Laboratory for Atmospheric and Space Physics

Activity Report
2007
University of Colorado at Boulder
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A Message from the Director

The Laboratory for Atmospheric and Space Physics will celebrate its 60th anniversary in 2008. LASP traces its roots back to the Upper Air Laboratory that was founded in the University of Colorado Physics Department in the years after World War II. Looking back upon the past six decades, one can certainly conclude that LASP scientists, students, engineers, and staff have been involved in some of the most exciting and inspiring space exploits ever undertaken by humankind. Moreover, there is every indication that LASP will continue to work at the forefront of space exploration for the decades to come.

Another anniversary that will be celebrated in 2008 is the 50th anniversary of the founding of the National Aeronautics and Space Administration (NASA). From very early in NASA’s existence as an agency, LASP and CU have been major players in sounding rockets, spacecraft missions, and theoretical research that have supported NASA and that have pushed back the frontiers of human inquiry.

When reaching decadal milestones, it is tempting to only look backward and to revel in past accomplishments. However, this is not the “culture” of LASP nor should it be. The Lab derives much (if not most) of its strength from constantly looking forward and seeking ways to improve products and processes. I am constantly amazed at the adaptability of LASP people in the face of changing external conditions and changing requirements. The secret to success – if there is one – I believe is to know what can be changed in an organization without tampering with the fundamentals that have made it the outstanding institute that it is.

Although we work extensively and very productively with NASA, LASP has been greatly extending its relationship with the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and other entities. In diversifying its scientific, technical, and programmatic relationships, LASP is finding exciting ways to apply its expertise to solve problems of great national, and international, importance. I am delighted that all of our staff are constantly seeking – and meeting – new challenges. This certainly was the case in 2007 as you will read about in the sections of this report.

As I have noted in these pages in prior years, LASP can only succeed by having the trust and support of the CU administration. I want very publicly to thank the many people in contracts administration, procurement, facilities management, and countless other areas who really “get it” and who, thereby, help us do our very special job. I also want to thank the Vice Chancellor for Research, the Provost, and the Chancellor for their tireless and unflagging support of LASP, its mission, and its ambitious goals.

Beyond the University, we recognize that LASP resides in the remarkable city of Boulder and in a nearly unique region for scientific inquiry. Let me express my sincere appreciation to the other institutes, national laboratories, dedicated centers, and very special commercial entities with which we work on a daily basis. This broad community makes our job easier and, indeed, much better. We look forward to working actively with the broad space research community in many new endeavors during the coming year. Thank you to the students, staff, and faculty of LASP for all their hard work. Special thanks go to Ann Alfaro for her thorough and careful efforts in preparing this report.

Daniel N. Baker

Please visit LASP’s Website for the latest developments: http://lasp.colorado.edu
LASP: A Brief History

In 1946-47, a handful of American universities joined with the military and with industry to initiate the era of space exploration. The University of Colorado was one of those pioneering universities. The first experiments to be performed in space were lofted by suborbital rockets. A key obstacle to these first rocket flights was providing a stabilized platform for cameras and other experiments. With support from the Naval Research Center and the Air Force Cambridge Research Laboratory (now the Phillips Laboratory), the University of Colorado formed a research group called the Upper Air Laboratory (UAL) to solve this problem. Their solution — called the biaxial pointing platform — cleared the way for some of the first major scientific discoveries made in space. Researchers and engineers from the UAL flew experiments into space on over 50 rocket flights before Sputnik. By 1965, the UAL had grown substantially. Along with this growth came a new building on campus and a new name: the Laboratory for Atmospheric and Space Physics. The public is invited to tour our facility and to observe the work that LASP does today.
**LASP Appropriated Funding**

During the period 1/1/2007 to 12/31/2007 LASP appropriated funding totaled $45M for support of 177 grants and contracts.

**Research Support: 2007 Calendar Year**

<table>
<thead>
<tr>
<th>Source of Funding</th>
<th>Total Grant Dollars</th>
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</thead>
<tbody>
<tr>
<td><strong>Federal Agencies:</strong></td>
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<tr>
<td>Department of the Interior – USGS</td>
<td>15,000</td>
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<tr>
<td>National Aeronautics and Space Administration</td>
<td>21,820,209</td>
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<tr>
<td>National Oceanic and Atmospheric Administration</td>
<td>161,189</td>
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<tr>
<td>National Science Foundation</td>
<td>1,575,579</td>
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<tr>
<td><strong>Non-Federal Agencies:</strong></td>
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<tr>
<td>Arizona State University</td>
<td>103,190</td>
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<tr>
<td>Ball Aerospace Systems Division</td>
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<td>Batelle Memorial</td>
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<tr>
<td>Boston University</td>
<td>1,299,835</td>
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<tr>
<td>Carnegie Institute of Washington</td>
<td>395,988</td>
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<tr>
<td>George Mason University</td>
<td>42,656</td>
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<tr>
<td>Hampton University</td>
<td>8,109,035</td>
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<tr>
<td>Jet Propulsion Laboratory</td>
<td>2,151,858</td>
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<tr>
<td>Johns Hopkins University</td>
<td>155,227</td>
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<tr>
<td>Lockheed Martin</td>
<td>1,578,858</td>
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<tr>
<td>Minority Engineering Association of Colorado</td>
<td>17,165</td>
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<tr>
<td>Northrop Grumman</td>
<td>25,000</td>
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<tr>
<td>Sarissa Technologies</td>
<td>35,000</td>
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<tr>
<td>Science Systems and Applications, Inc.</td>
<td>20,049</td>
</tr>
<tr>
<td>SETI Institute</td>
<td>21,000</td>
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<tr>
<td>Southwest Research Institute</td>
<td>552,399</td>
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<tr>
<td>Starsys</td>
<td>32,768</td>
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<tr>
<td>University Corporation for Atmospheric Research</td>
<td>77,663</td>
</tr>
<tr>
<td>University of Alaska</td>
<td>98,276</td>
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<tr>
<td>University of Arizona</td>
<td>187,496</td>
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<tr>
<td>University of California at Berkeley</td>
<td>960,787</td>
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<tr>
<td>University of Central Florida</td>
<td>739,737</td>
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<tr>
<td>University of Michigan</td>
<td>100,000</td>
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<tr>
<td>University of Minnesota</td>
<td>145,134</td>
</tr>
<tr>
<td>University of New Hampshire</td>
<td>1,158,592</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>$45,290,826</strong></td>
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</tbody>
</table>
LASP Connections

- AERO
- APS
- ATOC
- Geology
- Physics
- Ball
- Lockheed
- Northrop
- Raytheon
- Many others
- CU Departments
- Aerospace Industry
- NSF
- NASA
- Boulder Science labs
- NCAR
- NOAA
- SSI
- SWRI

FY07 Project Funding

$51.2 M in project awards

- top CU Boulder recipient of sponsored awards for FY 2007
- 18% of CU Boulder research awards
- 199% increase since 1997
Recent Grads have
gone to:

**PhD grads**
- LASP
- EPA
- Denver Museum
- Penn State.
- Northrop-Grumman Corp.
- Space Science Institute
- College Instructor
- JRF, Sweden
- SWRI in Boulder
- NSF

**MO&DS grads**
- United Space Alliance
- JPL
- Analytical Graphics Inc (STK development)
- Cessna
- Raytheon (Virginia)
- Lockheed Martin (Orion)
- Raytheon (Aurora)
- Lockheed Martin (Boulder)
- LASP

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**Student Employees**

Currently 120 students at LASP
64 are Graduate Students

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**Key Accomplishments**

Science - new observations and analyses at the Sun, Mercury, Earth, Mars, Jupiter, and Saturn and its satellites.

