

CURRICULUM VITAE
Derek Charles Richardson
University of Maryland at College Park

1. Personal Information

Name Derek Charles Richardson
Department Astronomy
Current Rank Associate Professor

Educational Background

1993 Ph.D. in Astrophysics, Institute of Astronomy, University of Cambridge.

1990 B.Sc. in Astronomy & Physics, University of British Columbia (First Class Honours, Dean's Honour List).

Employment Background

2006– Associate Professor, Department of Astronomy, Univ. of Maryland at College Park.

2000–2006 Assistant Professor, Department of Astronomy, Univ. of Maryland at College Park.

1999–2000 Research Assistant Professor, Department of Astronomy, Univ. of Washington.

1996–1999 Research Associate, Department of Astronomy, University of Washington.

1993–1996 Postdoctoral Fellow, Canadian Institute for Theoretical Astrophysics.

2. Research, Scholarly, and Creative Activities

a. Books.

iii. Chapters in books.

1. **Richardson, D.C.**, Leinhardt, Z.M., Melosh, H.J., Bottke Jr., W.F., Asphaug, E., 2002. Gravitational aggregates: evidence and evolution. In: Bottke Jr., W.F., Cellino, A., Paolicchi, P., Binzel, R.P. (Eds.), *Asteroids III*. Univ. of Arizona Press, Tucson, pp. 501–515.

[6 citations; NASA Astrophysics Data System]

2. **Richardson, D.C.**, Walsh, K.J., 2006. Binary minor planets. *Annu. Rev. Earth Planet. Sci.* 34, 47–81.

[7 citations; Web of Science]

b. Articles in Refereed Journals.

Errata are not listed. Citations are from either the Science Citation Index via Web of Science or from the NASA Astrophysics Data System.

1. Walker, G.A.H., Johnson, R., **Richardson, D.**, Campbell, B., Irwin, A.W., Yang, S., 1990. Cross talk in 1872 Reticon diode arrays. *Pub. Astron. Soc. Pac.* 102, 1418–1419.

[5 citations]

2. **Richardson, D.C.**, 1993. A new tree code method for simulation of planetesimal dynamics. *Mon. Not. R. Astron. Soc.* 261, 396–414.

[15 citations]

3. Lewis, G.F., Miralda-Escudé, J., **Richardson, D.C.**, Wambsganss, J., 1993. Microlensing light curves: a new and efficient numerical method. *Mon. Not. R. Astron. Soc.* 261, 647–656.

[55 citations]

4. **Richardson, D.C.**, 1994. Tree code simulations of planetary rings. *Mon. Not. R. Astron. Soc.* 269, 493–511.

[67 citations]

5. **Richardson, D.C.**, 1995. A self-consistent numerical treatment of fractal aggregate dynamics. *Icarus* 115, 320–335.

[19 citations]

6. Walker, G.A.H., Walker, A.R., Irwin, A.W., Larson, A.M., Yang, S.L.S., **Richardson, D.C.**, 1995. A search for Jupiter-mass companions to nearby stars. *Icarus* 116, 359–375.

[81 citations]

7. Lin, D.N.C., Bodenheimer, P., **Richardson, D.C.**, 1996. Orbital migration of the planetary companion of 51 Pegasi to its present location. *Nature* 380, 606–607.
[325 citations]
8. Bottke Jr., W.F., **Richardson, D.C.**, Love, S.G., 1997. NOTE: Can tidal disruption of asteroids make crater chains on the Earth and Moon? *Icarus* 126, 470–474.
[19 citations]
9. Bottke Jr., W.F., **Richardson, D.C.**, Love, S.G., 1998. Production of Tunguska-sized bodies by Earth’s tidal forces. *Plan. & Space Sci.* 46, 311–322.
[8 citations]
10. **Richardson, D.C.**, Bottke Jr., W.F., Love, S.G., 1998. Tidal distortion and disruption of Earth-crossing asteroids. *Icarus* 134, 47–76.
[61 citations]
11. Bottke Jr., W.F., **Richardson, D.C.**, Michel, P., Love, S.G., 1999. 1620 Geographos and 433 Eros: shaped by planetary tides? *Astron. J.* 117, 1921–1928.
[17 citations]
12. **Richardson, D.C.**, Quinn, T., Stadel, J., Lake, G., 2000. Direct large-scale N -body simulations of planetesimal dynamics. *Icarus* 143, 45–59.
[37 citations]
13. Leinhardt, Z.M., **Richardson, D.C.**, Quinn, T., 2000. Direct N -body simulations of rubble pile collisions. *Icarus* 146, 133–151.
[33 citations]
14. Michel, P., Benz, W., Tanga, P., **Richardson, D.C.**, 2001. Collisions and gravitational reaccumulation: forming asteroid families and satellites. *Science* 294, 1696–1700.
[69 citations]
15. Leinhardt, Z.M., **Richardson, D.C.**, 2002. N -body simulations of planetesimal evolution: effect of varying impactor mass ratio. *Icarus* 159, 306–313.
[16 citations]
16. Tanga, P., Michel, P., **Richardson, D.C.**, 2002. Planetesimal clusters in a keplerian disk: I. Gravitational evolution. *Astron. Astrophys.* 395, 613–623.
[3 citations]
17. Michel, P., Tanga, P., Benz, W., **Richardson, D.C.**, 2002. Formation of asteroid families by catastrophic disruption: simulations with fragmentation and gravitational re-accumulation. *Icarus* 160, 10–23.
[31 citations]
18. Michel, P., Benz, W., **Richardson, D.C.**, 2003. Disruption of fragmented parent bodies as the origin of asteroid families. *Nature* 421, 608–611.
[23 citations]
19. Durda, D.D., Bottke Jr., W.F., Enke, B.L., Merline, W.J., Asphaug, E., **Richardson, D.C.**, Leinhardt, Z.M., 2004. The formation of asteroid satellites in large impacts: results from numerical simulations. *Icarus* 167, 382–396.
[15 citations]
20. Michel, P., Benz, W., **Richardson, D.C.**, 2004. Catastrophic disruption of pre-shattered parent bodies. *Icarus* 168, 420–432.
[11 citations]
21. Lake, G., Quinn, T., **Richardson, D.C.**, Stadel, J., 2004. The pursuit of the whole NChilada: virtual petaflops using multi-adaptive algorithms for gravitational systems. *IBM J. Res. Dev.* 48, 183–197.
[0 citations]
22. Michel, P., Benz, W., **Richardson, D.C.**, 2004. Catastrophic disruption of asteroids and family formation: a review of numerical simulations including both fragmentation and gravitational reaccumulations. *Plan. & Space Sci.* 52, 1109–1117.
[7 citations]

