

Curriculum Vitae, Denton S. Ebel

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DEGREES

Ph.D. Purdue University	Geology, December, 1993
M.S. Purdue University, W. Lafayette, IN	Geology, August 1988
B.A. Harvard College, Cambridge, MA	Sociology, June 1982

ACADEMIC APPOINTMENTS

2011-present	Curator, American Museum of Natural History, NY.
2011-present	Professor, Richard Gilder Graduate School, AMNH.
2007-present	Curator-in-Charge, Dept. of Earth and Planetary Sciences, AMNH.
2007-2011	Associate Professor, Richard Gilder Graduate School, AMNH.
2006-2011	Associate Curator with tenure, American Museum of Natural History, NY.
2009-present	Adjunct Graduate Faculty, CUNY Graduate School and University Center, Ph.D. Program in Earth & Environmental Sciences.
2005-present	Director, OFM Research (www.ofm-research.org).
2002-present	Adjunct Associate Research Scientist, Lamont-Doherty Earth Observatory of Columbia University, New York.
2001-2006	Assistant Curator, Meteorites, American Museum of Natural History, NY.
1999-2001	Research Scientist, University of Chicago, Chicago, Illinois.
1995-1999	Research Associate, University of Chicago, with L. Grossman.
1993-1995	Post Doctoral Fellow, University of Toronto, with A.J. Naldrett.
1985-87; 90-93	Teaching fellow in mineralogy and petrology, Purdue University.
1982	Geological field assistant, Sierra Nevada, with J. Parker.

PUBLICATIONS (submitted and in revision)

- (2011) **Laboratory Spectroscopy in Herschel/PACS Range of Astrophysically Important Minerals.**
 Brusentsova T. N., D. Maukonen, P. Figueiredo, H. Saxena, R. E. Peale, A. Nissinboim, J. Boesenberg, J. Leibold, K. Sherman, G. E. Harlow, D. S. Ebel, K. Hibbitts and C. M. Lisse.
 Submitted to *Monthly Notices of the Royal Astronomical Society*.
- (2011) **Laboratory far-infrared spectroscopy of terrestrial sulfides to support analysis of cosmic dust spectra.** Brusentsova T., R.E. Peale, D. Maukonen, P. Figueiredo, G.E. Harlow, D.S. Ebel, A. Nissinboim, K. Sherman, and C.M. Lisse. *Monthly Notices of the Royal Astronomical Society*. (in revision)
- (2011) **Petrology and oxygen isotopes of NWA 5492, a new metal-rich chondrite.**
 Weisberg, M. K., T. E. Bunch, J. H. Wittke, D. Rumble III, and D. S. Ebel.
Meteoritics and Planetary Science (in revision)
- (2011) **Thermochemical stability of low-iron, manganese-enriched olivine in astrophysical environments.** Ebel, D.S. and M. K. Weisberg. *Meteoritics and Planetary Science* (in revision)

PUBLICATIONS (peer reviewed, accepted)

- (2011) **Questions, questions: Can the contradictions between the petrologic, isotopic, thermodynamic, and astrophysical constraints on chondrule formation be resolved?**
C. M. O'D. Alexander and D. S. Ebel. *Meteoritics and Planetary Science* (in press)
- (2011) **Petrology and oxygen isotopic compositions of chondrules in E3 chondrites.**
Weisberg, M. K., D. S. Ebel, H. C. Connolly Jr., N. Kita and T. Ushikubo
Geochimica et Cosmochimica Acta (in press).
- (2011) **3D analysis of whole Stardust tracks: A means for original impactor estimation.**
Greenberg, M., and D. S. Ebel *Meteoritics and Planetary Science* (in press)
- (2011) **Radioactive elements on Mercury's surface from MESSENGER: Implications for the planet's formation and evolution.** Peplowski, P. N., L. G. Evans, S. A. Hauck II, T. J. McCoy, W.V. Boynton, J. Gillis-Davis, D. S. Ebel, J. O. Goldsten, D. K. Hamara, D. J. Lawrence, R. L. McNutt Jr., L. R. Nittler, S. C. Solomon, E. A. Rhodes, A.L. Sprague, R. D. Starr, and K. R. Stockstill-Cahill. *Science* **333**: 1850-1852.
- (2011) **The major-element composition of Mercury's surface from MESSENGER x-ray spectrometry.** Nittler, L. R., R. D. Starr, S. Z. Weider, T. J. McCoy, W. V. Boynton, D. S. Ebel, C. M. Ernst, L. G. Evans, J. O. Goldsten, D. K. Hamara, D. J. Lawrence, R. L. McNutt Jr., C. E. Schlemm II, S. C. Solomon, and A. L. Sprague. *Science* **333**: 1847-1850.
- (2011) **Laboratory experiments bearing on the origin and evolution of olivine-rich chondrules.**
Richter, F. M., R. A. Mendybaev, J. N. Christensen, D. S. Ebel, and A. Gaffney.
Meteoritics and Planetary Science **46**: 1152-1178.
- (2011) **Equilibrium condensation from chondritic porous IDP enriched vapor: Implications for Mercury and enstatite chondrite origins.** Ebel, D. S., and C. M. O'D. Alexander
Planetary and Space Sciences (in press) doi:10.1016/j.pss.2011.07.017.
- (2011) **Sulfur in extraterrestrial bodies and the deep Earth.** Ebel, D.S. In *Sulfur in Magmas and Melts: Its Importance for Natural and Technical Processes*, ed. H. Behrens, J. D. Webster.
Reviews in Mineralogy & Geochemistry **73** Mineralogical Society of America, pp. 315-336.
- (2011) **Magnetic evidence for a partially differentiated carbonaceous chondrite parent body.**
Carporzen, L., B. P. Weiss, L. Elkins-Tanton, D. L. Schuster, Ebel, D., and J. Gattacceca
Proceedings of the National Academy of Sciences **108**: 6386-6389.
- (2010) **The solar system primordial lead.** Blichert-Toft, J., B. Zanda, D.S. Ebel, and F. Albarède.
Earth and Planetary Science Letters **300**: 152-163.
- (2010) **Far infrared spectroscopy of the carbonate minerals.** Brusentova, T.N., R. E. Peale, D. Maukonen, G. E. Harlow, J. S. Boesenberg, and D. S. Ebel. *American Mineralogist* **95**: 1515-1522.
- (2010) **Laser Scanning Confocal Microscopy of Comet Material in Aerogel.** Greenberg, M. and D. S. Ebel. *Geosphere* **6**: 515-523.
- (2009) **Incompletely compacted equilibrated ordinary chondrites.** Sasso, M.R., R.J. Macke, J.S. Boesenberg, D.T. Britt, M.L. Rivers, D.S. Ebel and J.M. Friedrich. *Meteoritics and Planetary Science* **44**: 1743-1753.
- (2009) **3-dimensional textural and compositional analysis of particle tracks and fragmentation history in aerogel.** Ebel D.S., M. Greenberg, M.L. Rivers and M. Newville. *Meteoritics and Planetary Science* **44**: 1445-1463.

