

## Frank J. Pavia

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Website: <https://frankpavia.com>
- RESEARCH INTERESTS Isotope Geochemistry, Global Carbon Cycling, Chemical Oceanography, Paleoclimatology
- EMPLOYMENT **California Institute of Technology**  
Foster and Coco Stanback Postdoctoral Fellow, Dec. 2019-Present
- EDUCATION **Columbia University**, New York, NY  
Ph.D., Earth and Environmental Sciences, October 2019  
*Thesis:* Biogeochemical Studies of the South Pacific Ocean Using Thorium and Protactinium Isotopes  
*Advisor:* Robert F. Anderson  
**Columbia University**, New York, NY  
M.A., Earth and Environmental Sciences, May 2016  
**Columbia University**, New York, NY  
B.A. (*cum laude*), Earth Science and Chemistry (Dept. Honors)
- HONORS AND AWARDS Caltech Foster and Coco Stanback Postdoctoral Fellowship, 2019  
ASLO Student Travel Grant, 2018  
Goldschmidt Student Travel Grant, 2017  
Department of Defense NDSEG Fellowship, 2015 (Declined)  
NSF Graduate Research Fellowship, 2015  
DEES Young Investigator Award, 2013  
Alaska Geological Society Scholarship, 2013
- PUBLICATIONS [13] **Pavia, F.J.**, R.F. Anderson, P. Pinedo-Gonzalez, M.Q. Fleisher, M.A. Brzezinski, R.S. Robinson. Isopycnal Transport and Scavenging of  $^{231}\text{Pa}$  and  $^{230}\text{Th}$  in the Pacific Southern Ocean. *submitted, Global Biogeochemical Cycles*.
- [12] **Pavia, F.J.**, R.F. Anderson, G.W. Winckler, M.Q. Fleisher. Atmospheric Dust Inputs, Iron Cycling, and Biogeochemical Connections in the South Pacific Ocean from Thorium Isotopes. *In Revision, Global Biogeochemical Cycles*.
- [11] Costa, K.M., C.T. Hayes, R.F. Anderson, **F.J. Pavia**, and 30 others.  $^{230}\text{Th}$ -normalization: New insights on an essential tool for quantifying sedimentary fluxes in the modern and Quaternary ocean. *Paleoceanography and Paleoclimatology*, 35, e2019PA003820. <https://doi.org/10.1029/2019PA003820>.
- [10] Middleton, J.E., S. Mukhopadhyay, K.M. Costa, **F.J. Pavia**, G. Winckler, J.F. McManus, M. D'Almeida, C.H. Langmuir, P.J. Huybers. The spatial footprint of hydrothermal scavenging on  $^{230}\text{Th}_{xs}$ -derived mass accumulation rates. *Geochimica et Cosmochimica Acta*, 272, 218-234. <https://doi.org/10.1016/j.gca.2020.01.007>.

