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## BACKGROUND AND EDUCATION

**BORN:** 17 March 1961, West Palm Beach, Florida

### PREVIOUS CAREER:

United States Navy, active duty enlisted, 1981-1989

Navy Nuclear Power Training Unit (Idaho Falls, ID), 1983-1986: instructor

USS Hawkbill, SSN-666 (Pearl Harbor, HI), 1986-1989: plant operator & supervisor

Eigen Engineering (San Jose, CA), 1989-1991: junior engineer (nuclear plant instrumentation)

Farley Nuclear Plant (Ashford, AL), 1991-1993: nuclear plant operator

### EDUCATION:

University of Florida, 1979-1980 (electrical engineering)

Idaho State University, 1984 (electrical engineering)

Troy State University at Dothan, 1995-1998 (physical sciences)

Florida State University, 1998-2000: **B.S. in Physics**, cum laude

University of Arizona, 2000-2005: **Ph.D. in Planetary Sciences** (geosciences minor)

### DISSERTATION:

*Title:* The seismic effect of impacts on asteroid surface morphology

*Summary:* an analytical and numerical modeling approach is used to investigate the effects of impact-induced seismic activity and impact ejecta emplacement on the geomorphology of fractured asteroids in the 5-100 km size range.

*Dissertation Advisors:* H. Jay Melosh and Richard Greenberg

## POST-DOCTORAL EMPLOYMENT

### INSTITUTION:

Center for Radiophysics and Space Research, Cornell University (Ithaca, NY), 2005-present

**Research Associate** (Joseph Veverka, supervisor)

*Geophysical and geomorphological analysis of asteroids, comets, & satellites, in association with the NEAR, Deep Impact, Stardust NeXT, and Cassini missions.*

### CURRENT AND PENDING RESEARCH FUNDING:

NASA award NNX07AG04G-DDAP, *Investigating the Regional Seismic Effects of Impacts on the Surface Morphology of Asteroid 433 Eros*, **Principal Investigator** (2007-2009).

NASA award NNH06ZDA001N-DDAP, *Infrared Studies of the Material Excavated by the Deep Impact Experiment*, **Co-Investigator** (2007-2009).

NASA PG&G [approval pending], *A Detailed Numerical Modeling Investigation of Regolith Generation and Retention on Asteroid Surfaces*, **Principal Investigator** (2010-2012).

NASA PG&G [approval pending], *Thermal, Physical, and Climatic Effects of Impact Bombardments on Rocky Worlds*, **Co-Investigator** (2010-2013).

## ADDITIONAL INFORMATION

### RESEARCH INTERESTS:

Geophysics, geomorphology, tectonics, impact cratering, and related processes on asteroids, comets, planetary satellites, and terrestrial planets.

### SPACECRAFT MISSION TEAMS:

Stardust-NExT mission: Science Team member, 2006-present

Cassini-Huygens mission: Imaging Team support / data analysis: 2005-present

Deep Impact mission: associate Science Team member, 2001-2007

### TEACHING EXPERIENCE (Graduate Student):

NATS 102, The Universe And Humanity: Origin And Destiny, Spring 2001 (William Hubbard)  
*Occasional lectures, homework and test grading, office hours, review sessions*

PTYS 206, Our Golden Age of Planetary Exploration, Fall 2001 (Timothy Swindle)  
*Frequent lectures, homework and test grading, office hours, review sessions*

### PROFESSIONAL ORGANIZATIONS:

AAS Division of Planetary Sciences (DPS)

American Geophysical Union (AGU)

The Meteoritical Society

### WEBSITE (includes downloadable copies of all papers):

<http://www.astro.cornell.edu/~richardson/>

## FELLOWSHIPS AND HONORS

Meteoritical Society, Pellas-Ryder Award, 2006

Lunar and Planetary Laboratory, Gerard P. Kuiper Award, 2005

Galileo Circle Fellowship, 2005

Graduate College Fellowship, 2000-2001

Troy State University at Dothan, Outstanding Student for 1997

## PROFESSIONAL REFERENCES

Michael A'Hearn, Professor, Department of Astronomy

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## PUBLICATIONS LIST

9 reviewed papers (6 first authored) in 5 years of publishing  
 First-authored paper citation average =  $71 / 5 = 14.2$   
 Hirsch citation metrics:  $h = 7$ ,  $m = 1.4$   
 Total citations (all work) = 307

