

ERIK ASPHAUG

Associate Professor

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RESEARCH WRITINGS

Peer-Reviewed Professional Writings:

Melosh, H. J., E. Ryan, and E. Asphaug (1992). Dynamic fragmentation in impacts. *J. Geophys. Res.* 97, 14,735-14,759.

Asphaug, E. and H. J. Melosh (1993). The Stickney impact of Phobos: a dynamical model. *Icarus* 101, 144-164.

Asphaug, E. (1993). Dynamic fragmentation in the solar system: applications of fracture mechanics and hydrodynamics to questions of planetary evolution. Dissertation, Department of Planetary Sciences, University of Arizona.

Benz, W., and E. Asphaug (1994). Impact simulations with fracture: I. method and tests. *Icarus* 107, 98-116.

Asphaug, E. and W. Benz (1994). Density of comet Shoemaker-Levy 9 deduced by modeling tidal break-up of the parent 'rubble-pile'. *Nature* 370, 120-124.

Benz, W., E. Asphaug, and E.V. Ryan (1994). Numerical simulations of catastrophic disruption: recent results. *Planet. Spa. Sci* 42, 1053-1066.

Benz, W. and E. Asphaug (1995). Simulations of brittle solids using smooth particle hydrodynamics. *Computer Physics Communications* 87, 253-265.

Asphaug, E., J. M. Moore, D. Morrison, W. Benz, M. C. Nolan and R. A Sullivan (1996). Mechanical and geological effects of impact cratering on Ida. *Icarus* 120, 158-184.

Sullivan, R. A., E. Asphaug, M. Belton, M. Carr, C. R. Chapman, P. Geissler, R. Greeley, R. Greenberg, J. W. Head III, R. Kirk, P. Lee, A. McEwen, D. Morrison, J. M. Moore, R. Pappalardo, P. Thomas and J. Veverka (1996). Geology of 243 Ida. *Icarus* 120, 119-139.

Greenberg, R., W. F. Bottke, M. C. Nolan, P. Geissler, J.-M. Petit, D. Durda, D. Morrison, J. Moore, E. Asphaug, and J. Head (1996). Collisional and dynamical history of Ida. *Icarus* 120, 106-118.

Asphaug, E. and W. Benz (1996). Size, density, and structure of comet Shoemaker-Levy 9 inferred from the physics of tidal breakup. *Icarus* 121, 225-248.

Schenk, P., E. Asphaug, W. B. McKinnon, H. J. Melosh, and P. Weissman (1996). Cometary nuclei and tidal disruption: the geologic record of crater chains on Callisto and Ganymede. *Icarus* 121, 249-274.

Nolan, M. C., E. Asphaug, H. J. Melosh, and R. Greenberg (1996). Impact craters on asteroids: does gravity or strength control their size? *Icarus* 124, 359-371.

Asphaug, E. (1997). Impact origin of the Vesta family. *Meteor. Plan. Sci.* 32, 965-980.

Nolan, M. C., E. Asphaug, R. Greenberg and H. J. Melosh (1997). Impacts on asteroids: fragmentation, regolith transport and disruption. *Icarus* 124, 359-371.

Greeley, R., R. Sullivan, J. Klemaszewski, J. W. Head III, R. T. Pappalardo, J. Veverka, B. Clark, T. V. Johnson, M. Belton, J. Moore, E. Asphaug, M.H. Carr, G. Neukum, T. Denk, C. R. Chapman, C. B. Pilcher, P. E. Geissler, R. Greenberg, R. Tufts and the Galileo SSI Team (1998). Geology of Europa. *Icarus* 135, 4-24.

Moore, J. M., E. Asphaug, R. J. Sullivan, J. E. Klemaszewski, R. Greeley, K. C. Bender, P. E.

Geissler, A. S. McEwen, B. R. Tufts, J. W. Head III, R. T. Pappalardo, K. B. Jones, C. R. Chapman, M. J. S. Belton, R. L. Kirk, and D. Morrison (1998). Large impact features on Europa: Results of the Galileo Nominal Mission. *Icarus* 135, 127-145.

Asphaug, E., S. J. Ostro, R. S. Hudson, D. J. Scheeres and W. Benz (1998). Disruption of kilometre-sized asteroids by energetic collisions. *Nature* 393, 437-440.