23. Tanga, P., Weidenschilling, S.J., Michel, P., **Richardson, D.C.**, 2004. Gravitational instability and clustering in a disk of planetesimals. *Astron. Astrophys.* 427, 1105–1115.
[8 citations]
 24. **Richardson, D.C.**, Elankumaran, P., Sanderson, R.E., 2005. Numerical experiments with rubble piles: equilibrium shapes and spins. *Icarus* 173, 349–361.
[14 citations]
 25. Leinhardt, Z.M., **Richardson, D.C.**, 2005. Planetesimals to protoplanets. I. Effect of fragmentation on terrestrial planet formation. *Astrophys. J.* 625, 427–440.
[7 citations]
 26. Leinhardt, Z.M., **Richardson, D.C.**, 2005. A fast method for finding bound systems in numerical simulations: results from the formation of asteroid binaries. *Icarus* 176, 432–439.
[3 citations]
 27. Walsh, K.J., **Richardson, D.C.**, 2006. Binary near-Earth asteroid formation: rubble pile model of tidal disruptions. *Icarus* 180, 201–216.
[11 citations]
 28. Tiscareno, M.S., Burns, J.A., Hedman, M.M., Porco, C.C., Weiss, J.W., Dones, L., **Richardson, D.C.**, Murray, C.D., 2006. 100-metre-diameter moonlets in Saturn’s A ring from observations of ‘propeller’ structures. *Nature* 440, 648–650.
[8 citations]
 29. **Richardson, D.C.**, Walsh, K.J., Eds. 2006. Binary Minor Planets V1.0. EAR-A-COMPIL-5-BINMP-V1.0. NASA Planetary Data System.
[? citations]
 30. Nesvorný, D., Enke, B.L., Bottke Jr., W.F., Durda, D.D., Asphaug, E., **Richardson, D.C.**, 2006. Karin cluster formation by asteroid impact. *Icarus* 183, 296–311.
[7 citations]
 31. Lufkin, G., **Richardson, D.C.**, Mundy, L.G., 2006. Planetesimals in the presence of giant planet migration. *Astrophys. J.* 653, 1464–1468.
[2 citations]
 32. Durda, D.D., Bottke Jr., W.F., Nesvorný, D., Enke, B.L., Merline, W.J., Asphaug, A., **Richardson, D.C.**, 2007. Size-frequency distributions of fragments from SPH/ N -body simulations of asteroid impacts: Comparison with observed asteroid families. *Icarus* 186, 498–516.
[5 citations]
 33. Consigli, J.-F., Tanga, P., Comito, C., Hestroffer, D., **Richardson, D.C.**, 2007. Formes d’astéroïdes et formation de satellites: rôle de la réaccumulation gravitationnelle. *C. R. Physique* 8, 469–480.
[0 citations]
 34. Popova, O.P., Hartmann, W.K., Nemtchinov, I.V., **Richardson, D.C.**, Berman, D.C., 2007. Crater clusters on Mars: shedding light on martian ejecta launch conditions. *Icarus* 190, 50–73.
[0 citations]
 35. Porco, C.C., Weiss, J.W., **Richardson, D.C.**, Dones, L., 2007. Saturn’s small inner satellites: clues to their origins. *Science* 318, 1602–1607.
[1 citation]
 36. Walsh, K.J., **Richardson, D.C.**, 2008. A steady-state model of NEA binaries formed by tidal disruption of gravitational aggregates. *Icarus* 193, 553–566.
[0 citations]
- Papers submitted...*
37. Porco, C.C., Weiss, J.W., **Richardson, D.C.**, Dones, L., Spitale, J., Throop, H., Quinn, T., Kehoe, T.J.J., 2008. Light scattering in Saturn’s Rings, I: Basic formulation, ring thickness, and the A ring azimuthal asymmetry. *Astron. J.*, submitted.
 38. **Richardson, D.C.**, Michel, P., Walsh, K.J., Flynn, K.W., 2008. Numerical simulations of asteroids modeled as gravitational aggregates. *Plan. & Space Sci.*, submitted.

39. Tanga, P., Hestroffer, D., Delbò, M., **Richardson, D.C.**, 2008. Asteroid rotation and shape: from disruption to gravitational reaccumulation by numerical simulations. *Plan. & Space Sci.*, submitted.
- Papers in preparation...*
40. Barnes, R., Quinn, T.R., Lissauer, J.J., **Richardson, D.C.** *N*-body simulations of growth from 1 km planetesimals at 0.4 AU. *Astrophys. J. Lett.*, in preparation.
- d. Book Reviews, Other Articles, and Notes.
1. **Richardson, D.C.**, 2001. News & Views: Giants in the asteroid belt. *Nature* 411, 899–900.
 2. **Richardson, D.C.**, 2002. News & Views: Rocks that go bump in the night. *Nature* 417, 697–698.
- e. Talks, Abstracts, and Other Professional Papers Presented.
- i. Invited talks, etc.
Where published abstracts are available, full citation is given.
- Invited Talks at Professional Meetings
Talks prior to Fall 2000 listed without titles.
1. Review, 30 mins, IX^{èmes} Rencontres de Blois, Blois, France: Jun. 25, 1997.
 2. “The Evolution of Fragile Planetesimals: Things that go Bump in the Night” (review, 20 mins). Washington Area Astronomers Meeting, NASA Goddard Space Flight Center, Greenbelt, MD: Feb. 22, 2001.
 3. **Richardson, D.C.**, 2003. The morphological evolution of asteroids. *Bull. Am. Astr. Soc.* 35, 1033. (Review, 50 mins.) 34th DDA meeting. Cornell University, Ithaca, NY: May 5, 2003.
 4. “Rubble Piles & Monoliths” (review, 30 mins). Catastrophic Disruptions VI. Cannes, France: Jun. 11, 2003.
 5. “Gravitational Reaccumulation in the Solar System” (review, 40 mins). Gravitational Collapse: From Massive Stars to Planets. Ensenada, Mexico: Dec. 8, 2003.
 6. “Gravitational Reaccumulation in the Solar System” (review, 50 mins). Planet Formation: Terrestrial and Extra Solar. Kavli Institute for Theoretical Physics (KITP), Santa Barbara, CA: Mar. 19, 2004.
 7. “Pkdgrav: A Parallel *k*-D Tree Gravity Solver for *N*-body Problems” (seminar, 40 mins). Fast Multipole Method, Tree Code, and Related Approximate Algorithms—Trading Exactness for Efficiency. Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD: Apr. 29, 2004.
 8. “Collisions in *N*-body Problems: Techniques and Applications” (review, 60 mins). Grand Challenge Problems in Computational Astrophysics—Workshop II: *N*-Body Problems in Astrophysics. UCLA, Institute for Pure and Applied Mathematics (IPAM), Los Angeles, CA: Apr. 18–22, 2005.
 9. “Coagulation and Fragmentation Processes in Planetesimal Dynamics” (review, 60 mins). Workshop on Coagulation-fragmentation Processes: Theory and Applications. International Center for Mathematical Sciences (ICMS), Edinburgh, UK: Jul. 4–8, 2005.
 10. **Richardson, D.C.**, Walsh, K.J., 2006. Forming NEA binaries: tidal disruption may not be enough. *IAU Symp. No. 236 S236*, 12. (Seminar, 30 mins.) Near Earth Objects, our Celestial Neighbors: Opportunity and Risk (IAU Symposium 236), Prague, Czech Republic, Aug. 14–18, 2006.
 11. “*N*-Body Models of Aggregation and Disruption” (review, 45 mins). Catastrophic Disruptions VII. Alicante, Spain, Jun. 26–29, 2007.
 12. Michel, P., **Richardson, D.C.**, 2007. On the concept of material strength and first simulations of asteroid disruption with explicit formation of spinning aggregates in the gravity regime. *Euro. Plan. Sci. Cong. 2*, EPSC2007-A-00491. (Seminar, 30 mins, given by Michel, P.) European Planetary Science Congress 2007. Potsdam, Germany: Aug. 20–24, 2007.

13. “Rocks with Moons: The Origin of Near-Earth Asteroid Binaries” (seminar, 20 mins). Geological Society of Washington meeting 1415. Washington, DC: Nov. 14, 2007.

Colloquia and Seminars

Talks prior to Fall 2000 listed without titles.

