Steven D. Jacobsen
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Boulder, CO 80309
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Curriculum Vitae
and List of Publications

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January 2026

Education

Ph.D. Geophysics, University of Colorado, 2001
M.S. Geology, University of Colorado, 1998
B.A. Geology, University of Colorado, 1995

Positions Held

Professor (2025-present) University of Colorado Boulder, Department of Geological Sciences
Professor (2016-2025) Northwestern University, Department of Earth and Planetary Sciences
Faculty Affiliate, Paula M. Trienens Institute for Sustainability and Energy
Faculty Affiliate, Center for Engineering Sustainability and Resilience
Faculty Member, Graduate Program in Applied Physics
Associate Professor (2011-2016); **Assistant Professor** (2006-2011)
Northwestern University, Department of Earth and Planetary Sciences
Research Scientist (2005-2006)
Carnegie Institution for Science, Earth and Planets Laboratory, Washington D.C.
Barbara McClintock Fellow, Postdoctoral Research Associate (2004-2005)
Carnegie Institution for Science, Earth and Planets Laboratory, Washington D.C.
Alexander von Humboldt Fellow, Postdoctoral Research Associate (2001-2003)
Bayerisches Geoinstitut, University of Bayreuth, Germany
CIRES Graduate Research Fellow (1999-2000)
Cooperative Institute for Research in Environmental Sciences, University of Colorado
Graduate Research Assistant (1995-2001)
University of Colorado, Department of Geological Sciences
Research Assistant (1994-1995 and 1997)
United States Geological Survey, National Ice Core Laboratory, Lakewood, Colorado
University of Nevada, Reno, Desert Research Institute, National Ice Core Laboratory

Research Statement

I am a mineralogist and materials scientist doing physical chemistry in extreme environments. Extremes may include high pressure or temperature, low temperature, radiation, and combinations found throughout the solar system. Applications span geophysical, planetary, chemical and materials sciences. I specialize in hydrogen bonding and am interested in the role of minerals in cycling biocritical elements (like C, O, H, and N) in the Earth. The conditions found deep in planets are rich for discovery of new compounds with functional properties, such as novel intermetallic compounds or superhard materials for operation in extreme environments. I am currently involved in a study on electrodeposition of carbonates in marine soils and PI of a cooperative agreement with NASA/MSFC and industry for development of off-world construction technology from regolith on the lunar south pole.

Awards and Fellowships

Friedrich Wilhelm Bessel Research Award, 2014
Alexander von Humboldt Foundation
Weinberg College Distinguished Teaching Award, 2013
Northwestern University, Weinberg College of Arts and Sciences
Presidential Early Career Award for Scientists and Engineers (PECASE), 2008
White House OSTP, Obama Administration. Citation: For innovative experimental research to elucidate the critical role of water on the physical properties of the Earth's deep interior. Further recognition for prioritizing science education at all levels and proactively working to close the minority achievement gap in science and mathematics.
Packard Fellowship for Science and Engineering, 2008
David and Lucile Packard Foundation
Elastic properties of superhard materials using gigahertz-ultrasound.
Faculty Early Career Development Award (CAREER), 2008
National Science Foundation
Mineralogical Society of America Distinguished Lecturer, 2007
Mineralogical Society of America
Barbara McClintock Postdoctoral Fellowship, 2005
Carnegie Institution of Washington
Alexander von Humboldt Fellowship, 2002
Bayerisches Geoinstitut, University of Bayreuth, Germany
E.H. Kraus Grant for Research in Crystallography, 2001
Mineralogical Society of America
Excellence in Trades Award, 2001
University of Colorado, Department of Physics
Mineral and Rock Physics Graduate Research Award, 2000
American Geophysical Union
Longley, Wahlstrom, Warner Award, 2000
University of Colorado, Department of Geological Sciences
CIRES Graduate Research Fellowship, 2000
Cooperative Institute for Research in Environmental Sciences, Univ. of Colorado

Patents

Title: **Optical Contact Micrometer**
Patent number: 8,810,904
Filing date: 02/09/2012; Awarded 08/19/2014.
The optical contact micrometer consists of a double-contact micrometer interfaced with an optical heterodyne interferometer to achieve high-spatial resolution, high-precision sample thickness measurements for calibrating a variety of material physical properties measurements on samples for spectroscopic, ultrasonic, and shockwave studies. Examples include application to determining elastic properties of diamond and related superhard materials.

