Cruz Ortiz Jr.

Environmental Engineering Sciences, University of Florida 32611

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Curriculum Vitae (Hyperlinked)

**Education:**

University of Florida ¬ PhD Student ¬ Department of Environmental Engineering Sciences (Present)

Committee Co-chairs: Prof. Dr. Chang-Yu Wu & Prof. Dr. Tara Sabo-Atwood

University of California Santa Cruz ¬ B.Sc. ¬ Earth Science ¬ Thesis Honors (Spring 10’- Spring 12’)

Advisors: Dr. Peter S. Weiss-Penzias, Project Scientist & Prof. A. Russell Flegal

El Camino Community College ¬ Chemistry and Math (Fall 07’ – Fall 09’)

**Publications:**

*Ortiz, Jr. C.,* Weiss-Penzias, P.S., Fork, S., Lay, C., Flegal, A.R., Temporal variations of mercury concentration in the tissue of terrestrial arthropods from the central California coast. (Submitted)

Weiss-Penzias, P.S., **Ortiz, Jr. C.,** Acosta, R.P., Heim, W., Ryan, J.P., Fernandez, D., Collett, Jr. J.L., Flegal, A.R., Total and monomethyl mercury in fog water from the central California coast, Geophys. Res. Lett. **2012**, 39, L03804. [Publication: Featured in the cover of Geophysical Research Letters](http://onlinelibrary.wiley.com/doi/10.1029/2011GL050324/abstract)

**Presentations, Posters, and Abstracts:**

*Ortiz Jr. C.,* Weiss-Penzias, P.S, Flegal, A.R., Mercury concentrations in the tissue of terrestrial arthropods from the central California coast. Platform: SACNAS National Conference (2013) @ San Antonio, Texas

Ortiz Jr. C., Sabo-Attwood, T., Wang, J., Wu, C.-Y., Toxicity mitigation of metal nanoparticles by using a silica precursor. Poster: NanoFlorida (2013) @ Gainesville, Florida.

*Ortiz, Jr. C.,* Weiss-Penzias, P.S., Flegal, A.R., Mercury concentrations in the tissue of terrestrial arthropods from the central California coast. [Poster: International Conference on Mercury as a Global Pollutant (2013](http://www.mercury2013.com/full-program/?keyword=cruz+ortiz)) @ Edinburgh, Scotland

*Ortiz, Jr. C.,* Weiss-Penzias, P.S., Flegal, A.R., Mercury concentration in the tissue of terrestrial arthropods from the central California coast. [Poster: CAL CUPA Forum Conference (2013)](http://www.calcupa.org/conference.html) @ Anaheim, California

*Ortiz, Jr. C.,* Weiss-Penzias, P.S., Flegal, A.R., Mercury concentration in the tissue of terrestrial arthropods from the central California coast. [Poster: AGU Fall Meeting (2012)](http://fallmeeting.agu.org/2012/eposters/eposter/b31c-0444/)

*Ortiz, Jr. C.,* Weiss-Penzias, P.S., Total and monomethyl mercury in fog water and spiders from the central California coast. [Platform: SETAC North America Meeting (2012)](http://longbeach.setac.org/node/3)

*Ortiz Jr. C.,* Weiss-Penzias, P.S, Flegal, A.R., Measurements of mercury in rain and fog water from the central coast of California. Poster: California Alliance for Minority Participation (CAMP) Statewide Symposium (2012) @ Irvine, California

**Media Appearances:**

From Lead Batteries to Environmental Toxicology ([SACNISTA Profile](http://sacnas.org/news/SACNISTA-profile-Cruz-Ortiz-Jr))

UCSC Press Release ([Mercury in Coastal Fog](http://news.ucsc.edu/2012/12/coastal-mercury.html))

**Awards:**

NSF Graduate Research Fellowship Program (2014 Fellow)

Ford Foundation Fellowship Program (Honorable Mention)

Best Student Oral Presentation ([2013 SACNAS National Conference](http://sacnas.org/about/how-we-work/honors/2013/presentations))

NSF Bridge to Doctorate Fellowship Program (2013-2015 Fellow)

Florida Board Of Education Fellowship (BOE) - $1500

International Conference of Mercury as a Global Pollutant – Travel Award + Registration ($2400)

[Cal Cupa Forum](http://calcupa.org/) – Student Research Award - $1500

Friends of Long Marine Lab - Student Research Award ($400)

**Research Interest:**

I am interested in research opportunities related to the field of environmental toxicology. Having a clear understanding of how toxicants cycle through the environment would enable me to quantify them and pinpoint new areas of concern. I am particularly interested in further developing technologies for containment, remediation, and monitoring of pollutants in the environment; as well as pollutant risk assessment.