MO&DS – responded to AIM problems by making great advancements in spacecraft ops, 3 missions extended

Engineering – EVE and Glory finished and shipped out, lots of proposals, now a period of relative calm

Administration – more solid IT infrastructure, changes in proposal systems, handling increased oversight from NASA and CU
NASA Earth Science Missions

- 4 instruments on SORCE mission
- Operating the SORCE, ICESat, and QuikSCAT missions at LASP
- Involved at some level with many of these missions

The Heliophysics Great Observatory
Tenure Track:
Linnea M. Avallone
Frances Bagenal
Charles A. Barth (Ret.)
Robert Ergun
Larry W. Esposito
Mihály Horányi
Brian Hynek
Bruce M. Jakosky
Xinlin Li
Peter Pilewskie
Cora E. Randall
Mark P. Rast
Nicholas M. Schneider
Owen B. Toon

Research Associates:
Nicole Albers
Laila Anderssen
Phil Chamberlin
Emily CoBabe-Ammann
Yi-Juin Su Caton
Annamaria Cereti
Peter Delamere
Scot Elkington
Francis G. Eparvier
Stefan Eriksson
Juan Fontenla
Jack Gosling
Jacques Gustin
Jerald W. Harder
Lynn Harvey
Noel Hinners
Greg Holsclaw
James E. Howard
Kyoung Joung Hwang
Kazunori Iwasaki
Andrew Jones
Shri Kanekal
Greg Kopp
Kristopher Larsen
George M. Lawrence (Ret.)
Wenlong Liu
William E. McClintock
Tom McCollom
Daniel Main
Sara Martinez-Alonzo

Michael Mellon
Aimee Merkel
Michael Mills
Steve Mojzsis
Keiji Ohtsuki
William Peterson
Erik C. Richard
Gary J. Rottman (Ret.)
David W. Rusch
Theodore Sarris
Sebastian Schmidt
Mindy Sears
Cynthia Shaw Singleton
Jamison Smith
Martin Snow
Miodrag Sremcevic
Zoltan Sternovsky
A. Ian F. Stewart
Glen R. Stewart
Takayuki Tanigawa
Gary E. Thomas (Ret.)
Thomas N. Woods

Visiting Scholars
Joseph Ajello, Jet Propulsion Laboratory, Pasadena, CA
Donald Brownlee, University of Washington, Seattle, WA
Yi-Jin Su Caton, University of Texas, Arlington, TX
Joshua E. Colwell, University of Central Florida, Orlando, FL
Serena Criscouli, Rome Observatory, University of Barcelona, Spain
Amanda Hendrix, Jet Propulsion Laboratory, Pasadena, CA
Antal Juhasz, KFKI Research Institute for Particle and Nuclear Physics, Budapest, Hungary
Mark Lewis, Trinity University, San Antonio, TX
Ada Otiz, Rome Observatory, University of Barcelona, Spain
Wayne Pryor, Central Arizona Coolidge, Coolidge, AZ
Chao Shen, Center for Space Science and Applied Research, Chinese Academy of Science, Beijing, China
Robert Weigel, George Mason University, Fairfax, VA
Oran White, Mancos, CO
Robert Winglee, Department of Earth and Space Sciences, University of Washington, Seattle, WA
**Engineering/Missions Ops/Program Support/Science**

**Engineering:**
- Gregg Allison
- Michael D. Anfinson
- Richard Arnold
- Haydar Arslan
- Dennis L. Baker
- Susan Batiste
- Douglas Bausch
- Helmut P. Bay
- Christopher Belting
- Bryce Bolton
- Mary Bolton
- James S. Bowers
- Brian D. Boyle
- Shelley Bramer
- Catherine Brant
- Vanessa Briggs
- Jeff Brown
- Patrick Brown
- Chelsey Bryant
- Valerie Bullock
- Zachary G. Castlemann
- Steve Chappell
- Christopher Converse
- David Crotser
- Kip W. Denhalter
- Sharon Dooley
- Virginia Drake
- Tim Flaherty
- David Gaither
- Elizabeth Grogan
- Roger Gunderson
- Scott Gusler
- David Harber
- Karl Heuerman
- Timothy Holden
- Vaughn Hoxie
- Edgar Johansson
- James Johnson
- Edith Knehans
- Richard Kohnert
- Bret Lamprecht
- Mark R. Lankton
- Ryan Lewis
- Michael McGrath
- James Mack
- Jack Marshall
- Nathaniel Miller
- Aref Nammari
- Gregory Newcomb
- Brian Nuel
- Sara Ohrtman
- Heather Passe
- Norman C. Perish
- Thomas Reese
- Dwight Reinhardt
- Hans Rohner
- Timothy Ruske
- Judith A. Salazar
- Patti Sicken
- Thomas Sparr
- Stephen Steg
- David Street
- Trenton Taylor
- Wayne Tighe
- Matt Triplett
- Scott A. Tucker
- Gregory Ucker
- Douglas Vincent
- Tracy Vincent
- Pamela J. Wagner
- James Westfall
- Neil White
- Ann Williams
- Heather Reed Withnell
- Peter Withnell
- Ray Wrigley
- Ed Wullschleger
- Alan Yehle
- Jason Young
- Jennifer Young
- Douglas M. Lindholm
- Debra McCabe
- Jerel Moffatt
- Steve P. Monk
- Michael Packard
- Chris Pankratz
- Radu Popescu
- Nicole Ramos
- Jennifer Reiter
- Randy Reukauf
- Pat Ringrose
- Stephen Roughton
- Sean Ryan
- Joan Slay
- Patrick Smith
- Gail Tate
- Brian Templeman
- Ann Windnagel
- Donald Woodraska

**Program Support:**
- Ann Alfaro
- Judy Antman
- Robert P. Biro
- Nancy Brooks
- Valerie Bullock
- Kathleen Cirbo
- Anita Davis
- Steve Ericksen
- Brian Evans
- Phillip L. Evans
- Jason Feickert
- Karla Lefevere Frank
- Judith (Dede) Gleason
- Donald Gritzmacher
- Matthew Groening
- Bonnie Kae Grover
- Cheryl Haugen
- Caroline Himes
- Rose A. Hoag
- Bonnie W. Hotard
- Erick Jasiak
- Edith Knehans
- Jason Laclair
- Lindsay McCandless
- Beth McGilvray
- Melanie McKinney
- Willie Mein
- John M. Padgett
- Ann Perez de Tejada
- Marissa Rusinek
- Gary Schut

**Mission Ops:**
- R. Larry Bloom
- Karen Beth Bryant
- Michael Bryant
- Heath Buck
- Lillian Connelly
- Pamela Crandall
- Randal L. Davis
- Michael Dorey
- Peter Elespuru
- Donald Elsborg
- Jack Faber
- Ken Greist
- Barb Hahn
- Jessica Harano
- Christian Jeppesen
- Alain J. Jouchoux
- David E. Judd
- Michelle Kelley
- Barry Knapp
- Jay Kominek
- Sally Lasater
John D. Smith  Matthew Chojnacki  James K. Thomas  
Lisa Sparhawk  Alexandra DeWolfe  Heather Weisacosky  
Paul Weidmann  Vincent Dols  Erin Wood  

Science:  
Kathryn Becker  Michael T. Callan  
Laura Bloom  Vincent Dols  
Michael T. Callan  Michael Gehmeyr  