Funding and Research Awards

NASA Marshall Space Flight Center (MSFC) Cooperative Agreement **$122,279**
Dual Use Technology Development at MSFC, in partnership with ICON Tech. Inc.
"Micro-Raman for Offworld Construction (μROC)"
PI, award dates: 01/01/2024-12/31/2024; under NCE 01/01/2025-12/31/2025

DOE/NNSA, Chicago/DOE Alliance Center (CDAC-V) Sub-award **$455,245**
SSAA Program of the National Nuclear Security Administration
"Chicago-DOE Alliance Center: A Center of Excellence for Materials at Extremes"
Partner, subaward-PI, award dates: 07/01/2024-06/30/2028

Z-Fundamental Science Proposal: Sandia National Laboratory **(in-kind)**
"*Origin of the Ultra-Low Velocity Zones atop Earth's core-mantle boundary: Shock-ramp compression of iron-rich (Mg,Fe)O*"
PI, awarded eight dedicated shots on the Z machine 2021-2027; ~$1.5M

DOE/NNSA, Chicago/DOE Alliance Center (CDAC-IV) Sub-award **$340,015**
SSAA Program of the National Nuclear Security Administration
"Chicago-DOE Alliance Center: A Center of Excellence for High Pressure Science and Technology" Partner, subaward-PI, award dates: 07/01/2020-06/30/2024

National Science Foundation (EAR-1853521) Geophysics Program **$472,282**
"Superdeep Diamonds from the Transition Zone and Lower Mantle"
PI, award dates: 02/01/2019-01/31/2022; NCE to 01/31/2023

DOE/NNSA, Capital/DOE Alliance Center (CDAC-IV) Sub-award **$120,902**
SSAA Program of the National Nuclear Security Administration
"Capital-DOE Alliance Center: A Center of Excellence for High Pressure Science and Technology" Partner, award dates: 10/01/2018-06/12/2020

NASA (Emerging Worlds) **$96,833**
"*Evolution of Hydrogen in the Inner Solar System: Volatile Abundances and Isotopic Compositions in CAIs and Chondrules from Primitive Carbonaceous Chondrites*"
PI (Erik Hauri), co-I (Conel Alexander), co-I (Ruslan Mendybaev), co-I (Steve Jacobsen)
Award dates: 03/06/2018-03/05/2021; NCE to 03/05/2022

National Science Foundation (DMR-1508577) Ceramics **$298,701**
"Hardness and Elastic Properties of Superhard and Ultrahard Materials"
PI (co-PI, C.R. Bina) award dates: 07/2015-06/2018; NCE to 06/2018

National Science Foundation (EAR-1452344) Geophysics Program **$343,479**
"Hydration State of the Transition Zone and Lowermost Mantle"
PI, award dates: 01/2015-01/2018; NCE to to 01/2019

DOE/NNSA, Carnegie/DOE Alliance Center (CDAC-III) Sub-award **$427,953**
SSAA Program of the National Nuclear Security Administration
"High-pressure elastic properties of minerals, glasses, and superhard materials"
Partner, subaward-PI, award dates: 03/2013-02/2018

David and Lucile Packard Fellowship for Science and Engineering **$875,000**
"Elastic properties of superhard materials using gigahertz-ultrasound"
PI, award dates: 11/2008-11/2013 (extended to 11/2017)

National Science Foundation (CAREER EAR-0748707) Geophysics Program **$509,328**
"Effects of hydration on the physical properties of mantle materials from atomic to geophysical scales." With PECASE. PI, award dates: 01/2008-12/2013

