

## CARA M. SANTELLI

### *Doctoral Candidate, MIT/WHOI Joint Program in Oceanography*

Woods Hole Oceanographic Institution  
 Watson Lab, MS #52, Woods Hole, MA 02543  
 (508) 289-3064, [csantelli@whoi.edu](mailto:csantelli@whoi.edu)

### **EDUCATION**

#### **Massachusetts Institute of Technology/Woods Hole Oceanographic Institution, 2000-present**

Ph.D. Candidate, MIT/WHOI Joint Program in Oceanography, Marine Chemistry and Geochemistry  
 Advisors: Dr. Katrina J. Edwards and Dr. Wolfgang Bach  
 “*The role of microorganisms in ocean crust weathering*”

#### **University of Wisconsin, Madison, 1997-2000**

B.S., Department of Geology and Geophysics  
 Advisors: Dr. Jillian F. Banfield and Dr. Susan A. Welch  
 “*The effect of Fe-oxidizing bacteria on Fe-silicate mineral dissolution*”

#### **University of Minnesota, Morris, 1995-1997**

Science/Engineering coursework prior to transfer to the University of Wisconsin

### **RESEARCH EXPERIENCE**

#### **Synchrotron X-ray Radiation, Advanced Light Source (ALS), 2005-present**

Used micro x-ray diffraction, x-ray fluorescence, and micro x-ray absorption spectroscopy techniques to investigate seafloor sulfide and basalt weathering

#### **Microscopy Imaging & Analysis, Woods Hole Oceanographic Institution, 2000-present**

Experienced with scanning electron, atomic force, confocal, epi-fluorescent, and light microscopy for geomicrobiological and mineralogical investigations related to microbe-mineral and fluid-mineral weathering reactions; assisted with and currently training for high-resolution transmission electron microscopy analyses

#### **Molecular Biological Studies, Woods Hole Oceanographic Institution, 2000-present**

Experienced with DNA extraction and purification, PCR, cloning, 16S rDNA sequencing techniques for phylogenetic analyses of microorganisms associated with seafloor mineral weathering; used CARD-FISH analyses to examine the abundance of distribution of microorganisms inhabiting ocean crust

#### **Undergraduate Research Assistant, University of Wisconsin, Madison, 1998-2000**

Involved in “microbial weathering of silicate minerals” studies with graduate students and post-docs; performed mineral identification analyses using XRD as well as aqueous geochemical analyses of Fe and Si

#### **XRD Lab Technician, University of Wisconsin, Madison, 1999-2000**

Ran the x-ray diffraction laboratory in the Department of Geology and Geophysics

### **RESEARCH CRUISE & FIELD EXPERIENCE**

#### **Research cruise, East Pacific Rise, 9°N, R/V Atlantis, AT11-20, November 2004**

Geomicrobiological investigations of basalt and sulfide weathering

#### **Research cruise, East Pacific Rise, 9°N, R/V Atlantis, AT11-7, February 2004**

Volcanic processes on fast-spreading mid-ocean ridges

#### **Research cruise, Costa Rica Convergent Margin, Ocean Drilling Program Leg 205, September 2002**

Fluid flow and subduction fluxes across the Costa Rica Convergent Margin

#### **Geological Summer Field Assistant, Montana and Idaho, Summer 1998**

Rock collection/identification for graduate student studying the source and alteration of the Idaho batholith

## **TEACHING EXPERIENCE**

### **Laboratory Mentor, *Edwards Geomicrobiology Laboratory, WHOI, 2004-2006***

Assisted and instructed several molecular biological laboratory techniques and phylogenetic analysis tools to graduate students and post-doctoral investigators.

### **Falmouth Schools Science Outreach Program, *Falmouth, MA, 2005***

Helped design and improve the science curriculum for a 5<sup>th</sup> grade teacher

### **High School Geology Teacher, *Zermatt, Switzerland, Fall Semester, 2001***

Taught an advanced classroom and lab-based geology class at an American boarding school in Switzerland

### **K-12 Outreach Engagements, *University of Wisconsin, Madison, 1997-1999***

Demonstrated basic science experiments and implemented a civil engineering city planning outreach kit

## **AWARDS, FUNDING & TRAINING**

**Molecular Geomicrobiology Short Course**, Mineralogical Society of America, 2005

**NASA Astrobiology Institute Travel Award**, to attend the MSA Molecular Geomicrobiology Short Course, 2005

**Troodos Ophiolite Field School**, Ridge2000, Cyprus, 2005

**Schlanger Ocean Drilling Fellowship**, 2003

**Student Travel Grant**, to attend the American Society for Microbiology Conference, 2003

**Outstanding Senior Award**, Department of Geology and Geophysics, University of Wisconsin-Madison, 2000

**Wasatch-Uinta Field Camp**, Geological Field Methods course, Utah, Summer 1999

## **PROFESSIONAL SOCIETIES**

American Geophysical Union, Mineralogical Society of America, American Society for Microbiology

## **PUBLICATIONS & MANUSCRIPTS**

Rogers, D.R., **Santelli, C.M.**, Edwards, K.J., 2003. Geomicrobiology of deep-sea deposits: Estimating community diversity from low-temperature seafloor rocks and minerals. *Geobiology Journal*, vol. 1, pp. 109-117.