- [9] Jacobel, A.W., R.F. Anderson, S.L. Jaccard, J.F. McManus, **F.J. Pavia**, G. Winckler. Deep Pacific Storage of Respired Carbon during the Last Ice Age: Perspectives from bottom water oxygen reconstructions. *Quaternary Science Reviews*, 230, 106065. <https://doi.org/10.1016/j.quascirev.2019.106065>.
- [8] Seltzer, A.M., **F.J. Pavia**, J. Ng, J.P. Severinghaus. Heavy Noble Gas Isotopes as New Constraints on the Ventilation of the Deep Ocean. *Geophysical Research Letters*, 46, 8926-8932. <https://doi.org/10.1029/2019GL084089>.
- [7] **Pavia, F.J.**, R.F. Anderson, P.J. Lam, B.B. Cael, S.M. Vivancos, M.Q. Fleisher, Y. Lu, H. Cheng, P. Zhang, R.L. Edwards. Shallow Particulate Organic Carbon Regeneration in the South Pacific Ocean. *Proceedings of the National Academy of Sciences*, 42, 9753-9758. <https://doi.org/10.1073/pnas.1901863116>. (GEOTRACES IPO Highlight). (OCB Highlight)
- [6] Jacobel, A.W., R.F. Anderson, G. Winckler, K.M. Costa, J. Gottschalk, J.L. Middleton, **F.J. Pavia**, E.M. Shoenfelt, Y. Zhou (2019). No evidence for equatorial Pacific dust fertilization. *Nature Geoscience*, 12, 154-155. <https://doi.org/10.1038/s41561-019-0304-z>
- [5] Lund, D.C., **F.J. Pavia**, E.I. Seeley, S. McCart, P.A. Rafter, K.A. Farley, P.D. Asimow, R.F. Anderson (2019). Hydrothermal Scavenging of  $^{230}\text{Th}$  on the Southern East Pacific Rise During the Last Deglaciation. *Earth and Planetary Science Letters*, 510, 64-72. <https://doi.org/10.1016/j.epsl.2018.12.037>
- [4] **Pavia, F.J.**, R.F. Anderson, E. Black, L. Kipp, S.M. Vivancos, M.Q. Fleisher, M.A. Charette, V. Sanial, W. Moore, M. Hult, Y. Lu, H. Cheng, P. Zhang, R.L. Edwards (2019). Timescales of Hydrothermal Scavenging in the South Pacific Ocean from  $^{234}\text{Th}$ ,  $^{230}\text{Th}$ , and  $^{228}\text{Th}$ . *Earth and Planetary Science Letters*, 506, 146-156. <https://doi.org/10.1016/j.epsl.2018.10.038>. (GEOTRACES IPO Highlight)
- [3] Hayes, C.T., E.E. Black, R.F. Anderson, M. Baskaran, K.O. Buesseler, M.A. Charette, H. Cheng, J.K. Cochran, R.L. Edwards, P. Fitzgerald, P.J. Lam, Y. Lu, S.O. Morris, D.C. Ohnemus, **F.J. Pavia**, G. Stewart, Y. Tang (2018). Flux of Particulate Elements in the North Atlantic Ocean Constrained by Multiple Radionuclides. *Global Biogeochemical Cycles*, 32, 1738-1758. <https://doi.org/10.1029/2018GB005994>. (OCB Highlight) (EOS Highlight)
- [2] Schlitzer, R. et al. (including **F. J. Pavia**) (2018). The GEOTRACES Intermediate Data Product 2017. *Chemical Geology*, 493, 210-223. <https://doi.org/10.1016/j.chemgeo.2018.05.040>
- [1] **Pavia, F.J.**, R.F. Anderson, S.M. Vivancos, M.Q. Fleisher, P.J. Lam, Y. Lu, H. Cheng, P. Zhang, R.L. Edwards (2018). Intense Hydrothermal Scavenging of  $^{230}\text{Th}$  and  $^{231}\text{Pa}$  in the Deep Southeast Pacific. *Marine Chemistry*, 201, 212-228. <https://doi.org/10.1016/j.marchem.2017.08.003>

MANUSCRIPTS IN PREPARATION

**F.J. Pavia**, S. Wang\*, R.F. Anderson, R.W. Murray. Trace Metal Indicators of Abyssal Ventilation During the Last Deglaciation. *to be submitted, full manuscript draft available upon request.*

\* Indicates Undergraduate Advisee

BOOK CHAPTERS (PEER-REVIEWED)

[1] Bell, J.E., **F.J. Pavia**. Time Bomb: Pessimistic Approaches to Climate Change Studies. Book Chapter in *Timescales*. Editor: Bethany Wiggin. University of Minnesota Press, *Accepted*.

FUNDING

**Pavia, F.J.** Heavy Noble Gas Isotopes in the Ocean as a Tracer of Air-Sea Disequilibrium. Geological Society of America Student Research Grant (Outstanding Mention), 2018. \$1,518.

**Pavia, F.J.**, R.F. Anderson. Glacial-Interglacial Deepwater Oxygen Variations in the Pacific Southern Ocean. LDEO Climate Center, 2017, \$10,000.

**Pavia, F.J.**, G. Winckler, R.F. Anderson, S.M. Vivancos. Helium Isotopes in the South Pacific: Tracking Hydrothermal Activity and Deep Ocean Circulation. LDEO Climate Center, 2015, \$10,000.

**Pavia, F.J.**, G. Winckler, J.E. Nichols. Leaf wax *n*-alkane concentrations and stable isotope composition in dust - A new dust proxy for the South Pacific. LDEO Climate Center, 2013, \$10,000.

