

CURRICULUM VITAE

1. PETER H. SCHULTZ

Professor
Department of Geological Sciences

2. EDUCATION:

B.A. Carleton College, 1966, Honors in Major
Ph.D. in Astronomy, University of Texas at Austin, 1972
Dissertation: "A Preliminary Morphologic Study of the Moon"

3. PROFESSIONAL APPOINTMENTS

- 1966-1967 Summer Employee, U.S. Naval Observatory, Washington, D.C.
- 1970-1973 Research Scientist, Department of Geological Sciences, University of Texas, Austin, Texas
- 1973-1975 Research Associate, National Academy of Sciences-National Research Council, NASA Ames Research Center, Moffett Field, California
- 1975-1976 Research Associate at NASA Ames Research Center (through University of Santa Clara, Santa Clara, California)
- 1976-1981 Staff Scientist, The Lunar and Planetary Institute, Houston, Texas
- 1981-1984 Senior Staff Scientist, The Lunar and Planetary Institute, Houston, Texas
- 1984-1996 Visiting Scientist, The Lunar and Planetary Institute, Houston, Texas
- 1984-1994 Associate Professor, Department of Geological Sciences, Brown University, Providence, Rhode Island
- 1994-Present Professor, Department of Geological Sciences, Brown University, Providence, Rhode Island

4. COMPLETED RESEARCH

a. PUBLISHED BOOKS, PAPERS AND ABSTRACTS

2007 Peer-Reviewed Papers (see attached for complete publication list):

- Schultz, P. H.**, Eberhardy, C. A., Ernst, C. M., A'Hearn, M. F. A., Sunshine, J. M., Lisse, C. M. (2007), The Deep Impact oblique cratering experiment, *Icarus* **190**, 295-333.
- Schultz, P. H.** (2007), Hidden Mars, *Science* **318**, 1080-1081.
- Ernst, C. M. and **Schultz, P. H.** (2007), Evolution of the Deep Impact flash: Implications for the nucleus surface based on laboratory experiments. *Icarus* **190**, 334-344.
- Zarate, M. A., **Schultz, P. H.**, Blasi, A., Clifford, H., King, J., and Hames, W. (2007) Geology and geochronology of type Chasicuan (late Miocene) mammal-bearing deposits of Buenos Aires (Argentina) *Journal of South American Earth Sciences*, **23**, 81-90.
- Thomson, B. J. and **Schultz, P. H.** (2007), The geology of the Viking Lander 2 site revisited, *Icarus* **191**, 505-523; doi:10.1016/j.icarus.2007.05.011.
- Sunshine, J. M., Groussin, O., **Schultz, P. H.**, A'Hearn, M. F., Feaga, L. M., Farnham T. L., and Klaasen, K. P. (2007), The distribution of water ice in the interior of Comet Tempel 1, *Icarus*, 284-294.
- Thomas, P. C., J. Veverka, M. J.S. Belton, A. Hidy, M. F. A'Hearn, T. L. Farnham, O. Groussin, Jian-Yang Li, L. A. McFadden, J. Sunshine, D. Wellnitz, C. Lisse, **P. H. Schultz**, K. J. Meech, and W. A. Delamere (2007), The shape, topography, and geology of Tempel 1 from Deep Impact Observations *Icarus* **187**, 4-15.
- A'Hearn, M. F. A., Belton, M. J. S., Collins, S. M. Farnum, T. L. Feaga, L., M., Groussin, O., Lisse, C. M., Meech, K. J., **Schultz, P. H.**, and Sunshine, J. M. (2006), Deep Impact and sample return, *Earth Planets Space*, **58**, 1-15.
- Farnham, T. L., Wellnitz, D.L. Hampton, D. L., Li, J.-Y., Sunshine, J.M., Groussin, O. McFadden, L.A., Crockett, C.J., A'Hearn, M.F., Belton, M.J.S., **Schultz, P.H.**, and Lisse, C.M. (2007), Dust Coma Morphology in the Deep Impact Images of Comet 9P/Tempel 1" by *Icarus*, **187**, 26-40.
- Belton, M. J. S., Thomas, P., Veverka, J., **Schultz, P. H.**, A'Hearn, M. F., Feaga, L., Farnham, T. L., Groussin, O., Li, J.-Y., Lisse, C., McFadden, L. A., Sunshine, J. M., Meech, K. J., Delamere, W. A., and Kissel, J. (2007), The Internal Structure of Jupiter Family Cometary Nuclei from Deep Impact Observations: The 'Talps' or 'Layered Pile' Model" *Icarus* **187**, 332-344.
- Minitti, M., Rutherford, M. J., Taylor, B. E., Dyar, M. D., and **Schultz, P. H.** (2007), Assessment of shock effects on amphibole water contents and hydrogen isotope compositions: 1. Amphibole experiments. *Earth and Planet. Sci. Letts.*

Firestone, R. B., West, A., Kennett, J. P., Becker, L., Bunch, T. E., Revay, Z. S., **Schultz, P. H.**, Belgya, T., Kennett, D. J., Erlandson, J. M., Dickenson, O. J., Goodyear, A. C., Harris, R. S., Howard, G. A., Kloosterman, J. B., Lechler, P., Mayewski, P. A., Montgomery, J., Poreda, R., Darrah, T., Que Hee, S. S., Smith, A. R., Stich, A., Topping, W., Wittke, J. H., and Wolbach, W. S. (2007), Evidence for an extraterrestrial impact 12,900 years ago that contributed to the megafaunal extinctions and the Younger Dryas cooling, *Proc. Nat. Acad. Science*, **104**, no. 41, 16012-16021.

Abstracts 2007 (see attached for complete publication list):

Schultz, P. H. and Crawford, D. A. (2007), Comparing laboratory and hydrocode experiments for oblique impacts into spherical targets. *Workshop on Impact Cratering II* (2007), extended abstract no. 8049.

Schultz, P. H. (2007), Impact cratering in soft sediment layers, *Bridging the Gap II: Effect of Target Properties on the Impact Cratering Process*, extended abstract no. 8033.

Schultz, P. H. (2007), A possible link between Procellarum and the South-Pole-Aitken basin, *Bridging the Gap II: Effect of Target Properties on the Impact Cratering Process*, extended abstract no. 8049.

Schultz, P. H., (2007), Kinetic prospecting of planetary surfaces (Invited Keynote), *Dynamic Compression of Condensed Matter* (December), The Royal Society, London, abstract

Schultz, P. H., (2007), The Deep impact oblique impact experiment (Invited Keynote), American Physical Society (July), *Shock of Condensed Materials*, Kona, Hawaii (abstracts)

Schultz, P. H. (2007), Probing planetary surfaces with hypervelocity impacts (Invited Keynote), *Hypervelocity Impact Symposium*, (September), Williamsburg, VA (abstract)

Ernst, C. M. and **Schultz, P. H.** (2007) Temporal and spatial resolution of the early-time impact flash: Implications for light source distribution, *38th Annual Lunar and Planetary Science Conference*, March 13-17, 2007, League City, Texas, Extended Abstract No. 2353.

Harris, R. S., **Schultz, P. H.**, and King, P. L. (2007), The fate of water in melts produced during natural and experimental impacts into wet, fine-grained sedimentary targets, *Bridging the Gap II: Effect of Target Properties on the Impact Cratering Process*, Extended abstract no. 8051.