**Santelli, C.M.**, Welch, S.A., Westrich, H.R., Banfield, J.F., 2001. The effect of Fe-oxidizing bacteria on Fe-silicate mineral dissolution. *Chemical Geology*, vol. 180, no. 1-4, pp. 99-115.

Welch, S.A., **Santelli, C.M.**, Banfield, J.F., 2000. An experimental study of fayalite alteration by an iron oxidizing microorganism, *Thiobacillus ferrooxidans*. *Midwest Microscopy* 27, 3: 6-7.

Banfield, J.F., Welch, S.A., Taunton, A.E., **Santelli, C.M.**, Barker, W.W., 1999. Exploring microbial controls on mineral weathering. *Proceedings of the 5<sup>th</sup> International Symposium on the Geochemistry of the Earth's Surface*, Reykjavic Iceland, 16-20, August, 1999: 353-356.

**Santelli, C.M.**, Bach, W., Edwards, K.J. Abundance and diversity of life in the ocean crust. *In prep.*

**Santelli, C.M.**, Edgcomb, V., Bach, W., Edwards, K.J. Phylogenetic diversity of bacterial communities inhabiting seafloor lavas from the East Pacific Rise, 9°N. *In prep.*

**Santelli, C.M.**, Banerjee, N.R., Bach, W., Edwards, K.J. The deep ocean biosphere: Evidence for low biomass in old ocean crust. *In prep.*

## **ABSTRACTS**

Toner, B., **Santelli, C.M.**, Bach, W., Rogers, D.R., Edwards, K.J., 2006. Low temperature weathering of hydrothermal chimney sulfide minerals at Juan de Fuca Ridge. *Astrobiology Science Conference*.

**Santelli, C.M.**, Edgcomb, V., Bach, W., Edwards, K.J., 2005. Bacterial Diversity of Young Seafloor Basalts: A potential role for microorganisms in ocean crust weathering. AGU Fall Meeting. Poster Presentation.

Toner, B., **Santelli, C.M.**, Bach, W., Rogers, D.R., Edwards, K.J., 2005. Low temperature weathering of hydrothermal chimney sulfide minerals at Juan de Fuca Ridge. AGU Fall Meeting.

**Santelli, C.M.**, Banerjee, N.R., Bach, W., Edwards, K.J., 2005. The deep ocean crust biosphere: Young and dynamic, old and dormant? The Joint International Symposia for Subsurface Microbiology (ISSM 2005) and Environmental Biogeochemistry (ISEB XVII). Poster Presentation.

**Santelli, C.M.**, Bach, W., Edwards, K.J., 2005. Bacterial diversity of young ocean crust at the East Pacific Rise, 9°N. Ridge 2K Troodos Ophiolite Field School, Troodos, Cyprus. Poster Presentation.

**Santelli, C.M.**, Bach, W., Rogers, D.R., Edwards, K.J., 2004. Phylogenetic Diversity of Young Ocean Crust at the East Pacific Rise 9°N. AGU Fall Meeting. Poster Presentation.

**Santelli, C.M.**, Edwards, K.J., 2003. The Role of Crystallography and Electrostatic Forces in the Adhesion of *Thiobacillus ferrooxidans* to Pyrite Surfaces. American Society for Microbiology. Poster Presentation.

Welch, S.A., Taunton, A.E., **Santelli, C.M.**, Banfield, J.F., 2000. Microorganisms and the weathering of silicate minerals. International Geological Congress, Abstracts, vol. 31, unpaginated.

**Santelli, C.M.**, Welch, S.A., Banfield, J.F., 1999. Lithotrophic growth of *T. ferrooxidans* on Fe<sup>2+</sup> from silicate mineral dissolution. Geological Society of America, Abstracts with Programs, vol. 31, no. 7, p. 324. Poster Presentation.

Welch, S.A., **Santelli, C.M.**, Westrich, H.R., Banfield, J.F., 1999. Ferric iron ordering and microstructural evolution of olivine during biological dissolution; reproduction of features of natural weathering. Geological Society of America, Abstracts with Programs, vol. 31, no. 7, pp. 489-490.

Taunton, A.E., Welch, S.A., **Santelli, C.M.**, Fournelle, J., Banfield, J.F., 1998. Apatite weathering and cerium fractionation; possible microbial influences. Geological Society of America, Abstracts with Programs, vol. 30, no. 7, p. 304.

Welch, S.A., Taunton, A.E., **Santelli, C.M.**, Fournelle, J., Banfield, J.F., 1998. The role of microorganisms in biotite weathering. Geological Society of America, Abstracts with Programs, vol. 30, no. 7, pp. 305.