

HOPE A. ISHII

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EDUCATION**PhD, Stanford University, 2002** in Materials Science & Engineering

Dissertation: The Chemically-Specific Structure of an Amorphous Molybdenum-Germanium Alloy by Anomalous X-ray Scattering. (Advisor: Prof. Arthur Bienenstock)

MS with Distinction, Chalmers University of Technology, 1995

in Physics & Engineering Physics (Teknisk Fysik, Gothenburg, Sweden)

Dissertation: Prevention of Field-Induced Rotational Instabilities in Chiral Smectic Liquid Crystals by Incorporation of Polymer Network. (Advisor: Prof. Sven Lagerwall)

BS with Honors, Cornell University, 1994 in Materials Science & Engineering

Honors Thesis: Solvent Intercalation in Organically-Modified Fluorohectorite as a Model for Direct Melt Intercalation. (Advisor: Prof. Emmanuel Giannelis)

RESEARCH INTERESTS

- Formation, evolution, migration and inter-relationships among small solar system bodies from rocky asteroids to icy comets; Processing, incorporation and modification of interstellar dust during early solar system accretion and potential repositories of recognizable presolar and interstellar dust; Radiolysis effects in primitive materials.
- Chemical, isotopic and petrographic analysis of natural, and technological materials using micro- and nano-beam techniques; Focused ion beam, synchrotron x-ray, scanning electron and aberration-corrected (scanning) transmission electron microscopies and spectroscopies.

RESEARCH AND INDUSTRY APPOINTMENTS

2014 (Jan) – present **Associate Researcher, UH Mānoa**
 Hawaii Institute of Geophysics and Planetology

2014 (July) – present **Director, Advanced Electron Microscopy Center, UH Mānoa**

2016 (Dec) – present **Cooperating Graduate Faculty, UH Mānoa**
 Department of Geology and Geophysics

2017 (Nov) – present **Cooperating Graduate Faculty, UH Mānoa**
 Department of Mechanical Engineering

- Micro- and nano-analysis of extraterrestrial material to investigate origins and processing of early solar system solids, especially NASA and JAXA comet and asteroid samples.
- Established the Advanced Electron Microscopy Center at UH with a NASA-funded Titan monochromated and aberration-corrected (scanning) transmission electron microscope and a Helios 660 DualBeam focused ion beam instrument.

- 2014 – present** **Affiliate, Lawrence Berkeley National Laboratory**
National Center for Electron Microscopy
- High solid angle chemical mapping of fine-grained extraterrestrial materials
 - Electron energy-loss spectroscopy on extraterrestrial materials
- 2006 – 2013** **Physicist (permanent), Lawrence Livermore National Laboratory**
2004 – 2005 **Postdoctoral Researcher, Lawrence Livermore National Laboratory**
Institute of Geophysics and Planetary Physics
- PI on >\$3M in NASA research grants.
 - Nano-analysis on comet dust and interplanetary dust by electron microscopy, synchrotron x-ray methods and isotope analyses; Consortium study of the first CAI found in comet dust; Studies of meteorite components with isotope anomalies; Radiation interactions with fine-grained solar system solids.
 - NASA Stardust Preliminary Examination Team member; invented aerogel cutting method implemented at NASA JSC for Stardust sample curation.
 - Chemical forensics on particulates and oxidation layers for the attribution of smuggled nuclear materials, funded by NNSA Office of Defense Nuclear Nonproliferation.
 - DOE Q-level security clearance.
- 2002 – 2003** **Advisory Engineer/Scientist, IBM & Hitachi Global Storage Tech.**
- Substrate development on next-next-generation hard drive magnetic media
- 2002 (July) – 2002 (Sept)** **Postdoctoral Researcher, Stanford Synchrotron Radiation Lab**
1995 – 2002 (May) **Graduate Research Assistant, SSRL & Stanford University**
- Local atomic structure (chemically-specific pair distribution functions) of an unusual amorphous alloy to understand its role in phase separation; Improved anomalous x-ray scattering reliability by exclusion of inelastic scattering.
- 1995 – 1996** **Research Intern, Hewlett-Packard Co.**
1993 (summer), 1994 (summer) HP Labs Materials Characterization
- Established lab's total x-ray fluorescence (TXRF) and scanning tunneling microscopy (STM) capabilities.
 - Inorganic and polymeric LED materials, interconnect metallurgy, baseline wafer cleanliness analyses using STM, AFM, TEM, TXRF and S-XRF.
- 1992 – 1993 (winter)** **Engineering Assistant, Naval Research Labs**
1992 (summer) Nanoprocessing Facility
- Magnetron sputtering, SEM and e-beam lithography for microelectronics research.

CITATIONS

Published papers: **43** (1 >1500 citations, 4 >500 citations, 9 >100 citations), Cumulative citations: ~ **5382**. h-index: **20** and i10-index: 34 (*Statistics from Google Scholar, August 2018*)

PUBLICATIONS

* Names of student and postdoc authors on work done fully or partially under H.A. Ishii's supervision are underlined.

IN PREPARATION

45. Ishii, H.A. and Bradley, J.P. (in preparation) "High resolution elemental mapping reveals subtle terrestrial alteration effects that alter bulk chemistry of interplanetary dust components", for submission to *Geochimica et Cosmochimica Acta*.
44. Ishii, H.A., Bonal, L., Bradley, J.P., Krot A.N., Nagashima K., Huss G. and N. Teslich (in preparation) "Transmission electron microscopy study of regions carrying extreme and moderate 15-nitrogen isotope anomalies in the CH/CB-like meteorite Isheyevo", for submission to *Geochimica et Cosmochimica Acta*.

UNDER SUBMISSION

43. Cheng Z., Gillis-Davis J.J., Crandall P.B., Ishii H.A., Bradley J.P., Corley L. and Kaiser R.I. (2018) The formation and liberation of lunar water by dual solar wind irradiation and micrometeorite impact. *Science Advances*, submitted June 2018.

REFEREED PUBLICATIONS

42. Ishii H.A. (2018) Comparison of GEMS in interplanetary dust particles and GEMS-like objects in a Stardust impact track in aerogel. *Meteoritics and Planetary Science*, published online in Early View on 4 August, 2018. doi:10.1111/maps.13182.
41. Ishii H.A., Bradley J.P., Bechtel H.A., Brownlee D. E., Bustillo K., Ciston J., Cuzzi J. N., Floss C. and Joswiak D. (2018) Multiple generations of grain aggregation in different environments preceded solar system body formation. *Proceedings of the National Academy of Sciences*, 115 (26) 6608-6613. doi: 10.1073/pnas.1720167115.
40. Wozniakiewicz P.J., Kearsley A.T., Burchell M.J., Price M.C., Ishii H.A. and Cole M.J. (2018) Preparation of large Stardust aluminum foil craters for analysis. *Meteoritics and Planetary Science*, 53, 1066-1080. doi: 10.1111/maps.13052.
39. Westphal, A. J., Bridges, J. C., Brownlee, D. E., Butterworth, A. L., De Gregorio, B. T., Dominguez, Z., Flynn, G., Gainsforth, G. J., Ishii, H. A., Joswiak, D., Nittler, L. R., Ogliore, R. C., Pepin, R. O., Palma, R., Stephan, T. and Zolensky, M. E. (2017) The Future of Stardust Science. *Meteoritics and Planetary Science*, 52, 1859-1898. doi: 10.1111/maps.12893.
38. Wooden D. H., Ishii H. A. and Zolensky M. E. (2017) Cometary Dust: The Diversity of Primitive Refractory Grains. *Royal Society Philosophical Transactions A*, A375: 20160260. doi: 10.1098/rsta.2016.0260.
37. Kaluna, H.M., Ishii, H.A., Bradley J.P., Gillis-Davis, J.J. and Lucey P.G. (2017) Simulated Space Weathering of Fe- and Mg-rich Aqueously Altered Minerals Using Pulsed Laser Irradiation. *Icarus*, 292, 245-258. doi: 10.1016/j.icarus.2016.12.028.

36. Gillis-Davis J.J., Lucey P.G., Bradley J.P., **Ishii** H.A., Kaluna K.M., Misra A. Connolly Jr. H.C. (2017) Incremental laser space weathering of Allende reveals non-lunar like space weathering effects. *Icarus* 286, 1-14. doi: 10.1016/j.icarus.2016.12.031.
35. Radecka, Anna; Dye, David; Bagot, Paul A.; Martin, Thomas L.; Coakley, James; Vorontsov, Vassili A.; Moody, Mike P.; **Ishii**, Hope; Rugg, David (2015) The formation of ordered clusters of Ti-7Al and Ti-6Al-4V: a combined TEM and atom probe tomography study. *Acta Materialia* 112, 141-149. doi: 10.1016/j.actamat.2016.03.080.
34. Wozniakiewicz P.J., **Ishii** H.A., Kearsley A.T., Bradley J.P., Price M.C., Burchell M.J., Teslich N., Cole M.J. (2015) The survivability of phyllosilicates and carbonates impacting Stardust Al foils: Facilitating the search for cometary water. *Meteoritics and Planetary Science* 50, 2003-2023, doi:10.1111/maps.12568.
33. Hallis L.J., **Ishii** H.A., Bradley J.P. and Taylor G.J. (2014) Transmission electron microscope analyses of alteration phases in martian meteorite MIL090032. *Geochimica et Cosmochimica Acta*, 134, 275-288. doi: 10.1016/j.gca.2014.02.007.
32. Bradley J.P., **Ishii** H.A., Gillis-Davis J.J., Ciston J., Nielsen M.H., Bechtel H.A. and Martin M.C. (2014) Detection of solar wind-produced water in irradiated rims on silicate minerals. *Proceedings of the National Academy of Sciences*, 111 (5), 1732-1735. doi:10.1073/pnas.1320115111.
31. Wozniakiewicz P.J., Bradley J.P., **Ishii** H.A., Price M.C. and Brownlee D.E. (2013) Pre-accretional sorting of grains in the outer solar nebula. *The Astrophysical Journal*, 779(2), 164(6pp). doi:10.1088/0004-637X/779/2/164. doi: 10.1088/0004-637X/779/2/164.
30. Wozniakiewicz P.J., Bradley J.P., **Ishii** H.A., Brownlee D.E., Kearsley A.T., Burchell M.J. and Price M.C. (2012) Grain sorting in cometary dust from the Outer Solar Nebula. *The Astrophysical Journal Letters*, 760, L23(6pp). doi:10.1088/2041-8205/760/2/L23. doi: 10.1088/2041-8205/760/2/L23.
29. Zinin P.V., Ming L.C., **Ishii** H.A., Jia R., Acosta T. and Hellebrand E. (2012) Phase Transition in BC_x system under High-Pressure and High-Temperature: Synthesis of Cubic Dense BC₃ Nanostructured Phase. *Journal of Applied Physics*, 111, 114905. doi: 10.1063/1.4723275.
28. Wozniakiewicz P.J., **Ishii** H.A., Kearsley A.T., Burchell M.J., Bradley J.P., Price M.C., Teslich N., Lee M.R. and Cole M.J. (2012) Stardust Impact Analogues: Resolving Pre- and Post-Impact Mineralogy in Stardust Al Foils. *Meteoritics and Planetary Science*, 47, 708-728. doi: 10.1111/j.1945-5100.2012.01338.x.
27. Wozniakiewicz P.J., Kearsley A.T., **Ishii** H.A., Burchell M.J., Bradley J.P., Teslich N. and Cole M.J. (2012) The origin of crystalline residues in Stardust Al foils: Surviving cometary dust or crystallized impact melts? *Meteoritics and Planetary Science*, 47, 660-670. doi: 10.1111/j.1945-5100.2011.01328.x.
26. Kearsley A.T., Burchell M.J., Price M.C., Cole M.J., Wozniakiewicz P.J., **Ishii** H.A., Bradley J.P., Fries M. and Foster N.J. (2012) Experimental impact features in Stardust aerogel: how track morphology reflects particle structure, composition and density. *Meteoritics and Planetary Science*, 47, 737-762. doi: 10.1111/j.1945-5100.2012.01363.x.
25. Wozniakiewicz P.J., **Ishii** H.A., Kearsley A.T., Burchell M.J., Bland P.A., Bradley J.P., Dai Z., Teslich N., Collins G.S., Cole M.J. and Russell S.S. (2011) Investigation of iron sulfide impact crater residues: a combined analysis by scanning and transmission electron