- Harris, R. S., **Schultz, P. H.** and Zarate, M. (2007) La Dulce Crater: Evidence for a 2.8 km impact structure in the eastern pampas of Argentina, *38th Annual Lunar and Planetary Science Conference*, March 13-17, 2007, League City, Texas extended abstract #2243.
- Harris, R. S. and **Schultz, P. H.** (2007), Impact amber, popcorn, and pathology: the biology of impact melt breccias and implications for astrobiology. *38th Annual Lunar and Planetary Science Conference*, March 13-17, 2007, League City, Texas, Extended Abstract no. 2306.
- Harris, R. S. and **Schultz, P. H.** (2007), The record of late Cenozoic impacts in the Argentine Pampas: Consequences of hypervelocity collisions into soft sedimentary targets. *Geol. Soc. Amer.*, Paper 137-4.
- Harris, R. S. and **Schultz, P. H.** (2007), Preservation of floral and faunal remains in impact melts, *Geol. Soc. Amer.*, Paper 47-7.
- Van der Bogert, C. H., **Schultz, P. H.**, and Spray, J. G. (2007), High strain-rate deformation experiments on carbonate-silicate rocks: Implications for impact cratering processes, *Bridging the Gap II: Effect of Target Properties on the Impact Cratering Process*, extended abstract no. 8062.
- Wrobel, K. E. and **Schultz, P.H.** (2007), The significant contribution of glass to the Martian surface, *Seventh International Mars Conference*, Abstract no. 3093.

b. INVITED LECTURES (1985-2006)

1985:

Conference on the Evolution of the Martian Atmosphere (Hawaii)
 Workshop on Apollo 15 (keynote speaker)
 Workshop on Space Station Planetology Experiments
 Planetary Geology Speakers Bureau (Nassau Community College; Middlebury College)
 Lunar and Planetary Science Conference XVII: Panel on Martian Volatiles
 Volcanological Society of Japan (Tokyo)

1986:

Sixth Hypervelocity Impact Symposium (San Antonio, Texas)
 Mercury Conference (keynote speaker)
 NASA Goddard Lecture Series

1987:

Boston University (Colloquium)
 Brown-Vernadsky Microsymposium (Moscow)
 University of New Hampshire (Colloquium)
 M.I.T. Planetary Society Space University

American Geophysical Union Spring Meeting (Invited Speaker, San Francisco)
AAS Division of Planetary Sciences (Keynote Speaker, Tucson)
Workshop on Mars Sample Return (Keynote speaker, Houston)

1988:

American Geophysical Union Spring Meeting (Invited for three separate talks, Baltimore)

1990:

AIAA Student Lecture Series (NASA Goddard)
American Geophysical Union Fall Meeting (Invited Speaker, San Francisco)

1992:

National Academy of Sciences, Cordoba, Argentina (February)
University of Washington, Seattle (April)
American Geophysical Union Spring Meeting (Invited Speaker, Montreal)
URI Graduate School of Oceanography (September, Colloquium)
Hypervelocity Impact Symposium Keynote Speaker (Austin, TX)
Lunar and Planetary Science Conference, Space Science Education, Subliminal Side of Science (Invited Speaker, Houston)

1993:

Arizona State University (February, Colloquium and Seminar)
Los Alamos National Laboratories (March, Colloquium)
Cornell University (April, Colloquium)

1994:

American Geophysical Union Fall Meeting (Invited Speaker, San Francisco)
New York Academy of Sciences (January, Invited Speaker, New York)
University of Massachusetts (February, Colloquium, Amherst)
Dartmouth College (March, Colloquium and Seminar)
Rensselaer Polytechnic Institute (April, Colloquium, Troy, NY)
American Geophysical Union Spring Meeting (Invited for two separate talks, Baltimore)

1995:

University of Iowa and Iowa Department of Natural Resources (Iowa City)
American Association for the Advancement of Science (Atlanta)
University of Pittsburgh
International Conference on Advanced Materials (Cancun)
American Petrofina (Houston)

1996:

University of Rhode Island, Graduate School of Oceanography (Narragansett, RI)
American Association of Petroleum Geologists National Meeting (San Diego)
Brown University, Departmental Colloquium
Carleton College Alumni Weekend Guest Speaker

1997:

Rutgers University (New Brunswick, New Jersey)
University of Delaware (Newark, Delaware)
University of New Brunswick (Fredericton, New Brunswick)
Commencement Forum Participant (Brown University)

1998:

VII Congress on Argentine Paleontology and Biostratigraphy, 10/9/98 (Bahia Blanca),
Invited Speaker
Colloquium, Brown University
Colloquium, Rhode Island College (Space Grant)
Colloquium, Lamont-Doherty Geophysical Laboratory (NY)
Astrobiology Institute Review Panel

1999

Colloquium, John Hopkins Applied Physics Laboratory (Baltimore, MD)
Colloquium, SUNY Stony Brook (NY)
Seminar, Museo Mar del Plata, Argentina
National Space Grant Director's Meeting (Hawaii)
Keynote Speaker, Aeroballistic Ranges Conference (Livermore, CA)
Visiting Lecture, Wheaton College
Visiting Lecture, URI Geology

2000

Colloquium, Smithsonian (Washington, D.C.)
Colloquium, Department of Geological Sciences (Brown)
Seminar, YPF Petroleum Company (Buenos Aires)

2001

Colloquium, La Pampa University (Santa Rosa University)

2003

Invited Keynote, Impact Cratering Workshop (Houston, TX)
Colloquium, Northwestern University (Evanston, IL)
Colloquium, Brown University
Invited Keynote, Argentine Paleontological Association Congress (La Pampa, Argentina)
Invited Colloquium, Woods Hole Oceanographic Institution (MA)

2004

Invited Barringer Lecture, Meteoritical Society (Rio de Janeiro, Brazil)
Invited Plenary for SPARK Summer program (Brown University)

2005

ICSU Dark Nature, IGCP 490 (Mar Chiquita, Argentina, March): *Invited Keynote, Third Joint Meeting, Holocene environmental catastrophes in South America: from the*

lowlands to the Andes, sponsored by the International Geological Correlation Programme (IGCP), a joint initiative of UNESCO (United Nations Educational, Scientific and Cultural Organization) and IUGS (International Union of Geological Sciences).

Bryant University (April): Special University-wide Colloquium

Oberlin College (April): Colloquium and Seminar

Invited Speaker (May): Brown University Commencement Forum

Shock Effects on Condensed Matter (Baltimore, July): *Invited Keynote* Address

Atmospheric Effects on Impact Ejecta Emplacement (Baltimore, July): Invited review
“Asteroid, Comets, and Meteorites” Conference (August): *Invited talk*, Buzios, Brazil
(August)

Northeast Regional Space Grant Directors Meeting (August): *Invited Keynote* (August),
New Hampshire

Division of Planetary Science (September): First results from the Deep Impact Mission,
Invited, Cambridge, England

Division of Planetary Science (September): “Shooting the Moon: A Personal History of
Lunar Impact Theories,” *Invited*, Historical Division of the DPS, Cambridge,
England

Brown University, Department of Geological Sciences (September): Colloquium

National Space Grant Director’s Meeting (October): *Invited Keynote* (NASA Kennedy
Space Center)

Hypervelocity Impact Symposium (Lake Tahoe, October): *Invited Keynote* Address

American Geophysical Union Fall Conference (December): Whipple Lecture (*Invited*)

2006

Invited Keynote: 23rd annual Alexander Graham Christie Lecturer, Johns Hopkins
University (March 16, 2006)

Invited Keynote: Wisconsin Space Grant Statewide Consortium Meeting (August 10,
2006)

2007

Colloquium: “The Deep Impact Oblique Impact Experiment” *University of
Colorado*, Astrophysical and Planetary Sciences, Boulder, CO (January
2007)

Colloquium: “The Moon: Dead or Alive” *Southwest Research Institute*,
Boulder, CO (January, 2007)

Colloquium: “The Deep Impact Oblique Impact Experiment” *MIT Plasma
and Fusion Center*

Colloquium: Brown University (September, 2007)

Invited Workshop Presentation: “Hypervelocity Impact Flash
Experiments” *NASA Marshall*, Huntsville, AL (Feb., 2007)

Keynote (Invited): “The Deep Impact Oblique Impact Experiment”
American Physical Society (Shock and Condensed Matter), Kona,
Hawaii

Keynote (Invited): “Probing Planetary Surfaces with Hypervelocity
Impacts,” *Hypervelocity Impact Symposium*, Williamsburg, VA

Keynote (Invited): “Digging a Comet” Results from the Deep Impact
Mission” *Artist Lecture Series Symposium* (Hastings College, NE)

Keynote (Invited): “Kinetic Prospecting of planetary Surfaces” Dynamic
Compression of Condensed Matter, *The Royal Society, London*,
December 6, 2007.

