

CURRICULUM VITAE - Richard Walter Carlson



- Education:** B.A. Chemistry - Earth Science, University of California, San Diego, 1976
Ph.D. Earth Science, Scripps Institution of Oceanography, UCSD, 1980
- Employment:** *Director:* Carnegie Science, DTM, November, 2014 – Present.
Acting Director: Carnegie Science, DTM, May-October, 2014.
Staff Scientist: Carnegie Institution of Washington, DTM, 1981 - Present.
Postdoctoral Research Fellow: Carnegie Institution of Washington, DTM, 1980 - 81.
Teaching, Research Assistant: Scripps Institution of Oceanography, 1976-80.
- Awards:**
Yaakov Ben-Tor Lecturer, The Hebrew University of Jerusalem, 2018
Distinguished Lecturer, Mineralogical Society of America, 2015-16
Arthur L. Day Medal, Geological Society of America, 2013
Member, National Academy of Sciences, 2012
Inclusion in ISIHighlyCited.com, 2010
Fellow, American Academy of Arts & Sciences, 2009
Hamilton Visiting Scholar, Southern Methodist University, 2008
Norman L. Bowen Award, VGP Section, American Geophysical Union, 2008
Fellow, American Geophysical Union, 2003
Fellow, Geochemical Society 2003
Louis Murray Fellowship, University of Cape Town, 1999
- Professional Activities:**
Nemmers Prize Selection Committee, 2018
Visiting Committee Member, Columbia University DEES, 2018
Chair, Geology Section (15), National Academy of Sciences, 2018-2021
NASA Review Panel, 2017
Class Membership Committee Representative, National Academy of Sciences, 2017
Foreign Associate Temporary Nominating Group, National Academy of Sciences, 2013-19
Chair, J. Lawrence Smith Medal Committee, National Academy of Sciences, 2014-15
Co-organizer, Geoneutrino geoscience workshop, 2014
Invited Lecturer, CIDER, 2012, 2013
Vice President, President, Past President, Geochemical Society, 2010-15
Chair, International Program Committee, Goldschmidt 2008
NERC Isotope Facilities Review, 2007
Clarke Medal Award Committee, Geochemical Society, 2005-08
Editor, Earth and Planetary Science Letters, 2005-11
Associate Editor Geosphere, 2005-08
Co-Chair, EarthScope National Meeting, 2005
NASA Cosmochemistry Review Panel, 2004
Organizer, Cyberinfrastructure for Solid Earth Geochemistry Workshop, 2003
Co-organizer, Integrated Solid Earth Science - Cyberinfrastructure Workshop, 2003
Civilian Research Defense Foundation, Review Panel, 2003, 2004, 2006
EarthScope Science and Education Committee, 2002-04
Goldschmidt Medal Award Committee, Geochemical Society, 2002-05
EarthScope Working Group, 2002
Invited Participant, Kennedy School of Government Conflict Diamonds, 2001
Invited Discussion Group Leader, White House Diamond Conference, 2001
Chair, EarthScope Science Workshop Organizing Committee, 2001
Panel Member, Geoinformatics Workshop, 2000
NASA Instrumentation Program Workshop, 2000
Steering Committee, USArray, 1999
Committee of Visitors, NSF International Programs, 1999
Macelwane Medal Award Committee of the AGU, 1998-2000
Chair, Directions and Review Committee for JGR Solid Earth, 1997
AGU-VGP Liaison Press Officer 1996-98
U.S. Geodynamics Committee, National Research Council, 1996-99
Yucca Mountain Probabilistic Volcanic Hazard Project, Expert Panelist, 1995, 2004
IAVCEI Program Chair, IUGG General Assembly, 1995
International Science Foundation Review Panel, 1993-94

NSF Committee of Visitors, Petrology and Geochemistry Program, 1993
IAVCEI Representative to the US National Committee for the IUGG, 1991-95
AGU Committee for Studies of the Earth's Deep Interior, 1990- 92
Harry Hess Medal Award Committee of the AGU, 1990-91
National Research Council, Committee on the Solid-Earth Sciences, 1988-89
Continental Lithosphere Workshop, Chair, Origin and Evolution of Continents, 1989
NSF Earth Science Review Panel, 85-88; CSEDI 96; IF 97-00; SBIR 97-98; CD 05-09.
Co-convenor of 1 IGC, 3 GSA, 3 GS, 11 AGU symposiums, and 2 GSA field trips
National Research Council Panel on Explosive Volcanism, 1980