1. Colloquium, 60 mins, Cornell University, Ithaca, NY: Jan. 20, 1994.
2. Seminar, 60 mins, University of California, Santa Cruz, CA: Nov. 7, 1994.
3. Seminar, 60 mins, NASA Ames Research Center, Moffett Field, CA: Nov. 30, 1994.
4. Colloquium, 60 mins, University of Waterloo, Kitchener, ON: Mar. 8, 1995.
5. Seminar, 60 mins, University of California, Santa Cruz, CA: Oct. 20, 1995.
6. Colloquium, 60 mins, University of British Columbia, Vancouver, BC: Nov. 6, 1995.
7. Colloquium, 60 mins, University of Washington, Seattle, WA: Jan. 11, 1996.
8. Colloquium, 60 mins, St. Mary’s University, Halifax, NS: Feb. 16, 1996.
9. Colloquium, 60 mins, Washington State University, Pullman, WA: Nov. 14, 1996.
10. Colloquium, 60 mins, University of Washington (Geophysics), Seattle, WA: May 13, 1997.
11. Colloquium, 60 mins, University of British Columbia, Vancouver, BC: Sep. 15, 1997.
12. Colloquium, 60 mins, University of Cambridge, Cambridge, UK: Jun. 18, 1997.
13. Colloquium, 60 mins, Hertzberg Institute of Astrophysics, Victoria, BC: Nov. 7, 1997.
14. Seminar, 60 mins, Institute for Theoretical Physics, Santa Barbara, CA: Jul. 14, 1998.
15. Colloquium, 60 mins, University of Notre Dame, South Bend, IN: Oct. 20, 1998.
16. Colloquium, 60 mins, University of Victoria, Victoria, BC: Nov. 25, 1998.
17. Colloquium, 60 mins, Monash University, Melbourne, Australia: Apr. 1, 1999.
18. Colloquium, 60 mins, Mt. Stromlo Observatory, Canberra, Australia: Apr. 9, 1999.
19. Colloquium, 60 mins, Osservatorio di Brera, Milano, Italy: Oct. 5, 1999.
20. Colloquium, 60 mins, University of California, Santa Cruz, CA: Dec. 2, 1999.
21. Seminar, 60 mins, NASA Ames Research Center, Moffett Field, CA: Dec. 3, 1999.
22. Colloquium, 60 mins, University of British Columbia, Vancouver, BC: Jan. 24, 2000.
23. Colloquium, 60 mins, University of Pennsylvania, Philadelphia, PA: Feb. 1, 2000.
24. Colloquium, 60 mins, University of Maryland, College Park, MD: Feb. 9, 2000.
25. Seminar, 60 mins, Institute for Advanced Study, Princeton, NJ: Feb. 17, 2000.
26. Colloquium, 60 mins, Dartmouth College, Hanover, NH: Feb. 21, 2000.
27. Colloquium, 60 mins, University of Colorado, Boulder, CO: Mar. 20, 2000.
28. Colloquium, 60 mins, Center for Astrophysics, Cambridge, MA: May 30, 2000.
29. “Planetesimal Dynamics” (seminar, 60 mins). Osservatorio di Torino, Torino, Italy: Nov. 16, 2000.
30. “Adventures with Rubble Piles: The Evolution of Fragile Planetesimals” (seminar, 60 mins). Department of Terrestrial Magnetism, Carnegie Institute of Washington, Washington, DC: Jan. 24, 2001.
31. “Forming Asteroid Families and Satellites” (colloquium, 60 mins). McMaster University, Hamilton, ON: Nov. 28, 2001.
32. “Collisions and Gravity: How to Make Asteroid Families and Satellites” (LHEA seminar, 60 mins). NASA Goddard Space Flight Center, Greenbelt, MD: Dec. 18, 2001.
33. “How to Make Asteroid Families and Satellites” (colloquium, 60 mins). Bartol Research Institute, Newark, DE: Mar. 28, 2002.
34. “Numerical Methods in Planetesimal Dynamics” (Space Sciences Seminar, 60 mins), George Mason University, Fairfax, VA: Nov. 3, 2004.
35. “Gravitational Reaccumulation in the Solar System” (Arfken Visiting Scholar physics seminar, 60 mins). Miami University, Oxford, OH: Nov. 17, 2004.
36. “Binary Asteroids” (colloquium, 60 mins). Case Western Reserve University, Cleveland, OH: Mar. 1, 2005.

37. “Binary Asteroids” (seminar, 60 mins). Department of Terrestrial Magnetism, Carnegie Institute of Washington, Washington, DC: Mar. 30, 2005.
38. “Asteroid Binary Formation via Tidal Disruption of Gravitational Aggregates” (colloquium, 60 mins). Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ: Apr. 26, 2005.
39. “Asteroids with Satellites: Origins and Implications” (seminar, 60 mins). Goddard Center for Astrobiology, NASA Goddard Space Flight Center, Greenbelt, MD: May 19, 2005.
40. “Binary Minor Planets” (seminar, 60 mins). Theoretical Astrophysics Center, University of California, Berkeley, CA: Sep. 19, 2005.
41. “Binary Minor Planets” (colloquium, 60 mins). University of Washington, Seattle, WA: Jan. 19, 2006.
42. “Binary Minor Planets” (colloquium, 60 mins). University of Pennsylvania, Philadelphia, PA: Apr. 12, 2006.
43. “Binary Small Bodies in the Solar System” (colloquium, 60 mins). Cornell University, Ithaca, NY: Sep. 28, 2006.
44. “Binary Small Solar System Bodies and Dwarf Planets” (seminar, 60 mins). Observatoire de la Côte d’Azur, Nice, France: Mar. 15, 2007.
45. “Binary Small Solar System Bodies and Dwarf Planets” (colloquium, 60 mins). University of Zurich, Zurich, Switzerland: Mar. 26, 2007.
46. “Binary Small Solar System Bodies and Dwarf Planets” (colloquium, 60 mins). University of Florida, Gainesville, FL: Dec. 5, 2007.

Contributed Talks, Posters, and Abstracts

Only contributions appearing in published volumes are reported here.

Citations where listed are from the NASA Astrophysics Data System.

1. Walker, G., Bohlender, D., **Richardson, D.**, Walker, A., Irwin, A., Yang, S., 1991. A decade searching for stellar planetary companions with the HF technique. IAF, 42nd International Astronautical Congress, Montreal, Canada, Oct. 5–11, 1991, pp. 3.
2. **Richardson, D.C.**, Asphaug, E., Benner, L., 1995. Comet Shoemaker-Levy 9: A ‘rubble pile’ model with dissipative collisions and gravitational perturbations. Bull. Am. Astr. Soc. 27, 1114.
[1 citation]
3. Bottke Jr., W.F., **Richardson, D.C.**, Love, S.G., 1996. Can tidal disruption of asteroids make crater chains on Earth? Bull. Am. Astr. Soc. 28, 1103.
4. **Richardson, D.C.**, Bottke Jr., W.F., 1996. Tidal distortion and disruption of Earth-crossing asteroids. Bull. Am. Astr. Soc. 28, 1103.
5. **Richardson, D.C.**, Bottke Jr., W.F., 1996. Tidal breakup of asteroids by the Earth and Moon. Astron. Soc. Pacific Conf. Ser. 122: From Stardust to Planetesimals, Santa Clara, CA, Jun. 24–26, 1996, pp. 205–208.
6. Bottke Jr., W.F., **Richardson, D.C.**, Love, S.G., 1997. Can tidal disruption enhance the population of small Earth-approaching objects? Lunar & Plan. Sci. Conf. 28, 139.
7. Bottke Jr., W.F., **Richardson, D.C.**, Love, S.G., 1997. Making crater chains on the Earth and Moon with planetary tidal forces. Lunar & Plan. Sci. Conf. 28, 141.
8. Love, S.G., Bottke Jr., W.F., **Richardson, D.C.**, 1997. Alternative formation mechanisms for terrestrial crater chains. Lunar & Plan. Sci. Conf. 28, 837.
9. Bottke Jr., W.F., **Richardson, D.C.**, Love, S.G., 1997. Has 1620 Geographos been reshaped by planetary tides? Bull. Am. Astr. Soc. 29, 965.
10. **Richardson, D.C.**, Quinn, T., Lake, G., 1997. Direct simulation of planet formation with a million planetesimals. Bull. Am. Astr. Soc. 29, 1027.
11. **Richardson, D.C.**, Lake, G., Quinn, T., Stadel, J., 1998. Direct simulation of planet formation with a million planetesimals: a progress report. Bull. Am. Astr. Soc. 30, 765.