DOE/NNSA, Carnegie/DOE Alliance Center (CDAC-II) Sub-award **$271,167**
SSAA Program of the National Nuclear Security Administration
"Elasticity of superhard materials using GHz-ultrasonic interferometry".
Partner, subaward-PI, award dates: 03/2008-02/2013

National Science Foundation (EAR-0948953) Instrumentation and Facilities **$176,155**
"Acquisition of a Single-Crystal X-ray Diffractometer for Earth and Planetary Materials Research and Education at Northwestern University".
PI, award dates: 11/2010-10/2011

National Science Foundation (EAR-0651173) Instrumentation and Facilities **$54,500**
"Acquisition of a broadband oscilloscope for GHz-ultrasonic studies of mineral elasticity in the diamond anvil cell". PI, award dates: 02/2007-2/2008

National Science Foundation (EAR-0440112/EAR-0721449) Geophysics Program **$298,671**
"High P-T elasticity of deep Earth materials with new Gigahertz-ultrasonic techniques"
PI (co-PI, R.J. Hemley), award dates: 12/2004-12/2008; $159,970 to Northwestern

Grants internal to Northwestern:

Northwestern University, Center for Engineering Sustainability and Resilience **$60,000**
"SEACRET: Strengthening Electrochemically Any Coastal Region without Environmental Threats" Alessandro Rotta Loria (PI); Steve Jacobsen (co-PI)
Award dates: 12/01/21-5/31/23

Northwestern University, Innovative Initiatives Incubator (I3) Grant **$240,000**
"*Charting high-pressure phase space for undiscovered magnetic materials"*
Danna Freedman (PI), Steve Jacobsen (co-PI), Christopher Wolverton (co-PI)
Award dates: 09/2016-08/2018 ($73k to Jacobsen)

Northwestern University, Data Science Research Grant **$50,000**
"*High-pressure materials design and discovery using big quantum data"*
Christopher Wolverton (PI), Steve Jacobsen (co-PI); Award dates: 09/2016-08/2017

Northwestern University, Weinberg College of Arts and Sciences, Hewlett Grant **$34,374**
"*Establishment of an Earth and Planetary Materials Undergraduate Teaching Laboratory."* PI, Award date: 09/2006

Northwestern University, Weinberg College of Arts and Sciences, Hewlett Grant **$5,639**
"Modernization of Northwestern's rock and mineral collection in support of innovative undergraduate education and public outreach." PI, Award date: 06/2010

Teaching

GEOL-2005: University of Colorado Boulder, *Earth Materials*
GEOL-major required course covering all general aspects of geomaterials

GEOL-3010: University of Colorado Boulder, *Introduction to Mineralogy*
Core major course focusing on structure, properties and applications of minerals in science, society, and the future low-carbon economy, typically enrolls 20 students across Arts and Sciences and Engineering schools.

EARTH-101: Northwestern University, *Earth Science for the 21st Century*
TED-style Earth science for non-science majors enrolling 250-450 students annually.

EARTH-102: Northwestern University, *The Future of Renewable Energy*
Freshman seminar with capped enrollment of 15.

EARTH-300: Northwestern University, *Earth and Planetary Materials*
Core major course focusing on structure, properties and applications of minerals in science, society, and the future low-carbon economy, typically enrolls 20 students across Arts and Sciences and Engineering schools.

EARTH-301: Northwestern University, *Petrology: Evolution of crustal and mantle rocks*
Core major course with emphasis on thermodynamics and phase diagrams as well as a field trip to the UP-Michigan, enrolls 8-12 students.

