

Daniel J. Scheeres, PhD.

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Degrees

- Ph.D. Aerospace Engineering** The University of Michigan, 1992
On symmetric central configurations with application to satellite motion about rings
Prof. N.X. Vinh, Chairman.
- M.S.E. Aerospace Engineering** The University of Michigan, 1988
- B.S.E. Aerospace Engineering** (*summa cum laude*) The University of Michigan, 1987
- B.S. Letters and Engineering** Calvin College, 1985

Professional Positions

The University of Colorado at Boulder

Department of Aerospace Engineering Sciences
Colorado Center for Astrodynamics Research

A. Richard Seebass Chair, Professor 2/08 – present
Visiting Professor 8/07 – 2/08

The University of Michigan

Department of Aerospace Engineering

Adjunct Professor 2/08 – present
Graduate Chair, Department of Aerospace Engineering 10/06 – 12/07
Associate Professor 9/02 – 1/08
Assistant Professor 9/99 – 8/02

Institute of Space and Astronautical Science, Japan

Visiting Professor, JSPS Fellow 8/05 – 12/05
Japan Society for the Promotion of Science Fellow 5/99 – 8/99

Iowa State University

Department of Aerospace Engineering and Engineering Mechanics

Assistant Professor 8/97 – 8/99

Jet Propulsion Laboratory, California Institute of Technology

Senior Member of Engineering Staff 3/97 – 7/97
Member of the Technical Staff 9/92 – 3/97
Summer Intern/On-call employee 5/89 – 9/92

Honors and awards

- NASA Tech Brief Award for NTR no 43641: “Solar Sail Spaceflight Simulation Software Version 2.0 (S5 v2.0)”, 2006.
- Japan Society for the Promotion of Science Fellowship at the Institute of Space and Astronautical Science, Japan, August 15 – December 29, 2005.
- Associate Fellow of the American Institute of Aeronautics and Astronautics, 2003.
- Member of the International Astronomical Union, Commission on Celestial Mechanics and Dynamical Astronomy, 2003.
- NASA Group Achievement Award, NEAR-Shoemaker Mission Team. *For outstanding achievement in conducting the most comprehensive scientific study of Asteroid 433 Eros, including the first rendezvous, orbit, and landing on an asteroid.* Awarded July 9, 2002.
- Best Paper of Conference Award (with F.-Y. Hsiao), 12th AAS/AIAA Spaceflight Mechanics Meeting, San Antonio, Texas, January 2002.
- Letters of commendation for exceptional reviewing, AIAA Journal of Guidance, Control, and Dynamics, 2000, 2001, 2004.
- Japan Society for the Promotion of Science Fellowship at the Institute of Space and Astronautical Science, Japan, May 23 – August 15, 1999.
- Asteroid (8887) 1994LK1 renamed (8887) Scheeres. *Scheeres has pioneered the investigation of the dynamics of orbits close to small, irregularly shaped minor planets. His research has included studies of the short-term evolution and the long-term stability of orbits around radar-derived models of (4179) Toutatis and (4769) Castalia. His work has far-reaching implications for the operation of spacecraft orbiting minor planets, for the cosmogony of satellites of minor planets and for understanding the distribution of non-escaping impact ejecta on small bodies.* Dictionary of Minor Planet Names, 4th Ed., L.D. Schmadel, Springer, 1999, pg. 1069.
- NASA Group Achievement Award, NEAR Project Team. *For development of the NEAR mission and the return of the first Discovery program science data from the successful Mathilde asteroid flyby.* Awarded June 4, 1998.
- The Johns Hopkins University Applied Physics Laboratory Award for an outstanding publication in the category of Special Publications, for contributions to the special issue of *The Journal of Astronautical Sciences*, Vol 43, 1995, devoted to the Near Earth Asteroid Rendezvous Mission.
- Recipient of a Rockwell International Fellowship at The University of Michigan, 1989-1992.
- Graduated *summa cum laude* from The University of Michigan, 1987.

Graduate Students

Ph.D. committees chaired

Weiduo Hu Defended April 2002

“Orbital Motion in Uniformly Rotating Second Degree and Order Gravity Fields”

Committee Chair

Associate Professor, Dept. of Aerospace Engineering, BeiHang University, Beijing, China

Esther Morrow Defended August 2002, University of California - San Diego

“Solar Sail Orbit Operations”

Committee Co-Chair

Benjamin Villac Defended July 2003, Rackham Pre-Doctoral Scholar

“Dynamics in the Hill Problem with Applications to Spacecraft Maneuvers”

Committee Chair

Assistant Professor, Department of Mechanical and Aerospace Engineering, University of California – Irvine

Fu-Yuen Hsiao Defended April 2004

“Stabilizing and Specifying Motion Relative to Unstable Trajectories: Applications to Spacecraft Formation Flight”

Committee Chair

Assistant Professor, Department of Aerospace Engineering, Tamkang Univ., Taiwan

Vincent Guibout Defended September 2004

“The Hamilton-Jacobi theory for solving two-point boundary value problems: Theory and numerics with application to spacecraft formation flight, optimal control and the study of phase space structure”

Committee Co-Chair

Chief System Engineer, MBDA, Paris, France

Islam Hussein Defended February 2005

“Motion Planning for Multi-Spacecraft Interferometric Imaging Systems”

Committee Co-Chair

Assistant Professor, Department of Mechanical Engineering, Worcester Polytechnic Institute

Chandeok Park Defended February 2006

“The Hamilton-Jacobi Theory for Solving Optimal Feedback Control Problems With General Boundary Conditions”

Committee Chair

National Research Council Post-Doctoral Fellow, Naval Post-Graduate School

Leonel Rios-Reyes Defended September 2006

“Solar Sails: Modeling, Estimation, and Trajectory Control”

Committee Chair

Aerospace Corporation, El Segundo, CA

Stephen Broschart Defended September 2006, NASA GSRP Fellow

“Close Proximity Spacecraft Maneuvers Near Irregularly Shaped Small-bodies: Hovering,

Translation, and Descent”
Committee Chair
Jet Propulsion Laboratory, California Institute of Technology

Marci Paskowitz Defended October 2006, Francois-Xavier Bagnoud Fellow
“Orbit Design and Control of Planetary Satellite Orbiters in the Hill 3-Body Problem”
Committee Chair
GMV Space Systems, Rockville, MD

Ryan Park Defended November 2006
“Nonlinear Trajectory Navigation”
Committee Chair
Jet Propulsion Laboratory, California Institute of Technology

Jared M. Maruskin Defended January 2008
“On the Dynamical Propagation of Subvolumes and on the Geometry and Variational Principles of Nonholonomic Systems”
Committee Co-Chair

Ph.D. Candidates

Julie Bellerose Canadian NSERC Fellow, Committee Chair

Prashant Patel NASA GSRP Fellow, Committee Co-Chair

Sharyl Byram Committee Chair

Eugene Fahnestock NDSEG and NSF Fellowships, Committee Chair

Oier Penagaricano Gobierno Vasco Predoctoral Fellowship, Committee Chair

Eric Gustafson Committee Chair

M.S. committees chaired

David J.-P. Dechambre Defended Fall 2000, currently at Dassault, France
“Computation of Ellipsoidal Gravity Field Harmonics for Small Solar System Bodies”
Committee Chair

Research Interests

Astrodynamics

Investigation of orbital dynamics of highly perturbed systems using analytical, semi-analytical, and numerical methods. Specific problems of current interest include:

- Orbit mechanics about planetary satellites with applications to Lunar and Europa Orbiter missions (JPL: 2004-2006)
- Orbital motion about asteroids and comets with applications to NASA and international space science missions (JPL: 1999-Present, Orbital Sciences Corp: 1998, Lockheed-Martin: 2004-Present, Japanese Government Fellowships: 1999 & 2005)

- Spacecraft formation flight dynamics (NASA Office of Space Science: 2001-2004)
- Spacecraft dynamics in unstable orbital environments with applications to missions to Earth-Sun and Earth-Moon libration points (JPL: 1998-2002)
- Trajectory and propulsion system optimization (JPL: 2005-Present)

Navigation and Control

Investigation of spacecraft navigation and non-linear optimal control of spacecraft and mechanical systems in challenging environments. Specific problems of interest include:

- Optimal non-linear feedback control exploiting Hamiltonian formalisms (NSF: 2004-Present)
- Navigation and control of spacecraft for sampling small body surfaces (JPL: 1999-Present, Lockheed-Martin: 2004-Present)
- Navigation models of comet outgassing (JPL: 2004-Present)
- Navigation models of solar sail spacecraft (JPL: 2003-2005)
- Orbit determination and statistical control of spacecraft in unstable orbital environments (JPL: 1998-2006)

Space Science

- Co-Investigator on the Astrodynamics Science Team of the Japanese Hayabusa Mission to Asteroid Itokawa (Japanese Government Fellowships: 1999, 2005)
- Participating Scientist on the Radiometric Science Team of NASA's Near Earth Asteroid Rendezvous Mission to Asteroid Eros (NASA Office of Space Science: 2000-2001)
- Investigations into the mechanics and dynamics of the asteroid and comet environment (NASA Office of Space Science: 1998-Present)
- Formation and evolution of small-body binary systems (NASA Office of Space Science: 2005-Present)
- Co-I on several proposed NASA missions.

