

Fred Hall IV

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Academic Record

2006 Ph.D. University of Alaska Fairbanks: Space physics
1995 M.S. University of Colorado at Boulder: Plasma physics
1991 B.S. Ohio University: Physics with a concentration in astronomy (summa cum laude)

Ph.D. Thesis title: *A Mechanism for Current Sheet Thinning in the Growth Phase of Magnetospheric Substorms*

Undergraduate Honors Thesis title: *A Computer Model of Binary Star Systems*

Fellowships and Awards

Recipient, Outstanding Student Paper Award at the 2004 Fall Meeting of the American Geophysical Union, 2005.

Recipient, National Physical Science Consortium Fellowship, 1991.

Inductee in

- The Honor Society of Phi Kappa Phi, 1991.
- Sigma Pi Sigma, 1989.

Professional Associations

- The American Geophysical Union (AGU)
- The Geospace Environment Modeling (GEM) community
- The National Society of Black Physicists (NSBP)
- The Society of Physics Students (SPS)
- The American Association of Physics Teachers (AAPT)
- The American Association for the Advancement of Science (AAAS)

Academic/Professional Service

- Student Representative on the Geospace Environment Modeling (GEM) Steering Committee in the Summer of 2000
- Member of the Graduate Student Organization of the University of Alaska Fairbanks since its founding in 1997 and GSO President in the 2001 academic year

Research Experience

University of Alaska Fairbanks, 1998—1999 academic year to the present

- Conduct three-dimensional numerical simulations of current sheet thinning in the late growth phase of magnetospheric substorms, utilizing the local magnetohydrodynamic (MHD) numerical code developed by Otto.
- Constructed maps of the pressure in the equatorial plane of the magnetosphere consistent with Tsyganenko's T96 semi-empirical magnetic field model.

University of Colorado at Boulder, 1994—1995 academic year

- Participated in research pertaining to charged particle motion in representative magnetotail magnetic fields.
- Explored research options in plasma astrophysics, solar physics, and magnetospheric physics.

NASA Marshall Space Flight Center, Summers of 1991 and 1992

- Explored and documented protocols for accessing a local supercomputer through a VAX mainframe system and attendant terminals.
- Assisted in research concerning convection in the upper layers of the solar atmosphere.

Ohio University, 1990—1991 academic year

- Developed a suite of programs (in Turbo Pascal) to generate and display artificial light curves (taking limb darkening into account) for binary star systems.
- Wrote an undergraduate Honors Thesis describing this work.

Michigan State University, Summer 1990

- Used the Light Synthesis and Differential Corrections package developed by Linnell to investigate how the use of a single limb darkening coefficient biases the photometric determination of other system parameters in close binary star systems.

Programming and Computer Experience

- Extensive programming experience in Fortran and IDL.
- Familiarity with BASIC, Pascal, the C programming language, and Unix shell programming.
- Familiarity with Unix/Linux text formatting software and editing tools, including vi, emacs, TeX, LaTeX, and OpenOffice.
- Experience with system administration duties (including security concerns) on a small (5 machine) research cluster of Linux workstations.
- Experience with parallel programming, including use of the Message Passing Interface (MPI)

Teaching Experience

Graduate Teaching Assistant, University of Alaska Fairbanks, Spring Semester 2003 and the 1996—1997 academic year

- Led two laboratory sections for calculus-based introductory physics course; graded student laboratory reports; and held office hours.

Physics, Astronomy, and Mathematics Tutor, University of Colorado at Boulder, 1995—1996 academic year

- Conducted individual and small-group tutorials in physics, astronomy, and mathematics.
- Led a weekly ROTC physics tutoring session.

Chronological Account of Professional Experiences

Summer 2005	Graduate Research Assistant, Geophysical Institute, University of Alaska, Fairbanks.
Summer 2004	Graduate Research Assistant, Geophysical Institute, University of Alaska, Fairbanks.
Spring 2003	Graduate Teaching Assistant, Department of Physics, University of Alaska, Fairbanks.
1997-2003	Graduate Research Assistant, Geophysical Institute, University of Alaska, Fairbanks.
1996-1997	Graduate Teaching Assistant, Department of Physics, University of Alaska, Fairbanks.
Summer 1996	Graduate Research Assistant, Geophysical Institute, University of Alaska, Fairbanks.

