

# Gabriela A. Farfan

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## EDUCATION

- Ph.D.        **MIT-WHOI Joint Program in Oceanography/Applied Ocean Science & Engineering**, Department of Marine Chemistry and Geochemistry, 2018
- B.S.        **Stanford University**, Department of Geological and Environmental Sciences, 2013 *with Honors*

## RESEARCH EXPERIENCE

- 2019 –        **Peter Buck Postdoctoral Fellow**, Smithsonian National Museum of Natural History, Department of Mineral Sciences working with Dr. Jeffrey Post
- 2018        **Visiting Scientist**, WiscNanogeoscience Laboratory, University of Wisconsin at Madison with Dr. Huifang Xu
- 2013 – 2018    **Graduate Research Assistant**, Woods Hole Oceanographic Institution working with Dr. Colleen Hansel, funded by NSF-GRFP and the Ford Foundation. *The mineralogy and chemistry of modern deep-sea and shallow-water corals (Ph.D. thesis).*
- 2012 – 2013    **Undergraduate Summer Research Intern**, Smithsonian National Museum of Natural History working with Dr. Cara Santelli and Dr. Jeffrey Post. *Manganese Oxidation in ascomycete fungi as a bioremediation strategy.*
- 2012 – 2013    **Undergraduate Research Assistant**, Stanford University working with Dr. Gordon E. Brown, Jr. Mercury speciation on fine fraction coal fly ash.
- 2009 – 2013    **Undergraduate Research Assistant**, Stanford University working with Dr. Wendy Mao, Extreme Environments Laboratory. *3d transition metal carbonates at lower mantle pressures (undergraduate thesis); Properties of opal at high pressures.*
- 2007 – 2009    **Independent Researcher**, University of Wisconsin at Madison working with Dr. Huifang Xu, Wisc Nanogeoscience Laboratory. *Inclusions and pleochroism in gem-quality calcic labradorite.*

## PUBLICATIONS

7. **Farfan, G.A.**, Cordes, E.E., Waller, R., DeCarlo, T.M., and Hansel, C.M. (2018). Mineralogy of deep-sea coral aragonites as a function of aragonite saturation state, *Frontiers in Marine Science special issue "Coral Reef Calcification in a Changing Ocean: from Microscale Mechanisms to Macroscale Responses"* 5, 473.  
doi: 10.3389/fmars.2018.00473

6. **Farfan, G.A.**, Apprill, A., Webb, S., and Hansel, C.M. (2018). Coupled X-ray fluorescence and X-ray absorption spectroscopy for microscale imaging and identification of sulfur species within tissues and skeletons of scleractinian corals. *Analytical Chemistry*, 90(21), p. 12559-12566. doi: 10.1021/acs.analchem.8b02638
5. DeCarlo, T., Ren, H., **Farfan, G.**, and McCulloch, M.T. (2018). The origin and role of organic matrix in coral calcification: insights from comparing coral skeleton and abiogenic aragonite. *Frontiers in Marine Science special issue "Coral Reef Calcification in a Changing Ocean: from Microscale Mechanisms to Macroscale Responses"* 5, 170. doi: 10.3389/fmars.2018.00170
4. Xu, H., Hill, T., Konishi, H., and **Farfan, G.** (2017). *Protoenstatite*: A new mineral in Oregon sunstones with "watermelon" colors. *American Mineralogist*, 102(10) p. 2146-2149. doi: 10.2138/am-2017-6186
3. Jew, A.D., Rupp, E.C., Geatches, D.L., Jung, J., **Farfan, G.**, Bahet, L., Hower, J.C., Brown Jr., G.E., Wilcox, J. (2015). Mercury Interaction with the Fine Fraction of Coal-Combustion Fly Ash in a Simulated Coal Power Plant Flue Gas Stream. *Energy Fuels*, 29 (9), p. 6025–6038. doi: 10.1021/acs.energyfuels.5b01253
2. **Farfan, G.A.**, Boulard, E., Wang, S., Mao, W.L., (2013). Bonding and electronic changes in rhodochrosite at high pressure. *American Mineralogist*, 98(10) p. 1817-1823. doi: 10.2138/am.2013.4497
1. **Farfan, G.A.**, Wang, S., Ma, H., Caracas, R., Mao, W.L., (2012). Bonding and structural changes in siderite at high pressure. *American Mineralogist*, 97(8-9) p. 1421-1426. doi: 10.2138/am.2012.4001