12. **Richardson, D.C.**, Quinn, T., Stadel, J., Lake, G., 1998. Direct simulation of planet formation with a million planetesimals: First results. *Bull. Am. Astr. Soc.* 30, 1052.
13. Leinhardt, Z.M., **Richardson, D.C.**, Quinn, T., 1999. When rubble piles collide... *Bull. Am. Astr. Soc.* 31, 670.
14. **Richardson, D.C.**, Leinhardt, Z.M., Quinn, T., 1999. When rubble piles collide... *Bull. Am. Astr. Soc.* 31, 1125.
[1 citation]
15. Porco, C.C., Pantazopoulou, M.J., **Richardson, D.**, Quinn, T., Kehoe, T.J.J., 1999. Light scattering in planetary rings: the nature of Saturn's particle disk. *Bull. Am. Astr. Soc.* 31, 1140.
16. Leinhardt, Z.M., **Richardson, D.C.**, Quinn, T., 2000. When rubble piles collide. *Lunar & Plan. Sci. Conf.* 31, 1274.
17. Leinhardt, Z.M., **Richardson, D.C.**, Quinn, T., 2000. Size distribution dependence in rubble-pile collisions and implications for (216) Kleopatra. *Bull. Am. Astr. Soc.* 32, 1017.
[1 citation]
18. Barnes, R.K., **Richardson, D.C.**, Hahn, J.M., 2000. The effects of passing stars on planetesimal disks. *Bull. Am. Astr. Soc.* 32, 1101.
19. Leinhardt, Z.M., **Richardson, D.C.**, 2001. The effect of the internal configuration of rubble piles on collision outcome. *Lunar & Plan. Sci. Conf.* 32, 1400.
20. Durda, D.D., Bottke Jr., W.F., Asphaug, E., **Richardson, D.C.**, Leinhardt, Z.M., Merline, W.J., Flynn, K.W., 2001. Numerical models of the formation of asteroid satellites. Asteroids 2001—from Piazzini to the 3rd millenium, Palermo, Italy, Jun. 11–15, 2001, pp. 88–89.
21. Michel, P., Benz, W., Tanga, P., **Richardson, D.C.**, 2001. New simulations of collisions between asteroids in the gravity regime: comparison with the properties of some observed asteroid families. Asteroids 2001, *ibid.*, pp. 92.
22. Leinhardt, Z.M., **Richardson, D.C.**, 2001. Planetesimal evolution: a mass ratio study of rubble pile collisions. Asteroids 2001, *ibid.*, pp. 99.
23. **Richardson, D.C.**, Flynn, K.W., Leinhardt, Z.M., 2001. Rubble piles in the solar system: evidence and dynamics. Asteroids 2001, *ibid.*, pp. 255.
24. Tanga, P., Michel, P., **Richardson, D.C.**, 2001. Planetesimal clustering in protoplanetary disks. *Bull. Am. Astr. Soc.* 33, 1080.
25. Porco, C.C., Throop, H.B., **Richardson, D.C.**, 2001. Light scattering in Saturn's rings: basic disk properties and the A ring azimuthal asymmetry. *Bull. Am. Astr. Soc.* 33, 1091.
26. Durda, D.D., Bottke Jr., W.F., Asphaug, E., **Richardson, D.C.**, 2001. The formation of asteroid satellites: numerical simulations using SPH and *N*-body models. *Bull. Am. Astr. Soc.* 33, 1134.
[3 citations]
27. Michel, P., Benz, W., Tanga, P., **Richardson, D.C.**, 2001. Merging, spinning and bouncing in catastrophic collisions: consequences for final fragment properties. *Bull. Am. Astr. Soc.* 33, 1134.
28. **Richardson, D.C.**, 2001. Asteroid satellites from tidal disruption simulations. *Bull. Am. Astr. Soc.* 33, 1352.
[4 citations]
29. Leinhardt, Z.M., **Richardson, D.C.**, 2001. *N*-body simulations of planetesimal evolution: effect of varying impactor mass ratio. *Bull. Am. Astr. Soc.* 33, 1404.
30. Barnes, R.K., Quinn, T., Lissauer, J.J., **Richardson, D.C.**, 2002. The size distribution of planetesimals interior to 1 AU. 2nd Astrobiology Conf., NASA Ames, Moffett Field, CA, Apr. 7–11, 2002.
31. Durda, D.D., Bottke Jr., W.F., Enke, B.L., Asphaug, E., **Richardson, D.C.**, Leinhardt, Z.M., 2003. The formation of asteroid satellites in catastrophic impacts: results from numerical simulations. *Lunar & Plan. Sci. Conf.* 34, 1943.

32. Porco, C.C., Throop, H.B., **Richardson, D.C.**, 2003. Saturn's particle disk and the A ring azimuthal asymmetry. *Bull. Am. Astr. Soc.* 35, 929.
33. Leinhardt, Z.M., and **Richardson, D.C.**, 2003. Planetesimal collisions and terrestrial planet formation. *Bull. Am. Astr. Soc.* 35, 965.
34. Weissman, P.R., **Richardson, D.C.**, Bottke Jr., W.F., 2003. Random disruption of cometary nuclei by rotational spin-up. *Bull. Am. Astr. Soc.* 35, 1012.
35. Walsh, K.J., **Richardson, D.C.**, 2004. Direct N -body simulations of rubble pile collisions in strong tidal fields: applied to Saturn's F ring. *Bull. Am. Astr. Soc.* 35, 1486.
36. Tanga, P., Weidenschilling, S., Michel, P., **Richardson, D.**, 2004. Gravitational instability and clustering in a disk of planetesimals. *Bull. Am. Astr. Soc.* 36, 851.
37. Tanga, P., Weidenschilling, S.J., Michel, P., **Richardson, D.**, 2004. Gravitational clustering in a disk of planetesimals. *EdP-Sciences Conf. Ser. SF2A-2004*, 264.
38. Walsh, K.J., **Richardson, D.C.**, 2004. Near-Earth asteroid satellite formation via tidal disruption of idealized rubble piles. *Bull. Am. Astr. Soc.* 36, 1142.
39. Leinhardt, Z.M., **Richardson, D.C.**, 2004. The growth of terrestrial planets: results from high-resolution N -body simulations. *Bull. Am. Astr. Soc.* 36, 1176.
40. Durda, D.D., Bottke Jr., W.F., Nesvorný, D., Asphaug, E., **Richardson, D.C.**, 2004. Comparing the size-frequency distributions of asteroid families to those produced by SPH/ N -body impact simulations. *Bull. Am. Astr. Soc.* 36, 1185–1186.
41. Grimm, R.E., Bottke, W.F., Durda, D., Enke, B., Scott, E.R.D., Asphaug, E., **Richardson, D.C.**, 2005. Joint thermal and collisional modeling of the H-chondrite parent body. *Lunar & Plan. Sci. Conf.* 36, 1798.
42. Durda, D.D., Bottke Jr., W.F., Nesvorný, D., Asphaug, E., **Richardson, D.C.**, 2005. Size-frequency distributions of fragments from SPH/ N -body simulations: comparison with observed asteroid families. *Lunar & Plan. Sci. Conf.* 36, 1876.
43. Michel, P., Benz, W., **Richardson, D.C.**, 2005. Simulations of collisional disruption at the catastrophic impact energy threshold: effect of the target's internal structure and diameter. *Bull. Am. Astr. Soc.* 37, 622–623.
44. **Richardson, D.C.**, 2005. Rigid aggregates: theory and applications. *Bull. Am. Astr. Soc.* 37, 638.
45. Walsh, K.J., **Richardson, D.C.**, 2005. Binary near-Earth asteroid formation: rubble pile model of tidal disruptions. *Bull. Am. Astr. Soc.* 37, 638.
46. Porco, C.C., Thomas, P., Spitale, J., Jacobson, R.A., Denk, T., Charnoz, S., **Richardson, D.C.**, Dones, L., Baker, E., Weiss, J.W., 2005. Physical and orbital properties of some of Saturn's small satellites. *Bull. Am. Astr. Soc.* 37, 768.
47. Walsh, K.J., **Richardson, D.C.**, 2005. Small main-belt asteroid lightcurves. *Bull. Am. Astr. Soc.* 37, 963.
48. Porco, C.C., Weiss, J.W., Thomas, P.C., **Richardson, D.C.**, Jacobson, R.A., Spitale, J., 2006. Physical characteristics and possible accretionary origins for Saturn's small satellites. *Lunar & Plan. Sci. Conf.* 37, #2289.
49. Weiss, J.W., Porco, C.C., **Richardson, D.C.**, Dones, L., 2006. Photometric examination of Saturn's rings as seen in Cassini ISS images. *Lunar & Plan. Sci. Conf.* 37, #2371.
50. Weiss, J.W., Porco, C.C., **Richardson, D.C.**, Dones, L., 2006. A near-arm/far-arm asymmetry in Saturn's rings and implications for ring structure. *Bull. Am. Astr. Soc.* 38, #38.04.
51. Perrine, R.P., **Richardson, D.C.**, 2006. A computational model of moons in planetary ring gaps. *Bull. Am. Astr. Soc.* 38, #42.04.
52. Durda, D.D., Bottke Jr., W.F., Enke, B.L., Nesvorný, D., Asphaug, E., **Richardson, D.C.**, 2006. Comparing results of SPH/ N -body impact simulations using both solid and rubble-pile target asteroids. *Bull. Am. Astr. Soc.* 38, #53.07.

