

Dr. Michael Hesse

Office Address:

Director, Community Coordinated Modeling Center
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EDUCATION

Dr. rer. nat. (PhD), Theoretical Physics, Ruhr-Universität, Bochum, Germany (1988)

Diplom Physiker (MS), Physics, Ruhr-Universität, Bochum, Germany (1985)

EXPERIENCE

NASA Goddard Space Flight Center, Greenbelt, MD (1993–present)

Director of the Community Coordinated Modeling Center (CCMC) (1999-present). Responsible for leading a group of twelve scientific and engineering personnel. The CCMC is a US multi-agency activity, which employs research models for space weather purposes. Models at the CCMC cover the entire Sun-Earth domain, and include state-of-the-art, parallel and adaptive mesh codes. These models are executed in local and distributed high-performance computing systems. Participating agencies are AF/XOW, AFOSR, AFRL, NASA, NSF, NOAA, and ONR. The CCMC provides to the research community access to space science models, transitions these models to operational agencies, and participates in the development of advanced space weather models.

Acting Branch Head, Geospace Physics Branch (9/2004-3/2005)

Supervised 40 civil service and contractor staff during NASA Goddard Space Flight Center reorganization, in the absence of branch head. Participated in the establishment of the new Laboratory for Solar and Space Physics (LSSP) as branch representative.

Project Scientist for Theory and Modeling for NASA's Living With a Star program (1999-present). Provides guidance related to theory and modeling and the National Space Weather Program to the Goddard Living With a Star team. Provides implementation scenarios to NASA Headquarters program management. Responsible for interfacing between research and operational communities, and NASA Headquarters management.

Project Scientist for *Equator-S* and Deputy Project Scientist for *Polar* spacecraft missions (1996-99). Responsible for setting and verifying scientific milestones. Directed and evaluated research activities of a large science teams, and interacted closely with international space agencies and research institutions.

Senior research scientist in the Laboratory for Extraterrestrial Physics (1993-present).

Conducts research into fundamental physical processes in space plasmas, and in support of NASA missions. Leads or participates in studies of magnetospheric, solar physical and

astrophysical problems. Develops MHD, Hall-MHD, hybrid and PIC plasma simulations codes. Provides theoretical guidance for the data analysis of space flight missions, as well as contributes to the data analysis. Explained critical magnetospheric phenomena, such as the dipolarization, current disruption and diversion, and current wedge formation in the inner magnetosphere of the Earth, and its relation to mid-tail processes. Discovered the dissipative electron dynamics in collisionless magnetic reconnection. Guest lecturer at the Niels Bohr Institute in Copenhagen, Denmark. Co-Editor of monograph on magnetospheric current systems. Principal and Co-Investigator of several funded research grants for NASA and NSF. Co-Investigator on electric field instrument on the *Polar* spacecraft.

Hughes System Corporation (STX), Lanham, MD (1991-93)

Principal scientist. Theoretical research and numerical simulations of microphysical processes in space plasmas, such as current sheet formation and magnetic reconnection. Developed hybrid plasma simulation model that includes comprehensive electron model.

Los Alamos National Laboratory (LANL), Los Alamos, NM (1988-91)

Postdoctoral research scientist in the LANL Space Plasma Physics group. Numerical simulations and theoretical research of macroscale dynamical processes in the Earth's magnetosphere and solar corona. Developed MHD and Hall-MHD simulation models of the Earth's magnetosphere and of solar coronal processes.

Ruhr-Universität, Bochum, Germany (1985-88)

Research associate in the department for Theoretical Physics. Dissertation research: Investigations of magnetic reconnection in three dimensions. Applied modern mathematical methods, such a bifurcation theory and functional-based stability methods to fundamental plasma physical problems.

MANAGEMENT TRAINING

Goddard Leadership Education Series for Supervisors (1995)
NASA Management Education Program (2003)

PROFESSIONAL SOCIETY MEMBERSHIP

American Geophysical Union since 19xx
European Geophysical Union since 19xx

PROFESSIONAL ACTIVITIES

NSF Geospace Environment Modeling (GEM) program steering committee member (1993-98)
NSF GEM program, representative to the steering committee (1998-present)
NSF GEM program, working group co-chair (1993-97)
NSF GEM program, campaign co-coordinator (1996-99)
NASA-Air Force Space Command-NRO partnership, modeling panel (1997)
Science Definition Team for NASA's Magnetospheric Multiscale Mission (1998-2000)

Science Definition Team for NASA's Magnetospheric Constellation Mission (1999-present)
Community Coordinated Modeling Center, steering committee member (1999-present)
National Security Space Architect space weather transition plan, consultant (1999-2000)
Committee for Space Weather, alternate member (2000-present)
Niels Bohr Institute of the University of Copenhagen, guest lecturer (2000)
Living With a Star, NASA Goddard definition team member (1999-2000)
Living With a Star, Theory and Modeling pre-definition team leader (2000)
National Academy of Science Decadal Study, panel member (2001-02)
National Academy of Science Decadal Study, transition to operations working group (2001)
NASA Sun-Earth Connection Roadmap participant (2002-03)

HONORS

NASA Group Achievement Award, Community Coordinated Modeling Center (2004)
Performance award, Goddard Space Flight Center (2004)
Air Force Directorate of Weather Medal, awarded by BGen David Johnson, AF/XOW (2003)
Performance award, Goddard Space Flight Center (2004, '03, '02, '01, '00, '99, '97)
Space Science Achievement Award, first recipient, Goddard Space Flight Center (2002)
NASA Group Achievement Award, Polar Electric Fields (1998)
Outstanding Performance award, Goddard Space Flight Center (1996, '95, '94, '93)
Director's Postdoctoral Fellow, Los Alamos National Laboratory (1988-1990)
Graduated "mit Auszeichnung," Ruhr-Universität, Bochum (1985)

PUBLICATIONS

More than 140 papers published in scientific journals and books. More than 150 papers presented at international scientific meetings, which include numerous invited papers.