Publications

Journal Articles

1. *M. Nakamiya*, **D.J. Scheeres**, H. Yamakawa, and M. Yoshikawa. "Analysis of Capture Trajectories into Periodic Orbits about Libration Points," *Journal of Guidance, Control and Dynamics*, in press.
2. *J.L.R. Langlois* and **D.J. Scheeres**. "Examining Groundtrack Geometry Transitions by Evaluating the Number of Longitude Rate Zeros," *Journal of Guidance, Control and Dynamics*, in press.
3. M.W. Busch, L.A.M. Benner, S.J. Ostro, J.D. Giorgini, R.F. Jurgens, R. Rose, **D.J. Scheeres**, C. Magri, J.-L. Margot, M.C. Nolan, and A.A. Hine. 2008. "Physical Properties of Near-Earth Asteroid (33342) 1998 WT24," *Icarus*, in press.

4. E.G. Fahnestock and **D.J. Scheeres**. 2008. "Simulation and Analysis of the Dynamics of Binary Near-Earth Asteroid (66391) 1999 KW4," *Icarus*, in press.
5. E.G. Fahnestock and **D.J. Scheeres**. 2008. "Dynamical Characterization and Stabilization of Large Gravity Tractor Designs," *Journal of Guidance, Control and Dynamics*, in press.
6. J.E. Bellerose and **D.J. Scheeres**. 2008. "General Dynamics in the Restricted Full Three-Body Problem," *Acta Astronautica*, in press.
7. **D.J. Scheeres** and S. Mirrahimi. "Rotational Dynamics of a Solar System Body Under Solar Radiation Torques," *Celestial Mechanics and Dynamical Astronomy*, in press.
8. M.K. Shepard, B.E. Clark, M.C. Nolan, L.A.M. Benner, S.J. Ostro, J.D. Giorgini, F. Vilas, K. Jarvis, S. Lederer, L.F. Lim, T. McConnochie, J. Bell, J.-L. Margot, A. Rivkin, C. Magri, **D.J. Scheeres**, and P. Pravec. 2008. "Multi-wavelength observations of Asteroid 2100 Ra-Shalom," *Icarus* 193: 20-38.
9. J.E. Bellerose and **D.J. Scheeres**. 2008. "Restricted Full Three-Body Problem: Application to Binary System 1999 KW4," *Journal of Guidance, Control and Dynamics* 31(1): 162-171.
10. J.E. Bellerose and **D.J. Scheeres**. 2008. "Energy and stability in the Full Two Body Problem," *Celestial Mechanics and Dynamical Astronomy* 100(1): 63-91.
11. J.M. Maruskin, **D.J. Scheeres**, F.C. Adams and A.M. Bloch. 2008 "The eccentric frame decomposition of central force fields," *Celestial Mechanics and Dynamical Astronomy* 100(1): 43-62.
12. J. Kadish, J.R. Barber, P.D. Washabaugh and **D.J. Scheeres**. 2008. "Stresses in accreted planetary bodies," *International Journal of Solids and Structures* 45: 540-550.
13. R.S. Park and **D.J. Scheeres**. 2007. "Nonlinear Semi-Analytic Methods for Trajectory Estimation," *Journal of Guidance, Control and Dynamics* 30(6): 1668-1676.
14. S.M. Byram, **D.J. Scheeres** and M.R. Combi. 2007. "Models for the Comet Dynamical Environment," *Journal of Guidance, Control and Dynamics* 30(5): 1445 – 1454.
15. M.W. Busch, J.D. Giorgini, S.J. Ostro, L.A.M. Benner, R.F. Jurgens, R. Rose, M.D. Hicks, P. Pravec, P. Kusnirak, M.J. Ireland, **D.J. Scheeres**, S.B. Broschart, C. Magri, M.C. Nolan, A.A. Hine, J.-L. Margot. 2007. "Physical Modeling of Near-Earth Asteroid (29075) 1950 DA," *Icarus* 190(2): 608-621.
16. I.I. Hussein, **D.J. Scheeres**, A.M. Bloch, D.C. Hyland, and N.H. McClamroch. 2007. "Optimal Motion Planning for Dual-Spacecraft Interferometry," *IEEE Transactions on Aerospace and Electronic Systems* 43(2): 723 – 737.
17. L. Rios-Reyes and **D.J. Scheeres**. 2007. "Solar Sail Navigation: Estimation of Force, Moments, and Optical Parameters," *Journal of Guidance, Control and Dynamics* 30(3): 660-668.
18. S.D. Ross, and **D.J. Scheeres**. 2007. "Multiple Gravity Assists, Capture, and Escape in the Restricted Three-Body Problem," *SIAM Journal on Applied Dynamical Systems* 6(3): 576-596. DOI: 10.1137/060663374

19. H. Miyamoto, H. Yano, **D.J. Scheeres**, S. Abe, O. Barnouin-Jha, A.F. Cheng, H. Demura, R.W. Gaskell, N. Hirata, M. Ishiguro, T. Michikami, A.M. Nakamura, R. Nakamura, J. Saito, and S. Sasaki. 2007. "Regolith migration and sorting on asteroid Itokawa," *Science* 316: 1011-1014.
20. **D.J. Scheeres**. 2007. "Rotational fission of contact binary asteroids," *Icarus* 189: 370-385.
21. **D.J. Scheeres**. 2007. "The dynamical evolution of uniformly rotating asteroids subject to YORP," *Icarus* 188: 430-450.
22. **D.J. Scheeres**, M. Abe, M. Yoshikawa, R. Nakamura, R.W. Gaskell, P.A. Abell. 2007. "The effect of YORP on Itokawa," *Icarus* 188: 425-429.
23. F.Y. Hsiao and **D.J. Scheeres**. 2007. "Fundamental Constraints on Uncertainty Evolution in Hamiltonian Systems," *IEEE Transactions on Automatic Control* 52(4): 686-691.
24. P.A. Taylor, J.-L. Margot, D. Vokrouhlický, **D.J. Scheeres**, P. Pravec, S.C. Lowry, A. Fitzsimmons, M.C. Nolan, S.J. Ostro, L.A.M. Benner, J.D. Giorgini, C. Magri. 2007. "Spin Rate of Asteroid (54509) 2000 PH5 Increasing due to the YORP Effect," *Science* 316: 274-277.
25. S.B. Broschart and **D.J. Scheeres**. 2007. "Boundedness of Spacecraft Hovering Under Dead-Band Control in Time-Invariant Systems," *Journal of Guidance, Control and Dynamics* 30(2): 601-610.
26. C. Magri, S.J. Ostro, **D.J. Scheeres**, M.C.Nolan, J.D. Giorgini, L.A.M.Benner and J-L. Margot. 2007. "Radar observations and a physical model of Asteroid 1580 Betulia," *Icarus* 186: 152-177.
27. J. Bellerose and **D.J. Scheeres**. 2007. "Stability of Equilibrium Points in the Restricted Full Three Body Problem," *Acta Astronautica* 60: 141-152.
28. **D.J. Scheeres**, F.-Y. Hsiao, R.S. Park, B.F. Villac, and J.M. Maruskin. 2006. "Fundamental Limits on Spacecraft Orbit Uncertainty and Distribution Propagation," *Journal of the Astronautical Sciences* 54: 505-523.
29. E.G. Fahnestock and **D.J. Scheeres**. 2006. "Simulation of the Full Two Rigid Body Problem Using Polyhedral Mutual Potential and Potential Derivatives Approach," *Celestial Mechanics and Dynamical Astronomy* 96: 317-339.
30. **D. J. Scheeres**, E. G. Fahnestock, S. J. Ostro, J.-L. Margot, L. A. M. Benner, S. B. Broschart, J. Bellerose, J. D. Giorgini, M. C. Nolan, C. Magri, P. Pravec, P. Scheirich, R. Rose, R. F. Jurgens, S. Suzuki, E. M. DeJong. 2006. "Dynamical Configuration of Binary Near-Earth Asteroid (66391) 1999 KW4," *Science* 314: 1280-1283.
Featured on the cover of Science.
31. S. J. Ostro, J.-L. Margot, L. A. M. Benner, J. D. Giorgini, **D. J. Scheeres**, E. G. Fahnestock, S. B. Broschart, J. Bellerose, M. C. Nolan, C. Magri, P. Pravec, P. Scheirich, R. Rose, R. F. Jurgens, S. Suzuki, E. M. DeJong. 2006. "Radar Imaging of Binary Near-Earth Asteroid (66391) 1999 KW4," *Science* 314: 1276-1280.
Featured on the cover of Science.