2007 Graduates  

Cully, Christopher Michael: Astrophysical, Planetary and Atmospheric Sciences  
May 11, 2007  
"Space-based electric field measurements and the structure of the Earth's magnetotail"  
Thesis Advisor: Robert Ergun

McGouldrick, Kevin: Astrophysical, Planetary and Atmospheric Sciences  
May 11, 2007  
"Microphysics and radiative-dynamical feedback in the near infrared brightness features in the Venus clouds"  
Thesis Advisor: Owen B. Toon

Madry, William Lansing: Astrophysical, Planetary and Atmospheric Sciences  
May 11, 2007  
"Modeling the generation, transport, and radiative effect of sea salt aerosol"  
Thesis Advisor: Owen B. Toon

Graduate Students  

Dewey Anderson  Brian Hinde  Manny Presicci  
Charles Bardeen  Rachel Hock  Amal Ramachandran Nair  
Austin Barker  Monica Hoke  Licia Ray  
Suzanne Benze  Gregory Holtsclaw  Ryan Rhodes  
Todd Bradley  Courtney Hoskins  Lonnie Riesberg  
Nicole Cates  David James  Stuart Robbins  
Steve Chappell  Lars Kalnajs  Chester Rubbo  
Li Chen  Bruce Kindel  Eric Schleicher  
Jay Chhedu  Dongwon Lee  Karen Schmidt  
Seth Claudepierre  Patrick McBride  Donald Schmit  
Odelle H. Coddington  James McCollough  Naresh Sen  
Zane Crawford  Kevin McGouldrick  Supreet Kaur Sidhu  
Christopher Cully  Kevin McWilliams  Hanna Sizemore  
Samik Dasgupta  Lansing Madry  David Steussy  
Bruce Davis  Danielle Massey  Lin Su  
Sean Davis  Rebecca Matchuk  Lindsey Link Tierney  
Jason English  Patrick Meagher  Heather Tollerud  
Tina (Tianyi) Fan  Colin Mitchell  Weichao Tu  
Nathan Farr  Margaret Mitter  Drew Lawson Turner  
Bruce Ferguson  Nate Murphy  Jennifer Uchida  
Jeffrey France  Katherine Nauert  Richard Urata  
Damhnait Gleeson  Trang Nguyen  Vernon Volpe  
Alexa Halford  Heather Passe  Kaj Williams  
Anna Haugsjaa  Radu Popescu  Torsten Zorn
Undergraduate Students

John Adam  David Goluskin  Michael Phan
Keegan Amyx  Brandon Gonzales  Ryan Phillips
Marcus Arnold  Stephen Greenbaum  Andrew Poppe
Jeffrey Baxter  Michael Habinsky  Therese Possel
Michael Beach  Jessica Harano  Scott Potter
Ryan Behner  Brian Hasci  Kathryn Rash
Shivali Bidaiah  Ryan Hickman  Lindsey Rice
Brandon Bobian  Rachel Hoover  Elliot Richerson
Nathaniel Bolt  Rachel Humphrey  Ryan Rhodes
Aaron Bornstein  Paul Joos  Lauren Roemer
Michelle Bourgeois  Matthew Kelly  Miranda Rohlfing
Benjamin Brown  Kimberly Kroh  Crystal Salcido
Lottie Brown  Jessica Kruse  Ryan Schilt
Karen Beth Bryant  Davis Lawry  John Shelton
Christopher Bunch  Matthew Lenda  Abigale Shepard
Laura Bush  Dustin Leverman  Karie Shipley
Samuel Califf  Michael Levy  Patrick Smith
Bryan Callahan  Adam Lightman  Tiana Stastny
Ross Callison  Hey Joo (Diane) Lim  Kristina Stone
Christopher Carnahan  Anthony Lindell  Janusz Strzepek
Rhain Carpenter  Christopher Lindholm  Jastsch Sud
Michael Chaffin  Lucy Logan  Timothy Sullivan
Scott L. Chamberlin  Kurt Lorhammer  Linda Te
Matthew Chojnack  Jennifer Lowell  Edward Thiemann
Dain Cilke  Brooks Lustig  Vishal Thummalapally
Garrett Clark  Dung Luu  Ali Toltz
Sherry Clune  Justin McHenry  Dustin Trail
Zane Crawford  Scott Mackey  Diem Thy Tran
Ransom Christofferson  Sarah McNamara  Wiechao Tu
Krystyna Dillard-Crawford  Neil Marks  Melina Tremblay
Nichole Dudley  Danielle Massey  Christopher Van Poolen
Tera Dunn  Fabio Mezzalira  Veronica Vertucci
Claire Duquennois  Taylor Mills  Brandon Werdel
Jason Durrie  Dax Minary  Patrick Wessels
David Eason  David Motta  Donavan Wheeler
Negar Ehsan  McCall Mullen  Christopher White
Joshua Elliot  Burhan Muzzafar  Geneva Wilkesanders
Attila Elteto  Katherine Nauert  Jennifer Wilson
Neal Evans  Vu Anh Nguyen  Tom Wisniewski
James Everton  Jacob Niece  Robert Witoff
Nathan Farber  David Norton  Portia Wolf
Michael Ferenc  Karina Ogilvie  Alexander Woods
John French  kostas Pagratis  Courtney Wright
John Gibbons  Jason Patterson  Chihoko Yamashita
Nathan Goldbaum  Brian Payne  Bryon Young
**Scientific Research Interests**

**Laila Andersson**
Kinetic processes in space plasmas such as double layers, electron phase space holes and Alfvén waves (anywhere where measurement has or will be made). Atmospheric loss through ion outflow for objects such as Earth and Mars. Instrumentation for space plasma missions, for the moment to develop new techniques for future missions.
laila.andersson@lasp.colorado.edu (303) 492-1689

**Linnea Avallone**
Experimental and theoretical studies of tropospheric and stratospheric chemistry, particularly of halogens and related species. Analyzing measurements of chemical species to understand dynamical processes in the stratosphere and troposphere. Development of instrumentation for autonomous in situ measurements of trace species related to understanding the lifetimes of anthropogenic pollutants.
avallone@miranda.colorado.edu (303) 492-5913

**Frances Bagenal**
Magnetic fields and plasma environments of solar system objects—mainly Jupiter and the Sun, but more recently, other planets, comets and asteroids.
bagenal@colorado.edu (303) 492-2598

**Daniel N. Baker**
Research in space instrument design and calibration, space physics data analysis, and magnetospheric modeling. Study of plasma physical and energetic particle phenomena in the magnetospheres of Jupiter and Mercury, along with the plasma sheet and magnetopause boundary regions of the Earth’s magnetosphere. Analysis of large data sets from spacecraft; involvement in missions to Earth’s deep magnetotail and comets; the study of solar wind-magnetospheric energy coupling; theoretical modeling of magnetotail instabilities. Study of magnetosphere-atmosphere coupling; applying space plasma physics to study of astrophysical systems. Research to understand space weather and effects on human technology. Teaching of space physics and public policy, as well as public outreach to space technology community and general public.
daniel.baker@lasp.colorado.edu (303) 492-4509

**Charles A. Barth**
Planetary ultraviolet spectroscopy; observation and theory of nitric oxide in the Earth’s upper atmosphere; research on planetary atmospheres.
charles.barth@lasp.colorado.edu (303) 492-7502

**Scot Elkington**
Space physics theory and modeling, primarily understanding energetic particle dynamics in the inner magnetosphere in the context of radial diffusion and adiabatic transport processes within the radiation belts. Also working on models of plasma sheet access of energetic particles to the inner magnetosphere through convection/substorm injection, development of physical space weather radiation belt models, and magnetohydrodynamic/particle simulations.
elkingto@lasp.colorado.edu (303) 735-0810