53. Walsh, K.J., **Richardson, D.C.**, 2006. Steady-state population of the NEA binaries and YORP spinup models. *Bull. Am. Astr. Soc.* 38, #53.08.
 54. Barnes, R., Quinn, T.R., Lissauer, J.J., **Richardson, D.C.**, 2006. Direct simulations of growth from 1 km planetesimals at 0.4 AU. *Bull. Am. Astr. Soc.* 38, #63.04.
 55. Tanga, P., Consigli, J., Hestroffer, D., Comito, C., Cellino, A., **Richardson, D.C.** 2006. Are asteroid shapes compatible with gravitational reaccumulation? *Bull. Am. Astr. Soc.* 38, #65.06
 56. Hestroffer, D., Tanga, P., Cellino, A., Kaasalainen, M., Torppa, J., Marchis, F., **Richardson, D.C.**, Elankumaran, P., Berthier, J., Colas, F., Lounis, S., 2006. HST/FGS high angular resolution observations of binary asteroids. *Bull. Am. Astr. Soc.* 38, #65.08.
 57. Porco, C.C., Weiss, J., Thomas, P., **Richardson, D.**, Spitale, J., 2006. Accretionary origins for Saturn’s small satellites: sizes, shapes, and numerical simulations of growth. *Am. Geophys. Union Fall Meeting 2006*, #P34A-01.
 58. Durda, D.D., Enke, B.L., Asphaug, E., **Richardson, D.C.**, 2007. Examining the formation of satellites in large cratering events via numerical simulations with accurate shape models. *Lunar & Plan. Sci. Conf.* 38, 1742.
 59. Perrine, R.P., **Richardson, D.C.**, 2007. Numerical studies of satellite-ring interactions. *Bull. Am. Astr. Soc.* 39, #10.01.
 60. **Richardson, D.C.**, Michel, P., Walsh, K.J., 2007. Rotational disruption of gravitational aggregates with cohesive strength. *Bull. Am. Astr. Soc.* 39, #16.05.
 61. Walsh, K.J., **Richardson, D.C.**, Michel, P., 2007. Binary asteroid formation via slow spin-up. *Bull. Am. Astr. Soc.* 39, #16.06.
 62. Porco, C.C., Weiss, J.W., **Richardson, D.C.**, Dones, L., 2007. Saturn’s ring particles: lossier than previously thought. *Bull. Am. Astr. Soc.* 39, #26.04.
 63. Michel, P., **Richardson, D.C.**, 2007. Catastrophic disruption of asteroids: first simulations with explicit formation of spinning rigid and semi-rigid aggregates. *Bull. Am. Astr. Soc.* 39, #30.10.
- iii. Unrefereed conference proceedings.
1. Lake, G., Quinn, T., **Richardson, D.C.**, 1997. From Sir Isaac Newton to the Sloan Survey: calculating the structure and chaos owing to gravity in the Universe. *Proc. 8th Ann. ACM-SIAM Symp. on Discrete Algorithms*, New Orleans, LA, Jan. 5–7, 1997, pp. 1–10.
 2. Lake, G., Quinn, T., **Richardson, D.C.**, Stadel, J., 1997. Parallel gravity from the 9 planet problem to billions and billions. *High Performance Computing 1997: Grand Challenges in Computer Simulation—Proc. 1997 Simulation MultiConference*, Atlanta, GA, Apr. 6–10, 1997, pp. 86–91.
 3. **Richardson, D.C.**, 1998. Simulating collisions in the solar system. In: Celnikier, L.M., Vân, J.T.T. (Eds.), *Planetary systems: the long view*. Editions Frontières, France, pp. 199–205.
 4. Lake, G., Quinn, T., **Richardson, D.C.**, Stadel, J., 1999. Virtual petaflops to simulate Solar System formation. *High Performance Computing 1999: Grand Challenges in Computer Simulation—Proc. 1999 Advanced Simulation Technologies Conf.*, San Diego, CA, Apr. 11–15, 1999, pp. 128–131.
 5. Lake, G., Quinn, T., **Richardson, D.C.**, Stadel, J., 2000. Speedup to virtual petaflops using adaptive potential solvers and integrators for gravitational systems. *SPEEDUP 12*, 53–60.
 6. Stadel, J., Wadsley, J., **Richardson, D.C.**, 2002. High performance computational astrophysics with *pkdgrav/gasoline*. In: Dimopoulos, N.J., Lie, K.F. (Eds.), *High Performance Computing Systems and Applications*. Kluwer Academic Publishers, Boston, pp. 501–523.
 7. **Richardson, D.C.**, Scheeres, D.J., 2002. Asteroid satellites formed by tidal disruption. *ESA Special Publications SP-500*, 737–739.

8. Leinhardt, Z.M., **Richardson, D.C.**, 2002. *N*-body simulations of planetesimal evolution: effect of varying impactor mass ratio. ESA Special Publications SP-500, 767–770.
 9. Walsh, K.J., **Richardson, D.C.**, Rettig, T.W., 2003. Modeling the breakup of Comet Shoemaker-Levy 9. *Astron. Soc. Pacific Conf. Ser.* 291, 415.
 10. Kim, J.-S., Nam, B., Marsh, M., Keleher, P., Bhattacharjee, B., **Richardson, D.**, Wellnitz, D., Sussman, A. 2007. Creating a robust desktop grid using peer-to-peer services. *Proc. 2007 NSF Next Generation Software Workshop*, Mar. 2007; appears with *Proc. 2007 IPDPS 2007*.
 11. Marsh, M., Kim, J.-S., Nam, B., Lee, J., Ratanasanya, S., Bhattacharjee, B., Keleher, P., **Richardson, D.**, Wellnitz, D., Sussman, A. 2008. Matchmaking and Implementation Issues for a P2P Desktop Grid. *Proc. 2008 NSF Next Generation Software Workshop*, Mar. 2008; to appear with *Proc. 2008 IPDPS 2008*.
- h. Original Designs, Plans, Inventions, Software, and/or Patents.
- Developed **xa**, X11 software for viewing and animating images in a variety of formats. Released to the public domain in 1993, last update 1996. The code is archived in a variety of X11 public contribution repositories.
 - Developed **box_tree**, a gravity simulation tree code with support for sliding patches, released to the public domain in 1994. No longer supported. Most papers prior to Richardson *et al.* 2000 feature this code.
 - Modified **pkdgrav**, a high-performance parallel tree code, not presently in the public domain, originally developed by the *N*-body Shop at the University of Washington. Modifications include code for handling particle collisions, sliding patches, external potentials, hard surfaces, and rigid body dynamics. Most papers from Richardson *et al.* 2000 onward feature this code, which is under continuous development.
 - Developed **ss_core**, a suite of code for supporting **pkdgrav** solar system simulations, including initial conditions generators, analysis software, plotting scripts, visualization tools, and animation support. This support package is under continuous development and is used by a variety of collaborators.
- i. Contracts and Grants.

Research Grants

Only grants/proposals for which Richardson is PI or Co-I (i.e., not an unpaid collaborator) are listed.