- microscopy. *Meteoritics and Planetary Science*, 46, 1007-1024. doi: 10.1111/j.1945-5100.2011.01206.x.
24. Jacobsen B., Matzel J., Hutcheon I.D., Krot A.N., Yin Q.-Z., Nagashima K., Ramon E.C., Weber P.K., **Ishii** H.A. and Ciesla F.J. (2011) Formation of the short-lived radionuclide ^{36}Cl in the protoplanetary disk during late-stage irradiation of a volatile reservoir. *Astrophysical Journal Letters*, 731, article id. L28. doi: 10.1088/2041-8205/731/2/L28.
 23. Bonal L., Huss G.R., Krot A.N., Nagashima K., **Ishii** H.A., Bradley J.P. and Hutcheon I.D. (2010) Highly ^{15}N -enriched chondritic clasts in the Isheyevo meteorite. *Geochimica et Cosmochimica Acta* 74, 6590-6609. doi: 10.1016/j.gca.2010.08.017.
 22. **Ishii** H.A., Krot A.N., Bradley J.P., Keil K., Nagashima K., Teslich N., Jacobsen B., Yin Q.-Z. (2010). Discovery, mineral paragenesis, and origin of wadalite in a meteorite, *American Mineralogist* 95, 440-448. doi: 10.2138/am.2010.3296.
 21. Matzel J.E.P., **Ishii** H.A., Joswiak D., Hutcheon I.D., Bradley J.P., Brownlee D., Weber P.K., Teslich N., Matrajt G., McKeegan K.D., MacPherson G.J. (2010) Constraints on the formation age of cometary material from the NASA Stardust mission. *Science* 328, 483-486. doi: 10.1126/science.1184741.
 20. Chi M., **Ishii** H.A., Simon S.B., Bradley J.P., Dai Z.R., Joswiak D., Browning N.D. and Matrajt G. (2009) The origin of refractory minerals in Comet 81P/Wild 2. *Geochimica et Cosmochimica Acta* 73, 7150-7161. doi: 10.1016/j.gca.2009.08.033.
 19. Paque J.M., Beckett J.R., **Ishii** H.A., Toppani A., Burnett D.S., Teslich N. and Bradley J.P. (2009) The formation of boundary clinopyroxenes and associated glass veins in Type B1 CAIs. *Meteoritics and Planetary Science* 44, 665-687. doi: 10.1111/j.1945-5100.2009.tb00762.x.
 18. Simon S.B., Joswiak D.J., **Ishii** H.A., Bradley J.P., Chi M., Grossman L., Aléon J., Brownlee D.E., Fallon S., Hutcheon I.D., Matrajt G. and McKeegan K.D. (2008) A refractory inclusion returned by Stardust from comet 81P/Wild 2. *Meteoritics and Planetary Science*, 43, 1861-1877. doi: 10.1111/j.1945-5100.2008.tb00648.x.
 17. Bradley J.P. and **Ishii** H.A. (2008) Comment on “The Shape and Composition of Interstellar Silicate Grains”. *Astronomy & Astrophysics*, 486, 781-784. doi: 10.1051/0004-6361:20078710.
 16. **Ishii** H.A., Bradley J.P., Dai Z.R., Chi M., Kearsley A.T., Burchell M.J., Browning N.D. and Molster F. (2008) Comparison of Comet 81P/Wild 2 Dust with Interplanetary Dust from Comets. *Science*, 319, 447-450. doi: 10.1126/science.1150683.
 15. Graham G.A., Teslich N.E., Kearsley A.T., Stadermann F.J., Stroud R.M., Dai Z.R., **Ishii** H.A., Hutcheon I.D., Bajt S., Snead C.J., Weber P.K. and Bradley J.P. (2008) Applied focused ion beam techniques for sample preparation of astromaterials for integrated nano-analysis. *Meteoritics and Planetary Science* 43, 561-569. doi: 10.1111/j.1945-5100.2008.tb00672.x.
 14. Zolensky M., Nakamura-Messenger K., Rietmeijer F., Leroux H., Mikouchi T., Ohsumi K., Simon S., Grossman L., Stephan T., Weisberg M., Velbel M., Zega T., Stroud R., Tomeoka K., Ohnishi I., Tomioka N., Nakamura T., Matrajt G., Joswiak D., Brownlee D., Langenhorst F., Krot A., Kearsley A., **Ishii** H., Graham G., Dai Z.R., Chi M., Bradley J., Hagiya K., Gounelle M. and Bridges J. (2008) Comparing Wild 2 particles to chondrites and IDPs. *Meteoritics and Planetary Science* 43, 261-272. doi: 10.1111/j.1945-5100.2008.tb00621.x.
 13. **Ishii** H.A., Brennan S., Bradley J.P., Luening K., Ignatyev K. and Pianetta P. (2008) Recovering the elemental composition of Comet Wild 2 dust in five Stardust impact tracks

- and terminal particles in aerogel. *Meteoritics and Planetary Science* 43, 215-231. doi: 10.1111/j.1945-5100.2008.tb00618.x.
12. Stardust Preliminary Examination Team, D.E. Brownlee... **Ishii** H. ... et al. (183 authors) (2006) Comet 81P/Wild 2 under a microscope. *Science*, 314, 1711-1716. doi: 10.1126/science.1135840.
 11. Stardust Bulk Chemistry Subteam, Flynn G.J. ... **Ishii** H.A. ... et al. (80 authors) (2006) Elemental composition of Comet 81P/Wild 2 samples collected by Stardust. *Science*, 314, 1731-1735. doi: 10.1126/science.1136141.
 10. Stardust Mineralogy / Petrology Subteam, Zolensky M.E. ... **Ishii** H. ... et al. (75 authors) (2006) Mineralogy and petrology of Comet Wild-2 nucleus samples. *Science*, 314, 1735-1739. doi: 10.1126/science.1135842.
 9. Stardust Isotopes Subteam, K.D. McKeegan... **Ishii** H. ... et al. (47 authors) (2006) Isotopic compositions of cometary matter returned by Stardust. *Science*, 314, 1724-1728. doi: 10.1126/science.1135992.
 8. Stardust Craters Subteam, F. Hörz... **Ishii** H. ... et al. (44 authors) (2006) Impact features on Stardust: Implications for Comet 81P/Wild 2 dust. *Science*, 314, 1716-1719. doi: 10.1126/science.1135705.
 7. **Ishii** H.A. and Bradley J.P. (2006) Macroscopic subdivision of silica aerogel collectors for sample return missions", *Meteoritics and Planetary Science* 41, 233-236. doi: 10.1111/j.1945-5100.2006.tb00206.x.
 6. **Ishii** H.A., Graham G.A., Kearsley A.T., Grant P.G., Snead C.J. and Bradley J.P. (2005) Rapid extraction of dust impact tracks from silica aerogel by ultrasonic micro-blades. *Meteoritics and Planetary Science* 40, 1741-1747. doi: 10.1111/j.1945-5100.2005.tb00141.x.
 5. Bradley J.P., Dai Z.R., Erni R., Browning N., Graham G., Weber P., Smith J., Hutcheon I., **Ishii** H., Bajt S., Floss C., Stadermann F. and Sandford S. (2005) An astronomical 2175 angstrom feature in interplanetary dust particles. *Science*, 307, 244-247. doi: 10.1126/science.1106717.
 4. **Ishii** H., Johnson B. and Brennan S. (2004) Performance of a dispersive analyzer for anomalous scattering measurements of amorphous materials. *AIP Conference Proceedings* 705, 969-972. doi:10.1063/1.1757958.
 3. **Ishii** H., Brennan S. and Bienenstock A. (2002) Towards the chemically specific structure of amorphous materials: anomalous X-ray scattering from a molybdenum-germanium alloy. *Journal of Non-Crystalline Solids* 299-302, 243-248. doi:10.1016/S0022-3093(01)01164-4
 2. Rosner S.J., Carr E.C., Ludowise M.J., Girolami G. and [**Ishii**] Erikson H. (1997) Correlation of cathodoluminescence inhomogeneity with microstructural defects in epitaxial GaN grown by metalorganic chemical-vapor deposition. *Applied Physics Letters* 70, 420. doi: 10.1063/1.118322.
 1. Vaia R.A., **Ishii** H. and Giannelis E.P. (1993) Synthesis and properties of two-dimensional nano-structures by direct intercalation of polymer melts in layered silicates. *Chemistry of Materials*, 5, 1694, doi:10.1021/cm00036a004.

CONTRIBUTIONS TO PUBLISHED REPORTS

Westphal A.J., Bridges J.C., Brownlee D.E., Butterworth A.L., De Gregorio B.T., Dominguez G., Gainsforth Z., Flynn G.J., Ishii H.A., Joswiak D., Nittler L.R., Ogliore R.C., Pepin R.O.,

Palma R., Stephan T. and Zolensky M.E. “The Future of Stardust Science: A Special Report to NASA”, Report to NASA Program Management, February 2016.

Lee R.W., London R., Matthews D., *et al.* in "Report on the Instrument Development Workshop for Biological Imaging Experiments at LCLS", Development of simulation capability, LCLS Report, Stanford Linear Accelerator Center, March 2004.

RESEARCH FUNDING & FACILITY ACCESS GRANTS

*Affiliation is UHM unless otherwise noted.

ACTIVE

UH Office of the VCR and VCAA Strategic Initiative (**\$350,000**) 11/2017 – 6/2019; *UH Materials Science Consortium for Research and Education (UH MaterialS CORE)*; Lead: N. Gaillard, **Deputy Lead: H.A. Ishii.**

NASA Emerging Worlds (**\$604,017**) 7/2016 – 6/2019; *Insights into Origins and Inter-relationships of Amorphous Silicates from Primitive Solar System Bodies*; includes \$86,000 from the NASA Planetary Major Equipment Program; **PI: H.A. Ishii.**

NASA Cosmochemistry (**\$487,090**) 2013 – 11/2018; *Nebular and Parent Body Materials Processing in Early Solar System Solids II: Formation and Alteration Studies by FIB-(S)TEM*; **PI: H.A. Ishii.**

NASA Solar System Workings (**\$426,388**) 7/2016 – 6/2019; *Exploring the time-temperature history of the lunar interior with advanced materials characterization of troctolite 76535*; **PI: J. Hammer, Co-I: H.A. Ishii.**

NASA Solar System Workings (**\$502,189**) 7/2017 – 6/2020; *Scanning Transmission Electron Microscopy of Laboratory Space Weathered Particles*; **PI: J.J. Gillis-Davis, Co-I: H.A. Ishii.**

Molecular Foundry, Lawrence Berkeley National Lab (**\$1800** Opportunity Travel Grant); approved 5/2018, for travel to National Center for Electron Microscopy for instrument access; **PI: H.A. Ishii.**

Molecular Foundry, Lawrence Berkeley National Lab; 1-year of National Center for Electron Microscopy instrument access; approved 5/2018, expires 1 year after initial analyses anticipated to begin 10/2018; grant #5381; *“High spatial and energy resolution investigations of primitive extraterrestrial materials”*; **PI: H.A. Ishii.**

Molecular Foundry, Lawrence Berkeley National Lab; 1-year of National Center for Electron Microscopy instrument access; approved 10/2016, expires 11/2018; grant #4354; *“High spatial and energy resolution investigations of primitive extraterrestrial materials”*; **PI: H.A. Ishii.**

NOAA Atmospheric Baseline Observatory (cooperative agreement for access to instrumentation) 6/2016 – 12/2020; *Extraterrestrial particle collections at MLO*; **Co-PI: H.A. Ishii**, Co-PI: J.P. Bradley.

NASA Emerging Worlds; 12/2017 – 11/2020; *Collisional growth of aggregates in the turbulent protoplanetary nebula*; **PI: T. Hartlep**, (Bay Area Environmental Research Institute),

Collaborator: H.A. Ishii.