## AWARDS AND HONORS

2018	Peter Buck Postdoctoral Fellowship, Smithsonian NMNH
2017	Goldschmidt Conference Travel Grant
2017	Ford Foundation Dissertation Fellowship (\$20,000)
2017	Mineralogical Society of America Edward H. Kraus Crystallographic Research Fund (\$5,000)
2016	Woods Hole Oceanographic Institution Ocean Ventures Fund (\$5,000)
2013	National Science Foundation Graduate Research Fellowship (\$32,000/year for three years)
2013	Stanford Outstanding Senior in Geological and Environmental Sciences Award
2013	Stanford School of Earth Sciences Award in Excellence Award
2012	White House 40 <sup>th</sup> Anniversary Celebration of Title IX, guest appearing on a panel alongside Mae Jemison, Billie Jean King and others
2011	California Federation of Mineral Societies Deidrick Scholarship
2011	Santa Clara Valley Gem and Mineral Society Scholarship
2010	Association for Women Geoscientists Minority Scholarship
2010	First Lady Michelle Obama's guest for the State of the Union Address to represent students in STEM
2009	Intel Science Talent Search (formerly known as Westinghouse) finalist and 10 <sup>th</sup> place winner (\$10,000)

## CONFERENCE ACTIVITY

11. **Farfan, G.,\*** Webb S, Waller R, Cordes E., Hansel, C. (2017), Crystallographic Investigation of Coral Skeletons Under Shifting Ocean Condition. Presented at 2017 Goldschmidt Conference, Paris, FR, 13-18 Aug. *Goldschmidt Abstracts. Oral presentation*
10. **Farfan, G.,\*** Webb, S., Apprill, A., Hansel, C. (2016), Zinc and sulfur distributions and bonding environments in scleractinian corals. Presented at 2016 Ocean Sciences Meeting, AGU, New Orleans, LA, 21-26 Feb. *Poster presentation*
9. **Farfan, G.,\*** Webb, S., Apprill, A., Hansel, C. (2014), Elucidating the composition and distribution of trace metals in corals. Presented at 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 Dec. *Poster presentation*
8. Wang, S.,\* **Farfan, G.,** Mao, W.L. (2013), Bonding and Electronic Changes Associated with Spin Transition in Iron-containing Minerals. Presented at 2013 GSA Annual Meeting, Denver, CO, 30 Oct. *Poster presentation*
7. **Farfan, G.,\*** Boulard, E., Wang, S., Mao, W. L. (2012), High pressure behavior of 3d transition metal carbonates, V53D-2869. Presented at 2012 Fall Meeting, AGU, San Francisco, CA, 3-7 Dec. *Poster presentation*
6. Santelli, C., **Farfan, G.,\*** Post, A., Post, J.E. (2012), Impact of environmental chemistry on mycogenic Mn oxide minerals, B43A-0384. Presented at 2012 Fall Meeting, AGU, San Francisco, CA, 3-7 Dec. *Poster presentation*
5. **Farfan, G.,\*** Wang, S., Mao, W. L. (2011), Raman study of opal at high pressure, DI21A-2057. Presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5-9 Dec. *Poster presentation*
4. **Farfan, G.,\*** Wang, S., Ma, H., Baldini, M., Mu, K., Filipovitch, N. B., Caracas, R., Mao, W. L. (2010), Bonding and structural changes in siderite at high pressure, U21A-0009. Presented at 2010 Fall Meeting, AGU, San Francisco, CA, 13-17 Dec. *Poster presentation*
3. **Farfan, G.\*** & Xu, H. (2008). Pleochroism in calcic labradorite from Oregon: Effects from size and orientation of nano- and microprecipitates of copper and pyroxene. Presented at 2008 Goldschmidt Conference, Vancouver, BC. *Geochimica Et Cosmochimica Acta*, 72(12) A256. *Oral presentation*
2. Hill, T. R.,\* **Farfan, G.,** Konishi, H., & Xu, H. (2008). TEM investigation of micro- and nano-precipitates in Oregon sunstones: Genesis of and mechanisms for coloration, pleochroism, and dichroism in gem-quality feldspars. Presented at 2008 Joint Meeting of the Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM, Houston, TX. *Abstracts with Programs*, 40(6) 269. *Poster presentation*
1. Zhang, F.,\* **Farfan, G.,** Xu, H., Huberty, J., Konishi, H., & Roden, E. (2008). Substrate-controlled crystallization of calcite and aragonite. Presented at 2008 Goldschmidt Conference, Vancouver, BC. *Geochimica Et Cosmochimica Acta*, 72(12) A1081. *Poster presentation*

