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RESEARCH EXPERIENCE

JPL Postdoctoral Fellow

Jet Propulsion Laboratory
Pasadena, CA 91109-8099
02/2009-Present
Advisor: Noah Molotch, 818-354-3798

Integrating remote sensing data and energy balance modeling to study the impact of climate change on snowmelt and stream hydrochemistry in alpine watersheds.

NASA Postdoctoral Fellow

Jet Propulsion Laboratory
Pasadena, CA 91109-8099
02/2008-02/2008
Advisor: Martin Barmatz, 818-354-3088

Recrystallization processes in frozen materials were studied to constrain the evolution and physical properties of icy satellites in the solar system.

Postdoctoral Research Associate

Montana State University, Bozeman
Department of Land Resources &
Environmental Sciences
09/2005 - 09/2006
Advisor: John Priscu, 406-994-3250

Applied energy and mass balance calculations to quantitatively assess the habitability of near surface Mars in terms of energy and nutrient sources. Cryomicroscopy protocols were developed to observe microbial metabolic activity in polycrystalline ice.

Graduate Research Assistant (Ph.D.)

Cold Regions Laboratory
Civil Engineering Department
Montana State University, Bozeman
09/2003 - 09/2005
Supervisor: Edward Adams, 406-994-6122

Demonstrated, using numerical and experimental methods, the importance of mechanical anisotropy on intergranular melt and recrystallization processes in polycrystalline ice. Characterized experimentally the migration of fuel along the water vein network in polycrystalline ice.

SKILLS AND BACKGROUND

- Finite element modeling of heat transfer and deformation in ice.
- Laboratory experience measuring contaminant transport in ice, recrystallization in snow, and biological parameters in lakes in the dry valleys of Antarctica.
- Fieldwork experience in geological mapping and limnological sampling.
- Proficient with finite element (FE) codes ANSYS and RISA-3D, developed 1D and 2D FE codes in heat transfer and elasticity, programming experience in FORTRAN, MATLAB, and EXCEL Visual Basic.

PREVIOUS EMPLOYMENT

| | | |
|---------------|---------------------------------|---|
| 2007 (2 mos.) | Antarctic Field Assistant | Professor John C. Priscu, Montana State University, Bozeman |
| 2006-2007 | Structural Engineer (Junior) | ANVIL Corporation, Billings, MT |
| 2005-2006 | Postdoctoral Research Associate | Montana State University, Bozeman, MT |
| 2003-2005 | Graduate Research Assistant | Montana State University, Bozeman, MT |

EDUCATION

Ph.D., Engineering-Applied Mechanics, Montana State University, Bozeman, 2005

M.S., Physics, Montana State University, Bozeman, 2002

B.S., Physics, California State University, Fresno, 2000

B.S., Geology, Summa Cum Laude, California State University, Fresno, 1998

GPA: 3.75/4.0

PEER-REVIEWED PUBLICATIONS

Jepsen, S.M., E.E. Adams and J.C. Priscu (submission pending). Sediment melt dynamics in permanent Antarctic lake ice. *Arctic, Antarctic and Alpine Research*.

Jepsen, S.M. and E.E. Adams (2008). Anisotropic elastocreep in glacial ice: a mechanism for intergranular melt and recrystallization. *Journal of Geophysical Research-Earth Surface*, 113, F03010, doi:10.1029/2007JF000917.

Adams, E.E., S.M. Jepsen and B.C. Close (2008). A bonding process between grains in mechanically disaggregated snow. *Annals of Glaciology*, 48, 6-12.

Jepsen, S.M., J.C. Priscu, R.E. Grimm and M.A. Bullock (2007). The potential for lithoautotrophic life on Mars: Application to shallow interfacial water environments. *Astrobiology*, 7(2), 342-354.

Jepsen, S.M., E.E. Adams and J.P. Priscu (2006). Fuel movement along grain boundaries in ice. *Cold Regions Science and Technology* 45, 158-165.

Jepsen, S. M. (2005). Intergranular water and permeability of the Lake Vostok accretion ice, Eastern Antarctica. Doctoral Dissertation, Montana State University, Bozeman.

PRESENTATIONS

Jepsen, S.M. (2008). Sediment melt dynamics in lake ice from field and lab observations. McMurdo Dry Valleys (MCM) Long Term Ecological Research (LTER) annual meeting, 17-18 June 2008, Chicago, Illinois.

Jepsen, S.M., J.C. Priscu, R.E. Grimm and M.A. Bullock (2007). The potential for lithoautotrophic life on Mars: application to shallow interfacial-water environments. Abstract and oral presentation, ASLO 2007 Aquatic Sciences Meeting, Feb 4-9, 2007, Santa Fe, New Mexico.

Adams, E.E. and S.M. Jepsen (25 May 2006). Fuel tunneling and the potential for contamination of subglacial lakes, Subglacial Lakes Meeting #2, Committee on Principles of Environmental Stewardship for the Exploration and Study of Subglacial Environments, The National Academies, NAS Keck Center Room 101, Washington, DC.

Jepsen, S.M. and E.E. Adams (2004). Anisotropic finite element modeling of polycrystalline ice in deep glaciostatic settings. Poster presentation in Kunz-Pirrung, M. and M. Reinke, (Eds.), *Terra Nostra*, XXVIII SCAR & COMNAP XVI Meeting, 26-28 July 2004, Congress Centre, Bremen, Germany.

HONORS AND AWARDS

2-year fellowship, NASA Postdoctoral Program

1-year fellowship, Montana Space Grant Consortium, Montana State University, Bozeman, 2001.

Outstanding Physics Student, California State University, Fresno, 1999-2000.

Graduated Summa Cum Laude, Geology, California State University, Fresno, 1998.

Scholarships in 1996-1998 from Fresno Gem and Mineral Society, Robert Downing Foundation and American Federation of Mineralogical Societies.