**Francis G. Eparvier**
Research interests include the aeronomy of the upper atmosphere, the effects of solar irradiance and particle flux variability on the upper atmosphere, and the sources of that solar variability. Approaches include rocket and satellite measurements of the solar outputs and of the atmosphere, and data analysis and theoretical modeling. Currently Co-Investigator on the Thermosphere- Ionosphere-Mesosphere Energetics and Dynamics (TIMED) satellite Solar EUV Experiment (SEE).
eparvier@colorado.edu, (303) 492-4546, http://stripe.colorado.edu/~eparvier

**Larry W. Esposito**
Observational and theoretical studies of planetary atmospheres and rings; chemistry and dynamics of the Venus clouds; waves in Saturn’s rings; numerical methods for radiation transfer.
espo@lasp.colorado.edu (303) 492-7325

**Jerald Harder**
Measurement and interpretation of solar spectral irradiance; Development of space-borne prism spectrometers.
jerry.harder@lasp.colorado.edu (303) 492-1891
**Mihaly Horanyi**

Dusty space and laboratory plasmas. Electrodynamic processes and their role in the origin and evolution of the solar system. Comets, planetary rings, plasma surface interactions at moons and asteroids. Aerosol charging, in situ and remote observations of dust.

mihaly.horanyi@lasp.colorado.edu (303) 492-6903

**Bruce M. Jakosky**

Teaching and research activities focus on understanding the nature of planetary surfaces and atmospheres and the possibility for the existence of life in the universe. Specific activities include teaching undergraduate and graduate courses, training graduate students, research and grant activity pertaining to planetary science and exobiology, leading the campus effort in astrobiology, exploring the nature of the interactions between science and society, and outreach to the public.

bruce.jakosky@argyre.colorado.edu (303) 492-8004

**Greg Kopp**


Greg.Kopp@lasp.colorado.edu, 303-735-0934

**Xinlin Li**

Space physics, data analysis and modeling. Especially interested in understanding the dynamics of relativistic electrons in the magnetosphere: the source, loss, and transportation of these MeV electrons; also interested in charged particle injections into inner magnetosphere during magnetic storms and substorms, and magnetosphere-atmosphere coupling due to energetic particle precipitations.

lix@kotron.colorado.edu (303) 492-3514

**William E. McClintock**

Observational Astrophysics - Ultraviolet observations of the outer atmospheres of cool stars and the very local (d<20pc) interstellar medium. Ultraviolet Observations of Planetary Atmospheres. Development of state-of-the-art instrumentation for high resolution spectroscopy for the 900-2500/ wavelength range.

bill.mcclintock@lasp.colorado.edu (303) 492-8407

**Michael Mellon**

The history of water on Mars, the martian permafrost, surface-atmosphere interactions and the martian climate. Periglacial geology and geophysics on Earth and Mars. Use of ice-related geomorphic features as an indicating of the distribution of subsurface ice. Antarctic analogs to martian geomorphology. Laboratory research in transport processes in frozen soils, including gas diffusion and solute migration and the effects of water vapor, ice, and adsorbate on transport physics. Remote sensing and thermophysical properties of planetary regoliths, with specific emphasis on martian surface material. Planetary surface temperature behavior and geothermal heat flow.

mellon@argyre.colorado.edu (303) 492-1711

**Michael Mills**

Research has focused on stratospheric sulfate aerosol. The current research tool is a 2D microphysical model of the troposphere, stratosphere, and mesosphere. A primary goal has been to assess the sources of the nonvolcanic stratospheric sulfate layer, and understand anthropogenic contributions. Because of the role of aerosol in stratospheric chemistry and radiative balance, this knowledge of its sources is critical to understanding global change. Recent efforts have attempted to understand discrepancies between observed and calculated aerosol mass at the top of the layer. Other work has examined the causes of observed particle nucleation in polar winter, the implications for aerosol of recently measured photolysis rates for H2SO4 and SO3, and volcanic aerosol as a potential source for polar mesospheric clouds.

mills@colorado.edu (303) 492-7767

**Keiji Ohtsuki**

Theoretical studies of planet formation; origin and dynamical evolution of ring-satellite systems.

ohtsuki@lasp.colorado.edu (303) 492-0260

**Cora E. Randall**

Primary interests include atmospheric chemistry and dynamics, mainly of the stratosphere, and secondarily of the mesosphere and troposphere. Work is experimental in nature, relying on data from remote sensing satellites. The emphasis is on ozone, NO2, and aerosol data from the Polar Ozone and Aerosol Measurement (POAM) instrument as well as from the Stratosphere Aerosol and Gas Experiment (SAGE). Measurements from instruments...
on the Upper Atmosphere Research Satellite (UARS) and the Solar Mesosphere Explorer (SME) are also used. Other interests include the spectroscopy of comets and laboratory polarization measurements.

cora.randall@lasp.colorado.edu (303) 492-8208

Gary J. Rottman

Accurately measure the solar spectral irradiance (Principal Investigator on sounding rockets, UARS, EOS, SORCE, TIMED, and GLORY and Co-Investigator on SME, TIMED, and SDO). Special emphasis is given to solar variability on all time scales and to comparisons of the solar irradiance with the output of other late type stars. Past work has concentrated on the ultraviolet (λ<300) irradiance, but emphasis has not extended to the visible and near-infrared. Application of ultraviolet spectroscopy and the development of new instrumentation for remote sensing.
gary.rottman@lasp.colorado.edu (303) 492-8324

David W. Rusch

The general fields of spectroscopy and aeronomy, emphasizing the measurements of minor constituents and aerosols in planetary atmospheres such as nitric oxide and ozone and the physical and chemical phenomena which determine their densities and temporal variations. Research in the atmospheric sciences including stratospheric, mesospheric, and thermospheric data analysis and modeling. Application of the principles of molecular and atomic spectroscopy in the measurement of ultraviolet, visible, and near-infrared emission and absorption features to obtain understanding of atmospheric phenomena. Current research involves the determination of atmospheric processes affecting ozone and the reevaluation of ozone trends from long-term satellite measurements.
rusch@sertan.colorado.edu (303) 492-8627
http://lasp.colorado.edu/~rusch/dwr.html

Nicholas M. Schneider

The physics of planetary magnetospheres, particularly the interactions between planetary plasmas and the satellites of the outer planets. Extensive groundbased observations of the Jupiter/Io system, especially imaging and spectroscopy of the Io atmosphere and plasma torus. Program has been expanded to include Hubble Space Telescope observations. Designing and building of a spacecraft to study the Jupiter/Io system.
nick.schneider@lasp.colorado.edu (303) 492-7672

http://ganesh.colorado.edu/nick

Martin Snow

Primary research interests include ultraviolet spectroscopy of stars and the sun and the interaction of comets with the solar wind. The SOLSTICE instruments on UARS and SORCE provide a wealth of information about solar activity in the 115-300 nm range on a variety of timescales, ranging from minutes (solar flares) to decades (solar cycle). Understanding the variation in the solar output will lead to understanding its influence on the Earth. The interaction of comets with the solar wind is best studied using wide-field photography. Both amateur and professional astronomers contribute to this effort, and one research activity has been to help coordinate the interaction of the two groups.
marty.snow@lasp.colorado.edu 303-735-2143

A. Ian F. Stewart

The investigation by ultraviolet emissions of the aeronomy of planetary and satellite atmospheres, cometary comae, and Io's plasma torus.
stewart@viralf.colorado.edu (303) 492-4630