- 2000–02** Co-investigator, “Understanding the Physical Structure of the Comet Shoemaker-Levy 9 Fragments” (STScI HST Archives; PI: Terry Rettig, University of Notre Dame). \$20,000 paid directly to UMD graduate student Walsh by UND.
- 2003–06** Co-investigator, “Studies in Planetary Rings” (NASA Planetary Geology and Geophysics; PI: Carolyn Porco, Space Science Institute). \$28,542 subcontract.
- 2003–06** Principal investigator, “Rubble Pile Dynamics” (NASA Origins of Solar Systems). \$139,000.
- 2003–06** Principal investigator, “Planetesimals to Protoplanets” (NASA Graduate Student Researchers Program). \$72,000.
- 2003–07** Principal investigator, “Origin of Binary Near-Earth Asteroids” (NSF Planetary Astronomy). \$213,642.
- 2004–09** Co-investigator, “Origin and Evolution of Organics in Planetary Systems” (NASA Astrobiology; PI: Mike Mumma, NASA Goddard Space Flight Center). \$330,000 subcontract (5 years).
- 2005–06** Co-investigator, “Employing Peer-to-Peer Services for Robust Grid Computing” (NSF Computer Systems; PI: Alan Sussman, University of Maryland). \$60,000.
- 2005–08** Co-investigator, “Robust Grid Computing using Peer-to-Peer Services” (NASA Applied Information Systems Research; PI: Alan Sussman, University of Maryland). \$1,008,242 (commitment: 0.08 WY/yr).

- 2006–08** Co-investigator, “Impacts Between Icy and Silicate Bodies: Experiments to Determine Scaling Laws for Coefficient of Restitution” (NASA Outer Planets Research; PI: Dan Durda, Southwest Research Institute). \$27,793 subcontract.
- 2006–08** Co-investigator, “*N*-body Simulations of Growth from 1 km Planetesimals” (NASA Terrestrial Planet Finder/Foundation Science; PI: Jack Lissauer, NASA Ames Research Center). \$41,000 subcontract.
- 2006–08** Co-investigator, “Creating a Robust Desktop Grid using Peer-to-Peer Services” (NSF Computer Systems). \$366,000 (commitment: 0.04 WY/yr).
- 2006–07** Co-investigator, “Studies in Planetary Rings” (NASA Planetary Geology and Geophysics; PI: Carolyn Porco, Space Science Institute). \$13,542 subcontract.
- 2007–10** Principal investigator, “Binary Near-Earth Asteroid Formation from Rotational Disruption of Gravitational Aggregates” (NSF Astronomy and Astrophysics Research Grants). \$241,045.
- 2007–08** Principal investigator, “Investigations of Elusive Planetary Ring Particle Properties via Computational Modeling” (NASA Earth and Space Science Fellowship). \$24,000.
- 2008–09** Co-investigator, “Microprocesses in Saturn’s Rings” (NASA Cassini Data Analysis Program; PI: John Weiss, Space Science Institute). \$33,512 subcontract
- 2008–11** Co-investigator, “Development of a Tree Code for Extreme Mass Ratio Inspirals” (NASA Astrophysics Theory and Fundamental Physics; PI: Cole Miller, University of Maryland). \$390,874.
- 2008–11** Principal investigator, “Gravitational Aggregate Dynamics” (NASA Planetary Geology and Geophysics). \$217,192.

Proposals submitted (decisions pending)...

- 2008–09** Principal investigator, “Investigations of Elusive Planetary Ring Particle Properties via Computational Modeling” (NASA Earth and Space Science Fellowship, renewal). \$30,000.

Computing Grants

- 2004–06** Principal Investigator, “Planetesimals to Protoplanets” (National Computational Science Alliance). 100,000 node hours (Pittsburgh Supercomputing Center).
- 2006–08** Principal Investigator, “A Numerical Study of Perturbations in Planetary Rings” (CyberInfrastructure Partnership). 175,000 SUs (TeraGrid).

Internal Grants

- 2002** Summer research grant, “Torques and Non-central Impacts on Strong Aggregated Bodies: Applications to Asteroid Satellites, Tidal Disruption, and Granular Dynamics” (University of Maryland General Research Board). \$8,750.

Travel Grants

- 2003** AAS International Travel Grant for CD-VI meeting in Cannes, Jun. 2003. \$1,255.

j. Fellowships, Prizes, and Awards.

- 2004** Arfken Visiting Scholar, Miami University (Nov. 15–19).
- 2002** Asteroid 1998 SH54 renamed 12566 Derichardson.
- 1994–96** Natural Sciences & Engineering Research Council Postdoctoral Fellowship.
- 1990–93** Commonwealth Scholarship.

k. Editorships, Editorial Boards, and Reviewing Activities for Journals and Other Learned Publications.

Since 2000, I have reviewed 39 manuscripts for 13 journals (*Astronomical Journal*; *Astronomy and Astrophysics*; *Astrophysical Journal*; *Earth, Planets and Space*; *Icarus*; *Journal of Geophysical Research - Planets*; *Meteoritics and Planetary Science*; *Monthly Notices of the Royal Astronomical Society*; *Nature*; *Physical Review E*; *Physical Review Letters*; *Planetary and Space Science*; and *Science*). In 2001, I reviewed a chapter for *Asteroids III*. In 2006, I reviewed a contribution for *Proc. IAU Symp. 236*.

3. Teaching, Mentoring, and Advising

a. Courses taught in the last five years.

Student enrollment is after drop/adds and does not include students auditing.

NOTE: I was on sabbatical from Aug. 2006 to Aug. 2007.

i. General/introductory.

Spring 2003 ASTR121 “Introductory Astrophysics II – Stars and Beyond” for undergraduate majors (CORE with lab), 4 credits, 33 students in 2 sections.

Fall 2003 ASTR220 “Collisions in Space” for undergraduate non-majors (CORE), 3 credits, 50 students in 1 section.

Fall 2004 ASTR100 “Introduction to Astronomy” for undergraduate non-majors (CORE), 3 credits, 235 students in 7 sections.

Spring 2006 ASTR100 “Introduction to Astronomy” for undergraduate non-majors (CORE), 3 credits, 245 students in 6 sections.

Spring 2008 ASTR100 “Introduction to Astronomy” for undergraduate non-majors (CORE), 3 credits, 240 students in 6 sections.

ii. Specialized/advanced.

Spring 2004 ASTR688C “Special Topics in Modern Astronomy: Numerical Methods in Astrophysics” for graduates, 3 credits, 23 students in 1 section.

Spring 2005 ASTR415/ASTR688C “Computational Astrophysics” for undergraduate science majors and graduate students, 3 credits, 13 students in 2 sections.

Fall 2005 ASTR430 “The Solar System” for undergraduate science majors, 3 credits, 15 students in 1 section.

Fall 2007 ASTR615 “Computational Astrophysics” for graduate students, 3 credits, 13 students in 1 section.

iv. Independent Study, Tutorial, Internship Supervision.

Credits are totaled over students.

Spring 2003 ASTR498 “Special Problems in Astronomy” (2 students, 4 credits).

Spring 2003 ASTR699 “Special Problems in Advanced Astronomy” (3 credits).

Fall 2003 ASTR288 “Special Projects in Astronomy” (1 credit).

Fall 2003 ASTR399 “Honors Seminar” (2 credits).

Fall 2003 ASTR699 “Special Problems in Advanced Astronomy” (3 credits).

Fall 2003 ASTR899 “Doctoral Dissertation Research” (6 credits).

Spring 2004 ASTR288 “Special Projects in Astronomy” (3 credits).

Spring 2004 ASTR899 “Doctoral Dissertation Research” (2 students, 9 credits).

Summer I 2004 ASTR899 “Doctoral Dissertation Research” (2 students, 3 credits).

Summer II 2004 ASTR899 “Doctoral Dissertation Research” (2 students, 2 credits).

Fall 2004 ASTR498 “Special Problems in Astronomy” (2 credits)

Fall 2004 ASTR899 “Doctoral Dissertation Research” (2 students, 9 credits).

Spring 2005 ASTR498 “Special Problems in Astronomy” (2 students, 6 credits).

Spring 2005 ASTR899 “Doctoral Dissertation Research” (2 students, 6 credits).

Summer I 2005 ASTR899 “Doctoral Dissertation Research” (3 credits).