TEACHING  
EXPERIENCE

**Teaching Assistantships**

*Columbia University Earth and Environmental Sciences*

- EESC3101 Geochemistry for a Habitable Planet **Fall 2017**  
Professor Terry Plank
- EESC4926 Intro to Chemical Oceanography **Spring 2017**  
Professor Robert Anderson
- EESC4330 Intro to Terrestrial Paleoclimate **Fall 2016**  
Professors Wallace Broecker and Joerg Schaefer
- EESC3101 Geochemistry for a Habitable Planet **Fall 2015**  
Professor Terry Plank

*Guest lectures (at least 1) in each course listed above.*

*Columbia Graduate School of Business*

- B8718/B8535 The Management and Economics of Professional Sports **Spring 2013, 2014**  
Professors Casey Ichniowski and Sunil Gulati

PEDAGOGICAL  
ACTIVITIES

- Certificate of Interest in University Teaching, Caltech. *In Progress*
- Syllabus from Scratch Workshop, Center for Teaching and Learning. December 2017
- Innovative Teaching Summer Institute Workshop, Center for Teaching and Learning. June 2016
- Convener of working group on Pedagogy in Environmental Humanities, September 2015-May 2016. \$2000 grant from Columbia Center for Science and Society.

MENTORING

- Shouyi Wang, Columbia University Chemistry/DEES Senior Thesis, 2017-2018

OUTREACH  
ACTIVITIES

- Caltech RISE Program Tutor, January 2020-Present
- Intrepid Kids Week Exhibit, February 2019
- Organizer of Ocean Chemistry Exhibit at Lamont-Doherty Open House, October 2016-2019
- Lamont High School Intern Mentor, Summers 2015-2018
- Day in the Life of the Hudson, Leading High School Students in Sample Collection and Data Analysis, October 2014 & 2016
- Columbia Cool Jobs Panel for Prospective Scientists, October 2014
- Science Research Symposium, DEES Undergraduate Representative, April 2014
- Lamont-Doherty Career Day, March 2013
- Lamont-Doherty Open House Volunteer, October 2012
- Science on the Hudson River volunteer, July 2012

INVITED  
PRESENTATIONS

- University of Southern California Paleoenvironmental Seminar, April 2020.
- Scripps Marine Chemistry and Geochemistry Seminar, April 2019.
- Lamont-Doherty Geochemistry Seminar, November 2018.
- WHOI Marine Chemistry and Geochemistry Seminar, November 2018.
- MIT EAPS Seminar, November 2018.
- UCONN Avery Point Marine Sciences Seminar, October 2018.

- UC Berkeley Isotope Geochemistry Seminar, May 2018.
- Lamont-Doherty Earth Observatory Summer Intern Lecture, July 2016.

CONFERENCE  
PRESENTATIONS  
(PRESENTING  
AUTHOR ONLY)

**F.J. Pavia**, R.F. Anderson, G. Winckler, M.Q. Fleisher. Atmospheric Dust Inputs, Iron Cycling, and Biogeochemical Connections in the South Pacific Gyre. Ocean Sciences Meeting, 2020. Talk

M.Q. Fleisher, **F.J. Pavia**, R.F. Anderson, S.M. Vivancos, G. Winckler, J.T. Abell. Near-Bottom  $^{230}\text{Th}$  and  $^{231}\text{Pa}$  Scavenging and Anomalous  $^{230}\text{Th}$  Burial Rates in the South Pacific. Ocean Sciences Meeting, 2020. Poster.

**F.J. Pavia**, J.T. Abell, G. Winckler, R.F. Anderson. Reconstruction of Modern Dust Deposition in the South Pacific from Water Column and Sedimentary Methods. AGU Fall Meeting, 2019. Poster

**F.J. Pavia**, S. Wang, R.F. Anderson, R.W. Murray. Trace Metal Indicators of Abyssal Ventilation During the Last Deglaciation. Comer Climate Conference, 2019. Talk

**Pavia, F.J.**, R.F. Anderson, M.Q. Fleisher, G. Winckler. Supply and Removal of Trace Elements in the South Pacific Gyre from Long-Lived Thorium and Protactinium Isotopes. Chemical Oceanography Gordon Conference, 2019. Poster

**Pavia, F.J.**, P.J. Lam, J.K. Bishop, L.J. Gloege, R.F. Anderson. A global database of size-fractionated POC and PIC concentrations compared to satellite-based estimates. OCB Summer Workshop, 2019. Poster

**Pavia, F.J.**, R.F. Anderson, P.J. Lam, B.B. Cael, S.M. Vivancos, M.Q. Fleisher, P. Zhang, Y. Lu, H. Cheng. Distinct POC regeneration regimes in the Peru OMZ compared to oxic waters of the eastern Tropical South Pacific, ASLO Aquatic Sciences Meeting, 2019. Talk