NASA Laboratory Analysis of Returned Samples; 1/2018 – 12/2020; *Isotopic investigation of cometary particles returned by the Stardust Mission from comet Wild 2*; PI: G. Huss, **Collaborator: H.A. Ishii.**

NSF Division of Earth Sciences Geophysics; 7/2017 – 6/2020; *Fate and role of metastable pyroxenes in the subduction process*; PI: P. Dera, **Collaborator: H.A. Ishii.**

NASA Emerging Worlds; 1/2017 – 12/2019; *The Early Solar System and its Precursors*; PI: A. Davis (U Chicago), **Collaborator: H.A. Ishii.**

NASA Discovery Data Analysis Program; 6/2017 – 5/2019; *Carbon phases in low reflectance material on Mercury*; PI: P. Lucey, **Collaborator: H.A. Ishii.**

NASA Emerging Worlds; 2/2017 – 1/2020; *Thermal and alteration history of the CV parent asteroid*; PI: A.N. Krot, **Collaborator: H.A. Ishii.**

NASA Solar System Workings; 2/2017 – 2/2020; *A radiative transfer-based optical maturity index*; PI: P. Lucey, **Collaborator: H.A. Ishii.**

NASA Solar System Exploration Research Virtual Institute (SSERVI); 1/2014 – 12/2018; *Center for Lunar and Asteroid Surface Science (CLASS)*; PI: D. Britt (Univ Central Florida), **Collaborator: H.A. Ishii.**

PENDING

NASA Apollo Next Generation Sample Analysis Program (**\$774,190**) 2/2019 – 1/2022; *Investigation of Lunar Regolith Chemistry by X-ray Absorption and Emission Spectroscopy*; PI: David Blake (NASA Ames), Science PI: Richard Walroth (NASA Ames), **Co-I: H.A. Ishii.**

NASA Laboratory Analysis of Returned Samples (**\$764,627**) 2/2019 – 1/2022; *Microanalytical Studies of Dust Grains from Cometary and Asteroidal Returned Samples*; **PI: H.A. Ishii.**

NASA Emerging Worlds (**\$752,498**) 12/2018-11/2021; *Dry Collection of Cosmic Dust at Mauna Loa Observatory*; **PI: H.A. Ishii.**

NASA Emerging Worlds (**\$507,000**) 1/2018 – 12/2020; *Searching for Extraterrestrial Amino Acids in Cosmic Dust Particles: Tracing the Origin and Evolution of Organics in the Solar System*; PI: E.T. Parker (NASA Goddard SFC), **Co-I: H.A. Ishii.**

NASA Solar System Workings (**\$506,180**) 9/2018 – 8/2021; *Comparing space weathering effects produced by laser irradiation and Ames Vertical Gun Range impacts*; PI: J.J. Gillis-Davis, **Co-I: H.A. Ishii.**

NASA Solar System Workings (**\$737,552**) 9/2018 – 8/2021; *An investigation into the detection of volatiles on airless bodies, and an examination of processes that act to modify and transport them*; PI: J.J. Gillis-Davis, **Co-I: H.A. Ishii.**

UK Science and Technologies Facilities Council Consolidator Grant; 4/2019 – 3/2022; *Nanoscale Analyses of Proto Planetary Processes (NAP³)*; PI: M. Lee (Univ. of Glasgow),

Collaborator: H.A. Ishii.

European Research Council Consolidator Grant; 6/2019 – 5/2024; *Nanoscale Analyses of Proto Planetary Processes (NAP³)*; PI: Lydia Hallis (Univ. of Glasgow), **Collaborator: H.A. Ishii.**

NASA Solar System Workings; 9/2018 – 8/2021; *Ostwald ripening of nanophase particles and their effects on visible to near-infrared spectra*; PI: P. Lucey, **Collaborator: H.A. Ishii.**

COMPLETED

NASA Laboratory Analysis of Returned Samples (**\$911,000**) 2011 – 4/2017; *Deciphering Comet Wild 2 Dust: Refractory Component Formation, Analogue Capture Effects and Coordinated Analysis on New Stardust Particles*; **PI: H.A. Ishii.**

NNSA Office of Defense Nuclear Nonproliferation, NA-22 (**\$1,650,000**) 2012 – 2015; *Title is OVO*; PI: M.L. Davisson (LLNL), **Co-I: H.A. Ishii** (LLNL, then UHM).

IGPP Mini-Grants for Collaborative UC-LLNL Research (**\$150,000**) 2009 – 2012; *Developing Low-Dose Imaging and Spectroscopy Methods for the Analysis of Stardust and IDPs*; **Co-PI: H.A. Ishii** (LLNL), Co-PI: N. Browning (UC-Davis).

NASA Cosmochemistry (**\$670,000**) 2009 – 2012; *Nebular and Parent Body Materials Processing in Early Solar System Solids: FIB-Enabled Analytical Electron Microscopy Studies*; includes \$220,000 from the NASA Planetary Major Equipment Program; **PI: H.A. Ishii** (LLNL).

NASA Stardust Discovery Data Analysis (**\$750,000**) 2007 – 2010, extended to 2011; *Questions of Time and Place: Stardust Science*; **PI: H.A. Ishii** (LLNL).

LLNL Laboratory-Directed Research and Development, Exploratory Research (**\$855,000**) 2008 – 2011; *Coordinated analysis of geographic indicators for nuclear forensic route attribution*; **PI: H.A. Ishii** (LLNL).

NASA Stardust Participating Scientist (**\$900,000**) 2006 – 2009; *Microanalysis of cometary particles and impact residues returned by Stardust*; PI: J.P. Bradley (LLNL), **Co-I: H.A. Ishii** (LLNL).

Molecular Foundry, Lawrence Berkeley National Lab; 1-year of National Center for Electron Microscopy instrument access; 10/2015 – 10/2016; grant #3668; “*High spatial and energy resolution investigations of primitive extraterrestrial materials*”; **PI: H.A. Ishii.**

Molecular Foundry, Lawrence Berkeley National Lab; 1-year of National Center for Electron Microscopy instrument access; 8/2014 – 8/2015; grant #1954; “*Electron energy-loss spectroscopy of extraterrestrial materials*”; **PI: H.A. Ishii.**

Stanford Synchrotron Radiation Laboratory; beam time access; 2006 – 2009; 1.00 rating (1.0 highest, 5.0 lowest); *Pedigree of primitive extraterrestrial particles through mineralogy-correlated trace element abundances*; **PI: H.A. Ishii** (LLNL).

Stanford Synchrotron Radiation Laboratory; beam time access; 2006 – 2009; 1.33 rating (1.0 highest, 5.0 lowest); *Forensic analysis of micro-particulates*; **PI: H.A. Ishii** (LLNL).

NASA Laboratory Analysis of Returned Samples; 2015 – 2017; *Isotopic Analysis of Stardust Particles by Secondary Ion Mass Spectrometry*; PI: G. Huss, **Collaborator: H.A. Ishii**.

NASA Solar System Workings; 2015 – 2017; *Proton and Laser Irradiation of Carbonaceous Chondrites: Towards an Understanding of How C-type Asteroids Space Weather*; PI: J.J. Gillis-Davis, **Collaborator: H.A. Ishii**.

NASA Cosmochemistry; 2014 – 2016; *Lithium Isotopes and Relict Grains in Ca-Al-rich Inclusions*; PI: D.E. Brownlee (Univ. of Washington), **Collaborator: H.A. Ishii**.

NASA Cosmochemistry; 2012 – 2015; *Studies of coarse and fine components of interplanetary dust: Comparison with comet samples returned by the Stardust mission*; PI: D.E. Brownlee (Univ. of Washington), **Collaborator: H.A. Ishii** (LLNL, then UHM).

NASA Cosmochemistry; 2012 – 2015; *Alteration of unequilibrated ordinary chondrites and the origin of ferroan olivine in their matrices and fine-grained chondrule rims*; PI: A.N. Krot, **Collaborator: H.A. Ishii** (LLNL, then UHM).

NASA Cosmochemistry; 2011 – 2014; *Amorphous silicates and organic carbon at the nanometer scale in chondritic meteoritic materials*; PI: J.P. Bradley (LLNL), **Collaborator: H.A. Ishii** (LLNL).

NASA Cosmochemistry; 2011 – 2014; *Experimental Study of Oxygen-Isotope Exchange in Melilite during Hydrothermal Alteration*; PI: M. Ito (NASA JSC), **Collaborator: H.A. Ishii** (LLNL).

NASA Cosmochemistry; 2011 – 2014; *Isotopic, Petrologic, and Trace Element Studies of Primitive Solar System Material (VIII)*; PI: G. MacPherson (Smithsonian Institution), **Collaborator: H.A. Ishii** (LLNL).

NASA Cosmochemistry; 2011 – 2014; *The Study of 1-10 Micron Solid Components in Interplanetary Dust: Comparison with Comet Samples Returned by the Stardust Mission*; PI: D.E. Brownlee (Univ. of Washington), **Collaborator: H.A. Ishii** (LLNL).

NASA Cosmochemistry; 2010 – 2013; *Mineralogy, petrology and isotope compositions of chondrite components*; PI: A.N. Krot, **Collaborator: H.A. Ishii** (LLNL).

NASA Cosmochemistry; 2010 – 2013; *Testing models for Ca-Al-rich inclusion origin and evolution*; PI: D.S. Burnett (CalTech), **Collaborator: H.A. Ishii** (LLNL).

NASA Origins of the Solar System; 2010 – 2013; *Isotopic studies of chondrite precursor materials in the solar nebula*; PI: I.D. Hutcheon (LLNL), **Collaborator: H.A. Ishii** (LLNL).

NASA Cosmochemistry; 2010 – 2013; *Short-lived radionuclides and early solar system chronology*; PI: I.D. Hutcheon (LLNL), **Collaborator: H.A. Ishii** (LLNL).

NASA Laboratory Analysis of Returned Samples; 2010 – 2013; *Stardust sample analysis 2*; PI: D.E. Brownlee (Univ. of Washington), **Collaborator: H.A. Ishii** (LLNL).

NASA Technology Development for Exoplanet Missions; 2010 – 2013; *Starshades for Exoplanet Imaging and Characterization: Key Technology Development*; PI: J. Kasdin (Princeton), **Collaborator: H.A. Ishii** (LLNL).

NASA Discovery Data Analysis; 2008 – 2010; *SuperSTEM studies of Stardust grains and interplanetary dust particles*; PI: J.P. Bradley (LLNL), **Collaborator: H.A. Ishii** (LLNL).

UNFUNDED

NSF Division of Earth Sciences Geophysics (**\$2,999,428**) 9/2018 – 8/2023; *NRT: Innovative Materials and Technologies for an Adaptable Future (IMTAF)*; PI: P. Dera, **Co-I: H.A. Ishii**.

NASA Astrobiology Institute Cycle 8 Cooperative Agreement Notice (**\$1,194,446** over 5 years) submitted 2017; *Water and Tracing the Emergence of Habitable Worlds*; PI: K. Meech, **Co-I: H.A. Ishii**.

NASA Established Program to Stimulate Competitive Research (EPSCoR) (**\$506,180** over 3 years) submitted 2017; *An investigation into the detection of volatiles on airless bodies, and an examination of processes that act to modify and transport them*; PI: L. Flynn, **Co-I: H.A. Ishii**.

NASA Laboratory Analysis of Returned Samples (**\$708,407** over 3 years) submitted 2017; *Electron-Beam Studies of Space Weathered Surfaces of Asteroid Itokawa Regolith Grains*; **PI: H.A. Ishii**.

NASA Emerging Worlds (**\$727,885** over 3 years) submitted 2017; *Direct Collection of Comet Dust from the Troposphere at Mauna Loa Observatory*; **PI: H.A. Ishii**.

NASA Solar System Workings (**\$422,215**) submitted 2017; *Investigating the Unique Space Weathering Trends of Volatile-Rich Meteorites*; PI: H. Kaluna, **Co-I: H.A. Ishii**.

NASA Solar System Exploration Research Virtual Institute (**\$5,220,000**) submitted 2016; *OCEAN: Observational, Computational, Experimental, and Analytical Studies of NEAs to Enable Inner Solar System Science and Exploration*; PI: J.J. Gillis-Davis, **Co-I: H.A. Ishii**.