Glen R. Stewart

Origin and evolution of the solar system, with an emphasis on modeling the solid-body accretion of the terrestrial planets and the solid cores of the giant planets. Accretion of the Moon after a giant impact on the Earth. Modeling of satellite wakes and spiral density waves in planetary rings. Nonlinear dynamics of the three-body problem as applied to problems in solar system dynamics.
glen.stewart@lasp.colorado.edu (303) 492-3737

Gary E. Thomas

Research concerning the middle atmosphere of Earth, in particular the mesosphere (50-100 km). Of interest are noctilucent clouds which occur in the high-latitude summertime mesopause region, around 83 km. These clouds were observed for five years by a CU LASP ultraviolet experiment onboard the LASP SME satellite, and more recently by instruments onboard the POAM II and UARS (Upper Atmosphere Research Satellite) spacecraft. In the last decade, interest involves global change in this region, possibly caused by anthropogenic emissions and by climate changes in the troposphere. Critical parameters studied are solar UV flux, water vapor, temperature and ozone which are
being monitored by instruments onboard the UARS.
gary.thomas@lasp.colorado.edu (303) 492-7022
http://lasp.colorado.edu/noctilucent_clouds

Owen B. Toon
Theoretical studies of stratospheric aerosols; investigations of volcanic aerosols and studies of polar stratospheric clouds; theoretical studies of tropospheric clouds, aerosols and radiative transfer; experimental investigations of stratospheric and tropospheric phenomena; theoretical investigations of planetary atmospheres.
btoon@lasp.colorado.edu (303) 492-1534

Thomas N. Woods
Observational studies of the solar ultraviolet (UV) radiation, its variability, and its interaction with Earth's atmosphere. Principal investigator of NASA suborbital program to study the solar irradiance and thermospheric airglow. Principal investigator of the Solar EUV Experiment (SEE) on the TIMED mission. Co-investigator of the Solar Stel lar Irradiance Comparison (SOLSTICE) experiment currently making solar UV irradiance measurements on the Upper Atmosphere Research Satellite (UARS) and planned for the Earth Observing System (EOS) missions.
tom.woods@lasp.colorado.edu (303) 492-4224

FACULTY ACTIVITIES

American Geophysical Union (AGU)
Esposito, Larry (Session Convenor, Fall 2007)
Jakosky, Bruce (President-Elect, Planetary Sciences section)
Jakosky, Bruce (Member, Auditing and Legal Affairs Committee)
Toon, Owen B. (Member, Fellows selection committee)

Committee on Space Research (COSPAR)
Esposito, Larry (Main Scientific Organizer for "Planetary Atmospheres")

Division of Planetary Sciences
Esposito, Larry (Organizer, Program Committee)

Editor or Editorial Board Member
Esposito, (Editor, AGU Monograph)
Esposito, Larry (Advances in Space Research)
Jakosky, Bruce (Editor, Astrobiology)
Jakosky, Bruce (Editorial Board, International Journal of Astrobiology)
Jakosky, Bruce (Planetary Exploration Newsletter)

International Saturn Symposium
Esposito, Larry (Co-Convenor)

International Union of Geodesy and Geophysics (IUGG)
Esposito, Larry (Convenor at Perugia Conference)

Joint Faculty (Astrophysical and Planetary Sciences Department (APS))
Bagenal, Fran
Baker, Daniel
Ergun, Robert
Esposito, Larry W.
Rast, Mark
Schneider, Nicholas

Joint Faculty (Atmospheric and Oceanic Sciences Department (ATOC))
Avallone, Linnea
Pilewskie, Peter
Randall, Cora E.
Toon, Owen B., (Chair)
Joint Faculty (Geology Department)
Jakosky, Bruce

Joint Faculty (Physics Department)
Horanyi, Mihaly

Laboratory for Atmospheric and Space Physics (LASP)

Associate Director for Science
Jakosky, Bruce

Associate Director for Technical Divisions
Woods, Tom

Business Committee
Baker, Dan (Chair)
Himes, Caroline
Jakosky, Bruce
McGrath, Mike
Possel, Bill
Woods, Tom

Computer Support Advisory Committee (CSAC)
Colwell, Josh (Chair, Spring)
Greg Kopp (Chair, Fall)
Charles Bardeen (student representative)
Peter Delamere (Atmospheric, Cynewulf Users' Group chair)
Scot Elkington (Space Phys)
Caroline Himes (Admin)
Greg Kopp (Solar)
Mark Lankton (Eng. EE & FSW)
Ryan Lewis (Eng. ME)
Mike Mills (Planetary)
Chris Pankratz (Ops & Data Proc.)
Gary Schut (IT)

Education and Public Outreach Advisory Committee
Eparvier, Frank (Chair)
Avallone, Linnea
Bagenal, Fran
CoBabe-Ammann, Emily
Himes, Caroline
Li, Xinlin
Randall, Cora
Reed, Heather
Stewart, Glen
Stewart, Ian

Executive Committee
Baker, Dan
CoBabe-Amman, Emily
Delamere, Peter
Esposito, Larry
Gosling, Jack
Haugen, Cheryl (ex-comm support)
Himes, Caroline
Jakosky, Bruce
Jones, Andrew
Kopp, Greg
McClintock, Bill
McGrath, Mike
Pilewskie, Peter
Possel, Bill
Randall, Cora
Stewart, Ian
Toon, Brian
Westfall, Jim
Woods, Tom

**LASP Seminar Series Committee**
Chamberlin, Phil (Co-chair)
Sternovsky, Zoltan (Co-chair)

**Library Committee**
Snow, Marty (Chair)
Eparvier, Frank
George, Vanessa
Horanyi, Mihaly
Knapp, Barry
Rohner, Hans
Simmons, Karen
Wullschleger, Ed

**Merit Evaluation Committee**
Esposito, Larry
Himes, Caroline
Jakosky, Bruce
Li, Xinlin
Randall, Cora
Woods, Thomas N.

**Proposal Development Committee (PDC)**
Woods, Tom (Chair)
Sparn, Tom (Co-chair)
Anfinson, Mike
Baker, Dan
CoBabe-Ammann, Emily
Drake, Ginger
Ergun, Bob
George, Vanessa
Himes, Caroline
Jakosky, Bruce
Kopp, Greg
McClintock, Bill
McGilvray, Beth
McGrath, Mike
Pankratz, Chris
Perez de Tejada, Ann
Possel, Bill
Reed, Heather
Richard, Erik
Ryan, Sean
Sternovsky, Zoltan
Tate, Gail
Westfall, Jim

**Sponsored Visitor Committee**
Harder, Jerry (chair)
CoBabe-Amman, Emily
Elkington, Scot
Grover, Bonnie Kae
McClintock, Bill
Rast, Mark
Rusch, Dave

**Lunar and Planetary Institute (LPI)**
Jakosky, Bruce (Member, Science Council)

**National Academy of Sciences (NAS)**
Esposito, Larry (Committee to assess solar system exploration)

**National Aeronautics and Space Administration (NASA)**
Ergun, Robert, Member, Science Definition Advisory Panel – Solar Probe Mission Electric Field Experiment
Esposito, Larry, Member VEXAG Steering Committee
Esposito, Larry, Chair, CDAP Rings Review Panel
Esposito, Larry, Chair, Cassini Public Relations Working Group
Jakosky, Bruce (Member, NASA Mars Exploration Program Analysis Group (MEPAG))
Toon, Owen B. (Project scientist: 2007 NASA Tropical Clouds Mission)
Toon, Owen B. (Venus Advisory Panel of future mission)
Woods, Tom, Member, Science Working Groups for TIMED, SDO, and SORCE missions