- (2009) **Laser ablation - inductively coupled plasma - mass spectrometry and its application in geochemistry, cosmochemistry and environmental research.** Jochum K.P., B. Stoll, J.M. Friedrich, A. Marghalera, S. Becker, M. Dücking, D.S. Ebel, J. Enzweiler, H. Ming-yue, D. Kuzmin, R. Mertz-kraus, W.E.G. Müller, J. Regnery, A. Sobolev, X-h. Wang, and X. Zhan. *Rock and Mineral Analysis* **28**: 53-68.
- (2009) **The Fountain Hills impact modified CB chondrite and thermal history of the CB asteroid.** Weisberg, M.K., and D.S. Ebel. *Meteoritics and Planetary Science* **44**: 201-210.
- (2008) **Three-dimensional petrography of metal phases in equilibrated L chondrites – effects of shock loading and dynamic compaction.** Friedrich, J.M., D.P. Wignarajah, S. Chaudhary, M.L. Rivers, C.E. Nehru and D.S. Ebel. *Earth and Planetary Science Letters* **275**: 172-180.
- (2008) **Hf-W mineral isochron for Ca-Al-rich inclusions: Age of the solar system and the timing of core formation in planetesimals.** Burkhardt C., T. Kleine, B. Bourdon, H. Palme, J. Zipfel, J.M. Friedrich, and D.S. Ebel. *Geochimica et Cosmochimica Acta* **72**: 6177-6197.
- (2008) **Shape, metal abundance, chemistry and origin of chondrules in the Renazzo (CR) chondrite.** Ebel, D.S., M.K. Weisberg, M.K., J. Hertz, and A.J. Campbell. *Meteoritics and Planetary Science* **43**: 1725-1740.
- (2008) **The formation conditions of chondrules and chondrites.** Alexander, C.M.O'D., J.N. Grossman, D.S. Ebel and F.J. Ciesla. *Science* **320**: 1617-1619.
- (2008) **Pore size distribution in an uncompact equilibrated ordinary chondrite.** Friedrich J.M., R.J. Macke, D.P. Wignarajah, M.L. Rivers, D.T. Britt, and D.S. Ebel. *Planetary and Space Science*. **56**: 895-900.
- (2007) **Meteorite 3-dimensional synchrotron micro-tomography: Methods and applications.** Ebel, D.S. and M.L. Rivers. *Meteoritics and Planetary Science* **42**: 1627-1646.
- (2007) **Micromagnetic coercivity distributions and interactions in chondrules with implications for paleointensities of the early solar system.** Acton, G., Q.-Z. Yin, K. L. Verosub, L. Jovane, A. Roth, B. Jacobsen, and D. S. Ebel. *Journal of Geophysical Research* **112**, B03S90, doi: 10.1029/2006JB004655.
- (2007) **The origin of non-porphyritic pyroxene chondrules in UOCs: Liquid solar nebula condensates?** Engler, A., M.E. Varela, G. Kurat, D. Ebel, P. Sylvester. *Icarus* **192**: 248-286.
- (2006) **Comet 81P/Wild 2 under a microscope.** Brownlee, D. *et al.* *Science* **314**: 1711-1717.
- (2006) **Mineralogy and petrology of comet Wild 2 nucleus samples.** Zolensky, M.E. *et al.* (Stardust Mineralogy/Petrology Preliminary Examination Team) *Science* **314**: 1735-1739.
- (2006) **Thermochemistry of sulfide mineral solutions.** Sack, R. O., and D. S. Ebel. In *Sulfides*, ed. D. Vaughan, *Reviews in Mineralogy* **60**: 265-364. Mineralogical Society of America.
- (2006) **Chemical processes in CAIs: A mostly CMAS view of melting and crystallization.** Beckett, J., H.C. Connolly, and D.S. Ebel. In *Meteorites and the Early Solar System II*, (D. Lauretta *et al.*, eds.) University of Arizona, Tucson. p. 399-429.
- (2006) **Condensation of rocky material in astrophysical environments.** Ebel, D.S. In *Meteorites and the Early Solar System II*, (D. Lauretta *et al.*, eds.) University Arizona, Tucson. p. 253-277.
- (2005) **Model evaporation of FeO-bearing liquids: Application to chondrules** Ebel, D.S. *Geochimica et Cosmochimica Acta* **69**: 3183-3193.