NSF Research Traineeship (NRT) in Data-Enabled Science and Engineering (**\$2,995,704** over 5 years) submitted in 2016; *NRT-DESE: Natural and geo-inspired materials: cyber-enabled materials discovery for improved environmental and energy resource management*; PI: P. Dera, **Co-I: H.A. Ishii**.

NASA Science Mission Directorate Science Education Cooperative Agreement Notice (**\$9,633,642** over 5 years) submitted in 2015; *Pathways to science competence through advanced interactive learning in integrated Earth science, planetary science, helio- and astrophysics*; PI: G. Hasinger, **Co-I: H.A. Ishii**.

NASA Astrobiology Institute Cycle 7 Cooperative Agreement Notice (**\$7,663,280** over 5 years) submitted in 2014; *From the interstellar medium to life: The astrobiology water cycle*; PI: K. Meech, **Co-I: H.A. Ishii**.

NASA Emerging Worlds (**\$885,149** over 3 years) submitted in 2014; *Origins and Processing of Amorphous Silicates from Primitive Solar System Bodies*; **PI: H.A. Ishii**.

NASA Origins of Solar Systems (**\$589,416** over 3 years) submitted 2011; *Origins and Processing of Amorphous Silicates: Comparative Studies of Small Solar System Bodies*; **PI: H.A.**

Ishii (LLNL).

NASA Laboratory Analysis of Returned Samples (**\$1,503,020** over 3 years) submitted in 2010; *Comparative studies of comet 81P/Wild 2, IDPs and chondrites using aberration-corrected analytical electron microscopy*; PI: J.P. Bradley (LLNL), **Co-I: H.A. Ishii** (LLNL).

NASA New Frontiers Announcement of Opportunity; submitted in 2009; *Galahad*; PI: A. Cheng (Johns Hopkins APL), **Co-I: H.A. Ishii** (LLNL).

NASA Sample Return Laboratory Instrumentation and Data Analysis Program (**\$1,769,686** over 3 years) submitted 2008; *Comparative electron nanobeam studies of comet 81P/Wild 2 grains*; PI: J.P. Bradley (LLNL), **Co-I: H.A. Ishii** (LLNL).

NASA Cosmochemistry (**\$360,186** over 3 years) submitted in 2006; *Genealogy of Primitive Particles by Coordinated Petrology and Trace Element Studies*; **PI: H.A. Ishii** (LLNL).

AWARDS AND HONORS

ROLES IN SPACE MISSIONS

- **Deputy Sub-team Leader** (by invitation), **JAXA Hayabusa 2 Mission**. Initial analysis sub-team for petrology and mineralogy of asteroid Ryugu small grains, 2018 - present.
- **Science Team Member** (by invitation), **NASA FOSSIL Mission**. FOSSIL (Fragments from the Origin of the Solar System and our Interstellar Locale) is a mission in development for the NASA 2018 Discovery solicitation to trace origins of asteroid, comet and interstellar dust in Earth's vicinity by analyzing compositions and trajectories, 2018 – present.
- **Science Team Member** (by invitation), **NASA Galahad Mission**. Galahad is a proposed sample return mission to a binary near Earth asteroid, led jointly by JPL-APL in response to the NASA Announcement of Opportunity for New Frontiers 2009, 2008 – 2010.
- **Preliminary Examination Team Member** (by selection), **NASA Stardust Mission**. Member of Mineralogy/Petrology and Bulk Chemistry teams for early analysis of comet 81P/ Wild 2 dust particles, 2006.
- **Participant** (by invitation), **NASA Stardust Mission**. Performed initial optical examination of NASA Stardust samples upon opening of the sample return canister at NASA Johnson Space Center, 2006.

OTHER HONORS

- **Lawrence Livermore National Laboratory's Physics and Advanced Technologies Directorate Award 2007**. "For strong research contributions performed as part of the Lab's Stardust team [studying comet dust]."
- **Alameda County Women's Hall of Fame inductee for the category of Science 2007**. "The Women's Hall of Fame recognizes outstanding women for their achievements and contributions to Alameda County and its residents."
- **Lawrence Livermore National Laboratory's Institute of Geophysics and Planetary Physics SPOT Award 2007**. "For outstanding educational outreach."
- **Science Spectrum Trailblazer Award 2006**. "Trailblazers are men and women actively

seeking new paths for others in science, research, technology, and development... They distinguish themselves by constantly setting their sights higher, striving to innovate and open doors for others.”

- **Lawrence Livermore National Laboratory’s Physics and Advanced Technologies Directorate Award 2006.** “In recognition of outstanding work by women and minorities in science (related to Stardust mission science).”
- **Lawrence Livermore National Laboratory’s Physics and Advanced Technologies Directorate Award 2005.** “For the invention of ultrasonic micro-blades for aerogel division.”
- **Lawrence Livermore National Laboratory’s Institute of Geophysics and Planetary Physics SPOT Award 2004.** “For exceptional efforts towards commissioning a new synchrotron x-ray fluorescence microprobe.”
- **American Women’s Club of Sweden Scholar** 1994-1995. To facilitate study of American citizens at accredited Swedish universities, AWC Scholars are selected based on their records of scholarship and service.
- **Cornell University McMullen’s Dean’s Scholar** 1990-1994. “The John McMullen Dean’s Scholarship is the most prestigious award in the College of Engineering. It recognizes undergraduate students with outstanding achievements inside and outside of the classroom and indicates our confidence that you have an exceptionally bright future at Cornell and in engineering.”
- **Cornell University College of Engineering Dean’s Scholar** 1990-1994. “Dean’s List citations are presented each semester to engineering students with exemplary academic records.”
- **National Merit Scholar** 1990
- **U.S. Presidential Scholar Semi-finalist** 1990
- **Alpha Sigma Mu International Professional Honor Society** for Materials Science and Engineering, member
- **Tau Beta Pi Engineering Honor Society**, member

INVITED PRESENTATIONS

28. Ishii H.A., Ciston J., Bradley J.P., Bustillo K. and Ercius P. (2018) *Amorphous silicate building block origins by transmission electron microscopy*, Microscopy & Microanalysis 2018, Baltimore, MD (August 2018).
27. Caplan C.E., Huss G.R., Ishii H.A. and Bradley J.P. (2018) *Using Micro-Beam Techniques to Infer Meteorite Abundances of the Jurassic*, Microscopy & Microanalysis 2018, Baltimore, MD (August 2018).
26. Ishii H.A. (2015) Keynote address: *Exploring cometary interplanetary dust particles with new “eyes”*, Goldschmidt 2015, Prague, Czechoslovakia (August 2015).
25. Engrand C., Duprat J., Bardin N., Dartois E., Leroux H., Quirico E., Benzerara K., Remusat L., Dobrica E., Delauche L., Bradley J., Ishii H., Hilchenbach M. and the COSIMA team (2015) *The asteroid-comet continuum from laboratory and space analyses of comet samples and micrometeorites*, International Astronomers Union XXIX, Honolulu, HI (August 2015).

24. Ishii H.A. (2014) *Detection of water and organics in extraterrestrial materials at the nanometer scale*, NASA Astrobiology Institute, University of Hawai'i at Manoa, Honolulu, HI (December 2014).
23. Ishii H.A. (2013) *Evidence of transport and sorting in the outer solar disk from comet dust*, Physics Department, Washington University at St. Louis (February 2013).
22. Ishii H.A. (2013) *Nano-insights for cosmochemistry: (S)TEM + FIB complement isotope studies*, McDonnell Center for the Space Sciences, Washington University at St. Louis (February 2013).
21. Ishii H.A. (2012) *Insight into astrophysical processing of dust from laboratory studies of comet dust*, 220th American Astronomical Society Meeting, Anchorage (June 2012).
20. Ishii H.A. (2011) *Coming in from the Cold: Outer Solar System Dust from Comet 81P/Wild 2 and Cometary IDPs*, HIGP, University of Hawai'i at Manoa, Honolulu, HI (September 2011).
19. Davisson M.L., Ishii H.A. et al. (2010) *Determining the Route used to Transport Illicit Nuclear Materials*, NNSA's LDRD Symposium on Reducing the Global Danger of Weapons of Mass Destruction, Washington, D.C. (June 2010).
18. Ishii H.A. (2010) *From Curious Kid to Astromaterials Scientist*, Stanford Materials Research Society, Stanford University, Stanford, CA (April 2010).
17. Ishii H.A. (2010) *Age-Dating Stardust: Possibilities from Comet Wild 2's Micron-Sized Refractory Particles*, Geological and Planetary Sciences Division, California Institute of Technology, Pasadena, CA (March 2010).
16. Ishii H.A. (2009) *Comparison of Comet 81P/Wild 2 dust with anhydrous CP IDPs*, Timber Cove II: Stardust Science Workshop, Jenner, CA (October 2009).
15. Ishii H.A. (2008) *Comets and the Stardust Mission: What's in our Solar System's Freezer?*, Science on Saturday public lecture for the Science and Technology Education Program, Tracy, CA (November 2008).
14. Ishii H.A. (2008) *A Taste of Stardust: Comet Surprise*, Physics Department, University of Nevada, Reno, NV (April 2008).
13. Ishii H.A. (2007) *Comet Dust*, California Nobel Symposium, California APS Meeting 2007, Berkeley, CA (October 2007).
12. Ishii H.A. (2007) *Stardust: X-ray Microprobe Applied to Comet Dust*, Workshop on New Opportunities in Imaging and X-ray Microscopy, SSRL and LCLS Users' Meeting, Menlo Park, CA (October 2007).
11. Ishii H.A. (2007) *Wild Ride: Catching the Tail of a Comet*, Glenn T. Seaborg Institute CMLS Summer Internship Seminar Series, Lawrence Livermore National Laboratory, Livermore, CA (August 2007).
10. Ishii H.A. (2008) *Comets and the Stardust Mission: What's in our Solar System's Freezer?*, Science on Saturday public lecture for the Science and Technology Education Program, Pleasanton, CA (March 2007)
9. Ishii, H.A. (2006) *Stardust: Ancient Comet Dust in the X-ray Microprobe*, 33rd SSRL Annual Users' Meeting, Menlo Park, CA (October 2006).
8. Ishii H.A. (2006) *Stardust: a Window to the Past in Comet Dust*, presentation to the UC Provost, Lawrence Livermore National Laboratory, Livermore, CA (September 2006)
7. Ishii H.A. (2006) *Stardust: a Window to the Past in Comet Dust*, presentation to the UC Regents, Lawrence Livermore National Laboratory, Livermore, CA (June 2006)

6. Ishii H.A. (2005) *SuperSTEM and Stardust*, presentation to senior representatives from France's atomic energy commission, Lawrence Livermore National Laboratory, Livermore, CA (December 2005).
5. Ishii H.A. (2005) *Synchrotron based X-ray microanalysis of IDPs and the prospects for Stardust*, CIPS/BayPAC Workshop on Stardust, Berkeley, CA (December 2005).
4. Ishii H.A. (2005) *Earth-based laboratory studies of astromaterials*, presentation to the Physics & Advanced Technologies Directorate Review Committee, Lawrence Livermore National Laboratory, Livermore, CA (May 2005).
3. Ishii H.A. (2002) *Amorphous alloy structure by anomalous x-ray scattering*, IBM, San Jose, CA (July 2002).
2. Ishii H.A. (2002) *Chemically-specific structure of an amorphous Mo-Ge alloy by anomalous x-ray scattering*, Los Alamos National Laboratory, Los Alamos, NM (April 2002).
1. Ishii H.A. (2001) *Towards the chemically-specific structure of amorphous materials: anomalous x-ray scattering from a Mo-Ge alloy*, 28th Annual SSRL Users' Meeting, Stanford, CA (October 2001).

ABSTRACTS & EXTENDED ABSTRACTS

* Names of student and postdoc authors on work done directly or partially under H.A. Ishii's supervision are underlined.