Invited Presentation: LCROSS Impact and Coordination of LRO
Observations, Lunar Reconnaissance Orbiter Project Review, Goddard
Space Flight Center Nov. 29, 2007.

5. RESEARCH IN PROGRESS (2007)

- a) Developing a new technology (Impact Flash) to determine surface compositions of planets and asteroids. Hypervelocity impact experiments performed at *NASA Ames Research Center*.
- b) Investigating impact record in Argentina as a means to understand the chronostratigraphy of sedimentary sequences over the last 10 million years.
- c) Performing research on the effect of impact trajectory (direction and angle) on crater structure, which has important implications for the regional ecological stress created by terrestrial impacts.
- d) Using the *NASA Ames Vertical Gun Range* to understand new scaling relations for different conditions of impact and energy partitioning.
- e) Performing hypervelocity laboratory impact and high strain-rate experiments to understand the relative roles of shock and shear heating during impact.
- f) Assessing the effect of an atmosphere on the emplacement of crater ejecta as a means to probe the Martian crust.
- g) Investigating the generation, dispersal, survival and evidence for impact glass deposits on Mars.
- h) Co-Investigator on NASA Discovery Mission, *Deep Impact*.
- i) Assessing the effect of impact angle on asymmetries in peak pressures and ejecta distribution using the NASA Ames Vertical Gun Range
- i) Quantifying ejecta flow fields using three-dimensional particle velocimetry (with *NASA Ames Research Center*).
- j) Investigating processes affecting the synthesis and survival of organics during hypervelocity impacts (member, *NASA Ames Astrobiology Institute*).
- k) Analysis of data from NASA’s *Deep Impact* Discovery mission
- l) Team member of approved NASA missions: *Lunar Crater Observation Sensing Satellite* (LCROSS); DIXI (new rendezvous for Deep Impact spacecraft, Phase A); NeXT (return of StarDust spacecraft to the Deep Impact comet, 9P/Tempel 1)

- m) Team member on various new mission concept studies in development for NASA
- n) Assessing the meteorite impact flux risk for future lunar missions (with *NASA Marshal*)

6. SERVICE

a. TO THE DEPARTMENT AND THE UNIVERSITY

- 1984-1985 Under the Elms, Speaker
Corporation Spouses, Speaker
- 1985-1986 Brown University Club of Boston, Guest Speaker
Sophomore Class "Concentration Day" panelist
Academic Code Committee
Fulbright Undergraduate Award Committee
Departmental Advisory Committee
- 1986-1987 Educational Policy Committee
Independent Studies Subcommittee
Academic Code Committee
Fulbright Undergraduate Award Committee
Freshman Orientation Week Participant
Departmental Advisory Committee
Departmental Peer Review Committee
- 1987-1988 Independent Studies Subcommittee
Academic Code Committee
Fulbright Undergraduate Award Committee
Freshman Orientation Week Participant
Departmental Peer Review Committee
- 1988-1989 Academic Code Committee
Fulbright Undergraduate Award Committee
Independent Studies Subcommittee
Departmental Computer Committee
- 1989-1990 Academic Code Committee
Fulbright Undergraduate Award Committee
Curriculum Advisor Program Advisor
Departmental Computer Committee
Departmental Building Committee
- 1990-1991 Parents Weekend Lecture
Academic Code Committee
Fulbright Undergraduate Award Committee
Curriculum Advisor Program (CAP) Advisor
Departmental Curriculum Committee
Departmental Computer Committee
- 1991-1992 **Sabbatical** (But volunteered for Brown Alumnae Talk, Seattle Chapter, and Under the Elms, Speaker)

1992-1993 Under the Elms
Academic Code Committee
Departmental Advisory Committee

1993-1994 Academic Code Committee
Departmental Advisory Committee
Faculty Search Committee
Curriculum Advisor Program (CAP)
Sophomore Advisor
Brown Alumni Lecture (N. Kingston, RI)

1994-1995 Academic Code Committee
Building Committee
Departmental Computer Committee
Faculty Search Committee
Curriculum Advisor Program (CAP)
Tenure Review Committee

1995-1996 Academic Code Committee
Curriculum Advisor Program (CAP)
Sophomore Advisor
Curriculum Committee

1996-1997 Curricular Advisor Program (CAP)
Academic Code Committee
Curriculum Committee

1997-1998 **Sabbatical**

1998-1999 Curricular Advisor Program (CAP)
Library Committee
Sophomore Advisor

1999-2000 Curricular Advisor Program (CAP)
Library Committee
Keynote speaker, Points on the Compass, (General Assembly),
Department Curriculum Committee

2000-2001 Curricular Advisor Program (CAP)
Sophomore Advisor
Building Committee
Professional Development Committee

2001-2002 Sophomore Advisor, Computer Committee
WiSE Faculty Advisor
CAP Advisor

2002-2003 Department Colloquium Committee
CAP Advisor
WiSE Faculty Advisor
Undergraduate Low-Gravity Flight Opportunity (KC-135) Advisor

2003-2004 CAP Advisor (2004, spring); sabbatical (2004, fall)
Undergraduate Low-Gravity Flight Opportunity (KC-135) Advisor

2004-2005 **Sabbatical** (spring), leave (fall)
“Boldly Brown” participant
“Brown Commencement Forum” participant (May)

2006-2007 CAP advisor, sophomore advisor

**2007 CAP advisor, sophomore advisor
Director, NASA RI Space Grant, NASA-EPCoR**

b. TO THE PROFESSION

1977 Associate Editor, Proceedings of the Conference on Comparisons of Mercury and the Moon

1976-1977 NASA Proposal Review Panel, Planetary Geology

1978-1980 NASA Planetary Cartography Working Group

1980 Convenor and Editor, Conference on Multi-ring Impact Basins

1981-1983 NASA Proposal Review Panel, Lunar and Planetary Geology and Geophysics

1982 Co-Editor, Proceedings of the National Academy of Sciences Conference on the *Large Body Impacts and Terrestrial Evolution: Climatological and Biological Implications*

1982-1983 Chairman, NASA Regional Planetary Image Facilities Directors Committee

1985 Chairman of *NASA Working Group on Impact Experiments on the Space Station* (Workshop on Space Station Planetology Experiments, Flagstaff, AZ, June 1985)

1985-1987 Associate Editor, *Reviews of Geophysics*

1986 Member of NASA's Lunar Geoscience Working Group (a group responsible for documenting a scientific rationale for future lunar exploration)

1986-1989 Member of Planetary Geology Working Group (an advisory panel for NASA's Planetary Geology and Geophysics Program)

1987-1989 Planetary Science Data Steering Group (NASA Advisory Committee)

1987-1990 Committee on Planetary and Lunar Exploration (National Academy of Sciences/National Research Council)