**Planetary Society**
Jakosky, Bruce (Member, Advisory Board)

**National Research Council (NRC)**
Jakosky, Bruce (Co-Chair, Committee on Origin and Evolution of Life (COEL), Space Studies Board
Jakosky, Bruce (Chair, Committee on Mars Astrobiology Strategy), Space Studies Board

**National Science Foundation (NSF)**
Ergun, Robert, Member, Global Electrodynamic Modeling Steering Committee

**Reviewer of Manuscripts, Grants, or Creative Work**
Fontenla, John (Reviewed manuscripts for Astrophys. Jo, and Astron. and Astro.; reviewed proposals for Argentinian national research council)
Horanyi, Mihaly (Reviewed manuscripts for JGR-Space, Physics of Plasmas, Nature, Icarus; reviewed proposals for NSF, DOE, and NASA)
Harder, Jerry (Reviewed proposal for Department of Energy)
Jakosky, Bruce (Reviewed manuscripts for Astrobiology; reviewed proposals for NASA)
Kopp, Greg (Reviewed manuscripts for Geophys. Res. Letters; reviewed proposals for NASA)
Rast, Mark (Reviewed manuscripts for Astrophysical Journal, Solar Physics; reviewed proposals for NASA and NSF)
Snow, Martin (Reviewed manuscript for ApJ)

University of Colorado
Baker, Daniel (Principal Dissertation/Thesis Advisor)
Baker, Daniel (Member Dissertation/Thesis Committee)
Baker, Daniel (Member Masters or Ph.D. Qualifying Examination Committee)
Chamberlin, Phil (Principal Dissertation/Thesis Advisor)
Ergun, Robert (Principal Dissertation/Thesis Advisor)
Ergun, Robert (Member, Dissertation/Thesis Committee)
Esposito, Larry (Member, Dissertation/Thesis Committee)
Esposito, Larry (Member, Dissertation/Thesis Advisor)
Esposito, Larry (Chair, APS Exams Committee)
Esposito, Larry (Member, BFA Compensation and Benefits Committee)
Esposito, Larry (Supervisor, Independent Study/Research Study Groups)
Fontenla, John (Principal Dissertation/Thesis Advisor)
Himes, Caroline (Member, BFA Budget and Finance Committee)
Himes, Caroline (Member, Academic Affairs Budget Advisory Committee)
Himes, Caroline (Member, Dir. of Facilities Planning Search Committee)
Himes, Caroline (Member, Design and Construction Committee)
Horanyi, Mihaly (Principal Dissertation/Thesis Advisor)
Horanyi, Mihaly (Member of Dissertation/Thesis Committee)
Jakosky, Bruce (Principal Dissertation/Thesis Advisor)
Jakosky, Bruce (Member of Dissertation/Thesis Committee)
Jakosky, Bruce (Member Masters or Ph.D. Qualifying Examination Committee)
McClintock, Bill (Principal Dissertation Advisor)
Rast, Mark (Principal Dissertation/Thesis Advisor)
Rast, Mark (Member of Dissertation/Thesis Committee)
Rast, Mark (Member of Masters or Ph.D. Qualifying Examination Committee)
Rast, Mark (Member, Department Curriculum Development Committee)
Rast, Mark (Student Advisor)
Schmidt, Sebastian (Principal Dissertation/Thesis Advisor)
Sternovsky, Zoltan (Member, BFA Library Committee)
Toon, Owen B. (Principal Dissertation/Thesis Advisor)
Toon, Owen B. (Member, PRP committee, Chemistry Department)
Woods, Tom (Principal Thesis Advisor)
Woods, Tom (Member Dissertation/Thesis Committee)

FACULTY HONORS/AWARDS
### Courses Taught by LASP Faculty

#### Spring 2007

<table>
<thead>
<tr>
<th>Name</th>
<th>Course #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esposito, Larry</td>
<td>ASTR 3720</td>
<td>Planets and their atmospheres</td>
</tr>
<tr>
<td>Horanyi, Mihaly</td>
<td>PHYS 3210</td>
<td>Mechanics and its mathematical methods I</td>
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<tr>
<td>Hynek, Brian</td>
<td>ASTR 1010</td>
<td>Introductory Astronomy</td>
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<tr>
<td>Jakosky, Bruce</td>
<td>GEOL 5830/ASTR 5830</td>
<td>Astrobiology</td>
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<tr>
<td>Li, Xinlin</td>
<td>ASEN 5335</td>
<td>Aerospace Environment</td>
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<tr>
<td>Li, Xinlin</td>
<td>ASEN 5519</td>
<td>Space Hardware 1: Design</td>
</tr>
<tr>
<td>Li, Xinlin</td>
<td>ASEN 6519</td>
<td>Space Hardware 2: Manufacture and Test</td>
</tr>
<tr>
<td>Randall, Cora</td>
<td>ATOC 6020</td>
<td>Middle Atmosphere Modeling and Data Analysis Seminar</td>
</tr>
<tr>
<td>Randall, Cora</td>
<td>ATOC 5235</td>
<td>Introduction to Remote Sensing and Radiative Transfer</td>
</tr>
<tr>
<td>Rast, Mark</td>
<td>ASTR 3760</td>
<td>Solar and Space Physics</td>
</tr>
<tr>
<td>Toon, Owen B.</td>
<td>ATOC 6020</td>
<td>Seminar on Aerosols</td>
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</tbody>
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#### Fall 2007

<table>
<thead>
<tr>
<th>Name</th>
<th>Course #</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Ergun, Robert</td>
<td>ASTR 1030</td>
<td>Introduction to Astronomy</td>
</tr>
<tr>
<td>Esposito, Larry</td>
<td>ASTR 3300</td>
<td>Extraterrestrial Life</td>
</tr>
<tr>
<td>Horanyi, Mihaly</td>
<td>PHYS 3210</td>
<td>Mechanics and its mathematical methods II</td>
</tr>
<tr>
<td>Hynek, Brian</td>
<td>GEOL / ASTR 5800</td>
<td>Planetary surfaces and interiors</td>
</tr>
<tr>
<td>Hynek, Brian</td>
<td>GEOL 5700-007</td>
<td>Graduate field course in Planetary Geology</td>
</tr>
<tr>
<td>Li, Xinlin</td>
<td>ASEN 6519</td>
<td>Space Hardware 2: Manufacture and Test</td>
</tr>
<tr>
<td>Randall, Cora</td>
<td>ATOC 1050</td>
<td>Introduction to Weather and the Atmosphere</td>
</tr>
<tr>
<td>Randall, Cora</td>
<td>ATOC 6020</td>
<td>Middle Atmosphere Modeling and Data Analysis Seminar</td>
</tr>
</tbody>
</table>

22
| Rast, Mark | ASTR 5540 | Mathematical Methods |
| Toon, Owen B. | ATOC 6020 | Seminar on Aerosols |
| Toon, Owen B. | ATOC 5600 | Physics and Chemistry of Clouds and Aerosols |
| Toon, Owen B. | ATOC 6020 | Seminar in clouds and aerosols |