Scheeres D. J. and Asphaug, E. (1998). Debris and sample transport about asteroids. In *Space 1998* (R.G. Galloway and S. Lokaj eds.), American Society of Civil Engineering, Reston, Virginia, 340-346

Asphaug, E. and D. J. Scheeres (1999). Deconstructing Castalia: Evaluating a postimpact state. *Icarus* 139, 383-386.

Moore, J. M., E. Asphaug, D. Morrison, J. R. Spencer, C. R. Chapman, B. Bierhaus, R. J. Sullivan, F. C. Chuang, J. E. Klemaszewski, R. Greeley, K. C. Bender, P. E. Geissler, P. Helfenstein and C. B. Pilcher (1999). Mass movement and landform degradation on the icy Galilean satellites: Results of the Galileo nominal mission. *Icarus* 140, 294-312

Benz, W. and E. Asphaug (1999). Catastrophic disruptions revisited. *Icarus* 142, 5-20.

Ward, S. N. and E. Asphaug (2000). Asteroid impact tsunamis: A probabilistic hazard assessment. *Icarus* 145, 64-78.

Scheeres, D. J., S. J. Ostro, R. A. Werner, E. Asphaug, R. S. Hudson (2000). Effects of gravitational interactions on asteroid spin states. *Icarus* 147, 106-118.

Moore, J. M., Asphaug, E., Belton, M. J. S., Bierhaus, B., Breneman, H. H., Brooks, S. M., Chapman, C. R., Chuang, F. C., Collins, G. C., Biese, B., Greeley, R., Head, J.W.III, Kadel, S., Klaasen, K. P., Klemaszewski, J. E., Magee, K. P., Moreau, J., Morrison, D., Neukum, G., Pappalardo, R. T., Phillips, C. B., Schenk, P. M., Senske, D., Sullivan, R. J., Turtle, E. P., and Williams, K. K. (2001). Impact features on Europa: Results of the Galileo Europa Mission (GEM). *Icarus* 151, 93-111.

Canup, R. M. and E. Asphaug (2001). Origin of the Moon in a giant impact near the end of the Earth's formation. *Nature* 412, 708-712.

Nolan, M. C., R. Greenberg, H. J. Melosh and E. Asphaug (2001). Impacts on asteroids: fragmentation, regolith transport and disruption. *Icarus* 153, 1-15.

Bierhaus, E. B., C. R. Chapman, W. J. Merline, S. Brooks and E. Asphaug (2001). Pwyll craters and other small secondaries on Europa. *Icarus* 153, 264-276.

Ward, S. N. and E. Asphaug (2002). Impact tsunami Eltanin. In *Deep Sea Research II: Topical Studies in Oceanography* (Gersonde, R., Kyte, F.T., Deutsch, A., and Ivanov, B., eds.), 49, 1073-1079.

Asphaug, E., E. Ryan and M. Zuber (2002). Asteroid interiors. In *Asteroids III*, University of Arizona Press.

Richardson, D. C., Leinhardt, Z., Melosh, H. J., Bottke, W. F., and Asphaug, E. (2002). Gravitational aggregates: evidence and evolution. In *Asteroids III*, University of Arizona Press.

Ward, S. and Asphaug, E. (2003). Asteroid impact tsunami of March 16, 2880. *Geophys. J. Int.*, 153, F1-F5.

Lorenz, R. D., Kraal, E., Asphaug, E., and Thornson, R. E. (2003). The seas of Titan. *Eos* 84, 8 April 2003, pp. 125, 131-132.

Binzel, R. P., A'Hearn, M., Asphaug, E., Antonella Barucci, M., Belton, M., Benz, W., Cellino, A., Festou, M. C., Fulchignoni, M., Harris, A. W., Rossi, A., and Zuber, M. T. 2003. Interiors of small bodies: Foundations and perspectives. *Planetary and Space Science* 51, 443-454.

Asphaug, E., Korycansky, D. K., and Ward, S. (2003). Exploring ocean waves from asteroid impacts. *Eos* 84, 2 Sep. 2003, 339-340.

Korycansky, D. G. and Asphaug, E. (2003). Impact evolution of asteroid shapes. 1. Random mass redistribution. *Icarus* 163, 374-388.

