

Minna Rosalie Krejci

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RESEARCH INTERESTS

Selectivity in biomineralization of barium and strontium in green algae. Particular expertise in imaging metal uptake and mineralization in green algae using X-ray fluorescence microscopy. Application of synchrotron-based X-ray microscopy techniques to biological materials. Biological sample preparation for X-ray microscopy, with a focus on cryofixation. Interest in and some experience with cryogenic hard X-ray imaging of biological materials.

PROFESSIONAL INTERESTS

Science/medical communication, science policy, public science education/awareness, diversity within STEM fields.

EDUCATION

PhD in Materials Science and Engineering, expected 2011

Certificate in Management for Scientists and Engineers

Northwestern University, Evanston, Illinois

GPA: 3.59/4.00

Dissertation: "Investigating Biomineralization with X-ray Microscopy"

Advisor: Derk Joester

Bachelor of Science in Materials Science and Engineering, *magna cum laude*, 2006

Minor in Music

Case Western Reserve University, Cleveland, Ohio

GPA: 3.87/4.00

Thesis: "Prediction and Measurement of the Diffusion Coefficient of Nitrogen in Liquid Gallium"

Advisor: David Matthiesen

RESEARCH EXPERIENCE

Northwestern University and Argonne National Laboratory

Research Assistant (November 2007 to present)

Uncovered mechanistic details of barium and strontium selectivity in desmid green algae, with a focus towards applications in ^{90}Sr remediation.

Northwestern University and Argonne National Laboratory

Research Assistant (September 2006 to October 2007)

Designed and initiated development and characterization of nanoscale heterostructures for information storage applications.

Ferro Corporation

Summer Internship (June 2006 to August 2006)

Characterized and developed a database for all porcelain enamel frits in production.

Massachusetts Institute of Technology

NSF REU Internship in Professor Ian Hunter's Bioinstrumentation Laboratory (June 2005 to August 2005)

Developed techniques for processing conducting polymer films and characterizing the degree of molecular orientation to enhance conductivity for artificial muscle applications.

H.C. Starck Engineered Material Solutions

Division of Bayer Material Science (May 2004 to August 2004)

Developed microstructural evaluation methods to maintain quality assurance and identified causes of failure for returned materials.

Case Western Reserve University

Member of Professor John Lewandowski's Research Group (May 2003 to August 2003)

Developed methods to quantify microstructure of metallic foams and correlated microstructure with mechanical properties.

TEACHING EXPERIENCE

Northwestern University

Graduate Teaching Assistant (January 2008 to June 2008)

Led laboratory sessions, graded, held exam review sessions, and offered general student assistance for courses on Biomineralization and Chemical Aspects of Materials Science.

Case Western Reserve University

Supplemental Instruction Leader (August 2005 to May 2006)

Held twice-weekly formal review sessions for engineering students and helped students achieve success by emphasizing problem solving strategies for a course on Chemistry of Materials.

LEADERSHIP EXPERIENCE

Phi Sigma Rho National Engineering Sorority

National Vice President of Programming (July 2009 to present)

Coordinated leadership and member development programming for all undergraduates and alumnae.

E-Mentoring Program Coordinator (October 2008 to July 2009)

Initiated and managed a national mentoring program.

Regional Field Director (August 2007 to June 2008)

Served as a liaison between three chapters of the sorority and the National Council.

Founding Member of Case Western Reserve University Chapter (January 2003 to May 2006)

Served an instrumental role in establishing a new chapter of the organization.

Northwestern University Materials Science Student Association

Social Chair (May 2007 to May 2008)

Organized social events to promote and encourage networking within the department and with other campus organizations.

OUTREACH

Blog Co-Producer for the Chicago Council on Science and Technology (December 2010 to present)

Planned content, solicited submissions, and wrote blog posts related to technology and nanotechnology.

Science Fair Judge (January 2008 to present)

Served as a judge for various Chicago Public Schools Science Fairs.

Member of "Science Speakers Corps" at Northwestern University (April 2010 to present)

Prepared and delivered research talks to several high school science classes.