EARTH-438: Northwestern University, *Advanced Graduate Seminar*
Recent offerings: *Water in the Solar System*
Mineral Physics
Trailblazers
Shock Compression of Condensed Matter

Service and Outreach

Review Coordinator, Optimizing the USGS Mineral Resources Program Science Portfolio 2024-
National Academies of Sciences, Engineering and Medicine (NASEM)
Member, MSA Award Committee, Mineralogical Society of America 2024-
Chair, Advisory Board, Energy Frontier Research Center (EFRC), Northwestern 2022-
Hydrogen in Energy and Information Sciences, PI Sossina Haile
Senator, Faculty Senate of Northwestern University 2022-2024
Member, Executive Committee 2023-2024
Chair, Committee on Cause 2023-2024
Member, Salary and Benefits Committee 2022-2023
Director, Graduate Recruiting and Admissions, Dept. Earth and Planetary Sciences 2023-2025
Member, Advisory Committee, J.B. Cohen X-ray Diffraction Laboratory 2016-2025
Department of Materials Science and Engineering, Northwestern University
Member, Committee on Catalyzing Opportunities for Research in Earth Sciences 2018-2020
(CORES): a Decadal Survey for NSF's Division of Earth Sciences (NASEM)
Director, Graduate Recruiting and Admissions, Dept. Earth and Planetary Sciences 2015-2020
Member, Committee on Solid Earth Geophysics (NASEM) 2015-2020
Member, Curricular Policy Committee, Weinberg College of Arts and Sciences 2016-2019
Member, NSF-COMPRES Nominations Committee 2019

Member, DOE Beamline Advisory Team, NSLS-II FIS/MET beamline 2015-2018
National Synchrotron Light Source-II
Member, Executive Committee of NSF-COMPRES, 2015-2018
NSF-Consortium for Materials Properties Research in Earth Sciences (COMPRES)
Chair, NSF-COMPRES Nominations Committee 2011, 2016, 2017
Member, Administrative Board of The Graduate School, Northwestern 2012-2016
Associate Head, Public Affairs Residential College, Northwestern University 2009-2014
Member, Review Panel, NSF Geophysics Program Postdoctoral Fellowships 2014
Member, Laser Safety Committee, Northwestern University 2008-2014
Member, NSF-COMPRES Education, Outreach and Infrastructure Development 2008-2014
Member, Space Planning Committee, NU Dept. Earth and Planetary Sciences 2008-2012
Director of Computing, NU Dept. Earth and Planetary Sciences 2008-2012
Project Excite, Earth science education courses for Evanston district 65 3rd&4th graders
Northwestern University, Center for Talent Development, 2006-2012
Member, NSLS-II beamline development proposal team 2009-2011
Title: Frontier Synchrotron Infrared Spectroscopy Under Extreme Conditions
Awarded NxtGen beamline development status from DOE in 2012
Member, Mineral and Rock Physics Executive Committee, AGU 2004-2010
Member, Mineral and Rock Physics Graduate Research Award Committee, AGU 2006-2010
Member, Program Committee Annual COMPRES meeting 2008-2010
Chair, Mineral and Rock Physics Graduate Research Award Committee, AGU 2007-2008
Member, Geophysics Review Panel, NSF, Division of Earth Sciences 2007
Assistant Coordinator, NSF-REU Summer Scholar Program, Carnegie Institution 2004-2006
Member, Program Committee, American Geophysical Union 2004-2005

Editorship

Editor, *Geophysical Research Letters* 2018-2023
Associate Editor, *Geophysical Research Letters* 2012-2018
Editor, *AGU Monograph*, "Earth's Deep Water Cycle" (with S. van der Lee) 2006
Guest Editor, *Journal of Synchrotron Radiation* 2005
Structure determination by single-crystal X-ray diffraction at Megabar pressures
(with P. Dera and C.T. Prewitt), Vol. 12 2005

Society Membership

AAAS, member since 2019
American Geophysical Union, member since 1996
American Physical Society, member since 2019
Mineralogical Society of America, member since 1996

Advisors

M.S.& Ph.D. University of Colorado at Boulder: Joseph R. Smyth and Hartmut A. Spetzler
Postdoctoral research at Bayerisches Geoinstitut: Stephen J. Mackwell
Postdoctoral research at the Carnegie Earth and Planets Laboratory: Russell J. Hemley

Advisees

Current Graduate and Undergraduate Students:

Tirzah Abbott, Northwestern University, Ph.D. student, *supervisor*

Former Postdocs:

Alison Altman (Ph.D. Berkeley): Northwestern University, 2017-2021. Co-supervised with Danna Freedman, Chemistry. Publications: [110], [116], [119], [122]. Now Assistant Professor at Texas A&M.