Reviewed and In Press:

Durda, D. D., Bottke, W. F., Jr., Enke, B. L., Merline, W. J., Asphaug, E., Richardson, D. C., and Leinhardt, Z. M. The formation of asteroid satellites in large impacts: Results from numerical simulations. *Icarus*, in press.

Weissman, P. R., Asphaug, E. and Lowry, S. C. (2003). Structure and density of cometary nuclei. In *Comets II*, University of Arizona Press, 2004.

Asphaug, E. Interior structures for asteroids and cometary nuclei. Chapter for *Mitigation of Hazardous Impacts due to Asteroids and Comets* (Belton, M. J. S., Morgan, T., and Yeomans, D. K., eds.), Cambridge University Press, 2004. (Simulation from this chapter will be the book's front cover.)

Submitted and In Review:

Korycansky, D. and E. Asphaug. Tidal encounters and asteroid spin-states Icarus, in review.

Bruesch, L. S. and Asphaug, E. Modeling the global impact effects on middle-sized differentiated icy bodies: Application to the Saturnian satellites. Icarus, in review.

In Progress (First Author):

Asphaug, E., Agnor, C., and Williams, Q. Decompression from hydrostatic equilibrium during planetary encounters: tides, impacts, and the origin of meteorites. An assessment of the tidal disruption process as it may have affected the origin of planets and asteroids and the petrogenesis of meteorites. To be submitted to Nature Fall '03.

Asphaug, E., Zahnle, K. and Schenk, P.M. Split comets on Ganymede and Callisto. An analysis of imprints of tidally disrupted comets as imprinted as crater chains on Jupiter's satellites. Evidence for the unlocked rotation of Ganymede and an absence of small comets. To be submitted to Icarus or Nature.

Asphaug, E. Low-velocity cratering on asteroids. A study of craters on asteroids, especially 433 Eros, in which the impactor is found within the crater bowl. In preparation for GJI.

Asphaug, E. Asteroids: Their Origin, Geophysics and Exploration. Book contracted with Cambridge University Press, manuscript due in 2006.

Book Reviews, White-Papers, Editorials and Invited Writings:

Asphaug, E. (1995). Review of Introduction to the Physics of Rocks by Y. Gueguen and V. Palciauskas, Icarus 117, 446.

Asphaug, E. (1997). New Views of Asteroids. Perspectives editorial in Science 277, 2070-2071.

Asphaug, E. (1999). Survival of the Weakest. Lead News and Views editorial in Nature 402, 127-128.

Asphaug, E. (2000). The Small Planets. Scientific American 282, May issue, 28-37.

Asphaug, E. (2001). The Small Planets. The Best American Science Writing (T. Ferris, ed.), Lipper Publications.

Asphaug, E. (2001). Once Upon an Asteroid. Lead News and Views editorial in Nature 413, 369-370.

Sykes, M. V., E. Asphaug, J. F. Bell, R. P. Binzel, W. Bottke, S. J. Bus, A. Cellino, P. Clark, D. D. Davis, M. C. De Sanctis, D. D. Durda, J. Emery, R. Fevig, U. Fink, J. Granahan, A. W.

Harris, W. K. Hartmann, R. Jedicke, M. Kelley, S. M. Larson, D. J. Lien, C. Magri, S. J. Ostro, K. L. Reed, A. Rivkin, D. Sears, A. Storrs, D. Tholen, R. Walker, R. Whiteley and H. Yano (2002). Exploring main belt asteroids. In *The Future of Solar System Exploration, 2003-2013* (M. Sykes, ed.), ASP Conference Proceedings, Vol. 272, 159—176.

Yeomans, D. K., E. Asphaug, W. F. Bottke, P. G. Brown, A. Cellino, R. A. Fevig, U. Fink, C. W. Hergenrother, A. R. Hildebrand, S. M. Larson, J.-L. Margot and D. J. Tholen (2002). Near-Earth objects: Discovery, tracking, and characterization. In *The Future of Solar System Exploration, 2003-2013* (M. Sykes, ed.), ASP Conference Proceedings, Vol. 272, 105—110.

Asphaug, E. (2003). Taming the heavens. Editorial in *New Scientist*, April 19 2003.

Asphaug E. (2003). Book Review: *The Big Splat or How Our Moon Came To Be*, by Dana Mackenzie. In preparation for *Physics Today*.