- (2005) **Spinel-bearing spherules condensed from the Chicxulub impact-vapor plume.**
Ebel, D.S. and L. Grossman. *Geology* **33**: 293-296.
- (2005) **Origin of high-Ag fahlores from the Galena Mine, Wallace, Idaho, USA.** Sack, R.O., R. Fredericks, L.S. Hardy, and D.S. Ebel. *American Mineralogist* **90**: 1000-1007.
- (2004) **Petrology and origin of amoeboid olivine aggregates in CR chondrites.** Weisberg, M.K., H.C. Connolly, Jr., and D.S. Ebel. *Meteoritics and Planetary Science*, **39**: 1741-1753.
- (2004) **Chondrule formation and protoplanetary disk heating by current sheets in non-ideal magnetohydrodynamic turbulence.** Joung, M.K.R., M-M. Mac Low, and D.S. Ebel. *Astrophysical Journal*, **606**: 532-541.
- (2004) **Cosmic rays, carbon dioxide and climate.** Rahmstorf, S., D. Archer, D.S. Ebel, O. Eugster, J. Jouzel, D. Maraun, Urs Neu, G.A. Schmidt, J. Severinghaus, A.J. Weaver, and J. Zachos. *EOS*, **85**: 38-41. (see also, response and reply, *EOS*, 48: 510-511).
- (2002) **Elemental and isotopic fractionation of Type B CAIs: Experiments, theoretical considerations, and constraints on their thermal evolution.** Richter, F.M., A.M. Davis, D.S. Ebel, and A. Hashimoto. *Geochimica et Cosmochimica Acta*, **66**: 521-540.
- (2002) **Formation of refractory inclusions by evaporation of condensate precursors.**
Grossman, L., D.S. Ebel, and S.B. Simon. *Geochimica et Cosmochimica Acta* **66**: 145-161.
- (2001a) **Condensation from supernova gas made of free atoms.**
Ebel, D.S. and L. Grossman. *Geochimica et Cosmochimica Acta* **65**: 469-477.
- (2000) **Major element chemical and isotopic compositions of refractory inclusions in C3 chondrites: The separate roles of condensation and evaporation.**
Grossman, L., D.S. Ebel, S.B. Simon, A.M. Davis, F.M. Richter, and N.M. Parsad. *Geochimica et Cosmochimica Acta*, **64**: 2879-2894.
- (2000) **Condensation in dust-enriched systems.**
Ebel, D.S. and L. Grossman. *Geochimica et Cosmochimica Acta* **64**: 339-366.
- (2000) **Variations on solar condensation: Sources of interstellar dust nuclei.**
Ebel, D.S. *J. Geophysical Res. (Space Physics)* **105**: 10363-10370, part of a special section on *Interstellar Dust and the Heliosphere*.
- (2000) **Gibbs energy minimization in gas + liquid + solid systems.**
Ebel, D.S, Mark S. Ghiorso, R.O. Sack, and L. Grossman. *J. Computational Chem.* **21**: 247-256.
- (2000) **Complexly zoned Cr-Al spinel found *in situ* in the Allende meteorite.**
S.B. Simon, K.D. McKeegan, D.S. Ebel, and L. Grossman. *Meteor. Planet. Sci.*, **35**: 215-227.
- (1997) **Fractional crystallization of sulfide melts as illustrated at Noril'sk and Sudbury.**
Naldrett, A.J., D.S. Ebel, M. Asif, G. Morrison, and C. Moore. *European J. Mineralogy* **9**: 365-377.
- (1997) **Crystallization of sulfide liquids and the interpretation of ore composition.**
Ebel, D.S. and A.J. Naldrett. *Canadian Journal of Earth Sciences* **34**: 352-365.
- (1996) **Fractional crystallization of sulfide ore liquids at high temperatures.**
Ebel, D.S. and A.J. Naldrett. *Economic Geology* **91**: 607-621.
- (1996) **Petrogenesis of the flood-basalt sequence at Nori'l'sk, north central Siberia.**

Fedorenko, V.A., P.C. Lightfoot, A.J. Naldrett, G.K. Czamanske, C.J. Hawkesworth, J.L. Wooden, and D.S. Ebel. *International Geology Review* **38**: 99-135.

(1994) **Experimental determination of the free energy of formation of freibergite fahlore.**

Ebel, D.S. and R.O. Sack. *Geochimica et Cosmochimica Acta* **58**: 1237-1242.

(1993) **As-Sb exchange energies in tetrahedrite-tennantite fahlores and bournonite-seligmannite solid solutions.** Sack, R.O. and D.S. Ebel. *Mineralogical Magazine* **57**: 635-642.

(1993) **Thermodynamics of Fahlore (Tetrahedrite) and Biotite Mineral Solutions.**

Ebel, D.S. Ph.D. Dissertation, Purdue University.

(1991) **Arsenic-silver incompatibility in fahlore.**

Ebel, D.S. and R.O. Sack. *Mineralogical Magazine* **55**, 521-528.

(1989) **Ag-Cu and As-Sb exchange energies in tetrahedrite-tennantite fahlores.**

Ebel, D.S. and R.O. Sack. *Geochimica et Cosmochimica Acta* **53**: 2301-2309.

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Ebel, D.S. M.S. Thesis (unpublished), Purdue University.

(1987) **Tennahedrite thermochemistry and metal zoning.**

Sack, R.O., D.S. Ebel, and M.J. O'Leary. In *Chemical Transport in Metasomatic Processes*. Ed. H.C. Helgeson. *D. Reidel*, Dordrecht, Holland, p. 701-731.

EXTENDED ABSTRACTS

(two pages; find at, e.g., <http://www.lpi.usra.edu/meetings/lpsc200x/pdf/abs#.pdf>)

(2011) **Laboratory far-IR spectroscopy of minerals: Providing the data for IR missions analysis.**

Brusentsova, T., R.E. Peale, D. Maukonen, P. Figueiredo, G. Harlow, D. Ebel, C.M. Lisse. *Lunar and Planetary Science XLII*, Abs. #1457 (poster).