32. R.S. Park and **D.J. Scheeres**. “Nonlinear Mapping Of Gaussian State Uncertainties: Theory And Applications To Spacecraft Control And Navigation,” 2006. *Journal of Guidance, Control and Dynamics* 29(6): 1367-1375.
33. M.E. Paskowitz and **D.J. Scheeres**. 2006. “Design of Science Orbits About Planetary Satellites: Application to Europa,” *Journal of Guidance, Control and Dynamics* 29(5): 1147-1158.
34. P. Patel, **D.J. Scheeres**, and A. Gallimore. 2006. “Maximizing Payload Mass Fractions of Spacecraft for Interplanetary Electric Propulsion Missions,” *Journal of Spacecraft and Rockets* 43(4): 822-827.
35. A. Fujiwara, J. Kawaguchi, D. K. Yeomans, M. Abe, T. Mukai, T. Okada, J. Saito, H. Yano, M. Yoshikawa, **D. J. Scheeres**, O. Barnouin-Jha, A. F. Cheng, H. Demura, R. W. Gaskell, N. Hirata, H. Ikeda, T. Kominato, H. Miyamoto, A. M. Nakamura, R. Nakamura, S. Sasaki, and K. Uesugi. 2006. “The Rubble-Pile Asteroid Itokawa as Observed by Hayabusa,” *Science* 312: 1330-1334.
Featured on the cover in a special issue of Science.
36. S. Abe, T. Mukai, N. Hirata, O. S. Barnouin-Jha, A. F. Cheng, H. Demura, R. W. Gaskell, T. Hashimoto, K. Hiraoka, T. Honda, T. Kubota, M. Matsuoka, T. Mizuno, R. Nakamura, **D. J. Scheeres**, M. Yoshikawa. 2006. “Mass and Local Topography measurements of Itokawa by Hayabusa,” *Science* 312: 1344-1347.
Featured on the cover in a special issue of Science.
37. H. Yano, T. Kubota, H. Miyamoto, T. Okada, **D. J. Scheeres**, Y. Takagi, K. Yoshida, M. Abe, S. Abe, O. Barnouin-Jha, A. Fujiwara, S. Hasegawa, T. Hashimoto, M. Ishiguro, M. Kato, J. Kawaguchi, T. Mukai, J. Saito, S. Sasaki, and M. Yoshikawa. 2006. “Touch-down of the Hayabusa spacecraft at the Muses Sea on Itokawa,” *Science* 312: 1350-1353.
Featured on the cover in a special issue of Science.
38. F. Gabern, W.S. Koon, J.E. Marsden and **D.J. Scheeres**. 2006. “Binary Asteroids Observation Orbits from a Global Dynamical Picture,” *SIAM Journal on Applied Dynamical Systems* 5(2): 252-279.
39. **D.J. Scheeres**. 2006. “Relative Equilibria for General Gravity Fields in the Sphere-Restricted Full 2-Body Problem,” *Celestial Mechanics and Dynamical Astronomy* 94(3): 317-349.
40. C. Park and **D.J. Scheeres**. 2006. “Solutions of Optimal Feedback Control Problem with General Boundary Conditions using Hamiltonian Dynamics and Generating Functions,” *Automatica* 42: 869-875.
41. M.W. Busch, S.J. Ostro, L.A.M. Benner, J.D. Giorgini, R.F. Jurgens, R. Rose, C. Magri, P. Pravec, **D.J. Scheeres** and S.B. Broschart. 2006. “Radar and Optical Observations and Physical Modeling of Near- Earth Asteroid 10115 (1992 SK),” *Icarus* 181: 145-155.
42. C. Park, V.M. Guibout and **D.J. Scheeres**. 2006. “Solving Optimal Continuous Thrust Rendezvous Problems with Generating Functions,” *Journal of Guidance, Control, and Dynamics* 29(2): 321-331.

43. M.E. Paskowitz and **D.J. Scheeres**. 2006. "Robust Capture and Transfer Trajectories for Planetary Satellite Orbiters," *Journal of Guidance, Control, and Dynamics* 29(2): 342-353.
44. V.M. Guibout and **D.J. Scheeres**. 2006. "Spacecraft formation dynamics and design," *Journal of Guidance, Control, and Dynamics* 29(1): 121-133.
45. F.Y. Hsiao and **D.J. Scheeres**. 2006. "Evolution of Eigenvalues during the Transient Period for Hamiltonian Systems," *Physica D: Nonlinear Phenomena* 213: 66-75.
46. I.I. Hussein and **D.J. Scheeres**. 2005. "Effects of Orbit Variations and J_2 Perturbations on a Class of Earth-Orbiting Interferometric Observatories," *The Journal of the Astronautical Sciences* 53(2): 147-166.
47. S.J. Ostro, L.A.M. Benner, C. Magri, J.D. Giorgini, R. Rose, R.F. Jurgens, D.K. Yeomans, A.A. Hine, M.C. Nolan, **D.J. Scheeres**, S.B. Broschart, M. Kaasalainen and J.-L. Margot. 2005. "Radar observations of Itokawa in 2004 and improved shape estimation," *Meteoritics and Planetary Science* 40(11): 1563-1574.
48. R.A. Werner and **D.J. Scheeres**. 2005. "Mutual potential of homogenous polyhedra," *Celestial Mechanics and Dynamical Astronomy* 91(3-4): 337-349.
49. F.Y. Hsiao and **D.J. Scheeres**. 2005. "Design of Spacecraft Formation Orbits Relative to a Stabilized Trajectory," *Journal of Guidance, Control and Dynamics* 28(4): 782-794.
50. R.S. Park, **D.J. Scheeres**, G. Giampieri, J.M. Longuski, and E. Fischbach. 2005. "Estimating Parameterized Post-Newtonian parameters from Spacecraft Radiometric Tracking Data," *Journal of Spacecraft and Rockets* 42(3): 559-568.
51. S.B. Broschart and **D.J. Scheeres**. 2005. "Control of hovering spacecraft near small bodies: Application to Asteroid 25143 Itokawa," *Journal of Guidance, Control, and Dynamics* 28(2): 343-354. In the special "Battin Birthday Issue" of the Journal.
52. **D.J. Scheeres** and J. Bellerose. 2005. "The Restricted Hill Full 4-Body Problem: Application to spacecraft motion about binary asteroids," invited paper in a special issue of *Dynamical Systems: An International Journal* 20(1): 23-44, edited by M. Dellnitz and J.E. Marsden.
53. B.F. Villac and **D.J. Scheeres**. 2004. "On the concept of periapsis in Hill's problem," *Celestial Mechanics & Dynamical Astronomy* 90: 165-178.
54. **D.J. Scheeres**. 2004. "Bounds on Rotation Periods of Disrupted Binaries in the Full 2-Body Problem," *Celestial Mechanics & Dynamical Astronomy* 89: 127-140.
55. **D.J. Scheeres**, F. Marzari, and A. Rossi. 2004. "Evolution of NEO rotation rates due to close encounters with Earth and Venus," *Icarus* 170: 312-323.
56. V.M. Guibout and **D.J. Scheeres**. 2004. "Solving relative two-point boundary value problems: Spacecraft formation flight transfers application," *Journal of Guidance, Control, and Dynamics* 27(4): 693-704.
57. W. Hu and **D.J. Scheeres**. 2004. "Numerical Determination of Stability Regions for Orbital Motion in Uniformly Rotating Second Degree and Order Gravity Fields," *Planetary and Space Science* 52: 685-692.

58. J.M. Longuski, E. Fischbach, **D.J. Scheeres**, G. Giampieri, and R.S. Park. 2004. "Deflection of spacecraft trajectories as a new test of general relativity: Determining the parameterized post-Newtonian parameters β and γ ," *Physical Review D* 69(4), 042001.
59. S.J. Ostro, L.A.M. Benner, M.C. Nolan, C. Magri, J.D. Giorgini, **D.J. Scheeres**, S.B. Broschart, M. Kaasalainen, D. Vokrouhlicky, S.R. Chesley, J.-L. Margot, R.F. Jurgens, R. Rose, D.K. Yeomans, S. Suzuki, and E.M. De Jong. 2004. "Radar Observations of Asteroid 25143 Itokawa (1998 SF36)," *Meteoritics and Planetary Science* 39(3): 407-424.
Featured on the cover.
60. V. Guibout and **D.J. Scheeres**. 2003. "Stability of Surface Motion on a Rotating Ellipsoid," *Celestial Mechanics & Dynamical Astronomy* 87: 263-290.
61. B.F. Villac and **D.J. Scheeres**. 2003. "New class of optimal plane change maneuvers," *Journal of Guidance, Control, and Dynamics* 26(5): 750-757.
62. C.A. Renault and **D.J. Scheeres**. 2003. "Statistical analysis of control maneuvers in an unstable orbital environments," *Journal of Guidance, Control, and Dynamics* 26(5): 758-769.
63. A.I. Neishtadt, **D.J. Scheeres**, V.V. Sidorenko, P. Stooke, and A.A. Vasiliev. 2003. "The influence of reactive torques on comet nucleus rotation," *Celestial Mechanics & Dynamical Astronomy* 86(3): 249-275.
64. R.S. Hudson, S.J. Ostro, and **D.J. Scheeres**. 2003. "High-Resolution Model of Asteroid 4179 Toutatis," *Icarus* 161(2): 346-355.
65. B. Villac and **D.J. Scheeres**. 2003. "Escaping trajectories in the Hill Three Body Problem and Applications," *Journal of Guidance, Control, and Dynamics* 26(2): 224-232.
66. **D.J. Scheeres**, F.Y. Hsiao, and N.X. Vinh. 2003. "Stabilizing motion relative to an unstable orbit: Applications to spacecraft formation flight," *Journal of Guidance, Control, and Dynamics* 26(1): 62-73.
67. M. Lara and **D.J. Scheeres**. 2002. "Stability bounds for three-dimensional motion close to asteroids," *The Journal of the Astronautical Sciences* 50(4): 389-409.
68. F.-Y. Hsiao and **D.J. Scheeres**. 2002. "The dynamics of formation flight about a stable trajectory," *The Journal of the Astronautical Sciences* 50(3): 269-287.
69. **D.J. Scheeres** and F. Marzari. 2002. "Spacecraft dynamics far from a comet," *The Journal of the Astronautical Sciences* 50(1): 35-52.
70. **D.J. Scheeres**. 2002. "Stability in the Full Two Body Problem," *Celestial Mechanics and Dynamical Astronomy* 83: 155-169.
71. P.D. Washabaugh and **D.J. Scheeres**. 2002. "Energy and Stress Distributions in Ellipsoids," *Icarus* 159(2): 314-321.
72. **D.J. Scheeres**. 2002. "Stability of Binary Asteroids," *Icarus* 159(2): 271-283.

