

Mary K. Hudson

Title: Professor of Physics

Present Address: Dept. of Physics and Astronomy
Dartmouth College
Hanover, NH 03755

Date of Birth: January 6, 1949

Education: 1969, B.S. in Physics, U.C.L.A., Summa Cum Laude
1971, M.S. in Physics, U.C.L.A.
1974, Ph.D. in Physics, U.C.L.A., Charles F. Kennel, Adviser

Awards: Woodrow Wilson Fellow
NDEA IV Fellow
Phi Beta Kappa
Regents Scholar
American Geophysical Union Macelwane Award
American Geophysical Union Fellow
Robert E. Maxwell Professor in the Arts and Sciences
Pizzagali Prize, 2000

Experience: 1967, Mathematician, McDonnell-Douglas Corp., Long Beach
1968, NSF Trainee, Physics, U.C.L.A.
1969-71, Member Associate Staff, Space Sciences Laboratory
The Aerospace Corporation, El Segundo
1972-74, Research Assistant, Physics, U.C.L.A.
1974-86, Research Physicist, UCB
1980-85, Senior Fellow, UCB
1984-90, Associate Professor of Physics, Dartmouth College
1990 Visiting Associate Professor, Stanford University
1990 Professor of Physics, Dartmouth College
1996-04, Chair, Physics and Astronomy Department, Dartmouth
1984-03, Visitor, UC Berkeley Space Sciences Laboratory

Recent Publications:

Acceleration of relativistic electrons via drift-resonant interaction with toroidal-mode Pc-5 ULF oscillations, S.R. Elkington, **M.K. Hudson**, A.A. Chan, *Geophys. Res. Lett.*, **26**, 3273, 1999.

Increase in relativistic electron flux in the inner magnetosphere: ULF wave mode structure, **M.K. Hudson**, S. R. Elkington, J. G. Lyon and C. Goodrich, *Adv. Space Res.*, **25**, 2327, 2000.

Radiation belt electron acceleration by ULF wave drift resonance: Simulation of 1997 and 1998 storms, AGU Monograph, **M.K. Hudson**, S.R. Elkington, J.G. Lyon and M.J. Wiltberger, *Space Weather*, G. Sisco, P. Song, H. Singer, eds *AGU*, pp. 289-296, Washington, D.C. 2001.

MHD/Particle Simulations of Radiation Belt Dynamics, S.R. Elkington, **M.K. Hudson**, M.J. Wiltberger and J.G. Lyon, *J. Atmos. Solar-Terr. Phys.*, **64**, 607, 2002.

Resonant Acceleration and Diffusion of Outer Zone Electrons in an Asymmetric Geomagnetic Field, S.R. Elkington, **M.K. Hudson** and A.A. Chan, *J. Geophys. Res.*, **108**, 1116, 2003.

A Study of Pc5 ULF Oscillations, **Hudson, M.K.**, R.E. Denton, M.R. Lessard, E.G. Miftakhova and R. E. Anderson *Annals. Geophys.*, **22**, 289, 2004.

Dynamic Modelling of Geomagnetic Cutoff for the 23-24 November 2001 Solar Energetic Particle Event, Kress, B.T., **M.K. Hudson**, K.L. Perry and P.L. Slocum, Geophys. Res. Lett., **31**, L04808, 2004.

Ph.D. students, completed:

Robert L. Lysak, 1980, UCB
Earl F. Witt, 1984, UCB
Rachelle A. Bergmann, 1985, UCB
Perry Gray, Dartmouth
Xinlin Li, Dartmouth
Victor Marchenko, Dartmouth
Elena Belova
Marc Lessard
Scot Elkington
Jerry Goldstein
Shawn Young
Kara Perry

AB honors students supervised:

Keith Cerny, 1983, UCB
James Warren, 1987, Dartmouth
Jan Brzeski, 1989, Dartmouth
Karen Daniels, 1992-94, Dartmouth
Justin Kreidel, 2003-04, Dartmouth

Women in Science Program Students:

Karen Archibald (94)
Sonja Berndt (94)
Abigail Bickley (97)

Janna Berke (02)

M.S. students, completed:

Xiaomei Zhu
Evguenia Miftakhova
Alicia Eccles

Presidential Scholars:

Howard Skogman (94)
Karen Daniels (94)

Currently supervising PhD/MS students: Sumire Kobayashi, Yonggang Hu

Committees/ Service/Synergistic activities:

Chair, NSF Geospace Environment Modelling Steering Committee 2000-03.
Member, National Academy of Sciences/NRC Committee on Solar and Space Physics, 2000-03.
Vice Chair, CSSP Decadal Survey Magnetosphere-Ionosphere-Atmosphere Panel 2001-03.
Member, NASA Sun-Earth Connections Advisory Committee, 1996-2000.
Member, NASA Living with a Star, Geospace Mission Definition Team, 2001-03.
Chair, Physics and Astronomy Department 1996 – 2004.
Member, Dartmouth Committee Advisory to the President, 1992 –95, 1996 –99, 2001-04.
Member, Dartmouth Subcommittee on Priorities, 1999 – 2003.
Chair, Dean of Faculty Search Committee, 1997, member 2002.
Member, Education Department External Review Committee, 2000.
Member, American Geophysical Union Fellows Committee, 1999-2000, 2002-2003.RR

Space Physicist Mary Hudson, PhD UCLA 1974, is Professor of Physics and served for the past eight years as Chair of Physics and Astronomy at Dartmouth College. Hudson is currently one of the principal investigators with the NSF-funded Center for Integrated Space Weather Modeling (CISM), where researchers study the weather patterns that originate from a solar eruption, following the energy and mass transfer through the interplanetary medium, all the way to the earth's ionosphere. Current areas of investigation include the evolution of the radiation belts; how the ionized particle outflow known as the solar wind and the magnetic field of the sun interact with the magnetic field of the earth, producing electrical currents in the ionosphere; and the effects of solar cosmic rays on radio communications near the earth's poles. Professor Hudson is also funded by and serving on a steering committee for NASA's Living With a Star program, studying related effects of the Earth's space radiation environment which can affect both astronaut safety and satellite systems. Along with her students and postdoctoral research staff, she is modeling sudden changes in relativistic electron fluxes at and inside the 24-hr orbital period of many communication and navigation satellites, which are affected by global oscillations of the Earth's magnetic field, associated with changes in solar wind conditions which have their origins at the sun. She has served as chair of the NSF Geospace Environment Modelling program, and is funded for research in that program on geomagnetic 'storms'.