(2011) **Diffusion within the CAI bocce ball 1: The redistribution of ²⁶Mg* correlated with variations in Al/Mg within a Type B2 inclusion from Allende.** Connolly, H.C. Jr., G.R. Huss, A.

Shahar, K. Nagashima, E.D. Young, D.S. Ebel, M.K. Weisberg, J.R. Beckett, J.M. Paque, C. Ma, and G.R. Rossman. *Lunar and Planetary Science XLII*, Abs. #1858 (oral).

(2011) **CAI precursor compositions computed from Si and Mg isotope measurements.** Ebel, D.S.,

F.M. Richter, and E.D. Young. *Lunar and Planetary Science XLII*, Abs. #2787 (oral).

(2011) **3D fluorescent and reflective imaging of whole Stardust tracks in aerogel.** Greenberg, M.,

and D.S. Ebel. *Lunar and Planetary Science XLII*, Abs. #2640 (oral).

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Ebel. *Lunar and Planetary Science XLII*, Abs. #1297 (poster).

(2011) **Renewed search for FUN (fractionated and unidentified nuclear effects) in primitive chondrites.** Tollstrup D.L., J.B. Wimpenny, Q.-Z. Yin, D.S. Ebel, B. Jacobsen, I.D. Hutcheon. *Lunar*

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(2011) **Iridium anomaly in the Ivanhoe Creek section, New Jersey Coastal Plain K/Pg boundary.**

Troiano, J., D.S. Ebel, J.M. Friedrich, N.H. Landman, J.S. Boesenberg, and J.N. Bigolski. *Lunar and Planetary Science XLII*, Abs. #2733 (poster).

(2011) **Petrology and oxygen isotopes of NWA 5492, a new metal-rich chondrite.** Weisberg M.K.,

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- (2010) **Nondestructive XRF and quantitative volumetric image analysis of Stardust tracks 140, 151 & 152.** Greenberg, M. and D.S. Ebel. *Lunar and Planetary Science XLI*, Abs. #2346 (poster).
- (2010) **X-ray image analysis of clast size and abundance in Acfer 094.** Konrad, K., S.V. McKnight, and D.S. Ebel. *Lunar and Planetary Science XLI*, Abs. #1447 (poster).
- (2010) **Near-far IR spectra of sulfide minerals relevant to comets.** Moriarty, D., C.A. Hibbitts, C.M. Lisse, M.D. Dyar, G. Harlow, D. Ebel, and R. Peale. *Lunar and Planetary Science XLI*, Abs. #2447.
- (2010) **The American Museum of Natural History mineral library for spectroscopic standards.** Nissinboim, A., D.S. Ebel, G.E. Harlow, J.S. Boesenberg, K.M. Sherman, E.R. Lewis, T.N. Brusentsova, R.E. Peale, C.M. Lisse, C.A. Hibbitts. *Lunar and Planetary Science XLI*, Abs. #2518 (poster).
- (2010) **Methods for direct measurement of chondrule size, morphology and density.** Sherman, K.M., J.M. Friedrich, D.S. Ebel, and M.S. Rivers. *Lunar and Planetary Science XLI*, Abs. #2313 (poster).
- (2010) **Laboratory experiments bearing on the evolution of Type IA and IIA chondrules.** Richter, F.M., R.A. Mendybaev, J. Christensen, and D. Ebel. *Lunar and Planetary Science XLI*, Abs. #2562.
- (2010) **Initial analysis of a refractory inclusion rich in CaAl_2O_4 from NWA 1934: Cracked egg.** Sweeney Smith, S.A., H.C. Connolly Jr., C. Ma, G.R. Rossman, J.R. Beckett, D.S. Ebel, D.L. Schrader. *Lunar and Planetary Science XLI*, Abs. #1877.
- (2010) **Petrology and oxygen isotopes of chondrules in the Kota Kota EH3 chondrite.** Weisberg, M.K., D.S. Ebel, M. Kimura, N.T. Kita and D. Nakashima. *Lunar Planet. Sci. XLI*, Abs. #1735 (oral)
- (2010) **A partially differentiated parent body for CV chondrites?** Weiss, B.P., L. Carporzen, L.T. Elkins-Tanton, D.L. Schuster, D.S. Ebel, J. Gattacceca, M.T. Zuber, J.H. Chen, D.A. Papanastassiou, R.P. Binzel, D. Rumble, and A.J. Irving. *Lunar and Planetary Science XLI*, Abs. #1688 (oral).
- (2010) **Magnetic tests for partially differentiated chondrite parent bodies.** Weiss, B.P., L. Carporzen, L.T. Elkins-Tanton, M.T. Zuber, D.L. Schuster, D.S. Ebel, and J. Gattacceca. *Chondrules: Their Role in Early Solar System History*, Abs. #8010.
- (2009) **Oxygen isotopic compositions of chondrules in E3 chondrites.** Weisberg, M.K., D.S. Ebel, H.C. Connolly Jr., N.T. Kita and T. Ushikubo. Workshop on Antarctic Meteorites, National Inst. Polar Research, Japan. in press (Abstract).
- (2009) **Abundance and size distribution of inclusions in CV3 chondrites by x-ray image analysis.** Ebel, D. S., K. Leftwich, C. E. Brunner, and M. K. Weisberg. *Lunar Planet. Sci. XL*, Abs. #2065.
- (2009) **Evidence for internally generated magnetic fields on the CV chondrite parent planetesimal.** Weiss, B. P., L. Carporzen, L. T. Elkins-Tanton, and D. S. Ebel. *Lunar Planet. Sci. XL*, Abs. #2237.
- (2009) **Experiments to confirm condensed phase assemblages predicted by equilibrium thermodynamic calculations in dust-enriched systems: Preliminary results.** Boesenberg, J. S., and D. S. Ebel. *Lunar Planet. Sci. XL*, Abs. #2125 (poster).
- (2009) **Petrologic - geochemical study of chondrules in enstatite chondrites.** Weisberg, M. K., D. S. Ebel, H. C. Connolly Jr., N. T. Kita and T. Ushikubo. *Lunar Planet. Sci. XL*, Abs. #1886 (oral).
- (2009) **^{53}Mn - ^{53}Cr systematics of Allende chondrules and $\epsilon^{54}\text{Cr}$ - $\Delta^{17}\text{O}$ correlation in bulk carbonaceous chondrites.** Yin, Q-Z., K. Yamashita, A. Yamakawa, R. Tanaka, B. Jacobsen, D. S. Ebel, I. D. Hutcheon, and E. Nakamura. *Lunar Planet. Sci. XL*, Abs. #2006 (oral).