**Pavia, F.J.**, R.F. Anderson, S. Wang. Abyssal Ventilation in the Pacific Sector of the Southern Ocean During the Last Ice Age, AGU Fall Meeting, 2018. Poster

**Pavia, F.J.**, R.F. Anderson, P.J. Lam, M. Martin, R. Fine, S.M. Vivancos, M.Q. Fleisher, P. Zhang, Y. Lu, H. Cheng, R.L. Edwards. Vertical POC Flux Profiles and Oxygen Utilization Rates from Particulate  $^{230}\text{Th}$ -Normalization, Goldschmidt Conference, 2017. Talk

**Pavia, F.J.**, R.F. Anderson, M.Q. Fleisher, S.M. Vivancos, Y. Lu, P. Zhang, H. Cheng, R.L. Edwards. Continuous, Rapid Scavenging of Thorium and Protactinium During Westward Advection of the East Pacific Rise Hydrothermal Plume, AGU Ocean Sciences Meeting, 2016. Talk

**Pavia, F.J.**, J.E. Nichols, G. Winckler, P. De Deckker. Pairing Leaf-Wax Isotopes and Lithogenic Fluxes to Understand the Drivers of Dustiness in the South Pacific, AGU Fall Meeting, 2014. Poster

**Pavia, F.J.**, G. Winckler, J.E. Nichols. The Sensitivity of *n*-alkanes in Marine Sediments to Changes in Dustiness: Further Developing the Use of Leaf Wax Biomarkers as a Dust Proxy. AGU Fall Meeting, 2013. Poster

**Pavia, F.J.**, J.E. Nichols, D.M. Peteet. Reconstructing Paleoclimate and Carbon Storage of Alaskan Peatlands During the Holocene. AGU Fall Meeting, 2012. Poster

PROFESSIONAL  
WORKSHOPS AND  
CONVENED  
SESSIONS

- Convener, AGU Fall Meeting: Systematics and Applications of Redox Proxies from Precambrian to Pleistocene, December 2019.
- Chemical Oceanography Gordon Research Seminar Discussion Leader, July 2019.
- Ocean Observing Initiative Early Career Chemistry Data Workshop, August 2018.

- Biogeochemical Argo Workshop, University of Washington, July 2018.
- Data Science Bootcamp, Collaboratory@Columbia, January 2018
- Anthropogenic Sublime: A critique (respondent and panelist). Center for Science and Society, Columbia University, New York. December, 2016. ([Video Link](#)).
- GEOTRACES-OCB synthesis workshop, Biogeochemical Cycling of Trace Elements within the Ocean. Lamont-Doherty Earth Observatory, Palisades, New York. August 2016.
- Pedagogy in Environmental Humanities Symposium (co-convener and panel discussion leader). Columbia University, New York. April, 2016.
- National Ocean Exploration Forum. National Aquarium, Baltimore, MD. November 2015.

PROFESSIONAL  
SERVICE

- Team Member, Patagonia Case Competition, Winter 2018
- LDEO Mentoring Award Committee, 2017-2019
- Organizer, Weekly Geochemistry Seminar Series, LDEO, July 2017-July 2018
- Chairman, Chevron Student Initiative Fund, LDEO, Sept 2016-Sept 2018
- LDEO Colloquium Committee, June 2015-June 2017

REVIEW ACTIVITIES

- Peer Reviewer: *Geochemistry, Geophysics, Geosystems, Geophysical Research Letters, Frontiers in Marine Science*
- Panel Reviewer: NASA PSTAR, 2016

FIELD  
EXPERIENCE

R/V Ka'imikai-O-Kanaloa (HOT-303) **June 2018**  
Honolulu to Honolulu. 5 days.  
Water sampling for noble gas isotopes.

R/V IB Nathaniel B. Palmer (NBP17-02) **January-March 2017**  
McMurdo Station, Antarctica to Lyttleton, New Zealand. 42 days.  
Water sampling and filtration, multicoring, gravity coring, piston coring.

UltraPac Expedition, R/V Sonne (SO245). **December 2015-January 2016**  
Antofagasta, Chile to Wellington, New Zealand. 43 days.  
Water sampling and filtration, *in situ* pump operation for  
suspended particle sampling, box coring, gravity coring.

Lake and Marsh Sediment Coring, Black Rock Forest and Jamaica Bay **Sept-Oct 2012**