Keynote Speaker:

Goldschmidt 2018: Nature of Earth's first crust
ELSI Meeting Before the Moon, 2016
Holmes Lecture, Syracuse University, 2016
Goldschmidt 2016: Early Earth evolution
Gordon Conf. on Origins of Solar Systems, 2015
ATLAS Lecture, University of Alberta, 2014
Condon Lecture, Oregon State University, 2014
ELSI Annual Meeting, 2014
Goldschmidt 2013: Plenary Lecture – Making Earth
Origin of the Moon, Royal Society, 2013
Will Smith Meeting, First Century of Geochronology, GS London, 2013
Baldwin Lecturer, Miami University, 2013
Goldschmidt 2012: Earth Differentiation Before and After Earth Formation
COMPRES Annual Meeting, 2011
International Conference on Craton Formation and Destruction, Beijing, 2011
Goldschmidt 2011: Origin of alkalic volcanism and mantle geochemical variation
Goldschmidt 2010: Isotopic variability in the Solar System, Continental lithosphere evolution
Royal Society Meeting "Origin and Differentiation of the Earth", 2007
Goldschmidt 2007: High Precision Mass Spectrometry
Goldschmidt 2006: Continental Lithospheric Mantle
Studies of Earth's Deep Interior Conference, Garmisch, 2004
GERM Conference, Lyon, 2003
4th South American Symposium on Isotope Geology, Salvador, Brazil, 2003
Goldschmidt 2002: Age of the Solar System and Mantle Geochemistry
7th International Kimberlite Conference, Cape Town, 1998
Arch Bishop Usher Symposium, Geol. Soc. America Annual Meeting, 1997
Gordon Conf. on The Interior of the Earth, 1996, 2003, 2009, 2013
Int. Symposium, Physics and Chemistry of the Upper Mantle, Sao Paulo, 1994

Professional Societies:

American Association for the Advancement of Science, American Geophysical Union,
Geochemical Society (Life member), Geological Society of America (Life member),
Geological Society of Washington, Meteoritical Society, Mineralogical Society of America

Research Interests:

Nucleosynthetic isotope variability in early solar system materials; timescales and mechanisms of crust formation and mantle differentiation on the terrestrial planets; early Earth history; origin of large-volume volcanism; characteristics of the sub-continental mantle and its role in continent formation and preservation; techniques for high precision chemical and isotope analysis.

PhD and/or Masters Degree Examining Committees:

Michael So Chyi, Princeton University, 1984; James Meen, Pennsylvania State University, 1985; Francis Dudas, Pennsylvania State University, 1987; Paul Vespucci, George Washington University, 1987; Roric G. Smith, University of Natal, South Africa, 1988; Jeanne Cooper, Miami University, 1991; Steven Shank, Pennsylvania State University, 1993; Monica Handler, Australian National University, 1998; Jefferson Chaumba, University of Cape Town, 1998; Kalle Westerlund, University of Cape Town, 2000; Olivier Alard, Macquarie University, 2001; Nina Simon, Free Univ. Amsterdam, 2004; Darin Snyder, Miami University, 2005; Megan Coetzee, University of Cape Town, 2005; Fang-Zhen Teng, University of Maryland, 2005; Jingao Liu, University of Maryland, 2009; Matthew Sanborn, ASU, 2011, Leonard Ancuta, Lehigh University, 2016; Nivea Magalhaes, University of Maryland, 2018.

Post-Doctoral Fellows Supervised:

Barbara Barreiro, Harry Becker, Terry Blackburn, Maud Boyet, Alan Brandon, Paterno Castillo, Sonia Esperanca, Marion Garcon, David Gerlach, Monica Handler, William Hart, Munir Humayun, Tsuyoshi Ishikawa, Mathew Jackson, Philip Janney, Karl Kehm, David Lambert, John Lassiter, Ambre Lugué, Candace Martin, Christian Miller, Jonathan O'Neil, Rita Parai, Graham Pearson, Brad Peters, Aaron Pietruszka, Liping Qin, Jesse Reimink, Hanika Rizo, Mark Schmitz, Maria Schonbachler, Steve Shirey, Paul Tomascak, Richard Walker, Elisabeth Widom

Pre-Doctoral Fellows Supervised:

Ana Lucia Novaes de Araujo, Matthias Barth, Terrance Blackburn, Ashley Bromley, Emily Cahoon, Michael Chyi, Diana Diez de Medina, Francis Dudas, Mark Ford, Gianna Garda, Ben Garden, Jussi Heinonen, Kathryn Hoppe, Gordon Irvine, Kristen James, Kenneth Klewin, Jia Liu, Andrew Menzies, Siphon Mofokeng, Nicole Moore, Gina Moseley, Mark Norman, Nguyen Hoang, Jonathan O'Neil, Shari Preese, Sarah Rilling, Matthew Sanborn, Kaleb Scarberry, Manuel Schilling, Lasse Schiotte, Violet Simelane, Kurt Shoemaker, Darrin Snyder, Howard Snyder, Christy Till, Kan Tu, Kalle Westerlund, Alicja Wypych

Collaboration with Visiting Scientists:

David Bell, Victoria Bennett, Lars Borg, Tereza Brod, Valerie Chavagnac, Francis Dudas, Genet Duke, Rob Ellam, Sonia Esperanca, Shan Gao, Rodger Hart, William Hart, Rosemary Hickey-Vargas, Dmitri Ionov, Anthony Irving, Kyochi Ishizaka, Neng Jiang, Diana de Leeuw, Juliana Marques, Stanley Mertzman, Julie Morris, Sam Mukasa, Graham Pearson, Chiara Petrone, Stephen Richardson, Frederick Roelfse, Roberta Rudnick, Jeffery Ryan, Jason Shen, Ole Stecher, Marian Tredoux, Bob Tucker, Meenakshi Wadhwa, William White, Elisabeth Widom, Allan Wilson, Xinhua Zhou

External Grants Received:**NASA (\$1.7M):**

The Initial State of the Earth and Terrestrial Planets, with G.W. Wetherill (PI) and A.P. Boss, \$433,868, 11/82 -- 10/85.
Geochemical and Isotopic Studies on the Nature of the Terrestrial Crust. \$70,500, 6/84 -- 5/88.
The Earliest History of the Earth and Moon in the Context of Solar System Formation, with G.W. Wetherill (PI), A.P. Boss, J.A. Graham, and S.B. Shirey, \$414,948, 11/85 -- 10/88.
From Dust to Planets: Mixing and Initial Assembly of Planetary Building Blocks in the Early Solar Nebula, PI with co-I C.M.O'D. Alexander, \$360,000, 6/08 -- 5/11.
The mechanism and chronology of planetesimal and planet formation and differentiation, PI with co-I's C.M.O'D Alexander and M. Horan, \$410,590, 5/2011 -- 5/2015.

NSF (\$11.1M):

Chemical and Isotopic Investigation of Late-Cenozoic Volcanics from the Northwestern United States. \$54,750, 7/82 -- 12/84.
Acquisition of a Multicollector Thermal Ionization Mass Spectrometer for Geochronological, Geochemical, and Cosmochemical Studies, PI with co-I's T. Lee, D. James, and F. Tera, \$172,900, 2/84 -- 7/85.
Acquisition of an Inductively Coupled Plasma Emission Spectrometer (ICP) for the Chemical Analysis of Rock-Forming Materials, with S.B. Shirey (PI), G. Muncill, and B. Mysen, \$73,533, 7/86 -- 12/87.
Collaborative Research: Geochemical Investigation of Late Cenozoic Volcanism in the N.W. United States: Implications for Crust/Mantle Evolution and Tectonic Development, \$34,200, 2/87 -- 7/89.
Re-Os Isotopic Studies of Crust--Mantle Evolution on the Earth. PI with co-I's S.B. Shirey and L. Brown, \$95,000, 2/88 -- 7/90.
Acquisition of a High Power Laser for Resonance Ionization Mass Spectrometry. with L. Brown (PI) and S.B. Shirey, \$80,000, 2/88 -- 7/89.
Development of a Mass Spectrometer for Re-Os using Sputtering, with L. Brown (PI) and S. B. Shirey, \$48,000, 6/90-5/91.
Re-Os Isotopic Studies of Crust-Mantle Evolution on the Earth, PI with co-I's S.B. Shirey and L. Brown, \$110,000, 6/90--5/92.
Composition and History of the Siberian Lithosphere: Major Element and Isotopic Evidence from Udachnaya Xenoliths, with F. R. Boyd (PI) and N. V. Sobolev, \$77,589, 3/91-2/93.
Re-Os Investigations of Craton Development and Mantle Evolution, PI with co-I's S.B. Shirey and L. Brown, \$179,917, 7/92-6/95.
Upgrade of DTM Mass Spectrometry Equipment, PI with co-I's L. Brown, S.B. Shirey, J.D. Morris and F. Tera, \$39,666, 7/92 - 6/94.