- (2009) **Physical properties of incompletely compacted equilibrated ordinary chondrites: Implications for asteroidal structure and impact processing.** Sasso, M. R., R. J. Macke, D. T. Britt, M. L. Rivers, D. S. Ebel, and J. M. Friedrich. *Lunar Planet. Sci. XL*, Abs. #1670 (poster).
- (2009) **Status of a program monitoring optical lunar surface transients.** Crotts, A.P.S., A. Berger, G. Cecil, P. Cseresnjcs, D. Ebel, P. Hickon, M. Jone, T. Pfrommer, S. Marka, R. Morehead, J. Radebaugh and P. Schultz. *Lunar Planet. Sci. XL*, Abs. #2373 (poster).
- (2009) **Elemental and isotope fractionation of chondrule-like liquids by evaporation into vacuum.** Richter F. M., R. A. Mendybaev, J. Christensen, A. Gaffney, and D. S. Ebel. *Lunar Planet. Sci. XL*, Abs. #2321 (oral).
- (2009) **Nondestructive 3D confocal laser imaging with deconvolution of seven whole stardust tracks with complementary XRF and quantitative analysis.** M. Greenberg and D. S. Ebel. *Lunar Planet. Sci. XL*, Abs. #2124.
- (2008) **Paleontological and mineralogical evidence for a single K/T extinction impact at Chicxulub.** Ebel, D. S., M-M. Mac Low, and N. H. Landman. *Lunar Planetary Science XXXIX*, Abs. #1454.
- (2008) **Multiscale abundance and size distribution of inclusions in the Allende CV3 meteorite by x-ray image analysis of slabs.** Ebel, D. S., C. E. Brunner, and M. K. Weisberg. *Lunar Planetary Science XXXIX*, Abs. #2121.
- (2008) **Nondestructive 3D confocal laser imaging of stardust tracks in aerogel and deconvolution techniques.** Greenberg, M. and D. S. Ebel. *Lunar Planetary Science XXXIX*, Abs. #1800.
- (2008) **Origin of Na-, Al-, glass-rich chondrules in H, L, and LL chondrites.** Nehru, C. E., M. K. Weisberg, and D. S. Ebel. *Lunar Planetary Science XXXIX*, Abs. #1697.
- (2008) **Ultra-refractory attogram inclusions in comet dust - First condensates?** Brownlee D.E., D.J. Joswiak, G. Matrajt, J.P. Bradley, and D.S. Ebel. *Lunar Planetary Science XXXIX*, Abs. #1978.
- (2008) **Oxygen isotopes and the nature and origins of Type-II chondrules in CR2 chondrites.** Connolly, H. C. Jr., G. R. Huss, K. Nagashima, M. K. Weisberg, R. D. Ash, D. S. Ebel, D. L. Schrader and D. S. Laurretta. *Lunar Planetary Science XXXIX*, Abs. #1675.
- (2008) **Reassessing the conditions of chondrule formation.** Alexander, C. M. O'D., D. S. Ebel, F. Ciesla, and J. N. Grossman. *Lunar Planetary Science XXXIX*, Abs. #2440.
- (2007) **Microtomographic, petrologic and isotopic observations of the accretion histories of chondrules.** Ebel, D.S. N. Kita, T. Ushikubo, and M.K. Weisberg. Symposium on Antarctic Meteorites, National Institute of Polar Research, Japan. Invited talk June 2007.
- (2007) **Magnetic fields of the early solar system recorded in chondrules and meteorites: Insights from magnetic remanence and first-order reversal curve (FORC) measurements.** Acton, G., Q.-Z. Yin, K. L. Verosub, and D. S. Ebel. *Lunar Planetary Science XXXVIII*, Abstract #1711.
- (2007) **Do we need to reassess the formation conditions of chondrules?** Alexander C.M.O'D., J. N. Grossman, and D. Ebel. *Lunar Planetary Science XXXVIII*, Abstract #2012.
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GRANTS

- 2010 Principal Investigator, NASA Cosmochemistry Program (# NNX10AI42G)
"Thermochemical Histories of the Earliest Solar System Solids" (4 yrs).
- 2010 Co-Principal Investigator, NSF MRI-R2 equipment grant.
"Acquisition of a High Resolution CT-Scanner at the American Museum of Natural History" (3 yr)
- 2010 Principal Investigator, NASA LARS equipment grant (#NNX10AH06G)
"Partial Support for Upgrading a Laser Confocal Scanning Microscope for Non-destructive High-resolution 3D Imaging of Cmet Sample Tracks in Aerogel Returned by the Stardust Mission" (1 yr).
- 2008 Principal Investigator, NASA Cosmochemistry Program (# NNX09AE84G)
"Thermochemical and Petrological Exploration of the Earliest Solar System Solids" (1 yr)