1991-1994 Editorial Advisory Board, *Earth in Space*, American Geophysical Union

1992 Organizing Committee for 1992 Hypervelocity Impact Symposium (Austin, TX)

1992 Review Panel, Venus Data and Analysis Program

1993 Organizing Committee for 1994 Hypervelocity Impact Symposium (Santa Fe, NM)

1994-1996 NASA Planetary Geology and Geophysics Review Panel

1994-1997 Editorial Board, *Geology*

1994-1996 Organizing Committee for 1996 Hypervelocity Impact Symposium (Freiburg, Germany)

1995-1997 Planetary Science Data Steering Group

1999-2000 Organizing Committee for 2000 Hypervelocity Impact Society

Review 10-20 manuscripts/proposals per year
 Frequent Chairman at national scientific meetings
 2000-2001 Organizing/Review Committee for 2000 Hypervelocity Impact Society
 Review 15-20 papers and proposals per year
 Review Committee for RPI Astrobiology NSCORT Program "Origins of
 Life: Interstellar molecules to Introns"
 2001-2002 Review 15-20 papers and proposals per year
 Review Committee for RPI Astrobiology NSCORT Program "Origins of
 Life: Interstellar molecules to Introns"
 Lunar and Planetary Science Conference Organizing Committee
 Review Panel, NASA Planetary Geology and Geophysics
 Chair, Regional Planetary Image Facilities Directors Council
 2002-2003 Review 15-20 papers and proposals per year
 Lunar and Planetary Science Conference Organizing Committee
 Review Panel, NASA Planetary Geology and Geophysics
 NASA Management Operations Working Group Member
 Chair, Regional Planetary Image Facilities Directors Council
 Hosted Northeast Regional Space Grant Consortia Meeting
 Chair, Mars Wind Tunnel Site Review Committee
 2003-2004 Review 15-20 papers and proposals per year
 NASA Management Operations Working Group Member
 Chair, Regional Planetary Image Facilities Directors Council
 Mars Data Analysis Program Review Panel

 1979-Present Science Coordinator for NASA-Ames Vertical Gun Range (national
 facility)

 2005 Review 15-20 papers and proposals per year
 NASA Management Operations Working Group Member
 Chair, Regional Planetary Image Facilities Director
 Council
 Member, Regional Planetary Image Facility Site Review
 Committee

 2006 Review 15-20 papers and proposals per year
 Lunar and Planetary Institute 5 Year Review Committee (November)
 Planetary Geology and Geophysics Proposal Review Panel (July)
 NASA Management Operations Working Group Member
 Chair, Regional Planetary Image Facilities Director
 Council
 Member, Regional Planetary Image Facility Site Review
 Committee

2007

Review 20 papers and proposals per year

Chair: Review Committee for *Planetary Aeolian Laboratory*
(NASA Ames)

**Executive Council for the National Space Grant
Consortium, Member**

National Space Grant Alliance, Board Member

NASA Management Operations Working Group, Member

Planetary Aeolian Laboratory Review Committee, Chair

**Regional Planetary Image Facilities Director
Council, Chair**

**Regional Planetary Image Facility Site Review
Committee, Member**

c. TO THE COMMUNITY

Director, Northeast Planetary Data Center (1984-Present)

Director, NASA/Rhode Island University Space Grant Consortium (1990-Present)

Brown Learning Community Instructor: *Halley's Comet* (Fall 1985); *The History Methods,
and Frontiers of Cartography* (Spring 1986); initiated *Brown Academy of Junior
Scientists*

Frequent Guest Speaker at local and national astronomy clubs

Member of National Stereoscopic Association and Photographic Historical Society of
New England

Guest Lecturer, Skyscrapers Annual Convention (1992)

Guest Lecturer, Ladd Observatory Speakers Series (1984-present)

Workshop for Warwick Elementary Science Teachers (1989, 1990)

Keynote Speaker at Astronomical League Convention, 1991 (Springfield, MA)

Co-organizer "Dinosaurs in Space: Walks and Talks on an Evolving Planet" (in coordination
with Roger Williams "Dynamation Exhibit," 1992)

Co-organizer "Science Posters Contest" for Warwick Elementary Schools (1992, 1993, 1994,
1995, 1996)

Keynote Speaker, Hartford Astronomy Day (May, 1993)

Dinner Speaker for Brown Learning Community "Teachers Overnight: Evening Under the
Stars" (May, 1993)

Keynote Speaker, Northeast Region of the Astronomical League, Springfield, MA (June,
1993)

Co-organized "Lost Worlds: From Jurassic Park to Mars," a Workshop for RI Science
Teachers (August, 1993)

Keynote Speaker for Custer Institute's (Long Island) Astronomy Jamboree (October, 1993)

Lecturer at Roger Williams Park, "Chicken Little Was Right" (February, 1994)

Participant: Providence Math-Science Coalition Project (1994)

Participant: Zooscape (Brown and Roger Williams Park series, Summer 1994)

Organizer: Planetary Catastrophes Workshop for RI Teachers (July, 1994)
 Speaker at Skyscrapers Astronomy Club Meeting (September, 1994)
 Organizer: Planetary Data Center Open House "Legacy of Apollo" (evening public lectures and viewing of Shoemaker-Levy 9 collision), 1994
 Host for "Warwick Elementary Schools Award Ceremony: Space Poster Contest" (Fall, 1995)
 Co-organizer and contributor "Mapping Worlds" (Joint NASA Space Grant and Institute for Secondary Education Seminar Series for Teachers, Spring 1995)
 Co-organizer and contributor "Fly Me to the Moon: Apollo 13 Workshop for Rhode Island K-12 Teachers" (Brown University, Fall 1995)
 Co-hosted poster and booth at the "New England Conference on Technology Transfer" (Providence, August 1995)
 Speaker at the Rhode Island Science Teachers Association (RISTA) Convention, (1997)
 Banquet Speaker at the Skyscrapers Convention, (1997)
 Involvement with various educational groups and initiatives in Rhode Island and at Brown to bring NASA science and exploration into the classroom (Rhode Island College, NASA Resource Center, Roger Williams Park Museum, Aerospace States Association, RI Science Teachers Association, Lt. Governors Office, IESE)
 Mentored two high school students (under-represented minority student at Mt. Pleasant High School and student at Lincoln School), 1996-1999
 Speaker at the Rhode Island Science Teachers Association (RISTA) Convention, (1997, 1998)
 Guest Speaker at RI Audubon Society, 1998
 Banquet Speaker at StarCon (National Amateur Astronomers Convention), 1998
 Boy Scout Award Ceremony, East Greenwich (1997)
 Presentation Speaker, Lt. Governor's Office (RI, 1998)
 Speaker, Jamestown Rotary Club (RI, 1999)
 Speaker, RI Association for Retired Principals and Superintendents (1999)
 Presentation Speaker, "Comet Chasers" Day (Charleston, RI 1999)
 Keynote, New England Chemistry Teachers Association (Roger Williams University, 2000)
 Boston Bay Group Colloquium (MIT, 2000)
 Sigma Xi; Banquet Talk (Brown University, 2000)
 Custer Institute Astronomy Jamboree (Southold, Long Island, NY 2001)
 Keynote Speaker, Science Teachers Association (RISTA, RIC, 2002)
 Banquet Speaker, Astro-Assembly (2002)
 Keynote, RI Natural History (URI, 2002)
 Guest Speaker, 2003 Astro-Assembly
 Guest Speaker, 2003 StarConn (Wesleyan U., Middletown CT)
 Invited Speaker, International Photo-History Symposium (George Eastman House, fall 2003)
 Keynote Speaker, "The Conjunction" (Connecticut River Valley Astronomical Convention, 2004 spring)
 Keynote Speaker, SPARK (2004 Brown University Summer Studies)
 Invited Award Presenter to Astronaut Woody Spring (2004 fall, RI Aviation Hall of Fame)
 Invited Speaker, Photographic Historical Society of New England, "The History of 19th Century Lens Makers" (2004 spring)