73. W. Hu and **D.J. Scheeres**. 2002. "Spacecraft Motion about Slowly Rotating Asteroids," *Journal of Guidance, Control, and Dynamics* 25(4): 765-775.
74. S. Sawai, **D.J. Scheeres**, and S. Broschart. 2002. "Control of Hovering Spacecraft using Altimetry," *Journal of Guidance, Control, and Dynamics* 25(4): 786-795.
75. D. Dechambre and **D.J. Scheeres**. 2002. "Transformation of spherical harmonic coefficients to ellipsoidal harmonic coefficients," *Astronomy and Astrophysics* 387: 1114-1122.
76. A.I. Neishtadt, **D.J. Scheeres**, V.V. Sidorenko, and A.A. Vasiliev. 2002. "Evolution of comet nucleus rotation," *Icarus* 157: 205-218.
77. J.K. Miller, A.S. Konopliv, P.G. Antreasian, J.J. Bordi, S. Chesley, C.E. Helfrich, W.M. Owen, T.C. Wang, B.G. Williams, D.K. Yeomans, and **D.J. Scheeres**. 2002. "Determination of shape, gravity and rotational state of Asteroid 433 Eros," *Icarus* 155: 3-17.
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Journal Notes

1. I. Hussein, **D.J. Scheeres** and D.C. Hyland. 2007. "Optimal Formation Design for Imaging and Fuel Usage," *Journal of Guidance, Control, and Dynamics* 30(5): 1511-1515.
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Conference Papers

1. M. Nakamiya, **D.J. Scheeres**, H. Yamakawa, and M. Yoshikawa. "Three-Dimensional Analysis of Capture Trajectories to the Periodic Orbits of L1 and L2 Points," paper presented at the 2008 AAS/AIAA Spaceflight Mechanics Meeting, Galveston, Texas, January 27-31. AAS 08-237.

2. J.E. Bellerose and **D.J. Scheeres**. “Mission to Binary Asteroids: 1999 KW4 as a Case Study,” paper presented at the 2008 AAS/AIAA Spaceflight Mechanics Meeting, Galveston, Texas, January 27-31. AAS 08-170.
3. P. Patel and **D.J. Scheeres**. “A Non-Linear Optimization Algorithm,” paper presented at the 2008 AAS/AIAA Spaceflight Mechanics Meeting, Galveston, Texas, January 27-31. AAS 08-116.
4. J.M. Maruskin, **D.J. Scheeres**, and A.M. Bloch. “Dynamics of Symplectic SubVolumes,” paper presented at the 46th IEEE Conference on Decision and Control, New Orleans, Louisiana, December 2007.
5. **D.J. Scheeres**, J.M. Maruskin, and K.T. Alfriend. “Correlation of optical observations of objects in Earth orbit,” invited paper S3.2 presented at the Seventh US/Russian Space Surveillance Workshop, Naval Postgraduate School, Monterey, California, October 29-November 1, 2007.
6. **D.J. Scheeres**. “Orbit mechanics about small asteroids,” paper presented at the 20th International Symposium on Space Flight Dynamics, Annapolis, Maryland, September 24-28, 2007.
7. J. Peláez and **D.J. Scheeres**. “On the Control of a Permanent Tethered Observatory at Jupiter,” paper presented at the 2007 AAS/AIAA Astrodynamics Specialist Conference, Mackinac Island, Michigan, August 19-23, 2007. AAS 07 - 369
8. S.B. Broschart and **D.J. Scheeres**. “On the Implementation of Spacecraft Hovering under Reduced-order Dead- band Control,” paper presented at the 2007 AAS/AIAA Astrodynamics Specialist Conference, Mackinac Island, Michigan, August 19-23, 2007. AAS 07 - 397
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14. S. Ross and **D.J. Scheeres**. “Multiple Gravity Assists in the Restricted Three-Body Problem,” paper presented at the 17th AAS/AIAA Space Flight Mechanics Meeting, Sedona, Arizona, January 2007. AAS 07 - 227
15. J. Bellerose and **D.J. Scheeres**. “Energy Constraints in the Restricted Full Three-Body Problem: Application to Binary System KW4,” paper presented at the 17th AAS/AIAA Space Flight Mechanics Meeting, Sedona, Arizona, January 2007. AAS 07 - 224
16. O. Peñagaricano Muñoa and **D.J. Scheeres**. “A Perturbation Theory for Hamilton’s Principal Function: Applications to the Two-Point Boundary Value Problem,” paper presented at the 17th AAS/AIAA Space Flight Mechanics Meeting, Sedona, Arizona, January 2007. AAS 07 - 220
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19. E.D. Gustafson and **D.J. Scheeres**. “Optimal Control of Uncertain Non-linear Trajectories Using Continuous Thrust,” paper presented at the 17th AAS/AIAA Space Flight Mechanics Meeting, Sedona, Arizona, January 2007. AAS 07 - 135
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 35. P. Patel, **D.J. Scheeres**, A. Gallimore and T. Zurbuchen. “Automating Trade Studies for Optimal Interplanetary Electric Propulsion Missions,” paper presented at the 2006 AAS/AIAA Space Flight Mechanics Meeting, Tampa, Florida, January 2006. AAS 06-152.
 36. F.Y. Hsiao and **D.J. Scheeres**. “Uncertainty Control Utilizing Natural Dynamics in Hamiltonian Systems,” paper presented at the 2006 AAS/AIAA Space Flight Mechanics Meeting, Tampa, Florida, January 2006. AAS 06-136
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41. C. Park, **D.J. Scheeres** and V. Guibout. “Solving Optimal Continuous Thrust Rendezvous Problems with Generating Functions,” paper presented at the 2005 AIAA Guidance, Navigation and Control Conference, San Francisco, August 2005. Paper AIAA-2005-6077.
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45. R.S. Park and **D.J. Scheeres**. “Nonlinear Mapping of Gaussian State Uncertainties: Theory and Applications to Spacecraft Control and Navigation,” paper presented at the 2005 Astrodynamics Specialist Conference, Lake Tahoe, California, August 2005. AAS Paper 05-404.
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51. C. Park and **D.J. Scheeres**. “Extended Applications of Generating Function to Optimal Feedback Control Problems,” paper presented at the 2005 American Control Conference.
52. **D.J. Scheeres**, F.-Y. Hsiao, R.S. Park, B.F. Villac, J.M. Maruskin. “Fundamental Limits on Spacecraft Orbit Uncertainty and Distribution Propagation,” invited paper presented at the Shuster Symposium, Grand Island, New York, June 2005. Paper AAS 05-471.
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67. **D.J. Scheeres**, S.B. Broschart, S.J. Ostro and L. Benner. “The Dynamical Environment About Asteroid 25143 Itokawa, Target of the Hayabusa Mission,” paper presented at the 2004 Astrodynamics Specialist Meeting, Providence, Rhode Island, August 2004. AIAA Paper 2004-4864.
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74. B.F. Villac and **D.J. Scheeres**. “A simple algorithm to compute the hyperbolic invariant manifolds near L_1 and L_2 ,” paper presented at the Space Flight Mechanics Meeting, Maui, Hawaii, February 2004. Paper AAS 04-243
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Conference Abstracts and Posters

1. **D.J. Scheeres**, S. Mirrahimi and R.W. Gaskell. “YORP sensitivity to shape and shadowing [# 2348],” abstract presented at the 39th Lunar and Planetary Science Conference, 2008.
2. S.M. Byram and **D.J. Scheeres**. “Rotational Dynamics of a Comet Nucleus Subject to Outgassing Jets [# 1287],” poster presented at the 39th Lunar and Planetary Science Conference, 2008.
3. **D.J. Scheeres**, E.G. Fahnestock and J.E. Bellerose. “Binary Asteroid System Dynamics and Scientific Exploration,” invited presentation at the 1st International Primitive Bodies Exploration Working Group meeting, Okinawa, Japan, January 13-16, 2008.
4. **D.J. Scheeres**, O. Pinon and R.W. Gaskell. “Dynamics Of Dust Fines On Asteroids: Applications To Eros And Itokawa (13.07),” talk presented at the 39th Annual DPS meeting, Orlando, Florida, October 7-12, 2007.
5. **D.J. Scheeres** and S. Mirrahimi. “Evolution of Asteroid Rotation States Subject to the YORP Effect (05.06),” invited talk presented at the 39th Annual DPS meeting, Orlando, Florida, October 7-12, 2007.
6. **D.J. Scheeres** and E.G. Fahnestock. “Ejecta Dynamics and Regolith Transport within Binary Asteroid Systems (51.06),” poster presented at the 39th Annual DPS meeting, Orlando, Florida, October 7-12, 2007.
7. **D.J. Scheeres** and E.G. Fahnestock. “Stand-off Estimation of Binary Asteroid Mass Distributions,” poster presented at the Seventh IAA International Conference on Low-Cost Planetary Missions, Pasadena, California, September 12-14, 2007.