### REVIEWED JOURNAL ARTICLES:

- J.E. Richardson** (2009). Cratering Saturation and Equilibrium: A New Model Looks at an Old Problem, *Icarus*, **204**, 697-715. (0 citations -- new paper)
- J.E. Richardson**, H.J. Melosh, C.M. Lisse, and B. Carcich (2007). A ballistics analysis of the Deep Impact ejecta plume: determining comet Tempel 1's gravity, mass, and density, *Icarus*, **190**, 357-390. (19 citations)
- P.C. Thomas, J.W. Armstrong, S.W. Asmar, J.A. Burns, T. Denk, B. Giese, P. Helfenstein, L. Less, T.V. Johnson, A. McEwen, L. Nicolaisen, C. Porco, N. Rappaport, **J.E. Richardson**, L. Somenzi, P. Tortora, E. P. Turtle, and J. Veverka (2007). Hyperion's sponge-like appearance, *Nature*, **448**, 50-56. (4 citations)
- D.P. O'Brien, R. Greenberg, and **J.E. Richardson** (2006). Craters on asteroids: reconciling diverse impact records with a common impacting population, *Icarus*, **183**, 79-92. (10 citations)
- J.E. Richardson**, H.J. Melosh, R.J. Greenberg, and D.P. O'Brien (2005). The global effects of impact-induced seismic shaking on fractured asteroid surface morphology, *Icarus*, **179**, 325-349. (8 citations)
- M.F. A'Hearn, M.J.S. Belton, W.A. Delamere, J. Kissel, K.P. Klaasen, L.A. McFadden, K.J. Meech, H.J. Melosh, P.H. Schultz, J.M. Sunshine, P.C. Thomas, J. Veverka, D.K. Yeomans, M.W. Baca, I. Busko, C.J. Crockett, S.M. Collins, M. Desnoyer, C.A. Eberhardy, C.M. Ernst, T.L. Farnham, L. Feaga, O. Groussin, D. Hampton, S.I. Ipatov, J.Y. Li, D. Lindler, C.M. Lisse, N. Mastrodemos, W.M. Owen, **J.E. Richardson**, D.D. Wellnitz, and R.L. White, (2005). Deep Impact: excavating comet Tempel 1, *Science*, **310**, 258-264. (222 citations)
- J.E. Richardson**, H.J. Melosh, N.A. Artemeiva, and E. Pierazzo (2005). Impact cratering theory and modeling for the Deep Impact mission: From mission planning to data analysis, *Space Science Reviews*, **117**, 241-267. (10 citations)
- J.E. Richardson**, H.J. Melosh, and R.J. Greenberg (2004). Impact-induced seismic shaking on asteroid 433 Eros: a surface modification process, *Science*, **306 (5701)**, 1526-1529. (21 citations)
- J.E. Richardson**, R.A. Lorenz, and A.S. McEwen (2004). Titan's surface and rotation: new results from Voyager 1 images, *Icarus*, **170/1**, 113-124. (13 citations)

### DISSERTATION:

- J.E. Richardson** (2005). The seismic effect of impacts on asteroid surface morphology, *Ph.D. Thesis*, Department of Planetary Sciences, University of Arizona.

### AMATEUR WORK IN METEOR SCIENCE:

- P.S. Gural, P. Jenniskens, M. Koop, M. Jones, J. Houston-Jones, D. Holman, and **J.E. Richardson** (2004). The relative activity of the 2001 Leonid storm peaks and implications for the 2002 return, *Advances in Space Research*, **33-9**, 1501-1506.

- D.D. Meisel and **J.E. Richardson** (1999). Statistical properties of meteors from a simple, passive forward-scatter system, *Planetary and Space Science*, **47/1-2**, 107-124.
- J.E. Richardson** and W. Kuneth (1998). Revisiting the radio doppler effect from forward-scatter meteor head echoes, *WGN, the Journal of the International Meteor Organization*, **26:3**, pp. 117-130.