2005

Deep Impact Teacher Workshop Lecturer (NASA Kennedy, January)
Deep Impact Teacher Workshop, Lecturer and Organizer (Roger Williams Park Museum, January-July)
Maine Space Day (Auburn, Maine, May)
Maine Astronomy Club (Portsmouth, Maine, May)
Brown Commencement Forum (May)
Guest Presenter, Chautauqua Workshop (June, Flagstaff, AZ)
Brown University Summer School (July, guest lecturer)
Ladd Observatory Astronomy night (Public Speaker, September)
Rutgers Museum of Natural History (November, New Brunswick, NJ)
“Boldly Brown” Fund Raising Evening Speaker (October)
Rhode Island Hospital Forum (December, with Karen Meech, U. Hawaii, December)
Director, Northeast Planetary Data Center (1984-Present)
Director, NASA/Rhode Island University Space Grant Consortium (1990-Present)
Brown University Alumnae Lecture about Results from Deep Impact (November)

2006

Director, Northeast Planetary Data Center (1984-Present)
Director, NASA/Rhode Island University Space Grant Consortium (1990- Present)
Benjamin Dean Lecture, Morrison Planetarium (January, 2006)
Brown University Summer School (Providence, RI; July 21, 2006, guest lecture about DI)
Keynote Speaker (Providence, RI; July 29): Brown University Summer Studies for Middle School participants and parents.
Deep Impact Teacher Workshop (with Karen Meech): Hawaii (February 25, 2006)
Banquet Talk, Houston Astronomical Society (March 11, 2006):
Guest Speaker for Brown’s VIGOR Program (linking undergraduate education in math with other disciplines, February 11, 2006):
Alumnae Reunion Talk (Carleton College, June 2006)
Brown University Staff Day (Providence, RI; June 7, 2006)
Roger Williams park Museum: Contributed materials and content to the exhibit comparing the Lewis and Clark expedition and planetary exploration (January, 2005-September, 2006)
Roger Williams park Museum: assisted in exhibit on *Extreme Living* (January, 2005-September, 2006)

2007

Invited Public Talk: Prairie Astronomy Club (October, Lincoln, NE)
Invited Keynote: 75th Annual *Astro-Assembly* Meeting, September 28
(Seagrave Observatory)
Invited Keynote: *The Conjunction* (Connecticut Valley Astronomy Society)

Mars exhibit: Sponsored Mars Express 3-D exhibit at the Roger Williams Park Natural History Museum

Mars Educator Workshop: Participated in workshop for teachers connected to the Mars 3D exhibit

Hosted NE Data Center Annual Meeting: The international network of Regional Planetary Image Facilities met in the Northeast Planetary Data Center in November

Hosted the RI Space Grant Consortium Symposium: Hosted the annual day-long symposium that highlighted activities (faculty research, undergraduate/graduate research, educational activities, classroom development, etc.).

d. OTHER EDUCATIONAL AND OUTREACH ACTIVITIES

Co-organizer, *A Short Course in Lunar Geology* (1974, NASA-Ames, California)

Co-organizer, *A Short Course in Lunar Geology* (1976, Fairfax, Virginia)

Instructor, *Lunar Geology Short Course* (1976, Lunar and Planetary Institute, Houston)

Instructor, *Planetary Geology Short Course* (1978, Arizona State University)

Instructor, *Planetary Geology Short Course* (1985, Geological Society of America)

BBC TV Science Series, *Shoot the Moon*

Featured in Disney TV Production, *Scheme of Things*

Featured in Life Magazine, *Masters of the Universe*

Featured in Japanese Broadcasting Corporation TV Series (NHK) on the Evolution of the Earth

Featured in Public Broadcasting System TV Series, *Planet Earth*

Featured Interview in Japanese Popular science magazine *Newton*

Disney Exhibit on 3-D space images (Disneyland, Japan)

Planetary Geology Speakers' Bureau Participant (1988-1990)

Featured Video Speaker in American Museum of Natural History (NYC) theater exhibit on Meteorites (1990-present)

Featured in Public Broadcasting System TV Series, *Miracle Planet*

Featured in Japanese (NHK)/WQED TV production, *Space Age*

Instructor in Annual Workshops on Planetary Exploration for New England Educators (1984-present)

Advisor for *Newton's Apple* (Aired in October, 1993)

Advisor for BBC *Horizons* TV Series "Doomsday Asteroid" (aired in Britain, 1994; in United States, 1995)

Advisor for NHK TV Special *Planet of Life* (aired in Japan 1994, in United States, 1995)

Featured in NHK Television Program on "Chicxulub and the Mayans" (aired in 1995, Japan only)

NPR radio interview (Space Grant) about "Life on Mars" (August, 1996)

NPR "Science Friday" radio interview concerning new theory about Chicxulub impact (January, 1997)

NPR "Science Friday" radio (Space Grant) about "Life on Mars" (August, 1996)

Featured in Discovery 2000 Television Series (Spring, 1998)

Featured in Brazilian Science TV Series (aired Spring, 1997)

Live interviews (NPR, BBC) dealing with new impact in Argentina (1998, 1999)

Featured in Discovery 2000 Television Series (Spring, 1998)

Featured in new BBC Horizon TV Series ("Crater of Death") about the Chicxulub impact (aired worldwide in 1998)

Featured in WGBH "Origins" A Science Odyssey TV Series (aired in Spring, 1998)

Featured in NHK-TV Program about the History of Apollo (1998, 1999)

Featured in WGBH/WQED TV program (aired in 2001), "*96 Worlds and Counting*" involving impact studies

Featured in BBC TV program (aired in 2001/02), "*Projectiles*", involving impact studies

Featured in Discovery Channel production (aired in 2001/02), "*Fireballs in Space*" about Argentina and laboratory impact studies

Guest Speaker for Brown's VIGOR Program (linking undergraduate education in math with other disciplines, 2002)

Featured in NHK TV Program (Living Planet, to air in 2004)

Facilitated 2003 Summer Studies Planetary Geology Courses (through Space Grant)

Facilitated 2004 Summer Studies Planetary Geology Courses (through Space Grant) for high school juniors/seniors.

Facilitated new 2004 Summer Studies Planetary Geology Courses (through Space Grant) for middle school (SPARK)

Participated in new NHK TV Production of "Miracle Planet" (to air 2005)

Participated in new Discovery TV Program about Deep Impact (to air in July 2005)

2005:

Pre-encounter press conference (June): Brown University

Pre-encounter press conference (June): NASA Ames Research Center (June)

Pre-encounter press conference (June): NASA JPL

Post-encounter Press conference, July 4: NASA JPL

Media Interviews: NPR Radio (June), local television stations (ABC, NBC, CBS), Associated Press, etc.

Research featured on: Discovery Channel ("*Comet Collision*"), NHK Television program, Australian Broadcasting (ABC), British Broadcasting Corporation (BBC)

Hosted: Special showing of IMAX, "Magnificent Desolation" (Space Grant)

2006

Media Interviews:

- Featured on *NPR Radio* (November)
- Local television programs
- British Broadcasting Corporation (BBC)* radio (November),

Astronomy Magazine
Popular Science
Science
Scientific American,
Geotimes

Research featured on:

KQED program about the LCROSS mission (to air 2007);
National Geographic programs (to air 2007);
British Broadcasting Corporation (BBC, to air 2007).