8. **D.J. Scheeres**. “Minimum energy catastrophic disruptions,” abstract presented at the VIIth Workshop on Catastrophic Disruption in the Solar System, Alicante, Spain, June 2007.
9. **D.J. Scheeres**, O. Peñagaricano, C. Park and V.M. Guibout. “Solving Two-Point Boundary Value Problems in Astrodynamics and Optimal Control,” abstract presented at the 21st Canadian Conference on Applied Mechanics, Ryerson University, Toronto 2007.
10. J.E. Bellerose and **D.J. Scheeres**. “Dynamics of the Restricted Full Three-Body Problem,” abstract presented at the 21st Canadian Congress of Applied Mechanics, Ryerson University, Toronto 2007.
11. **D.J. Scheeres**. “Minimum Energy Configurations of Resting Equilibria,” abstract presented at the 38th American Astronomical Society Division on Dynamical Astronomy, Ann Arbor, May 2007.
12. J.E. Bellerose and **D.J. Scheeres**. “Periodic Orbits in the Restricted Full Three-Body Problem,” abstract presented at the 38th American Astronomical Society Division on Dynamical Astronomy, Ann Arbor, May 2007.
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14. E.G. Fahnestock and **D.J. Scheeres**. “The Dynamics of 1999 KW4 and Similar Binary Near-Earth Asteroids,” abstract presented at the 38th American Astronomical Society Division on Dynamical Astronomy, Ann Arbor, May 2007.
15. J. Hudson and **D.J. Scheeres**. “Reduction of Arbitrary Orbit Perturbation Problems to a Standard Form,” poster presented at the 38th American Astronomical Society Division on Dynamical Astronomy, Ann Arbor, May 2007.
16. S.M. Byram, **D.J. Scheeres**, and M.R. Combi. “Implications of Outgassing Jets for the Comet Dynamical Environment [#1694],” poster presented at the 38th Lunar and Planetary Science Conference, 2007.
17. H. Miyamoto, H. Yano, A.M. Nakamura, **D.J. Scheeres**, R. Nakamura, M. Ishiguro, S. Abe, T. Hashimoto, N. Hirata, T. Kubota, T. Michikami, T. Nakamura, T. Noguchi, J. Saito, S. Sasaki, A. Tsuchiyama, Y. Yokota. “Rock Piles on Itokawa Observed by the Highest Resolution Images [#1614],” poster presented at the 38th Lunar and Planetary Science Conference, 2007.
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26. **D.J. Scheeres**. “The Dynamics and Evolution of NEO Binary Asteroids,” abstract presented at the International Astronomical Union General Assembly, Prague, Czech Republic, August 2006.
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36. **D.J. Scheeres**, L.A.M. Benner, S.J. Ostro, A. Rossi, F. Marzari and P. Washabaugh. “Abrupt Alternation of Asteroid 2004 MN4s Spin State During its 2029 Earth Flyby,” abstract presented at the American Astronomical Society Division on Dynamical Astronomy meeting, Santa Barbara, California, April 2005.
37. **D.J. Scheeres**. “Solar Radiation Pressure and Transient Flows on Asteroid Surfaces [#1919],” abstract presented at the Lunar and Planetary Science XXXVI meeting, Houston, Texas, March 2005.
38. **D.J. Scheeres** and S.J. Ostro. “Regolith Mechanics on Binary Asteroids,” abstract presented at the American Astronomical Society Division of Planetary Sciences meeting, Louisville, Kentucky, November 2004.
39. *J. Kadish*, J.R. Barber, **D.J. Scheeres** and P.D. Washabaugh. “The Effective Strength of Accreted Planetary Bodies,” poster presented at the American Astronomical Society Division of Planetary Sciences meeting, Louisville, Kentucky, November 2004.
40. **D.J. Scheeres**, S.J. Ostro and L.A.M. Benner. “The Dynamical Environment on the Surface of Itokawa,” invited abstract presented at the International Science Symposium on Sample Returns from Solar System Minor Bodies: The 1st HAYABUSA Symposium, ISAS/JAXA, Sagamihara, Japan, October 2004.

41. S.J. Ostro, L.A.M. Benner, C. Magri, J.D. Giorgini, R. Rose, R.F. Jurgens, D.K. Yeomans, A.A. Hine, M. C. Nolan, **D.J. Scheeres**, M. Kaasalainen, D. Vokrouhlicky, S.R. Chesley, and J. L. Margot. “Radar observations of Itokawa in 2004 and an improved physical model,” abstract presented at the International Science Symposium on Sample Returns from Solar System Minor Bodies: The 1st HAYABUSA Symposium, ISAS/JAXA, Sagami-hara, Japan, October 2004.
42. E. Asphaug, M. Belton, K. Klaasen, L. McFadden, S. Ostro, A. Safaeinili, **D. Scheeres**, J. Sunshine, D. Yeomans. “Deep Interior: The first comprehensive geophysical investigation of an asteroid,” abstract presented at the 35th COSPAR Scientific Assembly, Paris, France, July 2004. Abstract COSPAR04-A-02076;B1.3-0007-04.
43. **D.J. Scheeres**. “Asteroid Fission and Final Rotation Rates,” abstract presented at the American Astronomical Society Division on Dynamical Astronomy meeting, Cannes, France, April 2004.
44. S.J. Ostro, L.A.M. Benner, J.D. Giorgini, R.F. Jurgens, J.-L. Margot, M.C. Nolan, P. Pravec, and **D.J. Scheeres**. “Radar Observations of Binary Near-Earth Asteroid 66391 (1999 KW4),” abstract presented at the Arecibo Asteroid Dynamics Workshop, Arecibo Observatory, Puerto Rico, February 2004.
45. R.S. Park, E. Fischbach, G. Giampieri, J.M. Longuski, **D.J. Scheeres**. “A test of General Relativity: Estimating PPN parameters γ and β from spacecraft radiometric tracking data,” poster presented at Spacepart03: Fundamental Physics in Space for the next 20 Years, December 2003.
46. A. Rossi, F. Marzari, **D.J. Scheeres**. “Evolution of NEO rotation rates due to close encounters with Earth and Venus,” abstract presented at the American Astronomical Society Division of Planetary Sciences meeting, Monterey, California, September 2003.
47. **D.J. Scheeres**. “The dynamical environment of binary asteroids,” abstract presented at the American Astronomical Society Division on Dynamical Astronomy meeting, Cornell University, May 2003.
48. V. Guibout and **D.J. Scheeres**. “Stability of Surface Motion on Rotating Ellipsoids,” abstract presented at the American Astronomical Society Division on Dynamical Astronomy meeting, Cornell University, May 2003.
49. **D.J. Scheeres**, E.I. Asphaug, J. Colwell, R. Dissly, P.E. Geissler, L.A. McFadden, V. Petr, R. Reinert, H. Yano. “Asteroid surface science with pods,” abstract presented at the 34th Lunar and Planetary Science Meeting, Houston, Texas, March 2003. Abstract 1444.
50. D.W.G. Sears, **D.J. Scheeres**, and R.P. Binzel. “The HERA multiple Near-Earth asteroid sample return mission: Selection of the target asteroids,” abstract presented at the 34th Lunar and Planetary Science Meeting, Houston, Texas, March 2003. Abstract 1047.
51. E. Asphaug, J. Colwell, R. Dissly, K. Kanizay, V. Petr, and **D.J. Scheeres**. “Meteoroid bombardment and blast experiments on asteroids,” abstract presented at the 34th Lunar and Planetary Science Meeting, Houston, Texas, March 2003. Abstract 1537.

52. E. Asphaug, M.J.S. Belton, A. Cangahuala, L. Keith, K. Klaasen, L. McFadden, G. Neumann, S.J. Ostro, R. Reinert, A. Safaenili, **D.J. Scheeres**, and D.K. Yeomans. "Exploring asteroid interiors: The Deep Interior mission concept," abstract presented at the 34th Lunar and Planetary Science Meeting, Houston, Texas, March 2003. Abstract 1906.
53. A.I. Neishtadt, **D.J. Scheeres**, V.V. Sidorenko, A.A. Vasiliev. "The influence of reactive torques on comet nucleus rotation," abstract presented at the 2002 Asteroids, Comets, Meteors Meeting, Berlin, July 2002.
54. **D.J. Scheeres**, V.V. Sidorenko, A.I. Neishtadt, and A.A. Vasiliev. "Evolution of comet nuclei rotation," abstract presented at the Annual Meeting of the American Astronomical Society Division of Dynamical Astronomy, Timberline Lode, Oregon, April 2002.
55. D.W.G. Sears, C.M. Pieters, D. Britt, **D.J. Scheeres**, L. Gefert, S. Gorevan, and J. Preble. "Life after NEAR: The HERA Mission," poster presented at the American Geophysical Union Fall 2001 meeting, December 2001. Poster P32B-0550.
56. **D.J. Scheeres**, V.V. Sidorenko, A.I. Neishtadt, and A.A. Vasiliev. "Evolution of comet nuclei rotation," abstract presented at the 33rd Annual Meeting of the American Astronomical Society Division of Planetary Sciences, New Orleans, November 2001.
57. A.I. Neishtadt, **D.J. Scheeres**, V.V. Sidorenko, and A.A. Vasiliev. "Evolution of comet nucleus rotation," invited talk presented at the ASTROKAZAN 2001 International Conference, September 24-28, 2001, Kazan, Russia.
58. M. Lara and **D.J. Scheeres**. "Determining stability regions in highly perturbed, non-linear dynamical systems using periodic orbits," poster presented at the VII Jornadas Zaragoza-Pau de Matematica Aplicada y Estadistica meeting, September 17-18, Jaca, Spain.
59. D.W.G. Sears, L. Gefert, and **D.J. Scheeres**. "Asteroid constraints on multiple Near-Earth asteroid sample return," poster presented at the 64th Annual Meeting of the Meteoritical Society, September 2001, Rome, Italy.
60. A.I. Neishtadt, **D.J. Scheeres**, V.V. Sidorenko, and A.A. Vasiliev. "Evolution of comet nucleus rotation," abstract presented at the Joint U.S-Russian Researchers in Space Science conference, July 2001, University of Maryland - College Park.
61. **D.J. Scheeres**. "Stability of Binary Asteroids," abstract presented at CELMEC III, June 2001, Rome, Italy.
62. **D.J. Scheeres**. "Dynamical constraints on asteroid binaries," abstract presented at Asteroids 2001, June 2001, Palermo, Italy.
63. P. Washabaugh and **D.J. Scheeres**. "Energy and stress distributions in ellipsoids," abstract presented at Asteroids 2001, June 2001, Palermo, Italy.
64. A. Rossi, **D.J. Scheeres**, and F. Marzari. "Evolution of NEOs rotation rate due to repeated close encounters with the earth," abstract presented at Asteroids 2001, June 2001, Palermo, Italy.
65. P. Geissler, **D.J. Scheeres**, and D.D. Durda. "The fate of asteroidal ejecta," poster presented at Asteroids 2001, June 2001, Palermo, Italy.