Christopher M. Holl (Ph.D. CU-Boulder), Northwestern University, 2006-2009. Publications: [44], [45], [46], [48], [49], [50], [55].

Xiaobing Liu (Ph.D. Jilin University, PRC): Northwestern University, 2012-2017. Publications: [89], [93], [108]. Now Professor at Qufu Normal University, PRC.

Sylvia-Monique Thomas (Ph.D. GFZ-Potsdam): Northwestern University, 2008-2010. Publications: [62], [63], [66], [72], [79], [80], [81]. Now Editor at Cactus Communications, Center of Excellence for Earth and Environmental Sciences.

James P.S. Walsh (Ph.D. Manchester): Northwestern University, 2015-2019. Co-supervised with Danna Freedman, Chemistry. Publications: [85], [95], [99], [100], [104], [107], [110], [112], [116], [119]. Now Assistant Professor at University of Massachusetts.

Former Graduate Students:

Hannah Bausch, Northwestern University, Ph.D. 2015, *supervisor*
Publications: [103], [131], [135-submitted]
Now at: Postdoctoral Researcher, Sandia National Laboratories

Yun-Yuan Chang, Northwestern University, Ph.D. 2014, *supervisor*
Publications: [59], [62], [64], [67], [70], [72], [75], [81], [93]
Now at: Assistant Research Fellow, Inst. of Earth Sciences, Academia Sinica, Taiwan

Samantha M. Clarke, Northwestern University, Ph.D. 2018 Chemistry, *co-supervisor*
(with Danna Freedman), Publications: [85], [92], [95], [99], [100], [104], [112], [116]
Now at: Staff Scientist, Lawrence Livermore National Laboratory

Laura Gardner, Northwestern University, Ph.D. student, *supervisor*
Publications: [131], [132], [134], [137-submitted]
Now at: Lecturer, Northwestern University

Anastasia Kantor, Bayerisches Geoinstitut, Ph.D. 2008, *co-supervisor* (with L. Dubrovinsky)
Publications: [16], [24], [47]
Now at: European Synchrotron Radiation Facility, Grenoble, France

Ryan Klein, Northwestern University, Ph.D. 2019 Chemistry, *co-supervisor*
(with Danna Freedman), Publications: [100], [110], [116]
Now at: Researcher-III, National Renewable Energy Laboratory

John Lazarz, Northwestern University, Ph.D. 2018, *supervisor,* Publications: [79], [109]
Now at: Program Manager of the US ground-based nuclear detonation detection R&D program at the National Nuclear Security Administration.
Xiaoting Lou, Northwestern University, Ph.D. 2013, *co-supervisor* (with S. van der Lee)
Publications: [70]; Now at: Geophysicist, Chevron
Zhu Mao, Princeton University, Ph.D. 2009 *co-supervisor* (with Tom Duffy)
Publications: [45], [46], [48], [55], [56], [60], [64], [77]
Now at: Professor, University of Science and Technology of China (USTC)
Fei Qin, Northwestern University, Visiting Scholar (Chinese Scholarship Program), *supervisor*
Publications: [87], [91], [106], [123]
Now at: Associate Professor, China University of Geoscience, Beijing
Alexandra Tamerius, Northwestern University, Ph.D. 2021 Chemistry, *co-supervisor* (with Danna Freedman), Publications: [99], [104], [110], [119], [122]
Now at: Assistant Professor, Marian University
Joshua Townsend, Northwestern University Presidential Fellow, Ph.D. 2016, *supervisor*
Publications: [62], [67], [70], [78], [86], [88]
Now at: Staff Scientist at Sandia National Laboratory
Fei Wang, Northwestern University, Ph.D. 2021, *supervisor*
Publications: [98], [113], [117], [120], [121]
Now at: Postdoctoral researcher at Bayerisches Geoinstitut, Bayreuth, Germany
Diane Wetzel, Brown University, Ph.D. 2014, *co-supervisor* (with Alberto Saal)
Publications: [69]; Now at: Geologist at Anadarko Petroleum Corporation
Michelle Wenz, Northwestern University, Ph.D. 2019, *supervisor*
Publications: [103], [107]
Now Dean of Students, Science Dept. Head, Lincoln 6-12th Preparatory School, AZ