2007

Media interviews

National Geographic: *Naked Science, Peru impact, Comets and Asteroids*
NPR (Ira Flato, Science Friday):
History Channel: *The Universe*
BBC: *Returning to the Moon* (LCROSS mission)

7. HONORS AND AWARDS

2006 Distinguished Alumnae Achievement Award, Carleton College, Northfield, MN
Asteroid 6952 named "PeteSchultz"
2004 Barringer Medal Award (for achievements in impact research)
Certificate of Special Recognition, 2000 (U.S. House of Representatives)
Certificate of Appreciation, 2000 (RI House of Representatives)
Best Paper Award, 1992 Hypervelocity Impact Society Conference (Crawford/Schultz)
Best Paper Award, 2000 Hypervelocity Impact Society Conference (Dahl/Schultz)
NASA Group Achievement Award (Magellan Project), 1992
Medal of Achievement, National Academy of Sciences of Argentina, Cordoba
Magellan Guest Investigator
Sigma Xi
NASA Traineeship, 1968-1971
Phi Kappa Phi, 1972

Past Proposal Awards

NASA-NGT-50325 The Characteristics of Impact-Generated Plasma
(9/1/89-8/31/91)
PI - Schultz (D. Crawford NASA Fellowship)

NASA-NAGW-705	Planetary Impact Processes (10/1/84-9/30/96) PI - Schultz
NASA-NASW-855	Northeast Planetary Data Center (11/1/84-10/31/96) PI - Schultz
NASA-NGT-40034	Brown University Space Grant (3/1/91-2/28/97) PI - Schultz
NASA-JPL-958946	Atmospheric Effects on the Cratering Process (12/1/90-10/5/92) PI - Schultz, Magellan Guest Investigator
NSF-EAR-9121347	Terrestrial Low-Angle Impacts (8/1/91-8/1/93) PI - Schultz
NASA-NGT-51058	Modeling the Atmospheric Response to an Advancing Continuous Ejecta Curtain: Implications for Planets with Atmospheres (7/1/93 - 6/30/96) PI - Schultz (O. Barnouin NASA Fellowship)
NASA-NAGW-3431	Geologic Signatures of Atmospheric Effects on Impact Cratering on Venus (3/15/93 - 3/14/95) PI - Schultz
NSF-EAR-9219777	Major Equipment Request for a Subsurface Interface Radar (SIR) System (7/1/93-6/31/94) Co-PI - Schultz
JPL Director's Research and Development Fund Proposal	Impact Flash Spectroscopy (5/15/95-9/30/97) Co-PI - Schultz
Fina Oil Company	The Sierra Madera impact and implications for hydrocarbon exploration strategies (1/1/97-12/31/98)
NASA-NGT5-50166	Effects of High Strain-rate Deformation on Impact Melt Generation

(7/1/99 - 6/30/02)
 PI Schultz (C. van der Bogert NASA Fellowship)

NASA-NAG5-7082 An Ultra-spectrometer (MEMUS) for Planetary
 Surface Analysis (4/1/98-3/31/02): Planetary
 Instrument and Development Program
 PI – Schultz

NASA-NAG5-3877 Planetary Impact Processes
 (previously NAGW-705) (10/1/96-2003)
 PI - Schultz

NASA-NGT5-90014 Rhode Island Space Grant Program
 (previously NGT-40034) (3/1/91-present)
 PI – Schultz

NSF-EAR-0001047 Late Cenozoic Record of Impact Glasses in the
 Argentine Pampas
 (7/1/00 - 6/30/04)
 PI - Schultz

NASA-Z667703 *Deep Impact* Co-Investigator Participation
 (1/1/00 - 4/1/06)
 PI – Schultz

NASA-NAG5-12327 Survival and Synthesis of Organics During Hypervelocity Impacts
 (7/1/02-6/30/06)
 PI-Schultz

NASA-NNG04G197G Northeast Planetary Data Center
 (1/05/04-1/14/07)
 PI – Schultz

CURRENT PROPOSAL AWARDS (2007)

**NASA-NNG05G137G Planetary Impact Processes
 (4/15/05-4/14/08)
 PI - Schultz**

**NASA-NNX07AP52G Northeast Planetary Data Center
 (7/27/07-7/26/12)
 PI - Schultz**

- NASA-NNG05GG71H Rhode Island Space Grant Program
(3/15/05-3/14/10)
PI - Schultz**
- NASA- NNX07AG18G Discovery Data Analysis Program
(2/15/07-2/14/10)
PI - Schultz**
- LCROSS-NNA07CN76A NASA-Ames LCROSS Mission
(4/1/07-3/31/09)
PI Schultz**
- USRA-03482-07 NASA-Marshall grant on impact flash
(12/8/06-12/31/07)**
- NASA-NNG04G011H Thermal Evolution of Impacts from Laboratory
Experiments
(7/1/04 - 6/30/07)
PI Schultz (Carolyn Ernst, NASA GSRP
Fellowship)**

8. TEACHING (NB: Prior to 2006, Research grants typically cover 33-50% of teaching load; after 2005, grants cover 20 to 25% AY teaching)

1996-1997:

Fall

4 Graduate Students
Guest Lecturer (GE-22)

Spring

4 Graduate Students
Planetary Geology (GE-81; 100%;
26 students)
Also contributed to Seminar in Biology
on "Evolution of Life"

1997-1998:

Fall

(on sabbatical)
4 Graduate Students
Guest lecturer in GE-22, GE-31

Spring

(on sabbatical)
4 Graduate Students
Guest lecturer, Archeology (AN-252)
Also participated in GSO Lecture Series on
"Life in Extreme Environments"

1998-1999:

Fall

3 Graduate Students
Guest lecturer in GE-22, GE-31
Planetary Cratering (GE-288; 100%
9 students)

Spring

Planetary Geology (G-81; 100%;
32 students)
3 Graduate Students

1999-2000:

Fall

Terrestrial Impact Record (GE-281;
(100%; 6 students)
Guest lecturer, GE-22
3 Graduate Students
Physics Senior Thesis Advisor (Erin Weeks)

Spring

Planetary Geology (GE-81; 100%
25 students)
3 Graduate Students
Undergraduate Thesis Advisor

2000-2001:

Fall

Planetary Impact Cratering (GE-288; 100%)
6 students
3 Graduate Students
Guest lecturer GE-22
Physics Senior Thesis Advisor (Carolyn Ernst)
Geology Senior Thesis Advisor (D. Paduano)

Spring

Planetary Geology (GE-81; 100%
20 students)
3 Graduate Students
Undergraduate Thesis Advisor (2)

2001-2002:

Fall

6 Graduate Students
Guest Lecturer GE-22
Geology Undergraduate Thesis Advisor (2)

Spring

Planetary Geology (GE-81; 100%)
6 Graduate Students
Undergraduate Thesis Advisor (2)
Guest Lecturer, Advisor, and Critical
Reviewer for Industrial Design Course
(Rhode Island School of Design)

2002-2003:

Fall

7 Graduate students
Guest Lecturer GE 22
Planetary Impact Cratering
(GE 288; 100%)

Spring

Planetary Geology (GE-81; 100%)
7 Graduate students
Undergraduate Independent Study Advisor
Guest Lecturer, Advisor, and Critical
Reviewer for Industrial Design
Course (Rhode Island School of Design)
Design)
Guest Lecturer (University of Rhode Island)
Guest Lecturer (WHOI)
Guest Lecturer (Northwestern)

2003-2004:

Fall

8 graduate students

Spring

Planetary Geology (GE 81, 100%)

8 graduate students

Undergraduate Senior Thesis (N. Reul)

Guest Advisor and Critical

Reviewer for Industrial Design

Course (Rhode Island School of Design)

2004-2005:

Sabbatical Fall

6 graduate students

Spring (leave)

6 graduate students

Senior thesis advisor: Tyler Wilson

(Chemistry)