66. D.W.G. Sears and **D.J. Scheeres**. “HERA: Multiple NEAR-Earth asteroid sample return, asteroid constraints on sampling,” poster presented at Asteroids 2001, June 2001, Palermo, Italy.
67. **D.J. Scheeres**. “Stability of Asteroid Binaries,” abstract presented at the 32nd Annual AAS Division on Dynamical Astronomy, Lunar and Planetary Institute, Houston, TX, April 2001.
68. D. W. G. Sears, C. Allen, D. Britt, D. E. Brownlee, A. F. Cheng, C. R. Chapman, B. C. Clark, B. G. Drake, I. A. Franchi, S. Gorevan, H. Kochan, J. S. Lewis, M. M. Lindstrom, K. Nishiizumi, C. M. Pieters, M. S. Race, **D. J. Scheeres**, E. R. D. Scott, and H. Yano. “Near-Earth Asteroid Sample Return Missions,” abstract presented at the 33rd Lunar and Planetary Science Conference, Houston, Texas, March 2001.
69. **D.J. Scheeres**. “Trajectories in Close Proximity to Asteroids,” invited presentation at the Near Earth Asteroids Sample Return Workshop, Lunar and Planetary Institute, Houston, Texas, December 2000. LPI Abstract 8009.
70. E. Morrow, **D.J. Scheeres**, C.R. McInnes, and D. Lubin. “Solar Sails at Asteroids: Close Proximity Operations for Scientific Missions,” poster presented at the 32nd Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Pasadena, California, October 2000. Session 14, Abstract 369.
71. **D.J. Scheeres**, B. Khushalani, J. Bordi, A.S. Konopliv, J.K. Miller, and D.K. Yeomans. “Constraints on Eros density distributions from the measured shape and gravity field,” poster presented at the 32nd Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Pasadena, California, October 2000. Session 65, Abstract 645.
72. **D.J. Scheeres**, S.J. Ostro, E.I. Asphaug, R.S. Hudson, and R.A. Werner. “Alteration of Asteroid Spin States During Close Planetary Encounters,” abstract presented at the 31st Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Abano Terme, Italy, October 1999. Bulletin of the American Astronomical Society 31:1112.
73. **D.J. Scheeres**. “The Costs of Close Proximity Ops at Asteroids and Comets,” paper presented at the International Symposium for DeepSpace Communications and Navigation, Pasadena, California, September 1999.
74. **D.J. Scheeres**, B. Khushalani, and R.A. Werner. “Estimating Asteroid Density Distributions from Shape and Gravity Information,” poster presented at the Asteroids, Comets, Meteors 1999 Conference, Cornell University, July 1999.
75. **D.J. Scheeres** and F. Marzari, “Orbital evolution of ejecta blankets from comet Tempel 1,” abstract presented at the Asteroids, Comets, Meteors 1999 Conference, Cornell University, July 1999.
76. A. Enzian, . . . , **D.J. Scheeres**, “Periodic Comets 46P/Wirtanen and 9P/Tempel 1: Gas Dynamical Modeling of the Near-Nucleus Coma Environment,” poster presented at the Asteroids, Comets, Meteors 1999 Conference, Cornell University, July 1999.

77. **D.J. Scheeres** and F. Marzari, “Orbit Dynamics in the comet environment,” poster presented at the 30th Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Madison, Wisconsin, October 1998. *Bulletin of the American Astronomical Society* 30:1091.
78. **D.J. Scheeres**, D.L. Mitchell, and S.J. Ostro, E.I. Asphaug, R.S. Hudson, “Ejecta Distribution Patterns using Multiple 433 Eros Models,” poster presented at the 28th Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Tucson, Arizona, October 1996. *Bulletin of the American Astronomical Society* 28(3): 1104.
79. E. Asphaug, W. Benz, S.J. Ostro, **D.J. Scheeres**, E.M. DeJong, S. Suzuki, and R.S. Hudson, “Disruptive Impacts into Small Asteroids,” abstract presented at the 28th Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Tucson, Arizona, October 1996. *Bulletin of the American Astronomical Society* 28(3): 1102.
80. D. Dunham, R. Farquhar, J. McAdams, B. Williams, **D. Scheeres**, L. Wasserman, A. Klemola, H. Harris, and J. Manek, “Targeting (253) Mathilde,” abstract presented at the 28th Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Tucson, Arizona, October 1996. *Bulletin of the American Astronomical Society* 28(3): 1098.
81. **D.J. Scheeres**, S.J. Ostro, and R.S. Hudson, “Orbits about asteroid 4179 Toutatis,” poster presented at the 27th Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Mauna Lani Bay, Hawaii, October 1995.
82. **D.J. Scheeres**, S.J. Ostro, R.S. Hudson, and R.A. Werner, “Orbits about asteroid 4769 Castalia,” poster presented at the 26th Annual Meeting of the American Astronomical Society Division of Planetary Sciences, Bethesda, Maryland, November 1994.

Chapters in books

1. **D.J. Scheeres**. “The Dynamics of NEO Binary Asteroids,” in *Near Earth Objects, our Celestial Neighbors: Opportunity and Risk*, (A. Milani, G.B. Valsecchi & D. Vokrouhlicky, eds.), Proceedings IAU Symposium No. 236, in press.
2. V.M. Guibout and **D.J. Scheeres**. 2006. “Solving Two-Point Boundary Value Problems Using Generating Functions: Theory and Applications to Astrodynamics,” in *Modern Astrodynamics*, Elsevier Astrodynamics Series (P. Gurfil, ed.), Academic Press.
3. **D.J. Scheeres**. 2004. “Close Proximity Operations at Small Bodies: Orbiting, Hovering, and Hopping,” in *Mitigation of Hazardous Comets and Asteroids*, (M. Belton, T.H. Morgan, N. Samarasinha, D.K. Yeomans eds.), Cambridge University Press.
4. **D.J. Scheeres**, D.D. Durda, and P.E. Geissler. 2002. The Fate of Asteroid Ejecta, in *Asteroids III* (W.M. Bottke Jr., A. Cellino, P. Paolicchi, R.P. Binzel eds.), University of Arizona Press, Tucson.

Books and Proceedings Editor

1. **D.J. Scheeres**. “Orbital Motion in Strongly Perturbed Environments: Applications to Asteroid and Comet Orbiters,” book contract signed with Praxis Publishing Ltd., Springer-Verlag. Due May 2008. Approximately 350 pages.

2. **D.J. Scheeres**, M.E. Pittelkau, R.J. Proulx, and L.A. Cangahuala, Editors. 2003. *Spaceflight Mechanics 2003*, Vol. 114, Parts I-III, Advances in the Astronautical Sciences, American Astronautical Society, 2003, 2287 pages, includes CD-ROM Supplement.
3. L.A. D’Amario, L.L. Sackett, **D.J. Scheeres**, and B.G. Williams, Editors. 2001. *Spaceflight Mechanics 2001*, Vol. 108, Parts I-II, Advances in the Astronautical Sciences, American Astronautical Society, 2001, 2147 pages.

Book reviews

1. **D.J. Scheeres**. 2003. Review of June 8, 2004: Venus in Transit. *Journal of Guidance, Control, and Dynamics* 26(4): 670.
2. **D.J. Scheeres**. 2002. Review of Solar System Dynamics. *Meteoritics and Planetary Science* 37(4): 613.
3. **D.J. Scheeres**. 1998. Review of Applied Mathematics in Aerospace Science and Engineering. *Journal of Guidance, Control, and Dynamics* 20(2): 360.