100. Daly L., Lee M.R., Hallis L.J., Bland P.A., Reddy S.M., Saxey D.W., Rickard W.D.A., Fougereuse D., Timms N.E., Jourdan F., Cox M., Salge T., Ishii H.A., Bradley J.P., Aguiar J., Keller L.P., Thompson M.S. and Christoffersen R. (2018) The origin of hydrogen in space weathered rims of Itokawa regolith particles, JAXA's 6th Symposium of Solar System Materials (Hayabusa 2018) (Kanagawa, Japan, December, 2018).
99. Shea T., Ishii H.A. and Bradley J.P. (2018) Strain-testing diffusion modeling in the lab: zeroing in on the reactive crystal-melt interface, 2018 Goldschmidt Conference (Boston, USA, August, 2018).
98. Ishii H.A., Ciston J., Bradley J.P. and Bustillo K. (2018) Amorphous silicate building block origins by transmission electron microscopy, Microscopy & Microanalysis 2018 Meeting (Baltimore, USA, August, 2018).
97. Gong M.L., Yoon S.J., Unocic R.R., Ishii H., Bradley J.P., Miller B.D., Masiel D., Reed B., Taskizen T. and Aguiar J.A. (2018) Pioneering the use of neural network architectures and feature engineering for real-time augmented microscopy and analysis, Microscopy & Microanalysis 2018 Meeting (Baltimore, USA, August, 2018).
96. Caplan C.E., Huss G.R., Ishii H.A., Bradley J.P., Eschbach P., Schmitz B. and Nagashima K. (2018) Using micro-beam techniques to infer meteorite abundances of the Jurassic, Microscopy & Microanalysis 2018 Meeting (Baltimore, USA, August, 2018).
95. Ishii H.A. and Bradley J.P. (2018) Pristine amorphous GEMS in anhydrous interplanetary dust particles are very underdense, 49th Lunar and Planetary Science Conference (The Woodlands, TX, March 2018), *LPI Contrib. No. 2083*, Abstract 2368.
94. Teodoro L.D., Ishii H.A., Bradley J.P., Kaluna H.M., Taylor G.J. and Nii M.S. (2018) A pathway to planetary science in the Pacific, 49th Lunar and Planetary Science Conference (The Woodlands, TX, March 2018), *LPI Contrib. No. 2083*, Abstract 2359.

93. Gillis-Davis J.J., Gobi S., Bradley J.P., Cheng Z., **Ishii** H.A. and Kaiser R.I. (2018) Laser and electron weathering experiments on Murchison (CM2) meteorite, 49th Lunar and Planetary Science Conference (The Woodlands, TX, March 2018), *LPI Contrib. No. 2083*, Abstract 2051.
92. Kaluna H.M., Bradley J.P., **Ishii** H.A. and Gillis-Davis J.J. (2018) Spectral and morphological variations resulting from space weathering experiments on pristine lunar soils, 49th Lunar and Planetary Science Conference (The Woodlands, TX, March 2018), *LPI Contrib. No. 2083*, Abstract 2421.
91. Caplan C.E., **Ishii** H.A., Bradley J.P., Eschbach P., Schmitz B. and Nagashima K. (2018) Complexities of inclusions in extraterrestrial chrome-spinel from the Jurassic revealed by STEM-EDX, 49th Lunar and Planetary Science Conference (The Woodlands, TX, March 2018), *LPI Contrib. No. 2083*, Abstract 2548.
90. Bradley J.P. and **Ishii** H.A. (2017) An inconvenient reality: Terrestrial alteration of interplanetary dust particles (IDPs) and micrometeorites (MMs), 80th Annual Meeting of the Meteoritical Society (Santa Fe, NM, July 2017), *LPI Contrib. No. 1987, Meteor. Planet. Sci.* 52 (S1), A33, Abstract 6260.
89. Caplan C.E., Huss G.R., **Ishii** H.A., Bradley J.P., Schmitz B. and Nagashima K. (2017) Inclusions in extraterrestrial chrome-spinel from Jurassic sediments, 80th Annual Meeting of the Meteoritical Society (Santa Fe, NM, July 2017), *LPI Contrib. No. 1987, Meteoritics and Planetary Science* 52 (S1), A43, Abstract 6165. doi: 10.1111/maps.12934.
88. **Ishii** H.A., Wozniakiewicz P.J., Bradley J.P., Farley K. and Martinsen M. (2017) Extraterrestrial dust collection at Mauna Loa Observatory, Hawai'i, 48th Lunar and Planetary Science Conference (The Woodlands, TX, March 2017), Abstract 1141.
87. **Ishii** H.A., Bradley J.P., Nagashima K. and Huss G.R. (2017) New integrated analytical capability at the University of Hawai'i, 48th Lunar and Planetary Science Conference (The Woodlands, TX, March 2017), Abstract 1140.
86. Hammer J.E., **Ishii** H.A., Bradley J.P., Shea T., Welsch B. and Hellebrand E. (2017) Advanced materials characterization of P-rich and P-poor regions within single-crystal olivine, 48th Lunar and Planetary Science Conference (The Woodlands, TX, March 2017), Abstract 2375.
85. Alesbrook L.S., Wozniakiewicz P.J., Jones A.E., Price M.C., **Ishii** H.A., Bradley J.P., Brough N. (2017) Atmospheric collection of extraterrestrial dust at the Halley VI Research Station, Antarctica, 48th Lunar and Planetary Science Conference (The Woodlands, TX, March 2017), Abstract 1805.
84. Gillis-Davis J.J., **Ishii** H.A., Adams M. and Connolly Jr. H.C. (2017) Laser irradiation of two CV3 meteorites yields disparate weathering effects, 48th Lunar and Planetary Science Conference (The Woodlands, TX, March 2017), Abstract 1003.
83. **Ishii** H.A., Ciston J. and Bradley J.P. (2016) Advanced electron energy loss methods for applications to Stardust and fine-grained meteoritic materials, 47th Lunar and Planetary Science Conference (The Woodlands, TX, March 2016), Abstract 1805.
82. Villalon K.L., **Ishii** H.A., Bradley J.P., Stephan T. and Davis A.M. (2016) Resolving the ancestry of GEMS with CHILI, 47th Lunar and Planetary Science Conference (The Woodlands, TX, March 2016), Abstract 1796.
81. Engrand C., Duprat J., Bardin N., Dartois E., Leroux H., Quirico E., Benzerara K., Remusat L., Dobrica E., Delauche L., Bradley J., **Ishii** H., Hilchenbach M. and the COSIMA team

- (2015) The asteroid-comet continuum from laboratory and space analyses of comet samples and micrometeorites, Proceedings of the International Astronomical Union, vol. 11, 253-256. doi: 10.1017/S1743921316002994.
80. **Ishii** H.A. and Bradley J.P. (2015) Transmission electron microscopy advances reveal subtle comet dust differences, 78th Annual Meeting of the Meteoritical Society (Berkeley, CA, July 2015), *Meteor. Planet. Sci.* 50, S1, A181, Abstract 5162. doi: 10.1111/maps.12501.
79. Joswiak D.J., Brownlee D.E., **Ishii** H.A. and Sutton S.R. (2015) Electron energy loss spectroscopy measurements of titanium valence states in refractory nodule pyroxenes from a likely cometary IDP, 78th Annual Meeting of the Meteoritical Society (Berkeley, CA, July 2015), *Meteor. Planet. Sci.* 50, S1, Abstract 5144. doi: 10.1111/maps.12501.
78. **Ishii** H.A. (2015) Size matters: Assessing degree of preservation of interplanetary dust and micrometeorites, 46th Lunar and Planetary Science Conference (The Woodlands, TX, March 2015), Abstract 2541.
77. Gillis-Davis J.J., Gasda P.J., Bradley J.P., **Ishii** H.A. and Bussey D.B.J (2015) Laser space weathering of Allende (CV2) and Murchison (CM2) carbonaceous chondrites, 46th Lunar and Planetary Science Conference (The Woodlands, TX, March 2015), Abstract 1607.
76. **Ishii** H.A., Bradley J.P., Wozniakiewicz P.J., Noguchi T., Dobrica E., Engrand C. and Brownlee D.E. (2014) GEMS: Building Blocks of the Solar System”, 77th Annual Meeting of the Meteoritical Society (Casablanca, Morocco, September 2014), *Meteor. Planet. Sci.* 49, S1, Abstract #5421, A184. doi: 10.1111/maps.12359.
75. Wozniakiewicz P.J., Bradley J.P., Price M.C., Zolensky M.E., **Ishii** H.A., Brownlee D.E. and Russell S.S. (2014) Contemporary cosmic dust arriving at the Earth’s surface: Initial results from the Kwajalein micrometeorite collection, 77th Annual Meeting of the Meteoritical Society (Casablanca, Morocco, September 2014), *Meteor. Planet. Sci.* 49, S1, Abstract #5274, A438. doi: 10.1111/maps.12359.
74. Bradley J.P., **Ishii** H.A., Wozniakiewicz P., Noguchi T., Engrand C. and Brownlee D.E. (2014) Impact of the terrestrial environment on the composition of GEMS, 45th Lunar and Planetary Science Conference (The Woodlands, TX, March 2014), Abstract 1178.
73. Wozniakiewicz P. J., Bradley J.P., Price M.C., Zolensky M.E., **Ishii** H.A., Brownlee D.E., Dearborn D., Jones T., Barnett B., Yakuma S., Letendre T., Gonzalez C., Bastien R. and Rodriguez M. (2014) Initial results from the Kwajalein micrometeorite collections, 45th Lunar and Planetary Science Conference (The Woodlands, TX, March 2014), Abstract 1823.
72. Matzel J.E.P., **Ishii** H.A., Joswiak D., Brownlee D. and Hutcheon I.D. (2014) Mn-Cr isotope systematics of fayalite-silica intergrowths from the Stardust mission to comet 81P/Wild 2, 45th Lunar and Planetary Science Conference (The Woodlands, TX, March 2014), Abstract 1645.
71. Paque J.M., Burnett D.S., Beckett J.R., Guan Y. and **Ishii** H.A. (2013) Low temperature carbonate control of barium in igneous Ca-, Al-rich inclusions, 44th Lunar and Planetary Science Conference (The Woodlands, TX, March 2013), Abstract 2505.
70. Wozniakiewicz P., Bradley J.P., **Ishii** H.A., Brownlee D.E., Price M.C., Burchell M.J. and Kearsley A.T. (2013) Pre-accretional sorting of GEMS in the outer solar nebula, 44th Lunar and Planetary Science Conference (The Woodlands, TX, March 2013), Abstract 2275.
69. Gillis-Davis J.J., Lucey P.G., Bradley J.P., **Ishii** H.A. and Connolly Jr. H.C. (2013) Laser space weathering of Allende meteorite, 44th Lunar and Planetary Science Conference (The Woodlands, TX, March 2013), Abstract 2494.