- 2008 Principal Investigator, NASA SRLIDAP grant NNX09AC31G, (3 yr).
“Laser Confocal Microscopy and X-ray Fluorescence Analysis of Grains in Aerogel”
- 2008 Co-Principal Investigator, NSF Cyber-Enabled Discovery Initiative (Type I)
“Combined Global Physical, Chemical, and Mineralogical Models of Protoplanetary
Disks” PI: M-M. Mac Low, AMNH. (3 yrs)
- 2007 Co-Investigator, NASA Planetary Geology and Geophysics Program.
“Planetary Impact Ejecta and the Physico-Chemical Evolution of Expansion Plumes:
A Multidisciplinary Approach” PI: N. Artemieva, Planetary Science Institute.,
Tucson. (3 yrs)
- 2007 Co-Investigator, NASA Laboratory Astrophysics Program.
“Far-infrared Spectroscopy of Mineral Particles”
PI: R.E. Peale, U. Central Florida. (3 yrs)
- 2006 Principal Investigator, NASA SRLIDAP grant NNG06GE42G.
“Synchrotron X-ray Tomographic 3-dimensional Location of Particles
and Tracks in Whole Aerogel Tiles” (2 yrs)
- 2006 Principal Investigator, NASA Cosmochemistry grant NANG06GD89G.
“Thermochemistry and Petrology of Early Solar System Materials” (3 yrs)
- 2003 Team Lead, NASA Institutional Education/Public Outreach supplement
to grant NAG5-12855, “Outreach for Opening a New Hall of Meteorites
and Planetary Science at the American Museum of Natural History: Online
Guide, Open House, Teachers Institute”
- 2003 Principal Investigator, NASA Cosmochemistry grant NAG5-12855
“Thermochemistry and Petrology of Early Solar System Materials”
- 2001-2010 Principal Investigator, over 20 successful Advanced Photon Source synchrotron
beamtime proposals for x-ray computer-assisted microtomography (XR-CMT)
and x-ray fluorescence analysis (XRF).
- 1998-2001 Co-Investigator, NASA Cosmochemistry grant NAG5-4476
(PI: L. Grossman, U. Chicago)

AWARDS

- 2010 Elected Fellow, The Meteoritical Society
- 1992 Outstanding Graduate Student Award, Dept. of Earth and Atmospheric Sciences, Purdue
- 1988-1990 David Ross Graduate Fellowship, Purdue University Research Foundation
- 1982 Dedicated and Faithful Service Award, Dudley House, Harvard College

SOCIETY MEMBERSHIPS

- European Association of Geochemistry, since 2011
- Division of Planetary Sciences, American Astronomical Society, since 2006
- National Space Society, since 2001
- The Planetary Society, since 2001
- New York Academy of Sciences, since 2001
- The Meteoritical Society, since 1998 (elected fellow, 2010)

The Geochemical Society, since 1992
 American Geophysical Union, since 1987
 Geological Society of America, since 1986
 Mineralogical Society of America, since 1985
 American Association for the Advancement of Science, since 1985

INVITED SCIENTIFIC PRESENTATIONS (selected)

19 Jan 2012 Dept. of Physics and Astronomy, University of Rochester.
 9 Nov 2011 *MESSENGER: Constraints on Mercury's Origin*, 24th MESSENGER Science Team Mtg.
 25 Feb 2011 *Gas-Liquid-Solid Equilibria in Protoplanetary Disks: From Primitive Materials to Mercury's Origin*, Dept. of Geosciences, Princeton University.
 14 Aug 2010 *Earth, Meteorites, and the Dynamic Solar System*, Montauk Observatory, New York.
 19 Nov 2009 *Physical Processes in the Early Solar System: Evidence from Space Rocks*, NYU Physics.
 7 July 2009 *Constraints on Dust Processing and Accretion from Comet and Meteorite Petrology*, Gordon Research Conference: Origins of Solar Systems, invited speaker.
 9 June 2009 *Meteorites & Comets: Chemical Tracers of the Birth of the Solar System*, LI-American Chemical Society 19th High School Awards Dinner, St. Johns U.
 1 May 2009 *Science Return from Stardust and Genesis Missions*, Amateur Astronomers Assoc. of NY.
 1 April 2009 *Comet & Meteorite Constraints on Astrophysical Disk Models*, NASA Ames Research Lab.
 31 Mar 2009 *Meteorite Constraints on Solar System Models*, U. California, Berkeley.
 2 Feb 2009 *Chemical & Isotopic Histories of the Earliest Igneous Rocks*, U. Wisconsin, Madison.
 26 Feb 2008 *Meteorites: Entry point for Chemistry at AMNH*, Scientific Literacy /Scientific Frontiers Seminar group, Columbia U.
 20 Oct 2007 *Questions Raised by Stardust Mission Results*, Astronomical Society of New York.
 19 Oct 2007 *Meteorites: Evidence of Early Solar System Accretion*, American Physical Society NY section.
 7 June 2007 *Microtomographic, Petrologic and Isotopic Observations of the Accretion Histories of Chondrules*, Invited speaker, Symposium on Antarctic Meteorites, NIPR, Japan.
 10 Nov. 2006 *New Discoveries from Microtomography of Meteorites*, U. Chicago.
 28 May. 2005 Invited speaker, Symposium for John Wood, Harvard.
 23 Feb. 2005 *Spinel Condensates from the Chicxulub Impact Plume*, Arizona State U.
 22 Feb. 2005 *Condensation Chemistry of Protoplanetary Disks*, U. Arizona; Lunar Planet. Lab.
 23 Oct. 2003 *Science of the Arthur Ross Hall of Meteorites*, Curator Lecture, AMNH
 28 Feb. 2003 *Tomography of Meteorites*, Advanced Photon Source, Argonne National Lab
 20 Nov. 2002 *First Rocks in the Solar System*, Rutgers University.
 19 Aug. 2002 Invited talk, 12th Annual V.M. Goldschmidt Conference.
 15 Aug. 2002 Lecture, Institut für Mineralogie und Geochemie, Universität zu Köln.
 16 Jan. 2002 *Condensation, Crystallization, and Evaporation of Rocks in Astrophysical Environments*, Carnegie Institution of Washington.
 May 2001 Invited talk, 11th Annual V.M. Goldschmidt Conference.
 June 1999 Co-convenor, AGU session, *Magmatic Sulfide in the Crust, Mantle, Core*.
 Feb. 1999 *Spinel in Spherules at the K/T Boundary*, Geochem. Seminar, U. Chicago
 Oct. 1998 Invited talk, International Space Science Institute workshop, "Dust in the Local Interstellar Medium", Bern, Switzerland.