\*presenting author

## INVITED PRESENTATIONS

- 2019 *Mineral and chemical perspectives on corals in a changing ocean.* Johns Hopkins University, Baltimore, MD, February 2019. *Oral presentation*
- 2018 *An introduction to the world of mineralogy.* Wellesley College, Wellesley, MA, October 2018. *Oral presentation*
- 2018 *Biom mineralization of coral skeletons under stress.* Smithsonian Institution, Washington, DC, April 2018. *Oral presentation*
- 2017 *The chemistry and crystallography of corals under climate change.* WiscNanogeosciences Group, University of Wisconsin—Madison, Madison, WI, October 2017. *Oral presentation*
- 2017 *The speciation and distributions of trace metals and sulfur in scleractinian corals.* Marine Chemistry and Geochemistry Department Seminar, Woods Hole Oceanographic Institution, Woods Hole, MA, December 2017. *Oral presentation*

## PROFESSIONAL SERVICE

- 2018 Northeastern Geobiology Symposium, Session chair, Paleobiology
- 2017 Co-organizer of OCEANOS: WHOI en Español e Português Symposium with Luis Valentin
- 2017 Served on a search committee for the new WHOI VP/Dean of Academic Programs, 11 members (I was the only student)
- 2015-2016 President of the WHOI Graduate Student Organization
- 2014-2018 Member of the WHOI Broader Impacts Group

## PROFESSIONAL SOCIETIES

- 2018-present Society of Mineral Museum Professionals
- 2017-present Geological Society of America
- 2010-present American Geophysical Union
- 2008-present Mineralogical Society of America

## MINERAL & GEM MUSEUM/PROFESSIONAL EXPERIENCE

- 2019 **Networking** trip to the Tucson Gem and Mineral Show, AZ
- 2018 **Networking** at the Gem-A Conference, London, UK
- 2018 **Visiting** the behind-the-scenes of the London Natural History Museum, London, UK
- 2018 **Visiting** the behind-the-scenes of the Musée national d'histoire naturelle, Luxembourg City, Luxembourg
- 2018 **Networking** trip to the Tucson Gem and Mineral Show, AZ
- 2017 **Visiting** the behind-the-scenes of the Muséum National d'Histoire Naturelle and University P. and M. Curie (Sorbonne) Mineral Collections, Paris, France
- 2017 **Networking** trip to the Tucson Gem and Mineral Show, AZ

- 2016 **Networking** at the David Friend Hall Grand Opening Mineral and Gem Symposium, Yale University, CT
- 2013-2015 **Curatorial work** at the Harvard Mineralogical Museum (paid and volunteer) with Dr. Raquel Alonso-Perez, Harvard University, MA
- 2013 **Networking** Trip to Tucson Gem and Mineral Show, AZ
- 2012-2013 **Research intern** at the Smithsonian Institution National Museum of Natural History, Mineral Sciences Department (two summers) with Dr. Cara Santelli and Dr. Jeffrey Post
- 2010-2012 **Curatorial work** Stanford University (volunteer) with Dr. Gordon Brown, Jr. designed a display of the Kovach Gem Collection
- 2009 **Networking** trip to Tucson Gem and Mineral Show, AZ as the mineralogist representative for the UW Madison Geology Museum
- 2006-2009 **Curatorial work** for the University of Wisconsin Geology Museum (paid and volunteer) with Dr. Richard Slaughter. Curated the Vierthaler Gem Collection and helped design a new mineral exhibition of the Greiner Mineral Collection.