68. Hallis L.J., **Ishii** H.A., Bradley J.P., Taylor G.J. (2013) Comparisons of Martian and Antarctic alteration: A transmission electron microscope study of MIL 090032, 44th Lunar and Planetary Science Conference (The Woodlands, TX, March 2013), Abstract 1735.
67. Hallis L., **Ishii** H.A., Bradley J.P., Taylor G. J., (2012) Transmission electron microscope studies of martian 'iddingsite' in the nakhlite meteorite MIL 090032, 2012 Fall Meeting, AGU (San Francisco, CA, December 2012), Abstract #P11E-1875.
66. Zinin P.V., Ming L.C., **Ishii** H.A., Jia R., Acosta T. and Hellebrand E. (2012) Synthesis of the Diamond-like BC_x Phases with High Boron Concentration under High Pressure and High Temperature, 50th European High Pressure Research Group Meeting, (Thessaloniki, Greece, September 2012).
65. **Ishii** H.A., Bradley J.P. and Teslich N. (2012) Complexities of Focused Ion Beam Preparation of Electron-Transparent Sections for Meteorite Studies, 75th Annual Meeting of the Meteoritical Society (Cairns, Queensland, Australia, August 2012), *Meteor. Planet. Sci.* 47, S1, Abstract 5339. doi: 10.1111/j.1945-5100.2012.01401_2.x.
64. Bradley J.P., **Ishii** H.A., Aguiar J., Borg L.E., Shearer C.K. (2012) Amorphous silicates produced during space weathering: Insight from monochromated valence electron energy-loss spectroscopy, 43rd Lunar and Planetary Science Conference (The Woodlands, TX, March 2012), Abstract 1941.
63. Wozniakiewicz P., **Ishii** H.A., Bradley J.P., Kearsley A.T., Burchell M.J. and Price M.C. (2012) Grain size sorting in the outer nebula accretion disk, 43rd Lunar and Planetary Science Conference (The Woodlands, TX, March 2012), Abstract 2392.
62. Gillis-Davis J.J., Markley M.M., Lucey P.G., Bradley J.P., **Ishii** H.A. (2012) Laser space weathering of quartz, 43rd Lunar and Planetary Science Conference (The Woodlands, TX, March 2012), Abstract 2664.
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60. Wozniakiewicz P.J., Bradley J.P., Zolensky M.E., Brownlee D.E. and **Ishii** H.A. (2011) Kwajalein Atoll: A new collection site for micrometeorites" 74th Annual Meeting of the Meteoritical Society (London, UK, August 2011), *Meteorit. Planet. Sci.* 46, A253, Abstract 5206. doi: 10.1111/j.1945-5100.2011.01221.x.
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58. Wozniakiewicz P.J., **Ishii** H.A., Kearsley A.T., Burchell M.J., Bradley J.P., Teslich N. and Cole M.J. (2011) Investigating carbonate survival in Stardust aluminium foils, 74th Annual Meeting of the Meteoritical Society (London, UK, August 2011), *Meteorit. Planet. Sci.* 46, A253, Abstract 5205. doi: 10.1111/j.1945-5100.2011.01221.x.
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- (London, UK, August 2011), *Meteorit. Planet. Sci.* 46, A110, Abstract 5213. doi: 10.1111/j.1945-5100.2011.01221.x.
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 55. Wozniakiewicz P.J., **Ishii H.A.**, Kearsley A.T., Burchell M.J., Bradley J.P., Teslich N. and Cole M.J. (2010) Stardust crystalline residues: Surviving comet dust or crystallized impact melts?, 73rd Annual Meeting of the Meteoritical Society (New York, USA, July 2010), *Meteorit. Planet. Sci.* 45, A218, Abstract 5388. doi: 10.1111/j.1945-5100.2010.01051.x.
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 52. Wozniakiewicz P.J., **Ishii H.A.**, Kearsley A.T., Burchell M.J., Bradley J.P., Teslich N. and Cole M.J. (2010) Survivability of cometary phyllosilicates in Stardust collections and implications for the nature of comets, 41st Lunar and Planetary Science Conference (The Woodlands, TX, March 2010), Abstract 2357.
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 50. Brownlee D.E., Joswiak D., Matrajt G., Bradley J.P., **Ishii H.A.**, Westphal A.J., Gainsforth Z. (2010) The nature of moderately fragmenting comet dust: Case studies of Tracks 25 (Inti) and Track 77, 41st Lunar and Planetary Science Conference (The Woodlands, TX, March 2010), Abstract 2146.
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 46. Krot A.N., Nagashima K., Jacobsen B., Hutcheon I.D., **Ishii H.**, Yin Q.-Z., Davis A.M. and Simon S.B. (2009) Origin of grossular-bearing assemblages in CAIs from CV carbonaceous

- chondrites, 72nd Annual Meeting of the Meteoritical Society (Nancy, France, July 2009), *Meteorit. Planet. Sci.* 44, A116, Abstract 5353. doi: 10.1111/j.1945-5100.2009.tb01099.x.
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44. Jacobsen B., Matzel J., Hutcheon I.D., Ramon E., Krot A.N., **Ishii** H.A., Nagashima K. and Yin Q.-Z. (2009) The ³⁶Cl – ³⁶S Systematics of Wadalite from the Allende Meteorite, 40th Lunar and Planetary Science Conference (The Woodlands, TX, March 2009), Abstract 2553.
43. **Ishii** H.A., Joswiak D., Bradley J.P., Teslich N., Matzel J., Hutcheon I.D., Brownlee D., Matrajt G., MacPherson G., McKeegan K.D. (2009) Enabling Al-Mg Isotopic Measurements on Comet Wild 2's Micro-CAIs, 40th Lunar and Planetary Science Conference (The Woodlands, TX, March 2009), Abstract 2288.
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41. Andrews J.C., Brennan S., Pianetta P., **Ishii** H., Gelb J., Feser M., Rudati J., Tkachuk A. and Yun W. (2009) Full-field transmission x-ray microscopy at SSRL, 9th International Conference on X-Ray Microscopy (Zürich, Switzerland, July 2008), *Journal of Physics: Conference Series*, 186, 012002. doi: 10.1088/1742-6596/186/1/012002.
40. Barkan S., Saveliev V.D., Pianetta P., Brennan S., Tull C.R., Feng L., Takahashi M. and **Ishii** H. (2008) Silicon drift detector spectrometers for high count rate XRF applications, EXRS 2008 European Conference on X-Ray Spectrometry (Cavtat, Dubrovnik, Croatia, June 2008) *Book of Abstracts: EXRS-2008, European Conference on X-Ray Spectrometry* p. 41.
39. **Ishii** H.A., Bradley J.P., Dai Z.R., Chi M., Kearsley A.T., Burchell M.J., Molster F. 2008) Keynote: Comet 81P/Wild 2 dust versus cometary interplanetary dust, 2008 Goldschmidt Conference (Vancouver, British Columbia, July 2008) *Geochim. Cosmochim. Acta*, 71, A413. doi: 10.1016/j.gca.2007.06.017.
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34. **Ishii** H.A., Brennan S., Bradley J.P., Pianetta P., Kearsley A.T. and Burchell M.J. (2008)

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 28. Brennan S., **Ishii** H.A., Luening K., Ignatyev K., Pianetta P. and Bradley J.P. (2007) Panning for gold: A case study in evaluating the elemental composition of Comet Wild 2 dust in aerogel, 38th Lunar and Planetary Science Conference (League City, TX, March 2007), Abstract 1776.
 27. Chi M., **Ishii** H., Dai Z.R., Toppani A., Joswiak D.J., Leroux H., Zolensky M., Keller L.P., Browning N.D. and Bradley J.P. (2007) Does Comet Wild-2 contain GEMS?, 38th Lunar and Planetary Science Conference (League City, TX, March 2007), Abstract 2010.
 26. Kearsley A.T., Ball A., Graham G.A., Burchell M.J., **Ishii** H., Cole M.J., Wozniakiewicz P.J., Hörz F. and See T.H. (2007) Aerogel track morphology: Measurement, three dimensional reconstruction and particle location using confocal laser scanning microscopy, 38th Lunar and Planetary Science Conference (League City, TX, March 2007), Abstract 1690.
 25. Zolensky M., ... **Ishii** H. (33 authors) (2007) Wild-2 déjà-vu: Comparison of Wild-2 particles to chondrites and IDPs, 38th Lunar and Planetary Science Conference (League City, TX, March 2007), Abstract 1481 (2007).
 24. Nakamura-Messenger K., Zolensky M.E., Bastien R., See T.H., Warren J.L., Bevil T.J., Cardenas F., Vidonic L.F., Horz F., McNamara K.M., Allen C.C., Westphal A.J., Snead C., **Ishii** H.A. and Brownlee D. (2007) Stardust curation at Johnson Space Center: Photo documentation and sample processing of submicron dust samples from Comet Wild 2 for meteoritics science community, 38th Lunar and Planetary Science Conference (League City, TX, March 2007), Abstract 2191.
 23. Ignatyev K., Huwig K., Harvey R., **Ishii** H., Bradley J., Luening K., Brennan S., Pianetta P. (2007) First x-ray fluorescence microCT results from micrometeorites at SSRL, 9th International Conference on Synchrotron Radiation Instrumentation (Daegu, North Korea, May-June 2006), *AIP Conf. Proc.*, 879, 1337. doi: 10.1063/1.2436311.

22. **Ishii** H.A., Brennan S., Luening K., Ignatyev K., Pianetta P. and Bradley J.P. (2006) In situ chemical mapping and analysis of Stardust impact tracks: Isolation of cometary signal, American Geophysical Union 2006 Fall Meeting (San Francisco, CA, December 2006), *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract P51E-1241.
21. Stardust Mineralogy/Petrology Subteam, Weisberg M. ... **Ishii** H.A. et al. (2006) Stardust (comet) samples and the meteorite record, American Geophysical Union 2006 Fall Meeting (San Francisco, CA, December 2006), *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract P52B-1243.
20. Stardust Isotopes Subteam, McKeegan K.D. ... **Ishii** H.A. et al. (2006) Isotopic compositions of cometary matter returned by the STARDUST mission, American Geophysical Union 2006 Fall Meeting (San Francisco, CA, December 2006), *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract P52B-03.
19. Stardust Bulk Chemistry Subteam, Flynn G.J. ... **Ishii** H.A. et al. (2006) Chemical composition of Wild-2 dust collected by Stardust, American Geophysical Union 2006 Fall Meeting (San Francisco, CA, December 2006), *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract P52B-02.
18. Huber H., **Ishii** H.A. and Brennan S. (2006) Selenium and sulphur distribution in the anomalous CK chondrite EET 99430, 69th Annual Meeting of the Meteoritical Society (Zurich, Switzerland, August 2006), *Meteorit. Planet. Sci.*, 41, A167, #5344. doi: 10.1111/j.1945-5100.2006.tb00996.x.
17. Stardust Mineralogy/Petrology Subteam, Zolensky M., Bland P., Bradley J., Brearley A., Brennan S., Bridges J., Brownlee D., Butterworth A., Dai Z., Ebel D., Genge M., Gounelle M., Graham G., Grossman J., Grossman L., Harvey R., **Ishii** H., Kearsley A., et al. (2006) Mineralogy and petrology of Comet Wild2 nucleus samples – final results of the Preliminary Examination Team, 69th Annual Meeting of the Meteoritical Society (Zurich, Switzerland, August 2006), *Meteorit. Planet. Sci.*, 41, A79, #5324. doi: 10.1111/j.1945-5100.2006.tb00996.x.
16. Ignatyev K., Huwig K., Harvey R., **Ishii** H., Bradley J., Luening K., Brennan S., Pianetta P. (2006) XRF microCT study of space objects at SSRL, Developments in X-ray Tomography V (San Diego, California, August 2006), *Proc. of SPIE*, 6318, 631825. doi: 10.1117/12.681440.
15. **Ishii** H.A., Luening K., Brennan S., Pianetta P., Ignatyev K., Matrajt G. and Bradley J.P. (2006) Micro-SXRF on interplanetary and cometary dust particles: technical considerations for trace element analysis, 37th Lunar and Planetary Sciences Conference (League City, TX, March 2006), Abstract 2198.
14. **Ishii** H.A. and Bradley J.P. (2006) Macroscopic cutting of aerogel collectors for Stardust and future sample return missions, 37th Lunar and Planetary Sciences Conference (League City, TX, March 2006), Abstract 2240.
13. Brennan S., **Ishii** H.A., Luening K., Pianetta P. and Burnett D.S. (2006) Synchrotron total-reflection x-ray fluorescence (SR-TXRF) of Genesis return samples, 37th Lunar and Planetary Sciences Conference (League City, TX, March 2006), Abstract 2029 (2006).
12. Zolensky M. ... **Ishii** H. et al. (2006) Mineralogy and petrology of Comet Wild2 nucleus samples”, 37th Lunar and Planetary Sciences Conference (League City, TX, March 2006), Abstract 1203.
11. Flynn G.J. ... **Ishii** H. et al. (2006) Chemical analysis of Wild-2 samples returned by