Fall 2005 ASTR399 “Honors Seminar” (3 credits).

Fall 2005 ASTR699 “Special Problems in Advanced Astronomy” (1 credit).

Fall 2005 ASTR899 “Doctoral Dissertation Research” (6 credits).

Spring 2006 ASTR399 “Honors Seminar” (3 credits).

Spring 2006 ASTR699 “Special Problems in Advanced Astronomy” (2 credits).

Spring 2006 ASTR899 “Doctoral Dissertation Research” (6 credits).

Summer I 2006 ASTR899 “Doctoral Dissertation Research” (2 credits).

- Summer II 2006** ASTR699 “Special Problems in Advanced Astronomy” (2 credits).
Fall 2006 ASTR898 “Pre-candidacy Research” (2 credits).
Fall 2006 ASTR899 “Doctoral Dissertation Research” (6 credits).
Spring 2007 ASTR898 “Pre-candidacy Research” (4 credits).
Summer I 2007 ASTR898 “Pre-candidacy Research” (2 credits).
Fall 2007 ASTR898 “Pre-candidacy Research” (4 credits).
Spring 2008 ASTR898 “Pre-candidacy Research” (4 credits).
- b. Course or Curriculum Development.
- Spring 2001** Adapted undergraduate course on computational astrophysics to graduate level (ASTR688N) and later undergraduate level (ASTR415).
Fall 2004 Added online interactive tutorials and exercises as part of the ASTR100 curriculum.
Fall 2005 ASTR430 lectures redesigned from scratch. Introduced extensive electronic content.
- c. Manuals, Notes, Software, Webpages, and Other Contributions to Teaching.
- Web pages developed for classes:
- <http://www.astro.umd.edu/~dcr/Courses/ASTR100/>
<http://www.astro.umd.edu/~dcr/Courses/ASTR120/>
<http://www.astro.umd.edu/~dcr/Courses/ASTR121/>
<http://www.astro.umd.edu/~dcr/Courses/ASTR220/>
<http://www.astro.umd.edu/~dcr/Courses/ASTR415/>
<http://www.astro.umd.edu/~dcr/Courses/ASTR430/>
<http://www.astro.umd.edu/~dcr/Courses/ASTR615/>
<http://www.astro.umd.edu/~dcr/Courses/ASTR688/>
- d. Teaching Awards and Other Special Recognition.
- Twice nominated (2002, 2003) for UMD CMPS Dean’s Award for Excellence in Teaching.
 - Runner-up (2007) for Geophysical Society of Washington “Best Paper” award.
- f. Advising: Research Direction.
- i. Undergraduate.
- Spring 2002** Nicole Breslin-Romano (extrasolar planets).
Spring 2002–Spring 2003 David Bettis (asteroid satellite database).¹
Fall 2002 Kaveh Pahlevan (orbit circularization).
Spring 2003 Usha Vishnuvajjala (asteroid belt).
Fall 2003 Robyn Sanderson (Amalthea).
Fall 2003–2006 Pradeep Elankumaran (rubble pile spin limits, N -body codes).
Spring 2005 Jack Carter (asteroid spins).
- iii. Doctoral.
- 1999–2005** Zoë Leinhardt (planet formation).
2000–2001 Kenneth Flynn (rigid body dynamics).
2001–2006 Kevin Walsh (binary asteroids).
2005– Randall Perrine (planetary ring dynamics).
- g. Extension Activities.
- Local (UMd) Research Talks (2001–):
1. “Numerical Simulations of Asteroid Collisions” (60 mins), AMSC seminar, Oct. 2, 2001.
 2. “How to Make Asteroid Families and Satellites” (30 mins), ALTS (Astronomy), Oct. 5, 2001.
 3. “How to Make Asteroid Families and Satellites” (60 mins), Astroterps talk, Oct. 24, 2001.

¹David, a Computer Science major, started work with me in Fall 2001 (without credit that semester) for his College Park Scholars practicum. He found me through the Undergraduate Research Assistant Program.

4. “Problems in Planetary Dynamics” (60 mins), ASTR695 seminar, Dec. 4, 2001
5. “How to Make Asteroid Families and Satellites” (60 mins), Plasma Physics seminar, Oct. 9, 2002.
6. “Problems in Planetary Dynamics” (60 mins), ASTR695 seminar, Oct. 15, 2002.
7. “Using Earth’s Tides to Make Asteroid Moons” (60 mins), Astroterps talk, Nov. 6, 2002.
8. “Origin of Binary Near-Earth Asteroids” (60 mins), Comet Group talk, Dec. 18, 2002.
9. “Forming Asteroid Satellites by Tidal Disruption” (20 mins), Dean’s junior faculty seminar, Mar. 20, 2003
10. “Problems in Planetary Dynamics” (60 mins), ASTR695 seminar, Nov. 3, 2003.
11. “Morphological Evolution of Asteroids” (60 mins,) Comet Group talk, Nov. 5, 2003.
12. “Gravitational Reaccumulation in the Solar System” (60 mins), ATLAS (Astronomy), Nov. 13, 2003.
13. “How Fast Can a Rubble Pile Spin?” (30 mins), ALTS (Astronomy), Apr. 2, 2004.
14. “Gravitational Reaccumulation in the Solar System” (60 mins), Astroterps talk, Apr. 8, 2004.
15. “Problems in Planetary Dynamics” (30 mins), ASTR695 seminar, Nov. 1, 2004.
16. “Pkdgrav: A Parallel k -D Tree Gravity Solver for N -Body Problems” (50 mins), AMSC664 guest lecture, May 4, 2005.
17. “Borg: The Astronomy Beowulf Cluster” (30 mins), AMSC663 guest lecture, Sep. 15, 2005.
18. Research Highlights (30 mins), ASTR695 seminar, Nov. 7, 2005.
19. Research Highlights (50 mins), AMSC664 guest lecture, Feb. 21, 2006.
20. Research Highlights (30 mins), ASTR695 seminar, Nov. 6, 2006.
21. Research Highlights (30 mins), ASTR695 seminar, Nov. 5, 2007.
22. “Binary Small Solar System Bodies and Dwarf Planets” (60 mins), Comet Group talk (PALS), Feb. 28, 2008.

Other informal research talks (2005–):

1. “Collisions in the Solar System” (60 mins), Astrobiology Summer School lunch talk, Goddard Center for Astrobiology (GCA), Jul. 20, 2005.
2. Research Highlights (60 mins), astronomy lunch seminar, Dept. of Terrestrial Magnetism (DTM), Oct. 6, 2006.

Other:

1. “Numerical Methods in Planetary Dynamics” (two 60-min lectures, Arfken Visiting Scholar short course), Miami University, Oxford, OH: Nov. 16 & 18, 2004.

4. Service

a. Professional.

ii. Reviewing activities for agencies.

- 1999** Member, NASA Near Earth Asteroid Rendezvous science review panel.
- 2001** External reviewer, NASA Origins of Solar Systems.
- 2002** Member, NASA Origins of Solar Systems review panel.
- 2003** External reviewer, NASA Planetary Geology and Geophysics.
- 2003** Member, NASA Origins of Solar Systems review panel.
- 2004** External reviewer, NASA Planetary Geology and Geophysics.
- 2004** Member, NASA Outer Planets Research review panel.
- 2004** Member, NASA Origins of Solar Systems/Terrestrial Planet Finder review panel.
- 2005** External reviewer, U.S. Civilian Research and Development Foundation.
- 2005** External reviewer, NASA Origins of Solar Systems.