Workshop Leader for "Take Our Daughters to Work Day" at Northwestern University (April 2009 and April 2010)

Led experiments and demonstrations on materials science and engineering to girls aged 8-16 years.

Graduate Instructor for SWE STEP Program (June 2008 and June 2009)

Taught classes on engineering and chaperoned for 3-day engineering program for 7th grade girls.

Project Excite Volunteer (January 2008 to June 2008)

Provided weekly Honors Algebra tutoring to a 7th grade student.

HONORS

2010 Recipient of Student Poster Prize at Argonne APS/EMC Users Meeting

Laboratory-Graduate Appointment at Argonne National Laboratory, 2007-present

National Science Foundation Graduate Fellowship – Honorable Mention, 2008

National Defense Science and Engineering Graduate Fellowship – Alternate, 2008

2006 Recipient of the Wesley P. Sykes Prize

Awarded to a senior at Case majoring in materials science and engineering who shows outstanding ability in scientific research.

2006 Recipient of the Phi Sigma Rho Sorority National Senior Award

Awarded to the senior active sister who best exemplifies good character, gives distinguished service to the sorority, and shows achievement in various fields of student activity.

Member of Honorary Societies

Golden Key International Honor Society, Tau Beta Pi Engineering Honor Society

SKILLS

Software

Experience in Microsoft Office, MAT-LAB, Adobe Photoshop, Adobe Illustrator, and ImageJ.

Analysis and Laboratory Techniques

Experience in synchrotron X-ray fluorescence microscopy (SXRF), transmission X-ray microscopy and tomography (TXM), X-ray absorption spectroscopy (XANES and EXAFS), electron microscopy (SEM and TEM), algae cell culture, biological sample preparation for X-ray and electron microscopy (chemical fixation, cryofixation, freeze-substitution, freeze-drying, embedding, sectioning), light microscopy (bright field, DIC, fluorescence, and confocal), gel electrophoresis (SDS-PAGE and native PAGE), vibrational spectroscopy (FTIR and Raman), X-ray powder diffraction, mechanical testing (bend, tensile, and hardness), and associated sample preparation techniques.

PRESENTATIONS

241st American Chemical Society National Meeting, Spring 2011 (upcoming), Anaheim CA, USA.

Oral presentation titled: “*Selective Sequestration of Strontium and Barium via Biomineralization in Desmid Green Algae.*”

XRM 2010 10th International Conference on X-Ray Microscopy, Chicago IL, USA.

Poster titled: “*Investigating Selectivity in Algal Biomineralization of Barium and Strontium with X-Ray Fluorescence Microscopy.*”

2010 Argonne Users Week, Argonne National Laboratory, Argonne IL, USA.

Poster titled: “*Elucidating Mechanisms of Ba and Sr Selectivity in Desmid Green Algae with X-Ray Fluorescence Microscopy.*”

2010 Gordon Research Conference Environmental Bioinorganic Chemistry, Salve Regina University, Newport RI.

Poster titled: “*Investigating Selective Ba/Sr Accumulation in Desmid Green Algae for ⁹⁰Sr Remediation.*”

Argonne User Science Seminar, April 24, 2009, Argonne National Laboratory, Argonne IL, USA.

Invited talk titled: “*Study of Selective Biomineralization of Ba and Sr using X-Ray Fluorescence Microscopy.*”

2009 Argonne Users Week, Argonne National Laboratory, Argonne IL.

Poster titled: “*Investigating Selectivity in Biomineralization of Barium and Strontium with the X-Ray Fluorescence Microprobe.*”

2009 Gordon Research Conference Cell Biology of Metals, Salve Regina University, Newport RI.

Poster titled: “*Selectivity in Biomineralization of Barium and Strontium in Desmid Green Algae.*”

PUBLICATIONS

Krejci, Minna; Finney, Lydia; Vogt, Stefan; Joester, Derk. “*Selective sequestration of strontium in desmid green algae by biogenic co-precipitation with barite.*” *Submitted to ChemSusChem.*

Krejci, Minna; Wasserman, Brian; Finney, Lydia; Vogt, Stefan; Joester, Derk. “*Selectivity in biomineralization of barium and strontium.*” *In preparation.*