PROFESSIONAL SERVICE

2011 - 2013 Co-chair, theme team "Cosmochemistry and Planetary Science", 2013 Goldschmidt Conf.
 January 2011 Program committee, 42nd Lunar and Planetary Science Conference, Houston.
 2010-2011 Local Organizing Committee, 74th Meteoritical Society mtg., Greenwich, UK 2011.
 2009-2010 **Chair, Local Organizing Committee, 73rd Meteoritical Society mtg., New York 2010.**
 May 2010 Program committee, 73rd Annual Meteoritical Society Meeting, New York.
 January 2010 Program committee, 41st Lunar and Planetary Science Conference, Houston.
 January 2009 Program committee, 40th Lunar and Planetary Science Conference, Houston.
 2008, 2009 Judge, Nininger Award for best student paper, The Meteoritical Society (2 years).
 2007 - 2009 Chair, Audit Committee, The Meteoritical Society.
 2006 - present Participant (E/PO, Geochemistry Team), MESSENGER Science Team meetings.
 2003 - present NASA review panel member and chair service not disclosed, per confidentiality agreements.
 2002 - present NSF and NASA proposal review (external).
 2003 - present proposal review, PSC-CUNY grant program.
 Aug. 2000 Program committee, 63rd Annual Meteoritical Society Meeting, Chicago.
 2000 - present manuscript review for *Geochimica et Cosmochimica Acta*, *Computers and Geosciences*, *Mineralogical Magazine*, *Meteoritics and Planetary Science*, *American Mineralogist*, *National Academies Press*, *Canadian J. Earth Sci.*, *S. African J. Geology*, *PNAS*, and other journals.

EDUCATIONAL SERVICE (selected items, through October, 2011)

2011 - present Faculty, AMNH Masters of Arts in Teaching Program (Earth Sciences)
<http://www.amnh.org/education/mat/>

2011 - present Advisor, Ph.D. student J. Bigolski, CUNY (Earth & Environ. Sci.).

Jul 11- present Mentor, pre-doc intern A. White (B.S., Drexel), LCSM imaging of Stardust samples.

summer 2011 Mentor, summer research intern M. Hill, CT and SEM analysis of CO chondrites.

summer 2011 Mentor, summer research intern J. Bigolski, K/Pg boundary geochem. in NJ coastal plain..

summer 2011 Mentor, summer research intern J. Schoaf, petrology of CR chondrites (St. John's).

Mar 17, 2011 Organizer and host of MESSENGER orbital insertion public event, AMNH.

2010 - present Principal advisor, Ph.D. student E. Crapster-Pregont, Columbia U. (Earth & Environ. Sci.).

Sep 08-Aug 11 Mentor, pre-doc intern M. Greenberg (B.S., Brandeis), LCSM imaging of Stardust samples.

2008 - present Ph.D. committee member for C. McNally, Columbia U. (Astronomy).

2006 - present Ph.D. committee member for A. Buono, Columbia U. (Earth & Environmental Sci.).

Sep 05-present AMNH Education/Public Outreach representative, MESSENGER science team (Geochem.).

2001 - present Many TV, radio and newspaper interviews on meteorites, NASA missions, etc.

Sep 09-Sep 10 Co-mentor, student intern A. Nissinboim (Brooklyn Coll.), astrophys. spectroscopy sampling.

Aug 2010 Lecture/tour for teacher training program, AMNH (TRUST successor).

Jul 10-Sep 10 Mentor, pre-doc research, E. Crapster-Pregont, CAI petrology/cosmochemistry (Columbia).

Jun 10-Sep 10 Mentor, intern J. Bigolsky (MS), NJ K/T sequence strat. (Lecturer, CUNY Kingsborough).

summer 2010 Mentor, summer research intern I. Erb, petrology of CR chondrites (Wellesley).

summer 2010 Mentor, 'Research Experience for Undergraduates', M. Downen (W. KY U.).

summer 2010 Mentor, summer research intern R. Roberts, mapping chondrites by SEM (CUNY).

May 10-Aug 10 Mentor, pre-doc intern K. Konrad (B.A.), cosmochemistry sample analysis (U. Oregon).

Feb 10-Aug 10 Mentor, intern C-T. Hsieh (M.S., Oregon), chemical sedimentary history of NJ K/T sequence.

Sep 09-Sep 10 Mentor, undergrad intern E. Lewis (U. Chicago), meteorite/mineral spectra web databasing.

Dec 08-July 10 Mentor, pre-doc intern K. Sherman (Barnard), cosmochemistry sample analysis (U. Colorado).