Former Undergraduate Students with Publications:

Ari Melinger-Cohen, Northwestern, B.A. Honors Thesis 2013, *co-supervisor* (with C. Bina)
Rebecca Fischer, Northwestern University (Integrated Science Program), B.A. 2009, *supervisor*
Publications: [49]
Now at: Clare Boothe Luce Assistant Professor of EPS at Harvard
Ben Haugen, Carnegie Institution REU Program 2008, *co-supervisor* (with A. Goncharov)
Publications: [51], [54]
Now at: Sr. Geotechnical Solutions Engineer with Maptek.
Elizabeth Littlefield, Carnegie Institution REU Program 2008, *supervisor*
Publications: [57]
Now at: Research Scientist, Great Basin Center for Geothermal Energy
Taymae Mimouni, Northwestern, B.A. Honors Thesis 2024
Publications: [Effects of hot pressing on iron oxidation states in (Mg,Fe)O, in prep]
Now at: Research Staff, Corning Inc.
Julia Swanson, Northwestern University (EPS), B.A.
Publications: [65]
Now at: Teacher, 7th-grade Science, E Prep Cliffs, Breakthrough Public Schools

Invited Talks

Lawrence Livermore National Laboratory, High Energy Density Science Center, 2/20/25
University of Colorado at Boulder, Renewable & Sustainable Energy Institute, 4/25/24
Northwestern University, Department of Earth and Planetary Sciences, 11/3/23
Chicago/DOE Alliance Center Public Webinar Series, 05/17/23
University of Colorado at Boulder, Department of Geological Sciences, 03/15/23
University of Michigan, Smith Lecture, 02/21/20
Advanced Photon Source, Argonne National Laboratory, APS Colloquium, 01/09/19
Carnegie Institution for Science, Geophysical Laboratory, Mao Symposium, 10/02/18
National Synchrotron Light Source-II, Workshop on Synchrotron Infrared Spectroscopy on Materials in Extreme Environments, 05/23/18
Science Salon and Humanities Hour, WCAS-Northwestern University, 01/27/18
Jackson School of Geosciences, UT-Austin, DeFord Lecture, 9/14/17
Z Fundamental Science Program (ZFSP) Workshop, Sandia National Laboratory, 07/17/17
Université Pierre et Marie Curie, IMPMC, 03/06/2017
University of New Mexico, Department of Earth and Planetary Sciences, 10/28/2016
Center for Interdisciplinary Exploration and Research in Astrophysics, 10/10/2016
NSF Workshop on Emerging Opportunities in Ceramic and Glass Science, 9/13/16
Purdue University, Department of Earth, Atmospheric, and Planetary Sciences, 2/19/2016
University of Western Ontario, Department of Earth Sciences, 2/7/16
Advanced Photon Source, Argonne National Laboratory, 12/9/15
NNSA/DOE site visit and review of Carnegie/DOE Alliance Center (CDAC)
University of Vienna, Institute for Mineralogy and Crystallography, Austria, 5/22/2015
Goethe University, Institut für Geowissenschaften, Frankfurt, Germany, 4/22/2015
Observatoire de Physique du Globe, University of Clermot-Ferrand, France, 3/6/2015
University College London, Department of Earth Sciences, 2/4/2015
Bayerisches Geoinstitut, University of Bayreuth, Germany, 9/18/2014
Northwestern University, Department of Physics and Astronomy, 11/1/2013
Andor Academy Workshop, NU*ANCE*-Northwestern University, Keynote talk, 10/16/2013
Brown University, Department of Geological Sciences, 10/10/2013
Advanced Photon Source, Argonne National Laboratory, 9/16/2013
NNSA site visit and review of Carnegie/DOE Alliance Center (CDAC)
David and Lucile Packard Foundation, 25th Anniversary Reunion, Denver, 9/13/2013
Gordon Research Conference on Interior of the Earth, Mount Holyoke College, 6/6/2013
University of Colorado, Department of Physics, 4/8/2013
Cornell University, Department of Earth and Atmospheric Sciences, 5/2/2012
National Synchrotron Light Source, Brookhaven National Laboratory, 11/16/2011
NSF site visit: Consortium for Materials Properties Research in Earth Sciences (COMPRES)
Advanced Photon Source, Argonne National Laboratory, 10/25/2011
NNSA site visit and review of Carnegie/DOE Alliance Center (CDAC)
Northern Illinois University, Department of Geology and Environmental Sciences, 4/29/2011
University of Denver, Department of Geography, 11/18/2010
University of Denver, Department of Physics and Astronomy, 11/17/2010
Geophysical Laboratory, Carnegie Institution of Washington, 1/12/2010
Advanced Photon Source, Argonne National Laboratory, High-pressure seminar, 11/10/2009

