



**Manuel R. Vejar**

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### **Current position**

I am a doctoral candidate in environmental actinide geochemistry. I study the impacts of mineral complexity on the fate and transport of plutonium in nuclear waste repository and/or legacy environmental contamination settings. More specifically, I am studying the influence of Al-doping in iron (oxyhydr)oxides (relevant to nuclear repository and legacy contaminated environments) on the redox and speciation behavior of plutonium at the mineral-water interface. For my graduate work, I have been employing L<sub>3</sub>-edge EXAFS to determine coordination environment, and more recently M<sub>4</sub>-edge HERFD-XANES to determine the oxidation state of the plutonium associated with these minerals.

### **Education and Employment History**

- Doctor of Philosophy (Ph.D.)—Civil & Environmental Engineering & Earth Sciences, University of Notre Dame
  - Expected Completion Date: May 2024
    - Graduate Research Assistant, Environmental Actinide Chemistry Laboratory, Department of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame
      - PI and Advisor: Dr. Amy E. Hixon
      - July 2019—Present
      - Study plutonium sorption, reduction, and chemical behavior in the presence of aluminum-doped hematite and goethite using X-ray absorption spectroscopy (HERD-XANES and EXAFS).
    - Guest Researcher, European Synchrotron Research Facility Collaborating Research Group: BM20 Rossendorf Beamline (ROBL), Helmholtz-Zentrum Dresden-Rossendorf (as a collaboration with the University of Notre Dame).
      - Advisor: Dr. Kristina O. Kvashnina
      - September—November 2022
      - Study plutonium sorption, reduction, and chemical behavior in the presence of aluminum-doped hematite and goethite using X-ray absorption spectroscopy (HERFD-XANES).
- Bachelor of Science (B.S.)—Geology, California State Polytechnic University, Pomona

- Graduation Date: May 2019
  - Research Assistant, Environmental Geochemistry Laboratory, Chapman University
    - Advisor: Dr. Christopher S. Kim
    - June 2017—July 2019
    - Studied arsenic spatial distribution in mine wastes, working towards developing a proxy for short- and long-term exposure risks using extended X-ray absorption fine structure (EXAFS) spectroscopy and micro-X-ray fluorescence ( $\mu$ XRF) imaging.
  - Stanford Earth Summer Undergraduate Research in Geoscience and Engineering (SURGE), Sedimentary Geology Group, Stanford University
    - Advisor: Dr. Donald Lowe, Mentor: Dr. Chayawan Jaikla
    - June—August 2018
    - Applied petrography, geochemistry, and U-Pb detrital zircon geochronology of the Pigeon Point and Atascadero Formations to study the geologic implications for Late Cretaceous tectonic history of the San Gregorio-Hosgri fault.
  - Summer Undergraduate Research Fellowship in Environmental and Earth Sciences (SURFEES), Environmental Geochemistry Laboratory, Chapman University
    - Advisor: Dr. Christopher S. Kim
    - June—August 2016
    - Studied the effects of drying aggregation conditions on the uptake and retention of Pb(II) and Zn(II) onto iron oxyhydroxide nanoparticles.

### Honors and activities (selected)

- Postdoctoral Recruitment Initiative in Sciences and Medicine (PRISM) 2023, *Stanford University*
- Geoscience Diversity Goldschmidt 2023 conference grant, *Geochemical Society*
- GLOBES Interdisciplinary Mini-Grant 2023, *University of Notre Dame*
- Graduate Research Fellowship (NSF-GRFP) 2021, *National Science Foundation*
- Roy G. Post Graduate Scholarship 2021, *Waste Management Symposia*
- GLOBES Interdisciplinary Mini-Grant 2020, *University of Notre Dame*
- Merit and US early career Goldschmidt 2019 conference travel grant, *Geochemical Society*
- McNair Graduate Transition Scholarship Award 2019, *California State Polytechnic University, Pomona*
- Louis Stokes Alliance for Minority Participation (LSAMP) Research Fellowship 2018-2019, *California State Polytechnic University Pomona*
- McNair Scholar 2017-2018, *California State Polytechnic University Pomona*
- Administrative Fund for Conference Travel grant, Winter 2018, *California State Polytechnic University Pomona*
- Margaret Claire Van Buskirk Memorial Scholarship Award 2017-2018, *California State Polytechnic University Pomona*
- Associated Student Government Leadership (scholarship) Award 2016, *Santiago Canyon College*
- Barbara Hovanitz Memorial Scholarship Award 2016, *Santiago Canyon College*

- Uplifting Research Opportunity & College Readiness (UROC Readiness), University of Notre Dame
  - Spring 2022-present. Mentoring High School students to conduct scientific research and supplemental support to apply to 4-year colleges and universities.
  - Fall 2021. Co-author and co-developer of program and written proposal. Awarded Community Impact Grant from the Center for Social Concerns, *University of Notre Dame*. Partnership with ND Energy, ND TRiO, and Self-Healing Communities of Greater Michiana
- McNair Scholars Program, California State Polytechnic University Pomona
  - Fall 2022. Graduate Programs, the Application Process, and the Grad School Experience (Panelist)
  - Summer 2020. Graduate Programs and the Application Process (Workshop)
  - Fall 2018. Research Experience for Undergraduates—FAQs (Workshop). Researching Graduate Programs and the Application Process (Workshop)
- Chapman University
  - Fall 2022. Graduate Programs, the Application Process, and the Grad School Experience (Panelist)
- Cientifico Latino
  - Fall 2021. Graduate Student Mentorship Initiative (Mentor to an undergraduate applying to graduate programs)
  - Fall 2020. Graduate Student Mentorship Initiative (Mentor to an undergraduate applying to graduate programs)
- Chaffey College
  - Spring 2019. Transferring to a 4-year University in the Geosciences (Workshop)
  - Spring 2018. Transferring into a Geoscience program from Community/Junior College (Workshop)
- Stanford University (Stanford Earth)
  - Summer 2018. Undergraduate in Geosciences Student Panel (Panelist)

## Interests

Environmental geochemistry, actinide chemistry, redox active elements, contaminants, mineralogy, x-ray absorption spectroscopy, EXAFS, HERFD-XANES, and x-ray fluorescence mapping.

## Goals/ideas for advocacy for the user community

I aim to work towards:

- Finding ways to increase synergy between research groups (PIs, undergraduate/graduate students, post-docs) and synchrotron facilities and staff with an emphasis on user education and resources.
- Increasing access to synchrotron facilities and techniques for a diverse range of academic disciplines and institutions.
- Advocating for user-oriented evolution of beamlines and experiment workflow, prioritizing education, data collection quality, safety, and well-being.