- 1995-1996 Physics, Astronomy, and Mathematics Tutor, University of Colorado at Boulder.
- 1992-1995 Graduate Research Assistant, APAS Department, University of Colorado at Boulder.
- Summer 1992 Summer Intern, Solar Physics Branch, NASA Marshall Space Flight Center.
- 1991-1992 Graduate Research Assistant, APAS Department, University of Colorado at Boulder.
- Summer 1991 Summer Intern, Solar Physics Branch, NASA Marshall Space Flight Center.
- Summer 1990 Research Experiences for Undergraduates (REU) program participant, Department of Physics and Astronomy, Michigan State University.
- Summer 1989 College Summer student, Delco Moraine-NDH Division, General Motors Corporation.
- Summer 1988 Summer intern, Department of Physics and Astronomy, Ohio University.
- Summer 1987 Editorial assistant, Department of Physics and Astronomy, Ohio University.

Papers and Presentations

Conference Proceedings:

- “The Role of Magnetic Reconnection in the Terrestrial Magnetosphere” by F. Hall IV, A. Otto, and H. E. Petschek
 - Appears in the Proceedings of the Joint Conference of the National Society of Black Physicists (NSBP) and the National Conference of Black Physics Students (NCBPS) in early March 1998
 - Based upon an oral presentation given at that meeting

Oral Presentations:

- “Three-Dimensional MHD Simulation of Current Sheet Evolution During the Growth Phase of Magnetospheric Substorms” by F. Hall, IV and A. Otto
 - 2004 Fall Meeting of the American Geophysical Union (AGU)
 - 13 December 2004
 - Outstanding Student Paper Award

- “Slow Quasi-Static Convection of Magnetic Flux Tubes in the Magnetosphere and Its Implications for Current Sheet Thinning in the Late Growth Phase of Magnetospheric Substorms” by Fred Hall
 - Physics Journal Club of the Department of Physics of the University of Alaska Fairbanks (UAF)
 - 3 December 2004

- Discussion of my dissertation research
 - Informal Space Physics and Aeronomy Research Group Meeting of the UAF Geophysical Institute
 - 13 October 2004, 27 October 2004, and 2 November 2004

- “Sundry Aspects of Magnetospheric Physics” by F. Hall, IV and A. Otto
 - Annual Joint NSBP/NCBPS Conference
 - February 2002

- “An Introductory Discussion of Magnetospheric Convection” by Fred Hall IV
 - Departmental Colloquium at the University of Cincinnati
 - December 2000

- An introductory discussion of magnetospheric physics
 - Astrophysics Group in the Department of Physics of Ohio University
 - December 2000

- An introductory discussion of magnetospheric physics
 - Physics classes at Xenia High School
 - December 2000

- Presentation on Basic Phenomenology of Magnetospheric Substorms
 - Geospace Environment Modeling (GEM) Student Tutorials
 - June 2000

- Presentation on Current Controversies in Magnetotail and Substorm Physics
 - GEM Student Tutorials
 - June 2000

- “A Brief Introduction to Space Plasma Physics” by Fred Hall IV
 - UAF Chapter of the American Indian Science and Engineering Society (AISES)
 - 23 March 2000

- “An Introductory Discussion of Magnetospheric Substorms and Magnetic Reconnection” by Fred Hall IV
 - Student Tutorials of the Geospace Environment Modeling (GEM) Workshops
 - June 1999
- “New Perspectives on Plasma Sheet Transport” by Fred Hall, IV
 - UAF Physics Journal Club
 - 30 April 1999

Poster Presentations:

- “Three-Dimensional MHD Simulation of Current Sheet Thinning During the Growth Phase of Magnetospheric Substorms” by F. Hall, IV and A. Otto
 - AGU Fall Meeting
 - December 2003
- “Geeksta Rap: An Example of the Utilization of Elements of Popular Culture in Science Education and Outreach” by F. Hall, IV and A. Otto
 - AGU Fall Meeting
 - December 2003
- “Current Sheet Thinning and Entropy Constraints” by A. Otto and F. Hall IV
 - GEM Workshops
 - June 2001
- “A Model for Current Sheet Thinning During the Substorm Growth Phase” by F. Hall, IV and A. Otto
 - AGU Fall Meeting
 - December 2000
- “Consideration of 3D Effects on Magnetic Flux Tube Volumes and Their Implications for Current Sheet Thinning” by F. Hall, IV and A. Otto
 - AGU Fall Meeting
 - December 1999
- “Three-Dimensional Convection in the Magnetotail and Current Sheet Thinning” by F. Hall IV and A. Otto
 - AGU Fall Meeting
 - December 1998