**Colloquia and Informal Talks**

*Spring 2007*

Nicole Albers, CU/LASP, Size Distributions of Asteroid Families and the Stories
Caspar Ammann, NCAR/UCAR, Climate Change Research Beyond IPCC: Where Does The Sun Fit In?
Linnea Avallone, CU/LASP and ATOC, Ozone Holes, Smog and Space Shuttles: Measuring Ozone Throughout the Atmosphere
John Armstrong, Weber State Univ., The Virtual Planetary Laboratory: Toward a Community Tool for Extrasolar Planet Modeling
Fran Bagenal, CU/LASP and APS, The Peculiar Role of Io in the Magnetosphere of Jupiter
Andrei Beloborodov, Columbia Univ., Neutron Stars with Ultra-Strong Magnetic Fields
Pat Brown, CU/LASP, The FIRST Robotics Competition
Don Brownlee, U. of Washington, The Stardust Mission - Return of Samples From a Comet
Shane Byrne, U. of Arizona, Landscape Evolution and the Reincarnation of the Residual CO2 Ice Cap of Mars
Chris Carilli, RAO, Radio Observations of Cosmic Reionization and the Most Distant Galaxies
John Carlstrom, Univ. of Chicago, More Cosmology with the Cosmic Microwave Background; the Sunyaev-Zeldovich Array the 10 meter South Pole Telescope
Phil Chamberlin, CU/LASP, Solar Flares
Seth Claudepierre, LASP/APPMD, Power Spectral Densities, Pitfalls and MHD Waves
Ben Clark, Lockheed Martin Space Exploration Systems, What is Mars Made Of, Really? The Emerging Compositional Diversity and Its Implications
Chris Cully, LASP/APS, THEMIS Launch
Chris Cully, LASP/APS, Kinetic Equilibrium Models of the Tail Current Sheet
Peter Delamere, CU/LASP, Rapidly rotating magnetospheres: a comparison of Saturn with Jupiter
Steven Desch, Arizona State Univ., Cryovolcanism on Kuiper Belt Objects
Steven D'Hondt, Univ. of Rhode Island, Microbial Activities in Deep Sea Sediments
Mausumi Dikpati, HAO, Predicting Upcoming Solar Cycle Features by Assimilating Surface Magnetic Data Into a Flux-Transport Dynamo Model
Vincent Dols, CU/LASP, Multi-Species Chemistry Model of Io's Local Interaction
Jerry Edelstein, Space Sciences Laboratory, Univ. of California, Berkeley, Cold, Warm and Hot: The Interstellar Medium Observed in Far UV Emission
Stefan Eriksson, CU/LASP, When Magnetic Fields Collide: A Journey From the Sun to the Earth
Michael Gehmeyr, CU/LASP/NOAA, The First Forecast Models from the Center for Integrated Space Weather Modeling
Marv Geller, Institute of Terrestrial and Planetary Atmospheres, Tropical Upwelling in the Lower Stratosphere
Andrea Ghez, UCLA, The Central Dark Mass at the Center of Our Galaxy
Paul Graf, President, Aerospace Solutions, LLC, Recurring Surprises in PI-led Space Missions
David Grinspoon, Astrobiology Curator, Denver Museum of Nature & Science, Astrobiology and the Exploration of Venus
Vanda Grubisic, Desert Research Institute, Reno, Nevada, Exploration of Atmospheric Rotors
Eberhard Grün, CU/LASP and MPI, The Dust Astronomy Mission Cosmic DUNE
Lars Hoffmann, Forschungszentrum Juelich, ICG-1, Germany, Envisat MIPAS Measurements of the Chlorofluorocarbons CFC-11 and CFC-12
Mary Hudson, Dartmouth College, Relationship of the Van Allen Radiation Belts to Solar Wind Drivers
Mary Hudson, Dartmouth College, Solar Energetic Particle Access and Trapping in the Earth's Magnetosphere
Brian Hynek, CU/LASP, The Youngest Features on Mars: Gullies and Craters
Brian Hynek, CU/LASP, Sulfur-Bearing Minerals on Mars: Implications for Water and Habitability
Phil Isenberg, Univ. of New Hampshire, Kinetic Cyclotron Resonant Generation of the Fast Solar Wind
Randy Jokipii, Univ. of Arizona, Tucson, Implications of Voyager Observations Near and Beyond the Solar-Wind Termination Shock
Lisa Kaltenegger, Harvard Univ., Center for Astrophysics, Search for Exo-Terrestrial Planets: Decoding the Spectra of an Evolving Earth-Like Planet
George Khazanov, NASA/MSFC, Self-Consistent Ring Current/Electromagnetic Ion Cyclotron Waves Modeling
Daniel Kirshbaum, Yale Univ., The Triggering of Quasi-Stationary Orographic Rainbands by Small-Scale Topography
John Kovac, Caltech, CMB Polarimetry with More Muscle: Cosmology with BICEP and QUAD
Kris Larsen, CU/LASP, Titan Unmasked: Cassini Sees the Cloudy Moon of Saturn
Xinlin Li, CU/LASP, NASA's THEMIS Mission
Lindsey Link, CU/LASP, Mars: Time for a New Chronology?
William Lotko, Dartmouth College, Spontaneous Resonances in Earth's Magnetosphere-Ionosphere System
Tom McCollom, CU/LASP, Habitats for life in the crusts of Earth and Mars
Aimee Merkel, CU/LASP, Taking AIM at Noctilucent Clouds
Robert Michell, Dartmouth College, Ground Camera and Radar Observations of Auroral Downward Current Region Processes
David O'Brien, PSI/Tucson, High-Resolution Modeling of Terrestrial Planet Formation
Terry Onsager, NOAA/SEC, Energetic Particles in the Magnetosphere: Old Problems, New Data
Terry Onsager, NOAA/SEC, Solar Energetic Proton Penetration into the Magnetosphere - A GOES Perspective
Alexander Pavlov, LPL, Univ. of Arizona, Modeling constraints on the evolution of the terrestrial planetary atmospheres
Bill Peterson, CU/LASP, Role of Ionospheric Ions During Geomagnetic Storms
Wayne Pryor, Central AZ College/Space Environment Tech, Cassini Ultraviolet imaging spectrograph observations of Saturn’s auroras
Wayne Pryor, Central Arizona College, Cassini ultraviolet imaging spectrograph observations of Saturn's Auroras
Scot Rafkin, Southwest Research Institute, Radiative-Dynamic Feedback Between Atmospheric Dust Disturbances and the Surface of Mars
Licia Ray, CU/LASP & APS, The Effect of Field-Aligned Potentials on Magnetosphere-Ionosphere Coupling at Jupiter
Sean Raymond, CU/CASA, Formation and Habitability of Systems of Terrestrial Planets
Eric Richard, CU/LASP, Eight minutes to Earth: Understanding our Sun’s variable radiation
Theodore Sarris, CU/LASP, Multipoint observations of a multiday Pc5 pulsation
Peter H. Schultz, Brown Univ., NASA's Oblique Impact Experiment: Results from Deep Impact
Alice Shapley, Princeton Univ., NASA's Oblique Impact Experiment: Results from Deep Impact
Paul Strother, Boston College, Cryptospores and the Origin of Land Plants
Melissa Trainer, CU/LASP, Searching for Heterogeneous Sinks of CH4 on Mars
Margaret C. Turnbull, Carnegie Institution of Washington, Observing Habitable Worlds Near and Far
Martin Van Kranendonk, Geological Survey of Western Australia, Volcanic degassing, hydrothermal circulation and the flourishing of early life on Earth: A review of the evidence from c. 3490-3240 Ma rocks of the Pilbara Supergroup, Pilbara Craton, Western Australia
Fall 2007