- 2006** Group Chief, NASA Planetary Geology & Geophysics review panel.
- 2007** External reviewer, NASA Origins of Solar Systems.
- 2007** External reviewer, NASA Planetary Geology & Geophysics review panel.
- 2007** External reviewer, NASA Postdoctoral Program review panel.
- 2008** External reviewer, Lunar Advanced Science and Exploration Research review panel.
- iv. Other non-University committees, commissions, panels, etc.
 - 2002** Session chair, Scientific Frontiers in Research on Extrasolar Planets, Jun. 18–21, 2002, Washington, DC.
 - 2003** Session chair, October Astrophysics Conference: The Search for Other Worlds, Oct. 13–14, 2003, College Park, MD.
 - 2005** Session chair, 37th Division for Planetary Sciences Meeting, Sep. 4–9, 2005, Cambridge, UK.
- v. International activities not listed above.
 - 1996–** Member, American Astronomical Society (divisions: DPS, DDA).
 - 2000** External reviewer, Nuffield Foundation (United Kingdom).
 - 2003** Invited to be Director (declined), 2003 Summer School on Stability and Chaos in Planetary Systems, International Helmholtz Institute for Supercomputational Physics, held Sep. 2003 in Potsdam, Germany.
 - 2004–** Member, DDA professional society.
 - 2005** External reviewer, Council of Physical Sciences of the Netherlands Organization for Scientific Research.
 - 2007** External reviewer, Science and Technology Facilities Council research grants (United Kingdom).
- vi. Paid consultancies.
 - 1996–1997** Consultant, Center of Excellence in Space Data and Information Sciences.
- b. Campus. *NOTE: I was on sabbatical from Aug. 2006 to Aug. 2007.*
 - i. Departmental.
 - 2000–2001** Chair, Colloquium Committee.
 - 2001–2002** Co-Chair, Graduate Admissions Committee.
 - 2001–2003** Co-Organizer, Origins Seminar Series.
 - 2001–** Administrator, borg computer cluster.²
 - 2002–2003** Chair, Graduate Admissions Committee.
 - 2002–2006** Member, Computer Committee.
 - 2003, 2004** Member, Second-year Project Committee.
 - 2003–2004** Member, Undergraduate Education Committee.
 - 2004–2005** Chair, Graduate Admissions Committee.
 - 2005–2006** Member, Undergraduate Honors Committee.
 - 2005–2006** Member, Graduate Program Review.
 - 2007–2008** Chair, Astronomy Computer Committee.
 - ii. College.
 - 2002–2004** Participant, Dean’s project to link university research with Maryland highschools (“AstroGRID”).³
 - 2003** Met with Intel Science Talent Search students, Mar. 11, 2003.
 - 2003** Lecture on “expectations” (10 mins) for CMPS freshman orientation, Jul. 21, 2003.

²Duties include: original development of cluster, planning and arranging upgrades, and maintenance, including daily tape backups and user support. Also maintain web page <http://www.astro.umd.edu/~dcr/Research/borg.html>.

³Duties included: developing science idea, providing code, training students, developing analysis software, and testing implementation. This project is now the basis for funded research [through 2008] with Alan Sussman (UMd Computer Science: <http://www.cs.umd.edu/projects/hpsl/chaos/ResearchAreas/P2PGrid/>).

2004–2005 Mentor, CMPS Science and Technology: Addressing the Need for Diversity (STAND) Internship Research Program (SIRP), partnered with Charles Flowers High School (student: Aaron Gray, project: asteroid satellites database).

iii. University.

2001– Listed as potential advisor in the Undergraduate Research Assistant Program.

2006– Member, Office of Technology High Performance Computing Cluster Allocation Committee.

2006– Member, Office of Technology High Performance Computing Cluster Faculty Advisory Board.

v. Other.

2005–2006 Faculty Advisor, Astronomy Unjournal Club.

2005–2006,2007– Faculty Advisor, The Gamer Symphony Orchestra.

2007 Initiated “Agreement Regarding Scientific Cooperation and Academic Exchanges Between the Côte d’Azur Observatory (France) and the Department of Astronomy, University of Maryland (USA),” signed by Senior Vice President for Academic Affairs and Provost Nariman Farvardin, Jan. 24, 2008.

- I have served as chair of UMd Astronomy Ph.D. thesis committees for Zoë Leinhardt (defended Feb. 2005) and Kevin Walsh (defended Nov. 2006), as a member of UMd Astronomy Ph.D. thesis committees for Kayhan Gultekin (defended May 2006), Ke Zhang (defended Jun. 2007), Matthew Knight (in process), John Vernaleo (in process), and Catherine McGleam (in process), and as Dean’s Representative for the UMd Aeronautical Engineering Ph.D. thesis committee of Adam Dissel (defended Apr. 2007) and for the UMd Computer Science Ph.D. thesis committee of Jik-Soo Kim (in process). I am also external referee for the Astronomy Ph.D. thesis of Peter Scheirich, Charles University, Prague, Czech Republic (in process).
- Since Jan. 2000, I have written approximately 180 letters of reference for roughly 35 students and postdocs.

c. Community, State, National.

External Ph.D. Thesis Committees

1. Shana Tribiano (U Washington/Dartmouth College), Feb. 21, 2000. Title: “Radial Infall Dynamics of a Simulated Rich Cluster of Galaxies.”
2. Eugenio Rivera (SUNY Stony Brook), Aug. 28, 2001. Title: “Dynamical evolution of the Earth-Moon progenitors.”

Public Talks

Talks prior to Fall 2000 listed without titles.

1. Royal Astronomical Society of Canada (60 mins), Halifax, NS: Feb. 16, 1996.
2. Everett Astronomical Society (60 mins), Everett, WA: Feb. 28, 1998.
3. Battle Point Astronomical Association (60 mins), Bainbridge Island, WA: Dec. 8, 1999.
4. Tacoma Astronomical Society (60 mins), Tacoma, WA: Apr. 4, 2000.
5. Olympic Astronomical Society (60 mins), Bremerton, WA: May 1, 2000.
6. “Things That Go Bump in the Night: The Evolution of Fragile Planetesimals” (40 mins), UMd Astronomy Open House, Jul. 5, 2001.
7. “How to Make Asteroid Families and Satellites” (40 mins), UMd Astronomy Open House, Mar. 5, 2002.
8. “Using Earth’s Tides to Make Asteroid Moons” (40 mins), UMd Astronomy Open House, Aug. 20, 2003.
9. “Asteroids: Shedding New Light on Old Rocks” (60 mins), Arfken Visiting Scholar public lecture, Miami University, Oxford, OH: Nov. 16, 2004.
10. “Cool Things You May Not Know About Asteroids” (40 mins), UMd Astronomy Open House, Dec. 5, 2004.

11. “Binary Minor Planets” (60 mins). Frontiers of Astronomy public lecture, Cleveland Museum of Natural History, Cleveland, OH: Mar. 16, 2006.
12. “Strange New (Small) Worlds” (40 mins), UMd Astronomy Open House, Apr. 20, 2006.

Teaching Workshops

1. “Asteroid Families and Satellites” (45 mins), Science Insiders: A Workshop for Teachers (local), Jun. 6, 2002.

Other

1. Project ASTRO volunteer (regular visits to Grade 6 classroom), 1999–2000.
2. Maryland Day volunteer, Apr. 27, 2002 (UFO “demonstrations”).
3. Appeared on “Researching Maryland” (UMTV), May 13, 2002 (taped May 15, 2002).
4. Gave keynote address at UMd Sigma Kappa sorority scholarship banquet, Mar. 19, 2003.
5. Maryland Day volunteer, Apr. 24, 2004 (information booth).
6. Assisted with public viewing of Venus transit, Jun. 8, 2004.
7. Assisted with public viewing of Deep Impact event, Jul. 3–4, 2005.
8. Since 1996, my work has been cited in at least 15 popular publications (including *Astronomy*, *Astronomy Now*, *Science News*, *Scientific American*, *Sky & Telescope*, and *The Economist*), as well as on internet-only sites such as space.com, and has been featured as news items in *Nature* and *Science*, as well as national news media. I was acknowledged as a consultant for the Dec. 2004 issue of *National Geographic* in an article entitled “Search for other Earths” (pp. 68–95). My work was mentioned at the Senate Science, Technology, and Space Hearing: Near Earth Objects (NEO), Apr. 7, 2004 (SR-253, testimony of Dr. Wayne Van Citters, Division Director, Division of Astronomical Sciences, National Science Foundation). I was acknowledged as a consultant for the Dec. 2006 *National Geographic* “Special Supplement: The Solar System” insert.