Guest lecture Bio-19

2005-2006

On leave, fall 2005 (Deep Impact Encounter)

Senior Honors Thesis advisor: Lauren Brodsky

Senior Thesis advisor: Julie Kosominsky

Senior Honors Thesis Advisor (external): Evan Ackerman (Bates College)

Faculty Advisor: Engineering 176 (Capstone Senior Design Project) and

Independent Study

2006-2007:

Fall

6 graduate students

Planetary Crateriing

(GE 288; 100%)

Spring

Planetary Geology (GE 81, 100%)

6 graduate students

Guest Advisor and Critical

Reviewer for Industrial Design

Course (Rhode Island School of Design)

2006-2007:

Fall

5 graduate students

“Planetary Crateriing”

(10 students, GE 288; 100%)

Spring

“Planetary Geology” (19 students, GE 81, 100%),

6 graduate students

Freshman Advisor

**Guest Speaker, Advisor and
Critical Reviewer for
Industrial Course
(Rhode Island School of
Design)**

**External Faculty Advisor:
Engineering 176 (Capstone
Senior Design Project)
Senior Thesis Advisor: Daniel Finn-Foley (Physics)**

**2007: Fall
4 graduate students
Freshman Seminar
“Chicken Little or Armageddon” (18 students)
(GE 160; 100%)
Freshman Advisor**

GRADUATE THESES SUPERVISED:

**Current (PhD and Masters):
Carolyn Ernst
Robert (Scott) Harris
Brendan Hermalyn (first year)
Angela Stickle (first year)**

M.S. Patricia Grizzaffi (1987)
Robert Wichman (1989)
David Crawford (1989)
Charles Halfen (1991)
Olivier Barnouin-Jha (1992)
Jason Dahl (1999)
Carolyn van der Bogert (1999)
Jennifer Anderson (2001)
Carolyn Ernst (2003)
Kelly Wrobel (2003)
Clara Eberhardy (2004)

- Ph.D.** John Grant (1990): "Erosional Evolution of Impact Craters on the Earth and Mars"
- David Crawford (1992): "The Production and Evolution of Plasma and Associated Magnetic Fields During Hypervelocity Impacts: Implications for Planetary Paleomagnetism"
- Robert Wichman (1993): "Post-impact Modification of Craters and Multiring Basins on the Earth and Moon by Volcanism and Crustal Failure"
- Olivier Barnouin (1998): "Modeling atmospheric entrainment and transport of Impact ejecta"
- Seiji Sugita (1998): "Generation and Evolution of impact-generated vapor clouds: Spectroscopic observations and hydrodynamic calculations"
- Jennifer L. B. Anderson (2004): "Experimental studies of ejecta dynamics during vertical and oblique impacts"
- Carolyn van der Bogert (2004): "High strain-rate Deformation as an Impact Process: Ordinary Chondrite and Carbonate-silicate Frictional Melting Experiments and Their Comparison with Naturally Deformed materials"
- Bradley Thompson (2006): "Recognizing Impact Glass on Mars using Surface Texture, Mechanical Properties, and Mid-Infrared Spectroscopic Methods."
- Kelly Wrobel (2007): "Computational modeling of impact-generated vapor and melt: Implications for remnant impact products on Mars and Earth"**

External Ph. D. Committee Member, Robert Herrick, 1992 (SMU, Dallas); G. R. Osinski, 2004 (University of New Brunswick, Fredericton)

Internal PH. D. Dissertation Defense Committee (S. Murchie, J. Sunshine, M. Staid, L. Lee, C. Cooper, Noah Petro)

9. Date Prepared: 1/15/08

ALL PAPERS, BOOKS, ABSTRACTS (P. H. SCHULTZ)

Books (authored and edited)

- 1976 Schultz, P. H., *Moon Morphology*, University of Texas Press, Austin Texas, 604 pp.
- 1977 R. Greeley, R. and Schultz, P. H. (eds) *A Primer in Lunar Geology*, NASA Technical Memorandum
- 1980 Schultz P.H. and Merrill R.B. (eds.), *Multi-ring Basins*, Proc. Lunar and Planetary Sci. 12A
- 1981 Silver, L. and Schultz, P. H., *Geological Implications of Impacts by Asteroids and Comets on the Earth*, Geol. Soc. Amer. Special Paper 190 .

Papers

- 1973.P Schultz P.H. and Ingerson F.E. Martian lineaments from Mariner 6 and 7 images, *J. Geophys. Res.*, 78, pp. 8415-8427.
- 1974.P Schultz P.H. A review of lunar surface features. In *A Primer in Lunar Geology*, R. Greeley and P. H. Schultz, eds. NASA-TM 62,359, p. 574.
- 1975.P. Schultz P.H. and Gault D.E. Seismically induced modification of lunar surface features. In *Proc. Lunar Sci. Conf. 6th*, pp. 2845-2862.
- 1975.P Schultz P.H. and Gault D.E. Seismic effects from major basin formation on the Moon and Mercury. *The Moon*, 12, pp. 159-177.
- 1976.P Schultz P.H., Greeley R. and Gault D.E. Degradation of small mare surface features. In *Proc. Lunar Sci. Conf. 7th*, pp. 985-1003.
- 1976.P Schultz P.H. Floor-fractured lunar craters. *The Moon*, 15, pp. 241-273.
- 1977.P Schultz P.H. Endogenic modification of impact craters on Mercury. In *Physics of the Earth and Planetary Interiors*, 15, pp. 202-219.
- 1977.P Simonds C., Schultz P.H. and Solomon S. Comparison of Mercury and the Moon: A Conference. *EOS* 59, pp. 43-48.
- 1977.P Schultz P.H., Greeley R. and Gault D.E., Interpreting statistics of small lunar craters. *Proc. Lunar Sci. Conf. 8th*, pp. 3539-3564.
- 1978.P Schultz P.H. Martian intrusions: Possible sites and implications. *Geophys. Res. Lett.* 5, pp. 457-460.
- 1978.P Schultz P.H. and Mendell W., Orbital infrared observations of lunar craters and possible implications for impact ejecta emplacement. *Proc. Lunar and Planetary Sci. Conf. IX*, pp. 2857-2883.
- 1978.P Orphal D.L. and Schultz P.H. An alternative model for the Manicouagan impact structure. *Proc. Lunar and Planetary Sci. Conf. IX*, pp. 2695-2712.
- 1979.P Schultz P.H. and Gault D.E. Atmospheric effects on Martian ejecta emplacement. *J. Geophys. Res.* 84, pp. 7669-7687.