#### **MENTORSHIP, TEACHING, AND EDUCATIONAL OUTREACH**

- 2018 **Invited mineralogy presentation.** Madison Gem and Mineral Club, WI
- 2018 **Co-instructor**, EPS-144 Minerals and Gems, Harvard Extension School, with Dr. Raquel Alonso-Perez and Dr. Gordana Garaphic. I taught the Introduction to Gemology session and co-taught the second gemology session and the class field-trip to the Havey Quarry
- 2018 **MIT Kaufman Teaching Certificate Course**, Massachusetts Institute of Technology, MA
- 2018 **Invited mineralogy presentation**, Cape Cod Academy, MA
- 2017 **Mentor**, Katherine Sisson (Post-bac WHOI internship)
- 2017 **Co-mentor**, Shavonna Bent (Johnson State College) and Emma Stillman (Falmouth Academy)
- 2017 **Science fair judge**, Falmouth Academy High School, Falmouth, MA
- 2017 **Science fair judge**, Falmouth High School and Lawrence Middle School, Falmouth, MA
- 2016 **Co-mentor**, Chloe Wang (Haverford College)
- 2016 **Science fair judge**, Falmouth Academy Middle School, Falmouth, MA
- 2016 **Science fair judge**, Falmouth High School and Lawrence Middle School, Falmouth, MA
- 2016 – 2018 **Peer mentor** to Craig Mclean, MIT-WHOI Joint Program, MA
- 2016 **Visiting Coach**, Science Olympiad Hamilton Middle School Madison, WI
- 2016 **Invited mineralogy presentation**, Cape Cod Academy, MA
- 2016 **Invited mineralogy presentation**, Science Summer School, Woods Hole, MA
- 2016 **Invited mineralogy presentation**, East Falmouth Elementary School, Falmouth, MA
- 2015 **Science fair judge**, Falmouth High School, Falmouth, MA
- 2015 **Invited mineralogy presentation**, Woods Hole Preschool, Woods Hole, MA
- 2014 **Invited mineralogy presentation**, Bay View Academy WISE science workshop, Providence, RI

- 2013 **Invited mineralogy presentation**, Park Street School, Boston, MA
- 2013 **Stanford Splash Program**, mineralogy presentation, Stanford, CA
- 2012 **GeoKids volunteer**, Stanford University, CA
- 2009 **Junior Geologists workshop organizer**, Madison, WI
- 2009 **Spanish translator**, Expanding Your Horizons--Girls in STEM workshop,  
Madison, WI
- 2008 **Junior Geologists workshop organizer**, Madison, WI
- 1999 – 2018 **Educational collection exhibitions** at the Madison Gem and Mineral Show,  
Madison, WI

## **FIELD EXPERIENCE**

- 2018 WHOI Geodynamics Program, *Chemistry of the Ocean Microbiome* with Drs. Colleen Hansel and Elizabeth Kujawinski, (1 week)
- 2017 TORCH-relit Scientific Cruise, EN604, aboard the R/V Endeavor, (1.5 weeks)
- 2017 Benthic Foraminifera Cruise aboard the R/V Sproul, (1 week)
- 2016 TORCH Scientific Cruise, EN509, aboard the R/V Endeavor, Aug. 2016 (1 week)
- 2015 WHOI Geodynamics Program, *Hydrothermal Systems* with Drs. Lisa Morgan and Pat Shanks, (1 week)
- 2012 Field Camp—GES 190: Ruby Mountains (surrounding area) mapping tuffs with Dr. Elizabeth Miller, (2 weeks)
- 2012 Field Camp—GES 190: Trinity Alps Ultramafic with Dr. Jessica Warren and Dr. Marty Grove, (1 week)
- 2011 Field Camp—GES 105: Poleta Folds mapping with Dr. Elizabeth Miller and Dr. Marty Grove, (2 weeks)
- 2011 Field Trip—GES 102: Earth Materials to New Idria with Dr. Gordon Brown, Jr.
- 2010 Field Camp—GES 190: Klamath Mountains Josephine Peridotite with Dr. Jessica Warren, (1 week)
- 1997 Mineral collecting and visiting mineral deposits/mines since age 7 (detailed below)

## **MINERAL PROSPECTING AND MINE VISITS**

- Crater of Diamonds State Park, Murfreesboro, AR (diamonds)
- Mount Ida, AR (quartz crystals)
- Copper Queen Mine, AZ (Cu ore)
- New Almaden Mercury Mine, CA (Hg ore)
- Benitoite Gem Mine, San Benito Co., CA (benitoite)
- Gem Mountain Topaz Mine, CO (topaz)
- Sweet Home Mine, Alma, CO (rhodochrosite)
- Spencer Opal Mine, Spencer, ID (precious opal)
- Havey Quarry, ME (tourmaline and pegmatite minerals)
- Yogo Sapphire Mine, Yogo Gulch, MT (sapphires)
- Gem Mountain Sapphire Mine, Helena, MT (sapphires)
- Spokane Bar Mine, Helena, MT (sapphires and garnets)
- Orphan Girl Mine, MT (silver ore)