**Research Experience:**

*Graduate Research: Validating the Use of a Silica Precursor to Mitigate Nano-sized Metal Particle Toxicity in the Respiratory System*

I am working on mitigating the toxicity of welding fume particles. Our lab group engineered a welding torch which introduces tetramethylsilane (TMS) gas to the welding zone during the welding process. This gas coats nano-sized particles (fume) produced in the welding process with an insoluble layer of amorphous silica (SiO2). This application is especially important in coating chromium (VI). Chromium (VI), found in welding fume, is highly soluble and will go into solution in the lungs when inhaled. By having particles coated with an insoluble layer, chromium (VI) becomes less bioavailable, therefore TMS may mitigate the toxicity of welding fume. Adding TMS to the welding zone scavenges oxygen (O2) to form (SiO2); having less oxygen in the welding zone decreases the amount of Ozone (O3) that is generated. This is important because ground level ozone is toxic to the respiratory track and eyes. Lastly, this technology also increases fume particle size as a result from coating, larger particles are less likely to make their way to the alveolar region of the lungs. We are tackling welding fume toxicity from 3 different angles, current observations support future investigations to utilize this technology to minimize the toxicity associated with welding fume inhalation.

*Undergraduate Research: Measuring the concentration of mercury in coastal fog water* ([UCSC News Press Release](http://news.ucsc.edu/2012/12/coastal-mercury.html))

During the spring and summer of 2011 I assisted with collecting and measuring the concentration of Hg in fog water from the central California coast. Fog is an important contributor to the hydrologic cycle in this region, and wet deposition of Hg is known to be an important mechanism for delivering Hg to sensitive ecosystems. Aqueous mercury analysis is very prone to low-level contamination. This requires great care in sampling, processing, and analyzing environmental samples, I am proficient to this regard. The analysis of mercury in water is done by a semi-automated instrument with computer control (Tekran 2600 series). The calibration of this instrument requires a high level of precision, calibration standards need to be made in concentrations which are in parts per trillion (ppt).

*Senior Thesis:**Mercury Concentration in the Tissue of Terrestrial Arthropods from the Central California Coast*

I independently designed this project to evaluate mercury uptake in arthropods. The main objective was to determine if coastal fog was a contributor of Hg in their tissue. The research proposal was funded by winning a student research award. This study generated intriguing results and I continued to work on the project voluntarily after graduation. In lab, I was able to achieved reference material recovery rates that ranged from 96-102% and also reproduced results which varied by less than 5% (a standard requirement for publication). I received comprehensive honors for my senior thesis.

*Independent Research: Collecting weekly field samples for the University of Reno, Nevada (*[*Dr. Mae S. Gustin*](http://www.ag.unr.edu/gustin/research-projects.aspx)*)*

This study focused on investigating air gaseous oxidized mercury concentrations and potential dry deposition using developed passive samplers and surrogate surfaces. The primary question was whether local, regional or global sources are responsible for mercury deposition in the west coast. To investigate this, passive samplers and surrogate surface samplers were deployed and collected weekly. Great care needed to be taken during the deployment and collection of samples because of their high sensitivity to contamination. In addition, surrogate surfaces needed to be acid-cleaned every other week in order to insure a clean deployment.

**Courses:** **University of California Major GPA: 3.28/4.0**

*Earth Science:* Geologic Principles, Evolution of Earth, Mineralogy, Geophysics, Hydrology, Ground Water, Fossil Record Environmental *Toxicology:* Sources and Fates of Pollutants *Chemistry:* 1 A,B,C *Math:* Calculus I, II, Multivariable Calculus *Physics:* 6 A,B,C,

**Courses:** **University of Florida GPA: 3.3/4.0**

Elements of Air Pollution, Air Pollution Control and Design, Industrial Ecology, Public Health Concepts

*Computer Programing:* Java *Computer Software:* MATLAB, SigmaPlot

**Teaching Experience:**

Instructor (3hrs/week) Algebra 1 – [Santa Cruz Learning Center](http://www.santacruzlearningcenter.com/) Present

Tutor (8hrs/week) All levels of math, science, and Spanish Present

T.A. (4hrs/week) UCSC – [Evolution of Earth Lab](http://www.es.ucsc.edu/~pkoch/EART_110A/index.html) Fall 2011

**References:**

*Peter S. Weiss-Penzias*, Project Scientist, University of California Microbiology & Environmental Toxicology Department, Physical Science Building 454, 1156 High St. Santa Cruz, CA 95064, Office: (831) 459 – 1616,

Cell: (831) 295-2606, pweiss@ucsc.edu

*A. Russell Flegal*, Professor, University of California Microbiology & Environmental Toxicology Department, Physical Science Building 430, University of California, 1156 High St. Santa Cruz, CA 95064, Office: (831) 459‐2093, flegal@ucsc.edu

*Chan-Yu Wu*, Department Chair, University of Florida Environmental Engineering Sciences Department, 406 AP Black Hall, P.O. Box 116450, Gainesville, FL 32603, Office: (352) 392-0845, cywu@ufl.edu

*Tara Sabo-Attwood*, Professor, University of Florida Environmental and Global Health Department, 101 S. Newell Dr, Suite 2133, Gainesville, FL 32610, Office: (352) 294-5293, sabo@phhp.ufl.edu