, Science*

20-50 public talks per year to schools, planetaria, astronomy clubs, etc on New Horizons mission to Pluto and/or Juno mission to Jupiter

IMDB profile https://www.imdb.com/name/nm3293128/?ref_=fn_al_nm_1

Wikipedia profile https://en.wikipedia.org/wiki/Fran_Bagenal

SELECTED BOOKS & BOOK CHAPTERS (33 total)

Planetary Magnetospheres and the Interplanetary Medium, J.A. Van Allen, F. **Bagenal**, in *The New Solar System* (4th edition), Eds.J. Kelly Beatty, Carolyn Collins Petersen, Andrew Chaikin, Cambridge University Press & Sky Publishing, 1998

Jupiter: Planet, Satellites, Magnetosphere, eds. **Bagenal**, Dowling, McKinnon, Cambridge University Press, 2004

Comparative Planetary Environments, F. **Bagenal**, in *Heliophysics: Plasma Physics of the Local Cosmos*, C.J. Schrijver, G.L. Siscoe (eds), Cambridge University Press, 2009

Planetary Magnetospheres, F. **Bagenal**, in *Planets, Stars and Stellar Systems. Volume 3: Solar and Stellar Planetary Systems,* T.D. Oswalt, L. French, P. Kalas (eds.), Springer, 2013

Solar Wind Interaction with the Pluto System, F. **Bagenal**, D. J. McComas, H. A. Elliott, E. J. Zirnstein, R. L. McNutt Jr., C. M. Lisse, P. Kollmann, P.A. Delamere, N. P. Barnes, *Pluto After New Horizons*, University of Arizona Press, 2020

Space Environment of Io, **Bagenal,** F., Dols, V.. In: Lopes, R.M.C., de Kleer, K., Tuttle Keane, J. (eds) *Io: A New View of Jupiter's Moon .* Astrophysics and Space Science Library, vol 468. Springer, Cham. 2023

SELECTED JOURNAL PUBLICATIONS (249 total, h-index=56)

Direct plasma measurements in the Io torus and inner magnetosphere of Jupiter, F. **Bagenal** & J.D. Sullivan, *J. Geophys. Res. 86*, 8447, 1981

Empirical model of the Io plasma torus: I Voyager measurements, F. **Bagenal**, *J. Geophys. Res., 99,* 11043-11062, 1994

Mass and Energy Flow Through the Magnetospheres of Jupiter and Saturn, **Bagenal**, F., P.A. Delamere, *J. Geophys. Res.*, 116, A05209, 2011

Plasma conditions at Europa's orbit, **Bagenal**, Fran; Sidrow, Evan; Wilson, Robert J.; Cassidy, Timothy A.; Dols, Vincent; Crary, Frank J.; Steffl, Andrew J.; Delamere, Peter A.; Kurth, William S.; Paterson, William R., *Icarus, 261*, 1-13, 2015

Pluto's interaction with its space environment: Solar wind, energetic particles, and dust, **Bagenal**, and 156 coauthors of New Horizons Science Team, *Science,* 351, 2016

Survey of Voyager Plasma Science Ions at Jupiter: I Analysis Method*,* **Bagenal,** F., L. P. Dougherty, K. M. Bodisch, J. D. Richardson, and J. M. Belcher *J. Geophys. Res., 122*, 2017

Magnetospheric Science Objectives of the Juno Mission, F. **Bagenal**, A. Adriani, F. Allegrini, S. J. Bolton,B. Bonfond, E. J. Bunce, J.E.P. Connerney, S. W. H. Cowley, R. W. Ebert, G. R. Gladstone, C. J. Hansen, W. S. Kurth, S. M. Levin, B. H. Mauk, D. J. McComas, C. P. Paranicas, D. Santos-Costa, R. M. Thorne, P. Valek, J. H. Waite, P. Zarka, *Space Sci. Rev., 213,* 219-287, 2017

Alfvén Wave Propagation in the Io Plasma Torus, Hinton, P. C., **Bagenal**, F., & Bonfond, B. *Geophys. Res. Lett.,* 46, 1242-1249, 2019

The space environment of Io and Europa, F. **Bagenal**, V. Dols, *JGR, 125,* 2020

Survey of Juno observations in Jupiter's plasma disk: Density. Huscher, E., **Bagenal**, F., Wilson, R. J., Allegrini, F., Ebert, R. W., Valek, P. W., J. R. Szalay, D. J. McComas, J. E. P. Connerney, S. Bolton, S. M. Levin, *JGR, 126,* 2021