Gem Mountain Sapphire Mine, Philipsburg, MT, (sapphires and garnets)  
Westphal Quarry, Hyattville, MT, (dinosaur dig with University of Wisconsin-Madison)  
Kelly Mine, Socorro Co., NM (pyrite, calcite and malachite)  
Rainbow Ridge Mine, Virgin Valley, NV (precious opal)  
Royal Peacock Mine, Virgin Valley, NV (precious opal)  
Bonanza Opal Mine, Virgin Valley, NV (precious opal)  
Garnet Hill, Ely, NV (almandine)  
Dust Devil Mine, Plush, OR (labradorite “sunstones”)  
Juniper Ridge Mine, Quartz Mountain, OR (fire opal)  
Big Thunder Mine, SD (garnets and gold)  
Topaz Mountain, Juab Co., UT (topaz)  
Camel Hill Quarry, Madison, WI (fossils)  
Mineral Point area, Southern WI (galena)  
Mississippi River bank, Prairie du Chien, WI (Lake Superior agates)  
Vulcan Quarry, Oshkosh, WI (marcasite and calcite)  
Korite International Mines, Lethbridge, Alberta (“ammolite”)  
Klinker Opal Mine, Vernon, British Columbia (precious opal and agates)  
Poudrette Quarry, Mont Saint-Hilaire, Quebec (rare minerals)  
Chiflon del Diablo Mine, Lota, Chile (anthracite)  
El Teniente, Chile (world’s largest underground copper mine)

## **RESEARCH SKILLS**

X-ray diffraction  
Raman spectroscopy  
Synchrotron-based X-ray fluorescence  
Synchrotron-based X-ray absorption near edge spectroscopy  
Synchrotron-based Extended X-ray Absorption Fine Structure  
Scanning Electron Microscopy  
Optical mineralogy  
Mineral identification  
Inductively coupled plasma mass spectroscopy (ICP-MS)  
Electron microprobe  
Sterile technique and culturing plankton and fungi

## **FOREIGN LANGUAGES**

Spanish – Native speaker and working proficiency  
French – working proficiency

## **PRESS**

2017 10 Latinas Making Their Mark in the STEM World, Remezcla.  
<http://remezcla.com/lists/culture/latinas-stem-science-technology-engineering-mathematics/>  
2017 WHOI To Present Public Scientific Symposium In Spanish & Portuguese, Cape Cod

- Times. [https://www.capenews.net/falmouth/news/whoi-to-present-public-scientific-symposium-in-spanish-portuguese/article\\_fe56766b-6d7a-5335-94f6-37dff4623d65.html](https://www.capenews.net/falmouth/news/whoi-to-present-public-scientific-symposium-in-spanish-portuguese/article_fe56766b-6d7a-5335-94f6-37dff4623d65.html)
- 2017 OCEANOS: WHOI en Español e Portúges Symposium, Facebook Live  
<https://www.facebook.com/WoodsHoleOcean/videos/vb.56661991371/10154712012446372>
- 2017 Embrace Who You Are: One Latina Scientist’s Brave Journey in STEM, SACNAS, Medium STEM and Culture Chronicle. <https://medium.com/stem-and-culture-chronicle/embrace-who-you-are-one-latina-scientists-brave-journey-in-stem-4c301acffdf0>
- 2012 Obama Administration Commemorates 40 Years of Increasing Equality and Opportunity for Women in Education and Athletics, The White House Office of the Press Secretary. <https://obamawhitehouse.archives.gov/the-press-office/2012/06/20/obama-administration-commemorates-40-years-increasing-equality-and-oppor>
- 2010 Young Women Scholars Highlight President’s Commitment to STEM, The White House Office of the Press Secretary.  
<https://obamawhitehouse.archives.gov/blog/2010/01/29/young-women-scholars-highlight-president-s-commitment-stem>
- 2010 Second local woman to attend State of Union as first lady's guest, Wisconsin State Journal. [http://host.madison.com/wsj/news/local/second-local-woman-to-attend-state-of-union-as-first/article\\_86b2b2de-0b62-11df-9850-001cc4c03286.html](http://host.madison.com/wsj/news/local/second-local-woman-to-attend-state-of-union-as-first/article_86b2b2de-0b62-11df-9850-001cc4c03286.html)
- 2010 TV interviews for Fox and Friends and Univision (in Spanish)