- Stardust”, 37th Lunar and Planetary Sciences Conference (League City, TX, March 2006), Abstract 1217.
10. Brennan S., Luening K., Pianetta P., **Ishii** H.A. and Burnett D.S. (2005) Genesis sample surface contamination study using total-reflection x-ray fluorescence (TXRF), American Geophysical Union 2006 Fall Meeting (San Francisco, CA, December 2005), *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract SH33A-0366 (2005).
 9. **Ishii** H.A., Luening K., Brennan S., Pianetta P., Matrajt G. and Bradley J.P. (2005) Synchrotron x-ray fluorescence analysis of dust particles: experimental considerations for trace element analysis of small particles”, Workshop on Dust in Planetary Systems (Kauai, HI, September 2005) *LPI Contributions* 1280, p 73, Abstract 4079.
 8. Graham G.A., Bernas M., Dai Z.R., Bradley J.P., Smith J.B., Weber P.K., **Ishii** H. and Hutcheon I.D. (2005) Recovery of isotopic hotspots in interplanetary dust particles by focused ion beam microscopy: Bridging the gap between NanoSIMS and (S)TEM, Microscopy and Microanalysis (Honolulu, HI, July 2005) *Microsc Microanal* 11 (Suppl 2), pp 1390-1391. doi: 10.1017/S143192760550446X.
 7. **Ishii** H.A., Graham G.A., Kearsley A.T., Grant P.G., Snead C.J. and Bradley J.P. (2005) Ultrasonic micro-blades for the rapid extraction of impact tracks from aerogel, 36th Lunar and Planetary Science Conference (League City, TX, March 2005), Abstract 1387.
 6. **Ishii** H.A., Brennan S., Luening K., Pianetta P., Bradley J.P., Snead C.J. and Westphal A.J. (2005) Hard x-ray spectro-microscopy techniques at SSRL for astromaterials analysis, 36th Lunar and Planetary Science Conference (League City, TX, March 2005), Abstract 1393.
 5. Smith J.B., Dai Z.R., Weber P.K., Graham G.A., Hutcheon I.D., Bajt S., **Ishii** H. and Bradley J.P. (2005) Nitrogen isotopic anomalies in a hydrous interplanetary dust particle, 36th Lunar and Planetary Science Conference (League City, TX, March 2005), Abstract 1003.
 4. Graham G.A., Sheffield-Parker J., Bradley J.P., Kearsley A.T., Dai Z.R., Mayo S.C., Teslich N., Snead C., Westphal A.J. and **Ishii** H. (2005) Electron beam analysis of micrometeoroids captured in aerogel, 36th Lunar and Planetary Science Conference (League City, TX, March 2005), Abstract 2078.
 3. **Ishii** H., Brennan S. and Bienenstock A. (2002) Partial pair distribution functions obtained without regularization from a-MoGe₃ by anomalous x-ray scattering, 2002 American Physical Society March Meeting (Indianapolis, IN, March 2002), abstract X25.006.
 2. **Ishii** H.A., Brennan S. and Bienenstock A. (2001) Improved partials by AXS from amorphous molybdenum-germanium alloys, 19th International Conference on Amorphous and Microcrystalline Semiconductors, (Nice, France, August 2001).
 1. **Ishii** H.A., Brennan S. and Bienenstock A. (2001) Anomalous x-ray scattering from molybdenum-germanium alloys, Materials Research Society Spring Meeting (San Francisco, CA, April 2001), Abstract EE9.4.

OTHER PRESENTATIONS

- Ishii H.A. (2006) *Stardust comet dust in silico in the SSRL x-ray microprobe*, Stardust Science Workshop 7, Pasadena, CA (November 2006).
- Ishii H.A. (2006) *Ultrasonic (U/S) cutting for rapid aerogel extractions: Techniques for Stardust and future sample return missions*, Stardust Science Workshop 7, Pasadena, CA (November 2006).

Ishii H.A. (2005) *X-ray micro-spectroscopy on cosmic dust and source-sampled comet dust*, Postdoc Symposium, Lawrence Livermore National Laboratory, Livermore, CA (December 2005).

Ishii H.A. (2005) *Hard x-ray spectro-microscopy on astromaterials*, 32nd Annual SSRL Users' Meeting, Stanford, CA (October 2005).

TEACHING AND ADVISING EXPERIENCE & TRAINING

COURSES TAUGHT AND DEVELOPED

- *Voyage Through the Solar System* (GG 105) This introductory course offers an illustrated voyage through the Solar System based on recent scientific results. Topics include origin, evolution, and current knowledge of the eight planets, their moons, asteroids, comets, and the Sun. Course topics will emphasize applicable geology, tectonic activity, material properties, and atmospheric conditions of the planets and how these properties compare to planet Earth. iClicker technology used throughout the course.
Fall 2018, 3 units

Teaching evaluation score for overall instructor performance: TBD

- *Solar System Studio* (GG 107) Course description below.
Spring 2018, 4 units, co-instructor, contributed ~10% of teaching effort
- *Solar System Studio* (GG 107) This is an introductory course about our world and beyond. It uses active learning and peer teaching approaches in a studio lab environment to engage students in developing their scientific investigation, synthesis, and written and oral presentation skills through backwards-faded scaffolding in 3-4 group projects during the semester culminating in an authentic research experience with minimal guidance. Students are introduced to the astronomy, planetary geoscience and atmospheric science, remote observing, astrobiology, exoplanets and current space missions.
Spring 2017, 4 units, instructor for inaugural term, contributed 90% of teaching effort.

Teaching evaluation score for overall instructor performance: 4.6/5 mean, 5/5 median

- *Solar System Studio course development* (GG 107) Developed course materials, activities, demonstrations, experiments and research projects for the first Solar System Studio, a 4-unit lecture+lab interactive undergraduate course to introduce students to the Solar System and to the scientific process through hands-on participation and mini-research projects.
Fall 2016
- *Solar System Studio course proposal* (GG 107): Developed a proposal with a small team of faculty for a new lecture+lab introductory course on the Solar System at University of Hawaii to be taught through the Department of Geology and Geophysics.
Spring 2015
- *Freshman Women in Science and Engineering (WiSE) Seminar Series*: Guest Lecturer for

the WiSE living learning community of STEM majors at the University of Nevada, Reno
Spring 2008

- *Fusion and Astrophysics Teacher Research Academy*: Guest Lecturer for LLNL's Science and Technology Education Program high school physics teachers' workshop.
Summer 2006, Summer 2008
- *Waves and Diffraction, X-ray Diffraction Lab, Materials in Sports*: Guest lecturer for undergraduate and graduate courses at Stanford University
1999-2002

PLANNED TEACHING AND NEW COURSE DEVELOPMENT

- *Special Topics: Electron and Ion Microscopy (GG 710)* This course offers an introduction to the practical capabilities and utility of the Focused Ion Beam instrument (FIB) and Transmission Electron Microscope (TEM). It is intended for graduate students who are interested in or plan to use these instruments for their research. The course will include hands-on experience.
Spring 2019, 2 units.
- *Materials Synthesis and Characterization course development (ME 332, tentative)* This upper level, hands-on undergraduate course will follow on from ME 331 Materials Science and Engineering to provide practical research experience through hands-on projects on research instrumentation. The new course will be taught first as a 3-unit Special Topics course (Fall 2019) and then expanded into a 4-unit course with its own course designator. We will seek to cross-list in Physics, Chemistry, Electrical and Civil Engineering. Materials of societal / environmental relevance will be selected for study.
Spring 2019: I anticipate contributing ~33% of development effort.
- *Special Topics: Materials Synthesis and Characterization (ME 491/492)* This course is the first offering of an upper-level undergraduate course that follows on from *Materials Science and Engineering (ME 331)* to provide practical research experience through hands-on projects on research instrumentation. The focus in the first year is on sample synthesis and analysis for renewable energy materials and will use multiple UH labs.
Fall 2019, 3 units, team-taught: I anticipate contributing ~25% of teaching effort.
- *Solar System Studio (GG 107)* Description in Courses Taught above.
Spring 2020, 4 units
- *Materials Synthesis and Characterization (ME 332, tentative)* Description above.
Fall 2020, 4 units, team-taught: I will contribute ~25% of teaching effort.

TEACHING TRAINING

- Attended the Bowtie Risk Analysis Training for laboratory supervisors by Brent Cooley, Deputy Director of Environment, Health, and Safety with the University of California Office of the President (UCOP), June 27, 2018.

- Attended and presented “Lessons Learned” at the Total Course Transformation Workshop on active course design led by Anne Egger of National Association of Geoscience Teachers, UH Manoa, May 26, 2017.
- Attended the Carl Wieman Science Education Initiative Active Teaching Workshop and Demonstration, UH Manoa, Feb. 21 and 23, 2017.
- Attended the Center for Teaching and Learning Faculty Workshop: Inside the Master Teacher’s Studio, UH Manoa, Feb. 15, 2017.
- Participated in mid-semester evaluation by UHM Center for Teaching Excellence for GG 107 Spring 2017, UH Manoa, Feb. 14, 2017.
- Attended the Center for Teaching and Learning Faculty Workshop on Mastering Laulima, UH Manoa, Feb. 13, 2017.

STUDENT/POSTDOC TRAINING & MENTORING

Undergraduate Research Supervised

- *Assessment of New Extraterrestrial Particle Collections at Mauna Loa Observatory* (January 2017 – December 2017). Student advised: Lean Teodoro, Hawaii Space Grant Fellow
- *Analysis of Solar System Building Blocks using Transmission Electron Microscopy* (August 2018 – present). Student advised: Lean Teodoro, Hawaii Space Grant Fellow

Graduate Student Research Supervised

- Thesis advisor for MS candidate, Angelo Genabe, *Rapid Identification of Cosmic Dust Candidates from the Mauna Loa Cosmic Dust Collection (tentative)* (August 2018 – present)

Postdoc Research Supervised

- Supervisor for Postdoctoral Researcher, Kenta Ohtaki, UHM, research project: *Primitive solar system solids from comets and asteroids studied by FIB and TEM/STEM* (July 2018 – present)
- Co-advisor for Postdoctoral Researcher, Patrick Gasda, UHM, research project: *Space-weathering of carbonaceous phases in chondrites* (January 2015 – May 2015)
- Co-advisor for Postdoctoral Researcher, Penelope Wozniakiewicz, LLNL, research project: *Stardust impact tracks in aluminum foil collector* (February 2009 – January 2012)

Hands-on Training on Instrumentation

- Lean Teodoro (undergraduate), SEM qualified February 2017
- Laura Corley (grad student), FIB-SEM driver’s license October 2017
- Caroline Caplan (grad student), working towards FIB-SEM driver’s license

Informal Advising and Mentoring, including on FIB/TEM

Undergraduate students

- Reginald Toletino, UHM (2018), project advisor: Mehrdad Nejhad, ME

Graduate students

- David Frank, UHM (Summer 2017 – present), PhD advisor: Gary Huss

- Xiaojing Lai, UHM (Spring 2018), PhD advisor: Bin Chen
- Laura Corley, UHM (Spring 2017 – present), PhD advisor: Jeffrey Gillis-Davis
- Hannah Shelton, UHM (Fall 2016 – Spring 2017), PhD advisor: Przemek Dera
- Epifanio Vaccaro, Open University, UK (Fall 2015 – Spring 2016), PhD advisor: Sarah Russell
- Krystin Villalon, University of Chicago (Fall 2015 – present), PhD advisor: Andy Davis
- Caroline Caplan, UHM (Fall 2015 – present), PhD advisor: Gary Huss
- Anna Radecka, Imperial College London, UK (Spring 2015 -Fall 2015), PhD advisor: David Dye
- Wei-Ming Wang, UHM (Spring 2015), PhD advisor: Jingjing Li
- Elishevah van Kooten, Københavns Universitet, Denmark (Fall 2014 – Spring 2015), PhD advisor, Martin Bizzarro
- Patrick Gasda, UHM (Fall 2014), PhD advisor: Jeffrey Gillis-Davis
- Sladjian Lazarevic, UHM (Fall 2014), PhD advisor: Jingjing Li
- Yi Hu, UHM (Fall 2014 – Spring 2015), PhD advisor: Przemek Dera
- Myriam Tellus, UHM (Spring 2014 - Spring 2015), PhD advisor: Gary Huss
- Natalie Starkey, Open University (Spring 2014 – Spring 2016), PhD advisor, Ian Franchi
- Lydia Hallis, UHM (Spring 2013 - Spring 2014), PhD advisor: G. Jeffrey Taylor
- Lydie Bonal, UHM (2010-2012), PhD advisor: Gary Huss
- Jeffrey Aguiar, LLNL and UC Davis (2009-2012), PhD advisor: Nigel Browning