Submitted

1. P. Patel and **D.J. Scheeres**. “A nonlinear optimization algorithm satisfying second order constraints,” submitted to *Optimal Control Applications and Methods*.
2. S.M. Byram and **D.J. Scheeres**. “Rotational Dynamics of a Comet Nucleus Subject to Outgassing Jets,” submitted to *Astronomical Journal*.
3. J.M. Maruskin, **D.J. Scheeres** and K.T. Alfriend. “Correlation of optical observations of objects in Earth orbit,” submitted to *Journal of Guidance, Control and Dynamics*.
4. V. Sidorenko, **D.J. Scheeres** and S.M. Byram. “On the rotation of comet Borrelly’s nucleus,” submitted to *Celestial Mechanics and Dynamical Astronomy*.
5. **D.J. Scheeres**. “Minimum energy asteroid reconfigurations and catastrophic disruptions,” submitted to *Planetary and Space Science*.
6. J.M. Maruskin, **D.J. Scheeres**, and A.M. Bloch. “Dynamics of Symplectic SubVolumes,” submitted to *SIAM Journal on Applied Dynamical Systems*.
7. C. Park, **D.J. Scheeres**, V. Guibout, and A. Bloch. “Globally Optimal Feedback Control of the Underactuated Heisenberg System by Generating Functions,” submitted to *IEEE Transactions on Automatic Control*.
8. O. Peñagaricano Muñoa and **D.J. Scheeres**. “A perturbation theory for Hamilton’s Principle Function: Applications to the two-point boundary value problem,” submitted to *Celestial Mechanics and Dynamical Astronomy*.

Government, industry, or industrial reports

1. **D.J. Scheeres**, J.K. Miller, D.K. Yeomans. 2003. “The Orbital Dynamics Environment of 433 Eros: A Case Study for Future Asteroid Missions,” *InterPlanetary Network Progress Report* 42-152.

2. **D.J. Scheeres**, M.W. Lo. 2002. "Integrated Trajectory and Navigation Design in Unstable Orbital Environments," *InterPlanetary Network Progress Report* 42-150.
3. **D.J. Scheeres**, D. Han, and Y. Hou. 2001. "Orbit Determination Uncertainty Distributions and Mappings in an Unstable Halo Orbit," *InterPlanetary Network Progress Report* 42-146.
4. **D.J. Scheeres**. 2001. "Design and Analysis of Landing and Low-Altitude Asteroid Flyovers," *InterPlanetary Network Progress Report* 42-146.
5. **D.J. Scheeres**, S. Bhargava, and A. Enzian. 2000. "A Navigation Model of the Continuous Outgassing Field Around a Comet," *Telecommunications and Data Acquisition Progress Report* 42-142.
6. **D.J. Scheeres**. 2000. "A Comparison of Close-Proximity Operations at Comets and Asteroids," *Telecommunications and Data Acquisition Progress Report* 42-141.
7. **D.J. Scheeres** and F. Marzari. 1999. "Dynamics of dust ejected from comet Tempel 1 due to the Deep Impact cratering event," report written for the Deep Impact Discovery Mission PI, M. A'Hearn.
8. N. Samarasinha, H. Boehnhardt, L. Jorda, F. Marzari, B. Mueller, and **D.J. Scheeres**. 1998. "Rotation Models of Comet 46P/Wirtanen," report written for the Rosetta Science Working Group on Comet 46P/Wirtanen.
9. **D.J. Scheeres**. 1998. "Interactions Between Ground-Based and Autonomous Navigation for Precision Landing at Small Solar-System Bodies," *Telecommunications and Data Acquisition Progress Report* 42-132.
10. E. DeJong, S. Suzuki, **D.J. Scheeres**, S.J. Ostro, and R.S. Hudson, "Orbits About Asteroid 4179 Toutatis," JPL Video Release, AVC-96-096. Distributed to a wide international and national science and educational audience.
11. E. DeJong, S. Suzuki, **D.J. Scheeres**, S.J. Ostro, and R.S. Hudson, "Visualization of Earth Approaching Asteroids - 1. Orbits About Asteroid 4769 Castalia (1989 PB)," JPL Video Release, AVC-95-147. Distributed to a wide international and national science and educational audience.
12. W.C. Masters, **D.J. Scheeres**, and S.W. Thurman. 1993. "Enhanced Orbit Determination Filter: Inclusion of Ground System Errors as Filter Parameters," *Telecommunications and Data Acquisition Progress Report* 42-116: 37-41.
13. **D.J. Scheeres**. 1993. "Failure Modes of Reduced-Order Orbit Determination Filters and Their Remedies," *Telecommunications and Data Acquisition Progress Report* 42-114: 34-42.

Invited Seminars and Talks

1. "Celestial Mechanics of the Full Two-Body Problem: Applications to Binary Asteroids," Applied Mathematics Dynamics Seminar, University of Colorado, February 14, 2008.
2. "Asteroid Exploration: On Earth and In Space," ISTI-CNR, Pisa, Italy, June 21, 2007.

3. "Asteroid Exploration: On Earth and In Space," University of Zaragoza, Zaragoza, Spain, June 18, 2007.
4. "Asteroid Exploration: On Earth and In Space," Massachusetts Institute of Technology, Earth and Planetary Science Seminar, April 25, 2007.
5. "Asteroid Exploration: On Earth and In Space," California Institute of Technology, Planetary Science Seminar, February 27, 2007.
6. "Asteroid Exploration: On Earth and In Space," University of Michigan, Department of Aerospace Engineering Seminar, January 18, 2007.
7. "The Full Two Body Problem," Texas A&M University, Department of Aerospace Engineering Seminar, November 16, 2006.
8. "The Full Two Body Problem," University of Illinois, Champaign-Urbana, Department of Aerospace Engineering Seminar, November 6, 2006.
9. "Asteroids Up Close and Personal," Calvin College, Grand Rapids, Physics/Astronomy Seminar, October 17, 2006.
10. "Space Missions to Asteroids: NEAR and Hayabusa," Harbin Institute of Technology, Harbin, China, July 20, 2006.
11. "The Full Two-Body Problem: Celestial Mechanics and Binary Asteroids," Harbin Institute of Technology, Harbin, China, July 20, 2006.
12. "Asteroid Mission Design and Navigation," Harbin Institute of Technology, Harbin, China, July 21, 2006.
13. "Space Missions to Asteroids," Beihang University, Beijing, China, July 18, 2006.
14. "The Full Two-Body Problem," ETSI Aeronauticos, Technical University of Madrid, May 30, 2006.
15. "Solving Two Point Boundary Value Problems with Generating Functions," Department of Applied Mathematics, University of Murcia, Spain, May 2006.
16. "The Full Two-Body Problem: Celestial Mechanics and Binary Asteroids," Department of Applied Mathematics, University of Murcia, Spain, May 2006.
17. "Space Missions to Asteroids," University of Alicante, Spain, May 2006.
18. "Stability of Binary Asteroids Formed Through Fission," Southwest Research Institute – Boulder, February 20, 2006.
19. "The Full Two Body Problem," UCLA Department of Mechanical and Aerospace Engineering, February 16, 2006.
20. "Optimal Feedback Control and Hamiltonian Dynamics," Tokyo Metropolitan University, December 9, 2005.
21. "Space Exploration Missions to Asteroids," Tokyo Metropolitan University, December 9, 2005.

22. "Fundamental Limits on Spacecraft Orbit Uncertainty and Distribution Propagation," Guidance, Navigation and Control Section, Jet Propulsion Laboratory, July 29, 2005.
23. "The Full Two Body Problem: Celestial Mechanics and Binary Asteroids," Applied and Interdisciplinary Mathematics Seminar, Department of Mathematics, University of Michigan, April 8, 2005.
24. "Space Exploration and Astrodynamics," Shipman Society Seminar, University of Michigan, October 27, 2004.
25. "Exploration and Astrodynamics," Undergraduate Student Seminar, Department of Aerospace Engineering, University of Michigan, September 17, 2004.
26. "The High Impact of Low Thrust Propulsion," FEGI Student Seminar, University of Michigan, August 6, 2004.
27. "Dynamics of Planetary Satellite Orbiters: Applications to JIMO at Europa," Navigation Systems Section, Jet Propulsion Laboratory, August 2, 2004.
28. "The Dynamical Environment about Asteroid 25143 Itokawa: Scientific Implications," Institute of Space and Astronautical Science, Japan, June 8, 2004.
29. "The Dynamical Environment about Asteroid 25143 Itokawa: Navigation Implications," Institute of Space and Astronautical Science, Japan, June 7, 2004.
30. "Asteroid Fission and Final Rotation Rates," Spaceflight Dynamics Section, ISTI-CNR, Pisa, Italy, April 2004.
31. "Full Body Problems: Where to next?," Full Body Problem Workshop, California Institute of Technology, November 14, 2003.
32. "The Full 2-Body Problem," Michigan Aerospace Seminar, Department of Aerospace Engineering, University of Michigan, October 9, 2003.
33. "Past, Present and Pending Space Missions to Asteroids and Comets," Space Science Seminar Series, Atmospheric and Oceanic Space Science Department, University of Michigan, September 26, 2003.
34. "Close Proximity Spacecraft Operations About Asteroids and Comets," University of Michigan Σ FT chapter, September 25, 2003.
35. "The Dynamical Environment of Binary Asteroids," Non-linear Astrodynamics Group, California Institute of Technology, July 2003.
36. "The Dynamical Environment of Binary Asteroids," Navigation Systems Section, Jet Propulsion Laboratory, July 2003.
37. "The Full Two-Body Problem and the Dynamics of Binary Asteroids," University of Padova, Italy, June 2003.
38. "The Orbital Dynamics Environment of 433 Eros," Spaceflight Dynamics Section, ISTI-CNR, Pisa, Italy, June 2003.