- 1979.P Schultz P.H. and Spudis P.D. Evidence for ancient lunar basalts. *Proc. Lunar and Planetary Sci. Conf. X*, pp. 2899-2918.
- 1979.P Thomsen J.M., Austin M.G., Ruhl S.F., Schultz P.H. and Orphal D.L. Investigation of the mechanics of impact cratering. *Proc. Lunar and Planetary Sci. Conf. X*, pp. 2741-2756.
- 1979.P Pai S.I., Menon S. and Schultz P.H. Effects of lift force on ejecta transport. *Proc. Lunar and Planetary Sci. Conf. X*, pp. 2779-2797.
- 1979.P Schultz P.H. and Glicken H. Impact crater and basin control of igneous processes on Mars. *J. Geophys. Res.*, 84, pp. 8033-8047.
- 1980.P Schultz P.H. and Srnka L.J. Cometary collisions on the Moon and Mercury. *Nature* 284, pp. 22-26.
- 1980.P Schultz P.H. and Singer J. Secondary impact craters around lunar, Mercurian, and Martian craters. *Lunar and Planetary Sci. Conf. XI*, pp. 2243-2259.
- 1980.P Orphal D.L., Borden W.F., Larson S.A. and Schultz P.H. Impact melt generation and transport. *Proc. Lunar and Planetary Sci. Conf. XI*, pp. 2309- 2323.
- 1980.P Austin M.G., Thomsen J.M., Ruhl S.F., Schultz P.H. and Orphal D.L. Computational investigation of impact cratering dynamics: material motions during the crater growth period. *Proc. Lunar and Planetary Sci. Conf. XI*, pp. 2325- 2345.
- 1980.P Greeley R., Fink J., Gault D.E., Guest J. and Schultz P.H. Impact cratering in viscous targets: Laboratory experiments. *Proc. Lunar and Planetary Sci. Conf. XI*, pp. 2075-2097.
- 1981.P Schultz P.H. The impact of impacts explored. *Geotimes* 26, pp. 25-26.
- 1981.P Schultz P.H., Orphal D.L., Miller B., Borden W.F. and Larson S.A. Multi-ring basin formation: Possible clues from impact cratering calculations. In *Multi-ring Basins, Proc. Lunar and Planetary Sci. 12A*, Schultz P.H. and Merrill R.B. (eds.), pp. 181-195.
- 1981.P Austin M.G., Thomsen J.M., Ruhl S.F., Orphal D.L., Borden W.F., Larson S.A. and Schultz P.H. Z-Model analysis of impact cratering: An overview. In *Multi-ring Basins, Proc. Lunar and Planetary Sci. 12A*, Schultz P.H. and Merrill R.B. (eds.), pp. 197-205.
- 1981.P Thompson T.W., Zisk S.H., Shorthill R.W., Schultz P.H. and Cutts J.A. Lunar craters with radar bright ejecta. *Icarus* 46, pp. 201-225.
- 1981.P Head J.W., Bryan W.B., Greeley R., Guest J., Schultz P.H., Sparks, R.J.J., Walker G.P.L., Whitford-Stark J.L., Wood C.A. and Carr M.H. Distribution and morphology of basalt deposits on planets. In *Basaltic Volcanism on the Terrestrial Planets*, Basaltic Volcanism Study Project, pp. 701-800, Pergamon Press, N.Y., p. 1286.
- 1981.P Schultz P.H. From Arago to Apollo: The evolution of space photography. In *The Proceedings of the First Western Photohistory Symposium* (W.B. Carroll, ed.), pp. 17- The Western Photographic Collectors Association: Whittier, CA, p. 69.
- 1982.P Schultz P.H., Schultz R.A. and Rogers J.L. Structure and evolution of ancient impact basins on Mars. *J. Geophys. Res.* 87, pp. 9803-9820.
- 1982.P Schultz P.H. and Lutz-Garihan A.B. Grazing impacts on Mars: A record of lost satellites. *J. Geophys. Res.*, 87 Supplement, pp. A84-A96.
- 1982.P Schultz P.H. and Gault D.E. Impact ejecta dynamics in an atmosphere: Experimental results and extrapolations. In *Geol. Soc. Amer. Special Paper 190* (L.T. Silver and P.H. Schultz, eds.), pp. 153-174.
- 1983.P Schultz P.H. and Spudis P.D. Beginning and end of lunar mare volcanism. *Nature* 302, pp. 233-236.

- 1983.P Eppler D.T., Ehrlich R., Nummedal D. and Schultz P.H. Sources of shape variation in lunar impact craters - Fourier shape analysis. *Bull. Geol. Soc. Amer.*, 94, pp. 274-291.
- 1983.P Arvidson R.A., Levinthal E., Saunders R.S. and Schultz P.H. Remote sensing of the surfaces of terrestrial moons and planets. In *Manual of Remote Sensing*, Vol. II, second edition, pp. 2385-2415.
- 1984.P Matsui T. and Schultz P.H. On the brittle-ductile behavior of iron meteorites: New experimental constraints. *J. Geophys. Res.* 89, C323-C328.
- 1985.P Schultz P.H. and Gault D.E. Clustered impacts: Experiments and implications. *J. Geophys. Res.* 90, pp. 3701-3732.
- 1985.P Chicarro A.F., Schultz P.H. and Masson P. Global and regional ridge patterns on Mars. *Icarus* 63, pp. 153-174.
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1988. P Crawford D.A. and Schultz P.H. Electromagnetic emissions from oblique hypervelocity impacts. *Nature* 336, 50-52.
1988. P Schultz P.H. Impact cratering on Mercury: A relook. In *Mercury* (F. Vilas, C.R. Chapman, M.S. Mathews, eds.), U. Arizona Press, Tucson, 274-335.
- 1989.P Grizzaffi P.A. and Schultz P.H. Isidis Basin: Site of volatile-rich debris layer. *Icarus* 77, 358-381.
- 1989.P Grant J. and Schultz P.H. Gradation on Mars: From west and northwest of Isidis basin and the Electris region. *Icarus* 84, 166-195.
- 1989.P Wichman R.W. and Schultz P.H. Sequence and mechanisms of deformation around the Hellas and Isidis impact basins on Mars. *J. Geophys. Res.* 94, 17333-17357.
- 1990.P Schultz, P.H. and Gault, D.E. Prolonged global catastrophes from oblique impacts. In V.L. Sharpton and P.D. Ward, eds., *Global Catastrophes in Earth History: An Interdisciplinary Conference on Impacts, Volcanism, and Mass Mortality*, Geological Society of America Special Paper 247, 239-261.
- 1990 P Grant, J.A. and Schultz, P.H. Gradational epochs on Mars: Evidence from west-northwest of Isidis Basin and Electris. *Icarus*, 84, pp. 166-195.
- 1991.P Bunch, T.E., Schultz, P.H., Cassen, P., Brownlee, D., Podolak, J., Lissauer, J., Reynolds, R., and Chang, S. Alteration of chondrules on impact with low density particulate body surfaces: An experimental approach. *Icarus*, 91, 76-92.
- 1991.P Crawford, D.A. and Schultz, P.H. Laboratory investigations of impact-generated plasma. *J. Geophys. Res.*, 96, No. E3, pp. 18,807-18, 817.
- 1992.P Schultz, P.H. Atmospheric effects on ejecta emplacement and crater formation on Venus from Magellan. *J. Geophys. Res.*, 97, No. E10, 16,183-16,248.
- 1992.P Schultz, P.H. Atmospheric effects on ejecta emplacement. *J. Geophys. Res.*, 97, E7, 11,623-11,662.
- 1992.P Schultz, P.H. Atmospheric effects on cratering efficiency. *J. Geophys. Res.*, 97, E1, 975-1005.

- 1992.P Schultz, P.H. and Lianza, R. Recent grazing impacts on the Earth recorded in the Rio Cuarto crater field, Argentina. *Nature*, 355, 234-237.
- 1993.P Wichman, R.W. and Schultz, P.H. Floor-fractured crater models of the Sudbury structure, Canada: Implications for initial crater size and crater modification, *Meteoritics* 28, 222-231.
- 1992.P Schultz, P.H. and Beatty, J.K. Teardrops on the pampas, *Sky and Telescope*, 83, 387-392.
- 1993 P. Grant, J.A. and Schultz, P.H. Erosion of ejecta at Meteor Crater, Arizona, *J. Geophys. Res.*, 98, 15,033-15,047.
- 1993.P Grant, J.A. and Schultz, P.H. Degradation of selected terrestrial and Martian impact craters. *J. Geophys. Res.*, 98, E6, 11,025-11,042.
- 1993.P Schultz, P.H. Impact crater growth in an atmosphere. *International J Impact Eng.*, 114, 659-670.
- 1993.P Crawford, D.A. and Schultz, P.H. The production and evolution of impact-generated magnetic fields, *International J. Impact Eng.*, 14, 205-216.
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