Postdoc students

- Elizabeth Koeman Shields, UHM (Spring 2017 – Summer 2018), advisor: Gary Huss
- Patrick Donohoe, UHM (Spring 2017), advisor: Gary Huss
- Benoit Welsh, UHM (Spring 2014 – Spring 2017), advisor: Julia Hammer
- Heather Kaluna, UHM (Fall 2015 – present), advisor: Jeffrey Gillis-Davis
- Jennifer Matzel, LLNL (2009-2012), advisor: Ian Hutcheon

SERVICE

UNIVERSITY AND DEPARTMENT SERVICE

- *Member*, College of Education Teacher Education Council on Science Education, UHM (Fall 2018 – present).
- *Host Mentor*, UHM Hānai Program to help new UH students feel welcome and connected (Summer 2018 – present).
- *University of Hawaii Representative*, Council of Institutions, University Space Research Association (Fall 2017 – present).
- *Member*, Advisory Committee for “Building Sustainable Pathways to STEM Teaching”, NSF Robert Noyce Teacher Scholarship Program (O’Neill, PI, award #1660781), to explore UHM majors in education and STEM fields to increase the number of qualified math and science teachers for Hawaii schools (Summer 2017 – Summer 2018).
- *Member*, Graduate Admission Committee (planetary science representative), Department of

- Geology and Geophysics, UHM (Fall 2014 – present).
- *Member*, Faculty Review Committee, Hawaii Institute of Geophysics & Planetology, UHM (2016 – 2017).
 - *Member*, Faculty Selection Committee for Researcher in planetary remote sensing, Hawaii Institute of Geophysics & Planetology, UHM (Spring 2018).
 - *Member*, Faculty Search Committee for Specialist joint appointment in Water Resources Research Center and Hawaii Institute of Geophysics & Planetology, Hawaii Institute of Geophysics & Planetology, UHM (Fall 2016 – Spring 2017).
 - *Member*, Faculty Search Committee Member, Stanford University's Department of Materials Science and Engineering searches in Polymers, Photonics and Biomaterials (1999, 2001).
 - *Member*, 1 Qualifying Exam Committee for Geology & Geophysics grad student (Frank), Spring-Summer 2017
 - *Member*, 3 Comprehensive Exam Committees for Geology & Geophysics grad students (Caplan, Shelton, Frank), Spring-Summer 2016, Fall 2016-Spring 2017, Fall 2017-present
 - *Member*, 3 PhD Dissertation Committees for Dept. of Geology & Geophysics grad students (Caplan, Corley, Shelton), September 2016 – present, April 2017 – present, September 2017 – present

PROFESSIONAL SERVICE *

* NASA and JAXA science team memberships by invitation are listed under Awards and Honors

- *Vice Chair*, NASA's Curation and Analysis Planning Team for Extraterrestrial Materials (March 2018 – present).
- *Member*, NASA's Curation and Analysis Planning Team for Extraterrestrial Materials (January 2016 – present).
- *Chair* of the Cosmic Dust Committee of NASA's CAPTEM (Curation and Analysis Planning Team for Extraterrestrial Materials) (January 2016 – present).
- *Member*, Cosmic Dust Committee of NASA's CAPTEM (Curation and Analysis Planning Team for Extraterrestrial Materials) (2011–2015).
- *Member at Large*, Executive Committee, Far West Section, American Physical Society (January 2016 – present).
- *Local Organizing and Program Committee Member*, American Physical Society, Far West Section, Hawaii Meeting to be held January 19, 2019, Honolulu, HI (2017 – present).
- *Program Committee Member* for the 2015 Stanford Synchrotron Radiation Laboratory's Annual User's Meeting, Special Symposium Honoring Arthur Bienenstock, Stanford, CA (October 2015).
- *Program Committee Member* for 78th Annual Meeting of the Meteoritical Society, Berkeley, CA (July 2015).
- *Chair, Panel Reviews* for NASA Cosmochemistry Program, NASA Laboratory Analysis of Returned Samples Program, NASA Earth and Space Science Fellowship (2013 – present).
- *Panel Review Member* for NASA Astrobiology Institute Program, NASA Cosmochemistry Program, NASA Laboratory Analysis of Returned Samples Program, NASA Earth and Space Science Fellowship Program (non-chair, 2008 – present).
- *Panel Review Member* for LLNL's Lab Directed Research and Development program

- Exploratory Research Materials Review Committee (2010 – 2011).
- *External Peer Reviewer* for NSF Division of Earth Sciences Major Research Instrumentation Program, NASA Rosetta Discovery Data Analysis Program, NASA Hayabusa 2 Program, NASA Astrobiology Institute Program, NASA Cosmochemistry Program, NASA Laboratory Analysis of Returned Samples Program, Japan Aerospace Exploration Agency's HAYABUSA Sample Investigation Program (2012 – present).
 - *External Peer Reviewer* for Stanford Synchrotron Radiation Laboratory synchrotron x-ray beam time proposals (2016 – present).
 - *Review Committee Member*, Ninninger Meteorite Award for outstanding student research paper in the "Science of Meteoritics", offered by the Center for Meteorite Studies at Arizona State University (2017).
 - *Guest Associate Editor*, Meteoritics and Planetary Science special edition on Stardust science (2011 – 2012).
 - *Co-organizer*, Timber Cove III Astronomy, Cosmochemistry and Astromaterials Science Workshop on Stardust mission science, Jenner, CA (February 2011).
 - *Co-organizer*, Institute of Geophysics and Planetary Physics Seminar Series (2009 – 2010).
 - *Session / Symposium Chair*, American Physical Society Far West Section Annual Meeting, Lunar and Planetary Science Conference, (2008 – 2016).
 - *Peer Reviewer* for journals Meteoritics and Planetary Science, American Mineralogist, Geochimica et Cosmochimica Acta, Icarus (2004 – present).

Professional Affiliations

Member, Division of Planetary Sciences, American Astronomical Society
Member, American Association for the Advancement of Science
Member, American Geophysical Union
Member, Meteoritical Society
Member, Mineralogical Society of America
Member, Society of Women Engineers
Member, Materials Research Society
Chapter President 1993-1994, *VP* 1992-1993
Member, Association for Women in Science
Member, American Physical Society

EDUCATION AND OUTREACH SERVICE

- *Contributor*, national and international media interviews on interstellar dust stored in comets and implications, following high profile publication, 2018.
- *Featured author*, headline article by G. J. Taylor highlighting my research in Planetary Science Research Discoveries, July 2018.
- Advised and wrote letters of recommendation for grad students, postdocs and a junior faculty member for job and scholarship applications, 2016 – 2018.
- *Featured scientist*, article in Hana Hou! magazine, the official magazine of Hawaiian Airlines, October/November issue 2017
- *Presenter*, ARCS Foundation Honolulu Pau Hana laboratory tour and demonstration,

November 9, 2017

- *Lead-Presenter*, SOEST Open House, Space Matters exhibit, an “explosive and electrifying” demonstration about the 4 states of matter and their occurrences on Earth and beyond in our Solar System, October 20-21, 2017
- *Host and Tour Guide*, SOEST Open House tours of the Advanced Electron Microscopy Center to VIP visitors, October 20, 2017
- *Guest*, live television interviews on ThinkTech Hawaii’s “Research in Manoa:
 - new cosmic dust collection on Mauna Loa, Honolulu, HI, July 17, 2017:
<https://www.youtube.com/watch?v=U8ZAssJWrGw>
 - newly developed Solar System Studio course, Honolulu, HI, November 28, 2016:
<https://www.youtube.com/watch?v=ySv7-noOFOI>
- *Science and Engineering On-Call Expert*, for students in Kailua-Kalaheo Complex K-12 DOE schools doing science fair projects, September 2017 - present
- *Organizer and Leader*, quarterly gals’ gathering for women graduate students and postdocs doing research in the Hawaii Institute of Geophysics and Planetology to discuss work/life/kids issues in a casual, supportive environment, June 2017 - present
- *Tour Guide*, lab tours of the Advanced Electron Microscopy Center for undergraduate courses, Spring 2017, Fall 2017, Spring 2018
- *Judge*, 2017 Spring Undergraduate Showcase at UH Manoa, May 9, 2017
- *Member*, Organizing Committee-Outreach, March for Science – Hawaii, April 22, 2017
- *Volunteer*, Girl Scout STEM Fest 2016, Pacific Aviation Museum Pearl Harbor, Honolulu, HI, November 5, 2016
- *Presenter*, demonstrations on comets and states of matter to preschoolers at The Model School, Berkeley, CA, 2016.
- *Contributer*, national and international media interviews on implications of water produced in space dust by solar wind, following high profile publication, 2014.
- *Contributor*, White House briefing that included a NASA Planetary Science Nugget I wrote on implications of water produced in space dust by solar wind, 2014.
- *Featured scientist*, “Race: Are We So Different?” traveling exhibit sponsored by the Center of Science and Industry museum in Columbus, Ohio, 2012.
- *Presenter*, on planetary science and astromaterials research for frequent Lawrence Livermore National Laboratory Directorate-level reviews and high-profile visitors, 2004 – 2013.
- *Public Speaker*, LLNL Family Days public lecture on comets, 2009.
- *Speaker*, Stanford Materials Research Society Student Chapter Alumni Career Seminar Series, 2010.
- *Public Speaker*, Tri-Valley Stargazers public lecture on the NASA Stardust mission and results, 2008.
- *Contributor*, LLNL’s Science and Technology Education Program Dinner with a Scientist, 2008.
- *Public Speaker*, “Science on Saturday” public lecture to ~1000 middle school kids for the LLNL Science and Technology Education Program, 2007 and 2008.
- *Judge*, Tri-Valley Science and Engineering Fair, 2007.
- *Contributer*, public radio and national and international media interviews on NASA Stardust mission results and implications, following high profile publication, 2006.
- *Mentor*, Science Buddies Advisor for middle school kids on science fair projects, 2003-2004.

- *Organizer*, Expanding Your Horizons, a program designed to draw girls into science and engineering, 1996-1997.
- *Contributor*, frequent participant in Take Your Daughter to Work Day and Expanding Your Horizons.
- *Co-founder and Leader*, Materials Science and Engineering women's support group at Stanford University, 1993-1994.

SPECIALIZED SKILLS

- Transmission electron microscopy, TEM: Monochromated and dual aberration-corrected (S)TEM with high resolution Gatan imaging filter, energy-dispersive spectrometer and high angle annular dark field detector (FEI Tecnai and FEI Titan). Additional Gatan training in EELS and EFTEM. Qualified user on FEI Tecnai at Stanford and TitanX at LBL. Active access proposal at Molecular Foundry, LBL.
- Focused ion beam, FIB: FEI Helios 660 DualBeam FIB at UH, qualified user on dual-beam FIB at Stanford, and FEI Academy trained on FEI Nova 600 NanoLab dual-beam FIB at Oregon NanoPort. Operated FIB at LLNL and Stanford for TEM sample preparation and for other specialized sample modifications. Developed new methods of sample preparation and modification for cross-platform analyses by TEM and SIMS.
- Scanning electron microscopy, SEM: Trained on and operate high-resolution FEG-SEMs (JEOL and LEO) with energy dispersive x-ray analysis system and backscatter detector.
- Synchrotron radiation techniques for sample analysis: Energy spectroscopies (XANES, EXAFS), scattering (XRD) and elemental analysis (XRF and micro-XRF). Experience successfully applying for beam time for cosmochemistry research at national user facilities.
- Ultramicrotomy for TEM sample preparation.
- Micromanipulator and manual manipulation of small particles.
- Developed ultrasonic microblades for cutting silica aerogel (Stardust impact tracks).
- Familiar with cleanroom procedures and maintenance.
- Experienced in aerogel handling and storage.

INTERESTS AND ACTIVITIES

- Languages: Swedish, conversational German, tutored English as a foreign language
- Travel; back-country and winter wilderness camping; rock-climbing and skiing; violin and symphony concerts