39. "The Full Two-Body Problem and the Dynamics of Binary Asteroids," Cornell University, Theoretical and Applied Mechanics Seminar, May 2003.
40. "Mission Phases for Close Proximity Operations at Small Bodies and Other Issues," invited seminar at the B612 Foundation Founder's Meeting, March 14, 2003.
41. "Dynamics of Mutual Attraction: Gravitational Coupling of Rotation and Translation," California Institute of Technology, CDS Seminar, November 2002.
42. "Close Proximity Operations at Small Bodies: Orbiting, Hovering, and Hopping," Workshop on Scientific Requirements for Mitigation of Hazardous Comets and Asteroids, Arlington, Virginia, September 3-6, 2002.
43. "Engineering Constraints of Sample Collection," Workshop on Scientific Criteria for the Samples for the Hera Mission, workshop held at the Meteoritical Society Meeting, UCLA, July 21, 2002.
44. "Orbit Determination and Control of a Spacecraft in a Libration Point Orbit," Jet Propulsion Laboratory/California Institute of Technology, Pasadena, July 19, 2002.
45. On-air live interview concerning asteroid impact and hazard mitigation, P.W. Smith Show, WJR 760 AM, July 7, 2002.
46. "Orbit Determination and Control of a Spacecraft in a Libration Point Orbit," CNUCE, Pisa, Italy, June 2002.
47. "Orbit Determination and Control of a Spacecraft in a Libration Point Orbit," University of Barcelona, Barcelona, Spain, June 2002.
48. "The Orbital Dynamics Environment of 433 Eros," Faculty of Mathematics, University of Barcelona, Barcelona, Spain, June 2002.
49. "Dynamics of Binary Asteroids," UM Astronomy Colloquium, March 2002.
50. "Landing on an Asteroid: NASA's NEAR Mission," The University of Michigan, Department of Aerospace Engineering Undergraduate Seminar, Ann Arbor, September 2001.
51. "Spacecraft Formation Flight in Unstable Orbital Environments," UM Control Seminar Series, April 2001.
52. "Orbit Determination in Unstable Orbits," Jet Propulsion Laboratory/California Institute of Technology, Pasadena, August 2, 2000.
53. "Stability of Asteroid Binary Systems," CNUCE, Pisa, Italy, July 2000.
54. "Hovering and Orbit Dynamics of the Muses-C S/C at Asteroid 1989 ML," Institute of Space and Astronautical Science, Japan, May 24, 2000.
55. "NEAR at Eros: A science report on the mission to date," Institute of Space and Astronautical Science, Japan, May 22, 2000.
56. "NEAR at Eros: An Overview of the Mission to Date," Institute of Space and Astronautical Science, Japan, May 15, 2000.

57. "Ejecta Dynamics at Comet Tempel 1," Deep Impact Cratering Workshop, Ball Aerospace, February 2, 2000.
58. "NASA's Near Earth Asteroid Rendezvous (NEAR) Mission to Asteroid Eros," The University of Michigan, Department of Aerospace Engineering Undergraduate Seminar, Ann Arbor, October 1999.
59. "Measuring the Attraction of Eros," Dept. of Aeronautics and Astronautics, Purdue University, October 5, 1999.
60. "Design and Objectives of the NEAR Orbital Mission about 433 Eros," Institute of Space and Astronautical Science, Japan, July 23, 1999.
61. "Orbital Dynamics of the NEAR Spacecraft About Asteroid 433 Eros," Tsukuba Space Center (NASDA), Japan, June 24, 1999.
62. "Measuring the Mathilde and Eros Gravity Fields for the NEAR Mission," Institute of Space and Astronautical Science, Japan, June 3, 1999.
63. "Stability and Control of Hovering Orbits about Small Bodies," Jet Propulsion Laboratory/California Institute of Technology, March 16, 1999.
64. "Stability analysis of a Europa Orbiter," Jet Propulsion Laboratory/California Institute of Technology, Pasadena, March 15, 1999.
65. "Making Mathilde (and Toutatis) Tumble," University of California – Santa Cruz, February 1999.
66. "Spacecraft dynamics in the comet environment," University of Padova, Italy, July 13, 1998.
67. "Spacecraft dynamics in the comet environment," Jet Propulsion Laboratory/California Institute of Technology, Pasadena, June 4, 1998.
68. "Navigation in Unstable Orbits," Libration Point Mission Workshop, California Institute of Technology, February 6, 1998.
69. "Navigating Asteroid Flybys," Iowa State University AIAA chapter, November 1997.
70. "Landing Softly on a Comet," Iowa State University, Dept. of Aerospace Engineering and Engineering Mechanics, Ames, March 1997.
71. "Rosetta spacecraft dynamics at the comet Wirtanen," European Space Operations Center, Darmstadt, Germany, November 1996.
72. "Navigating to Near-Earth Asteroids," The University of Michigan, Department of Aerospace Engineering, Ann Arbor, November 1996.
73. "Spacecraft Dynamics about Asteroids," The University of Minnesota, Department of Aerospace Engineering and Mechanics, Minneapolis, March 1996.

Service to Professional Societies

Memberships

American Institute of Aeronautics and Astronautics Associate Fellow

American Astronautical Society

American Astronomical Society

Member of the Division for Planetary Sciences

Member of the Division on Dynamical Astronomy

International Astronomical Union Commission 07, Celestial Mechanics and Dynamical Astronomy

Review Activities

Associate Editor Celestial Mechanics & Dynamical Astronomy: An International Journal of Space Dynamics, published by Springer (2003-2009).

Associate Editor Journal of the Astronautical Sciences, published by the American Astronautical Society.

Associate Editor Journal of Guidance, Control, and Dynamics, published by the American Institute of Aeronautics and Astronautics.

NASA James Web Space Telescope Orbit Determination Review 2006.

NASA Discovery Data Analysis Program Proposal Review Board 2004.

NASA Planetary Astronomy Proposal Review Board 2003.

NASA Planetary Data Systems Review Board Planetary Data Systems Small Bodies Node: Comet review (April 2006), Lead reviewer for radio science data sets for the Stardust mission (August 2003), Near Earth Asteroid Rendezvous mission (August 2001).

NASA Red Team Review Board Member of the Genesis Mission Red Team Review Board, held at Lockheed-Martin, Denver, 2000.

JPL Peer Review Board Member of the Genesis Mission Peer Review Board, held at the California Institute of Technology, 1998.

Paper Reviews for the Journals *Science*; *Nature*; *Geophysical Review Letters*; *Icarus*; *Astronomical Journal*; *Astronomy and Astrophysics*; *Planetary and Space Science*; *Journal of Guidance, Control and Dynamics*; *Celestial Mechanics and Dynamical Astronomy*; *Journal of Spacecraft and Rockets*; *IEEE Transactions on Control Systems Technology*; *Physica D*; *Chaos*; *Nonlinearity*; *Journal of the Astronautical Sciences*; *Journal of Geophysical Research – Planets*; *Astrophysics and Space Science*; *Acta Astronautica*; *Journal of Power and Propulsion*; *Reviews of Geophysics*.

Proposal Reviews JPL New Millennium Program proposals, NASA Office of Space Science Proposals for the Planetary Geology and Geophysics Program and the Planetary Atmospheres and Theoretical Modeling Program, U.S. Civilian Research and Development Foundation, JPL Telecommunications and Mission Operations Technology Program proposals, German-Israel Foundation for Scientific Research and Development.

Committee Activities

Member American Institute of Aeronautics and Astronautics Astrodynamics Technical Committee.

Member American Astronomical Society Division of Dynamical Astronomy Committee (2001-2004).

Member American Astronautical Society Technical Committee on Space Flight Mechanics (1998-2003, 2005 -).

Chair American Astronautical Society's Dirk Brouwer Award Committee (2007-present).

Chair American Astronomical Society Division on Dynamical Astronomy Student Travel Stipend Committee (2004-2005).

Chair American Astronautical Society's Breakwell Student Travel Award Committee (2001-2004).

Conference Activities

Invited Session Chair 2007 AAS-DPS meeting, Orlando, Florida. Co-chaired an invited session: *YORP Observed!*

General Chair 2007 AAS/AIAA Astrodynamics Specialist Conference, Mackinac Island, Michigan.

Co-Chair 2007 AAS-DDA Annual Meeting, Ann Arbor, Michigan.

Member Scientific organizing committee for the Workshop on Spacecraft Reconnaissance of Asteroid and Comet Interiors, Santa Cruz, California, October 5-6, 2006.

Member Scientific organizing committee for the Hayabusa Symposium 2006.

General Chair 2006 AIAA/AAS Astrodynamics Specialist Conference, Keystone, Colorado.

Technical Chair Winter 2003 AAS/AIAA Space Flight Mechanics Conference, Ponce, Puerto Rico.

Member Scientific organizing committee for the International Workshop on the Scientific Requirements for Mitigation of Hazardous Comets and Asteroids, Washington D.C., September 2002.

General Chair Winter 2001 AAS/AIAA Space Flight Mechanics Conference, Santa Barbara, California.

Session Chair Several AAS/AIAA Space Flight Mechanics and Astrodynamics Specialists Meeting sessions.

Session Chair Several AAS-DDA Meeting sessions.

Session Chair 2004 American Control Conference, Boston, June 2004, Optimal Control session.

Session Co-Chair 24th International Symposium on Space Technology and Science, Miyazaki, Japan, June 2004, Student session, Guidance and Navigation session, Planetary Science session.

Session Co-Chair 23rd International Symposium on Space Technology and Science, Matsue, Japan, May 2002, Country-wide Education and Outreach Activity session.

Session Co-Chair AAS-DPS 2001 Meeting, Cometary Nuclei and Dynamics session.

Session Chair SPACE 98 conference, Albuquerque, New Mexico, April 1998.