Joseph Ajello, JPL, Titan airglow spectra from Cassini UVIS and other outer planet observations
Ariel Anbar, Arizona State University, A Whiff of Oxygen Before the Great Oxidation Event
Fran Bagenal, CU/LASP/APS, Is There any Dungey Cycle at Jupiter?
Fran Bagenal, CU/LASP/APS, Exploring the Giant Magnetosphere of Jupiter
John Bally, CU/APS, Do Most Planetary Systems Originate in Star Clusters?
Rory Barnes, Univ. of Arizona, Tides and the Evolution of Planetary Habitability
Amy Barr, SwRI, Boulder, Constraints on Timing and Duration of Satellite Formation From the Interior States of Rhea and Callisto
William F. Bottke, SwRI, An Asteroid Breakup 160 My Ago as the Probable Source of the K-T Impactor
John Clarke, Boston University, The HST Auroral Campaign for Jupiter and Saturn - Constraints on the Overall Magnetospheric Dynamics Physics Researchers
Emily CoBabe-Ammann, CU/LASP, Astrobiology Education and Public Outreach: Why it's Important, how it's Changing and how to get Involved
Shelley Copley, CU, The origin of the RNA World: co-evolution of genes and metabolism
Peter Delamere, CU/LASP, Satellite-Magnetosphere Interactions: A Comparison of Io and Enceladus
Yue Deng, HAO/NCAR, Study of November 2004 Storm Using AMIE: Preliminary Results
Vincent Dols, CU/LASP, Auroral Footprint of Io on Jupiter: the Challenge to Explain the Multi-Spot Morphology
J.F. Drake, UC Berkeley and Univ. of Maryland, Production of energetic electrons and ions during magnetic reconnection
Jamie Elsila, NASA Goddard, Photochemistry of Organic Compounds in Interstellar Ices
Bob Ergun, CU/LASP/APS, Ion Outflow at Mars
Larry Esposito, CU/LASP, Cassini Mission Science Update
Yuhong Fan, HAO/NCAR, The Magnetic Nature of Coronal Mass Ejections
John Fontenla, CU/LASP, Solar Physics: Moving From Semi-Empirical Models to a Broader Physical Basis
Eric Gaidos, University of Hawaii, Dying Stars and Living Worlds: Short-Lived Radionuclides and the Abundance of Planetary Water
Michael Gausa, Andøya Rocket Range, Norway, Research Opportunities at the ALOMAR Observatory (69N 16E) and the Andøya Rocket Range
Jason Glenn, CU/CASA, An exciting opportunity for Colorado for 21st Century Ground-Based Astronomy: The Cornell-Caltech Arecam Telescope
John Gosling, CU/LASP, The solar wind
Margit Haberreiter, Physikalisch-Meteorologisches Observatorium Davos Davos Dorf Switzerland, Radiative Transfer Calculations of the Solar Atmosphere
Nathan Kaib, Univ. of Washington, Oort Cloud Simulations: Constraining the Comet Impact Hazard and the Sun's Birthplace
Bodil Karlsson, Stockholm University, NLC Analysis from the Odin Satellite
Michael King, NASA Goddard, Observations of our changing world: The view from Space, Aircraft, and the Surface
Fred Lo, NRAO, Mega-Masers, Dark Energy, and the Hubble Constant
Scott McIntosh, HAO and SwRI, Alfvén Waves in the Solar Atmosphere: An Old Solution to an Old Problem?
Jean-Pierre Macquart, Caltech, Radio Intra-Day Variability in Quasars
David Malaspina, Eigenmode Structure in Solar Wind Langmuir Waves
Wendell Mendell, NASA Johnson Space Center, NASA's Constellation Program: Implementation of the Vision for Space Exploration
George Millward (NOAA/SEC), Global modeling of the Earth's ionosphere-thermosphere system
Alessandro Morbidelli, Laboratoire Cassiopée, Observatoire de la Côte d'Azur, Nice, France, Formation of the Terrestrial Planets and Primordial Sculpting of the Asteroid Belt
Antonius Otto, Univ. Alaska, Physics and particle acceleration at the geomagnetic cusps
Norman Pace, CU/MCDB, Life in the Universe: The Expanding World of Microbial Diversity
Peter Pilewskie, CU/LASP & ATOC, Quantifying the Radiative Effects of Aerosols and Clouds on Climate from Airborne Field Studies
Gabrielle Provan, Multi-instrument study of magnetosphere-ionosphere coupling utilizing the SuperDARN radars, auroral imagers and spacecraft observations

David Rusch, CU/LASP, The Aeronomy of Ice in the Mesosphere Explorer: First Science Results

David Rusch, CU/LASP, AIM: A NASA Mission Exploring Clouds on the Edge of Space

Daniel Sauer, Max Planck Institute for Astrophysics, Radiative Transfer in Type Ia Supernova Ejecta

Nick Scoville, Caltech, Large Scale Structure and Galaxy Evolution in COSMOS

Mindi Searls, CU/LASP, Shape from Shading: Photoclinometry and its Applications

Rob Simcoe, MIT, Galaxy Formation, Feedback, and the Early Chemical Enrichment of Intergalactic Matter

John Spear, Colorado School of Mines, Microbial Diversity in a Mexican Cenote as Captured by DEPTHX

Brian Toon, CU/LASP and ATOC, First Results from the Tropical Composition, Clouds and Climate Coupling (TC4) Experiment

Weichao Tu, CU/LASP, Storm-dependent radiation belt dynamics


Robert Winglee, U. of Washington, Multi-Fluid/Multi-Scale Simulations of Reconnection and Flux Ropes in the Magnetosphere

Weichao Tu, CU/LASP/AES, Storm-dependent Radiation Belt Dynamics

Publications


Heldmann, J.L., Observations of Martian gullies and constraints on potential formation mecha-


Peterson, W.K., P. C. Chamberlin, T. N. Woods, and P. Richards, Variations of the solar flux in the 1 to 50 nm range over a solar rotation inferred from observations of photoelectrons with energies from 0.01 to 1 keV from the FAST satellite, Adv. Space Res., doi:10.1016/j.asr.2007.08.038, 2007.


Toon, O.B., et al., Atmospheric effects and societal consequences of regional scale nuclear con-

Works in Progress

DeMaziere, M., C.E. Randall, et al., Validation of ACE-FTS v2.2 methane profiles from the upper troposphere to lower mesosphere, Atmos. Chem. and Physics, submitted, 2007.


Russell, J.M., III, C.E. Randall, et al., Aeronomy of ice in the Mesosphere (AIM): A satellite mis-


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Ergun, R.E., Angular momentum transfer at Jupiter: The role of parallel electric fields, Colloquium, U. of Sydney, Physics Department, 2007.
Fontenla, J., Solar radiation physical modeling: From semi-empirical models to a broader physical basis, ISSI Team meeting, Bern, Switzerland, 2007.


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**SPONSORED PROGRAMS**

Andersson, Laila Parallel Electric Fields and Alfven Waves
Andersson, Laila The De-Rotating Imaging System ‘Monitor’
Avallone, Linnea Comparison of In Situ and Remotely Sensed Measurements of Cirrus Cloud Properties
Avallone, Linnea Collaborative Research: Stratosphere-Troposphere Analyses of Regional Transport (START) Experiment
Avallone, Linnea In Situ Measurements of Cloud Ice Water Content During TC4 in Support of Satellite Validation
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Bagenal, Frances New Horizon Pluto-Kuiper Belt Mission Phase B
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Angular Momentum Coupling between Jupiter and its Magnetosphere
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Bagenal, Frances
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IO’s Interaction with the Magnetosphere of Jupiter-EPO Supplement

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