Washington University, St. Louis, Department of Earth and Planetary Sciences, 10/8/2009
David and Lucile Packard Foundation, Packard Fellows Meeting, Monterey, CA, 9/10/2009
Cooperative Institute for Deep Earth Research, Keynote, Planning Workshop, 5/19/2009
Ehime University, Geodynamics Research Center, Matsuyama, Japan, 3/3/2009
Northwestern University, Department of Physics and Astronomy, 5/23/2008
University of Munich, Department of Earth and Environmental Sciences, Germany, 3/7/2008
University of Neuchâtel, Institute of Geology and Hydrogeology, Switzerland, 3/5/2008
University of Bristol, Department of Earth Sciences, Bristol, U.K., 3/3/2008
North Dakota State University, Department of Geosciences, 1/24/2008
North Dakota State University, Department of Civil Engineering, 1/24/2008
University of North Dakota, Department of Geology and Geological Engineering, 1/23/2008
Winona State University, Department of Geosciences, 1/21/2008
Northwestern University, Department of Materials Science and Engineering, 5/15/2007
West Virginia University, Department of Geology and Geography, 9/10/2007
Rutgers University, Department of Earth and Planetary Sciences, 9/12/2007
Memorial University, Department of Earth and Planetary Sciences, Newfoundland, 9/14/2007
University of Illinois at Urbana-Champaign, Department of Geology, 2/9/2007
University of Chicago, Department of Geophysical Sciences, 10/20/2006
University of Illinois Chicago, Department of Earth and Environmental Sciences, 9/7/2006
University of Minnesota, Department of Geology and Geophysics, 3/2/2006
Virginia Tech, Department of Geological Sciences, 2/23/2006
Yale University, Department of Geology and Geophysics, 1/20/2006
Bayerisches Geoinstitut, University of Bayreuth, Germany, 10/17/2005
Tohoku University, Sendai Japan, Graduate School of Science, 7/22/2005
Northwestern University, Department of Geological Sciences, 4/15/2005
Princeton University, Department of Geosciences, 4/7/2005
University of Wisconsin, Madison, Department of Geology and Geophysics, 3/22/2004
Bayerisches Geoinstitut, Bayreuth, Germany, 6/26/2003
California Institute of Technology, Seismological Laboratory, Pasadena, California, 4/14/2003
Bavarian Academy of Science, Munich, Germany, 11/14/2002
Peking University, Department of Geological Sciences, Beijing, China, 7/16/2001