Aug 07-Aug 10 Instructor of Record, AMNH teaching program with Lehman College (TRUST successor).

summer 2009 Mentor, student intern S. McKnight (Mt. Holyoke), cosmochemistry sample analysis.

summer 2009 Mentor, high-school intern P. Hein (Manhattan), cosmochemistry sample preparation.

summer 2009 Co-mentor, student intern A. Nissinboim (Brooklyn Coll.), astrophys. spectroscopy sampling.

summer 2009 Mentor, student intern S. Ramcharan (Columbia), Stardust sample imaging and S-XRF.

summer 2009 Mentor, 'Research Experience for Undergraduates', K. Konrad (CUNY-Queens).

Sep 08-Jun 09 Mentor, AMNH H.S. Science Research program, M. Lu (Stuyvesant HS), meteorite petrology.

Sep 08-Jun 09 Mentor, AMNH H.S. Science Research program, I. Erb (home school), meteorite petrology.

July 2008 Lectures/tours (4) for 'TRUST' teacher training program, AMNH.

summer 2008 Mentor, high-school interns C. O'Rourke and M. Leventhal.

summer 2008 Mentor, student intern M. Greenberg (Brandeis U.), imaging of Stardust samples

summer 2008 Mentor, 'Research Experience for Undergraduates' K. Leftwich (W. KY U.)

summer 2008 Co-mentor, student intern A. Nissinboim (Brooklyn Coll.), astrophys. spectroscopy sampling.

26 May 2008 Mars Phoenix Lander public Q&A event in Rose Center

May 08-Aug 09 **Co-curator, AMNH/Cornell exhibition, *Saturn: Images from the Cassini Mission.***

February 2009 Co-author with N. deG. Tyson 'Solar System' on-line Seminars in Science course
<http://www.amnh.org/learn/solar>

summer 2007 Mentor, intern M. Greenberg (Brandeis U.), imaging of Stardust samples

summer 2007 Mentor, 'Research Experience for Undergraduates' C. Brunner (W. KY U.)

summer 2007 Mentor, high-school interns G. Lutzky and J. Finkelstein.

2002 - 2007 Ph.D. committee member for J. Boesenberg, Rutgers U. (Geology).

August 2006 Lectures/tours (3) for 'TRUST' teacher training program, AMNH.

Nov 04-Aug 06 Mentor, AMNH post-doctoral Kalbfleisch fellow, Dr. Jon Friedrich
(now Asst. Professor of Chemistry, Fordham University, New York)

7-9 July 2006 Invited guest and speaker, First Annual Meteorite Festival, Haviland, Kansas.

July 2006 Lectures/tours (3) for 'TRUST' teacher training program, AMNH.

summer 2006 Mentor, summer interns J. Wittenzellner (Wells College), J. Oram (Oberlin)

summer 2006 Mentor, 'Research Experience for Undergraduates' H. Rodriguez (U. TX El Paso)

July 2005 Lectures/tours (3) for 'TRUST' teacher training program, AMNH.

summer 2005 Mentor, summer H.S. intern A. Bergin

summer 2005 Mentor, 'Research Experience for Undergraduates' J. Bigolski.

summer 2005 Mentor, summer student S. Hylton (currently at SUNY Stony Brook)

April 2005 Appearance in History Channel special, *Meteors: Fire from the Sky.*

31 Mar 2005 Tour and presentations to 'Members Open House', AMNH.

3 Jan 2005 Tour and presentation to AMNH Urban Advantage student group.

2 Nov 2004 Tour and presentation for teacher development workshops (2 groups of 15)

Oct 04-Jun 05 Senior thesis advisor, S. Hylton, MIT (with Dr. T. Grove, Geology)

Aug 2004 Presentation to NASA - SHARP program student group.

July 2004 Lectures/tours (3) for 'TRUST' teacher training program, AMNH.

2 July 2004 Tour and presentation for Grand Ronde student interns.

1 July 2004 Tour and presentation for summer Saltz cart student intern hall explainers.

4-6 Apr 2004 K-6, Middle, High School, and public lectures, Barrow AK.

summer 2004 Mentor, 'Research Experience for Undergraduates' S. Baughman and S. Hylton

Oct 03 - Jun 04 Mentor, AMNH 'Inside View' high school intern J. Laverde

Jan - Mar 2004 Mentor, Annette-Kade graduate fellow T. Shoenbeck (U. Cologne)

Jan 24-25 2004 Conducted institute for ~40 teachers at AMNH (see grants, above)

9 Jan. 2004 Lecture, Westchester Amateur Astronomers Assoc.

3 Oct. 2003 Lecture, Amateur Astronomers Assoc. of New York
2002 - 2003 **Lead Curator, new Arthur Ross Hall of Meteorites, AMNH.**
summer 2003 Mentor, 'Research Experience for Undergraduates' student N. Costello
Sep-Oct 2003 Mentor, Ph.D. visiting scholar A. Engler, U. Vienna
summer 2002 Mentor, CUNY student in "Precollege Science Collaborative Program"
summer 2002 Mentor, college intern J. Murray (Colgate U.)
2001 - 2003 Mentor, high school intern J. Hertz (Columbia Prep., Columbia '07)

MUSEUM COMMITTEES

Sep 10 - present Executive Committee of the AMNH Scientific Senate
Sep 10 - present Chair, Science Support Committee of the AMNH Scientific Senate
Sep 10 - present Finance and Compensation Committee of the AMNH Scientific Senate
Sep 08 - Sep 10 Appointments and Promotions Committee of the AMNH Scientific Senate
Sep 07 - Sep 10 Microscopy & Imaging Facility Committee of the AMNH Scientific Senate
Sep 07 - Sep 10 Exhibitions Review Committee of the AMNH Scientific Senate
Sep 04 - Sep 10 Information Technology Committee of the AMNH Scientific Senate
Spring 2004 Astrophysics Curatorial Search Committee
Jan 02 - Jul 08 Chair, Shop Advisory Committee of the AMNH Scientific Senate.
Sep 01 - Jan 02 Shop Advisory Committee of the AMNH Scientific Senate

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