#### CONFERENCE PRESENTATION ABSTRACTS:

- J.E. Richardson** (2009). The seismic effect of impacts on asteroid surface morphology: Three-dimensional modeling results, *40th annual Lunar and Planetary Science Conference (LPSC)*, No. 2144..
- J.E. Richardson** (2008). A 3-D model of asteroid surface evolution, crater creation and erosion, regolith generation, and hillslope processes, *The 2008 Asteroids, Comets and Meteors conference*, No. 8090.
- J.E. Richardson** (2008). Modeling the evolution of cratered terrain in three dimensions: a study of crater creation and erosion on airless bodies, *39th annual Lunar and Planetary Science Conference (LPSC)*, No. 2079..
- J.E. Richardson** and P.C. Thomas (2007). Modeling the cratering records of Hyperion and Phoebe: indications of a shallow-sloped impactor population, *AAS/Division for Planetary Sciences Meeting Abstracts*, **39**, No. 11.11.
- J.E. Richardson** (2007). Improving the modeling of impact ejecta behavior: the effects of gravity and strength near the crater rim, *38th annual Lunar and Planetary Science Conference (LPSC)*, No. 1345.
- J.E. Richardson**, J. Veverka, and P.C. Thomas (2006). Large impact features on Phoebe and Hyperion: early analysis results, *AAS/Division for Planetary Sciences Meeting Abstracts*, **38**, No. 69.04.
- J.E. Richardson** and H.J. Melosh (2006). Impact generated seismic activity on fractured-monolith asteroids: a seismic propagation theory, *LPI Contributions*, **1325**, 66-67.
- J.E. Richardson** and H.J. Melosh (2006). Modeling the ballistic behavior of solid ejecta from the Deep Impact cratering event, *37th annual Lunar and Planetary Science Conference (LPSC)*, No. 1836.
- J.E. Richardson**, H.J. Melosh, and Deep Impact Science Team (2005). The Deep Impact experiment and the physics of impact cratering, *Bulletin of the American Astronomical Society*, **37**, 703.
- J.E. Richardson**, H.J. Melosh, and R. Greenberg (2005). A stochastic cratering model for asteroids surfaces, *36th annual Lunar and Planetary Science Conference (LPSC)*, No. 2032.
- J.E. Richardson**, H.J. Melosh, and R. Greenberg (2004). Impact-induced seismic shaking on asteroid 433 Eros: the mechanics of a surface modification process, *Bulletin of the American Astronomical Society*, **36**, 1186.
- J.E. Richardson**, H.J. Melosh, and R. Greenberg (2004). The seismic effect of impacts on asteroid surface morphology: early modeling results, *35th annual Lunar and Planetary Science Conference (LPSC)*, No. 1864.
- J.E. Richardson**, H.J. Melosh, and R. Greenberg (2003). The seismic effect of impacts on asteroids: early modeling results, *American Geophysical Union (AGU), Fall Meeting 2003*, No. P52A-0476.
- J.E. Richardson**, H.J. Melosh, and R. Greenberg (2003). An impact ejecta behavior model for small irregular bodies, *34th annual Lunar and Planetary Science Conference (LPSC)*, No. 1241.

- O. Abramov, **J.E. Richardson**, and A.S. McEwen (2002). Altimetry-based analysis of valley systems on Mars, *American Geophysical Union (AGU), Fall Meeting 2002*, No. P51B-0361.
- J.E. Richardson** and H.J. Melosh (2002). A numerical impact ejecta model for the Deep Impact mission, *Bulletin of the American Astronomical Society*, **34**, 886.
- J.E. Richardson**, R.A. Lorenz, and A.S. McEwen (2001). Titan's surface and rotation: new results from Voyager 1 images, *Bulletin of the American Astronomical Society*, **33**, 1110.
- J.E. Richardson**, J. Bedient, R. Lunsford, N. McLeod, and P. Martin (1999). Refining visual meteor perception models: shower radiant altitude effect, probability function, and limiting magnitude effect, *The 1999 Asteroids, Comets, Meteors conference, IAU Commission 22 professional-amateur working group meeting*.
- J.E. Richardson**, D.D. Meisel, D.E. Binns, and A. Mallama (1999). Analysis of radiometeor rates using Fourier and Wavelet techniques, *The 1999 Asteroids, Comets and Meteors conference*, No. ACM99 20.02.
- J.E. Richardson** and D.D. Meisel (1997). An amateur radiometeor network and its scientific results, *Bulletin of the American Astronomical Society*, **29**, 821.
- D.D. Meisel, **J.E. Richardson**, and A. Mallama (1997). Wavelet and Fourier analysis of radiometeor rate data, *Bulletin of the American Astronomical Society*, **29**, 820.
- D.D. Meisel and **J.E. Richardson** (1996). Fourier analysis of sporadic meteor rates, *News Letter of the Astronomical Society of New York*, **4-10**, 5.