Origin and Evolution of Archean Continental Lithosphere: A Pilot Study in the Sao Francisco Craton, Brazil, \$23,000, 1/93 - 12/94

Origin and Evolution of Archean Continental Lithosphere: A Pilot Study in the Sao Francisco Craton, Brazil, \$8,000, 8/94 - 12/95

Acquisition of an Ion Microprobe, with E. Hauri (PI), S.B. Shirey, \$712,000, 1/95 - 12/96.

Os Isotopic Studies of Solid Earth Evolution, PI with S.B. Shirey, \$181,000, 6/95-6/98.

Anatomy of an Archean Craton: A Planning Workshop for Interdisciplinary Studies of the Origin and Evolution of the Ancient Lithosphere of Southern Africa, PI with co-I's D. Bell, S. Bowring, F.R. Boyd, J. Grotzinger, T. Grove, D. James, T. Jordan, S. Shirey, P. Silver \$32,000, 4/95-3/96.

Anatomy of an Archean Craton, PI with co-I's D. Bell, S. Bowring, F.R. Boyd, J. Grotzinger, T. Grove, D. James, T. Jordan, S. Shirey, and P. Silver, \$1,339,915, 6/96 - 6/00 + \$175,000 Supplement, 6/01-5/03

Acquisition of a Multiple Collector Inductively-Coupled Plasma Mass Spectrometer for Geochemical, Cosmochemical and Geochronological Studies, PI with co-I's S. Shirey, E. Hauri, C. Alexander and F. Tera, \$572,452, 9/97 - 9/99.

Os Isotopic Studies of Solid Earth Evolution, with S. Shirey, \$195,000, 6/98-5/01.

Characterizing the Importance of Mafic Sources for Mantle-Derived Magmatism. \$99,415 6/01 to 5/03.

Development of a Western North American Volcanic and Intrusive Rock Database, with D. Walker, R. Black, A. Glazner, L. Farmer, \$250,000 6/01 - 5/03

Terrestrial 107Pd-107Ag systematics: implications for mantle circulation, with E. Hauri (PI), \$269,035, 1/03 to 12/05

Collaborative Research: Development of data visualization and query tools for NAVDAT, Western North American Volcanic and Intrusive Rock Database, with D. Walker, R. Black, A. Glazner, L. Farmer, \$497,268, 9/03 to 8/05

Acquisition of a Thermal Ionization Mass Spectrometer for Studies in the Solid Earth and Planetary Sciences, PI with co-I's C.M.O'D Alexander, E. H. Hauri and S.B. Shirey, \$414,584, 8/03 to 7/04

Integrated Studies of Diamond Age and Composition: Constraints on Continental Lithospheric Evolution, Kaapvaal-Zimbabwe Craton, Southern Africa, with S.B. Shirey (PI) and M.D. Schmitz, \$198,685, 7/03 to 6/05

Understanding the Causes of Continental Intraplate Tectonism: A Case Study in the Pacific Northwest, PI with co-I's D.E. James, T.L. Grove, W.K. Hart, A.L. Grunder, R.A. Duncan, C.R. Kincaid, G.R. Keller, S.H. Harder and M.J. Fouch, \$3,523,056, 8/2005-7/2010.

MRI: Acquisition of a Multiple Collector ICPMS for Geochemical and Cosmochemical Studies at DTM, PI with co-I's S.B. Shirey and C.M. O'D. Alexander, \$650,000, 7/2008 – 6/2009.

Geochemical and Geochronologic Studies of Earth's Oldest Crust, \$301,602, 6/2009 – 5/2011.

Collaborative Research: Intracontinental deformation and surface uplift – geodynamic evolution of the Hangay Dome, Mongolia, Central Asia, with K. Wegmann (PI), P. Zeitler, B. Idleman, A. Meltzer, D. Sahagian, C.P. Chamberlain, \$183,992, 9/2010-8/2015.

Exploration of the earliest crust forming events on Earth, with Co-I Steven Shirey \$331,899, 9/1/2015 – 8/31/2017.

Development of a simplified cavity thermal ionization source for geoscience applications, with Co-I Jesse Reimink, \$177,199, 2/1/2018-1/31/2019.