List of Publications: Steven D. Jacobsen

Updated February 2025
ORCID 0000-0002-9746-958X; Scopus ID 12781882700
Sum of citations: 7200 (Scopus); *h*-index: 49 (Scopus); 54 (Google Scholar)
Papers in high-impact journals, *Science* 4; *Nature* 3; *JACS* 3; *PRL* 3; *Geology* 2

Journal Publications

2026, and articles submitted or in press

[138] Abbott, T.M., C. Akins, M.L. Barsoum, L.L. Gardner, M. Hjelmstad, X. Hu, O.K. Farha, A. Winkelmann, P.R. Heck, T. Sharp, V.P. Dravid and **S.D. Jacobsen** (2026) Revealing multiple ringwoodite and wadsleyite transformation mechanisms in a shock-melt vein using transmission Kikuchi diffraction. *Submitted*

[137] Barsoum, M.L., T.M. Abbott, **S.D. Jacobsen**, O.K. Farha, and V.P. Dravid (2026) Crystal orientation and defect mapping in beam-sensitive zeolites with near-axis transmission Kikuchi diffraction. *ACS Nano Letters,* https://doi.org/10.1021/acs.nanolett.5c05800

[136] Bausch, H.J., J.P. Townsend, J.-P. Davis, S. Duwal, C.T. Seagle, T.M. Abbott, A.N. Clark, and **S.D. Jacobsen** (2026) Direct sound speed measurements of MgO along planetary adiabats up to 400 GPa using shock-ramp compression. *Submitted*

[135] T.M. Hutchison, C.P. McGuire, I.K. Ocampo, J.H. Eggert, C. Davis, E.C. Galtier, D. Khagani, N.A. Boiadjieva, B.K. Ofori-Okai, S. Lee, E.R. Sung, E.R. Toro, T. Subak, and **S.D. Jacobsen** (2026) X-ray-pump, speckled optical-probe transient grating spectroscopy at a hard x-ray free electron laser. *Submitted*

2025

[134] Gardner, L.L., W. Abramovich, M. Romanov, S. Flohr, U. Kierdorf, H. Kierdorf, J.D. Almer, **S.D. Jacobsen**, G. Gonzalez Aviles, J.-S. Park, and S.R. Stock (2025) Assessment of diagenesis in archeological human second metacarpal bones using the intensity of the small angle x-ray scattering *D*-period peak. *Journal of the Royal Society Interface* 22, 20240826. https://doi.org/10.1098/rsif.2024.0826

[133] Koocher, N.Z., A.B. Altman, R.A. Klein, C.D. Malliakas, **S.D. Jacobsen**, D.E. Freedman and J.M. Rondinelli (2025) Tunable negative thermal expansion in layered perovskite $Ba_3Zr_2S_7$. *Inorganic Chemistry* 64, 10761-10771. https://doi.org/10.1021/acs.inorgchem.5c00314

[132] Ni, P., S.B. Shirey, M.J. Walter, J. Czas, D. Novella, F. Nestola, N. Kueter, E.M. Smith, T. Stachel, D.G. Pearson, A. Steele, L.L. Gardner, **S.D. Jacobsen**, B. Harte, J.W. Harris and A. Shahar (2025) Onset of slab mantle melting in Earth's lower mantle: evidence from ferropericlase in superdeep diamonds. *Science Advances* 11, 9206. https://doi.org/10.1126/sciadv.adt9106

[131] Wang, F., H.J. Bausch, L.L. Gardner, D. Zhang, K. Armstrong, A.S. Bell, J. Zhao, E.E. Alp, and **S.D. Jacobsen** (2025) Thermoelastic properties of iron-rich ringwoodite and the deep mantle aerotherm of Mars. *Geophysical Research Letters* 52, e2024GL109666 https://doi.org/10.1029/2024GL109666

2024

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