

Ross M. Lieblappen

44 Zdon Road, Middlesex, VT 05602 (781) 424-7268

Ross.Lieblappen@vtc.edu <http://lieblappen.vtc.edu>

APPOINTMENTS

- '17 - present **Assistant Professor.** Vermont Technical College Department of Science
'16 - present **Post-Doctoral Fellow.** US Army Corps of Engineers Cold Regions Research and Engineering Lab
'17 **Visiting Instructor.** Middlebury College Department of Environmental Studies
'16 **Adjunct Faculty.** Champlain College Division of Information Technology & Sciences

EDUCATION

- '11 – '16 Thayer School of Engineering at Dartmouth College: Ph.D. in Engineering
Thesis: *How Sea Ice Microstructure Influences the Polar Transport of Salts from the Ocean into the Atmosphere*
'08 – '10 University of Vermont: M.S. in Mathematics, GPA 3.90
Thesis: *Aggressive Shadowing of a Low-Dimensional Model of Atmospheric Dynamics*
'03 – '07 Middlebury College: B.A. in Environmental Studies with a focus in Chemistry, and minor in Mathematics, *summa cum laude*, GPA = 3.80
Thesis: *The Influence of Surface Roughness on Air-Water Interfacial Areas in Porous Media*

RESEARCH EXPERIENCE

- '16 **Microstructural Characterization Specialist.** USACE Cold Regions Research Engineering Lab
Using x-ray micro-computed tomography to study the microstructure of soils, snow, and ice.
'13 – '16 **Brine Network Microstructure in Sea Ice.** Thayer School of Engineering at Dartmouth College
Characterizing the brine network pore structure in first-year Arctic sea ice, analyzing temporal and spatial variability, and developing a robust mathematical network description
'11 – '16 **Bromide in the Snow and Sea Ice Zone.** Thayer School of Engineering at Dartmouth College
Understanding the transport of bromide through the ocean-ice-snow-air system and how it leads to ozone depletion events in the Arctic and Antarctica
'09 – '10 **Aggressive Shadowing in the Atmosphere.** University of Vermont
Developing new techniques to improve weather and climate forecasting
'06 – '07 **Surface Roughness and Air-Water Interfacial Areas.** Middlebury College
Measuring interfacial areas to better understand contaminant transport through soil systems

PATENTS

Obbard, R. W., Afonina, N. P., **Lieb-Lappen, R. M.**, Pope, C. G. *Temperature Gradient Storage System and Method.* U.S. Patent 20160178264. Issued June 23, 2016.

PEER-REVIEWED PUBLICATIONS

Frantz, C. M., Light, B., Farley, S. M., Carpenter, S., Lieblappen, R., Courville, Z., Orellana, M., Junge, K. In review. Physical and Optical Characteristics of 'Rotten' Arctic Sea Ice.

Asenath-Smith, E., Melendy Jr., T. D., **Lieb-Lappen, R.**, Haehnel, R. B., Moser, R. In review. In Situ Observation of Crack Arrest in Reinforced Ice during Uniaxial Compression.

Lieblappen, R., Kumar, D., Pauls, S., Obbard, R. 2018. A Network Model for Characterizing Brine Channels in Sea Ice. *Cryosphere*, 12, 1013-1026, doi:10.5194/tc-12-1013-2018.

Lever, J., Taylor, S., Song, A., Courville, Z., **Lieblappen, R.**, Weale, J. 2017. The Mechanics of Snow Friction as Revealed by Micro-Scale Interface Observations. *J. Glaciology*, 1-10. doi:10.1017/jog.2017.76.

Courville, Z., **Lieb-Lappen, R.**, Claffey, K., Elder, B. 2017. Investigations of skeletal layer microstructure in the context of remote sensing of oil in sea ice. *International Oil Spill Conference Proceedings*. 2017, 1, 2237-2255. doi: 10.7901/2169-3358-2017.1.2237.

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Iverson, N., **Lieb-Lappen, R. M.**, Dunbar, N., Kim, E., Golden, E. J., Obbard, R. W. 2017. The First Physical Evidence of Subglacial Volcanism under the West Antarctic Ice Sheet. *Sci. Rep.* 7, 11457. doi: 10.1038/s41598-017-11515-3.

Lieb-Lappen, R. M., Golden, E. J., Obbard, R. W. 2017. Metrics for Interpreting the Microstructure of Sea Ice using X-Ray Micro-Computed Tomography. *Cold Reg. Sci. Technol.*, 138, 24-35. doi: 10.1016/j.coldregions.2017.03.001.

Obbard, R. W., **Lieb-Lappen, R. M.**, Nordick, K. V., Golden, E. J., Leonard, J. R., Lanzirrotti, A., Newville, M. G. 2016. Synchrotron X-Ray Fluorescence Spectroscopy of Salts in Natural Sea Ice. *Earth Space Sci.*, 3. doi: 10.1002/2016EA000172.

Hammonds, K., **Lieb-Lappen, R.**, Baker, I., Wang, X. 2015. Investigating the Thermophysical Properties of the Ice-Snow Interface under a Controlled Temperature Gradient: Part I: Experiments & Observations. *Cold Reg. Sci. Technol.*, 120, 157-167. doi: 10.1016/j.coldregions.2015.09.006.

Lieb-Lappen, R. M., Obbard, R. W. 2015. The Role of Blowing Snow in the Activation of Bromine over First-Year Antarctic Sea Ice. *Atmos. Chem. Phys.*, 15, 7537-7545. doi:10.5194/acp-15-7537-2015.

Lieb-Lappen, R. M., Danforth, C. M. 2012. Aggressive Shadowing of a Low-Dimensional Model of Atmospheric Dynamics. *Physica D*, 241, 637-648.

Costanza-Robinson, M. S., Harrold, K. H., **Lieb-Lappen, R. M.** 2008. X-ray Microtomography Determination of Air-Water Interfacial Area-Water Saturation Relationships in Sandy Porous Media. *Environ. Sci. & Technol.*, 42 (8), 2949-2956.

OTHER PUBLICATIONS

Hammonds, K., **Lieb-Lappen, R.**, Courville, Z., Song, A. Wang, X., Baker, I. 2014. Laboratory Investigations on the Thermophysical Properties of the Ice-Snow Interface while under a Controlled Temperature Gradient. *Proceedings of the International Snow Science Workshop*. Banff, Canada. Vol. 29, pp. 35-42.

Lieb-Lappen, R. M. 2014. Cover Art for Special Issue from the 13th International Conference on the Physics and Chemistry of Ice, *Journal of Physical Chemistry B*, November 26, **118**, 47, Cover.

Nghiem, S. V., Shepson, P. B., Simpson, W., Perovich, D. K., Sturm, M., Douglas, T., Rigor, I. G., Clemente-Colón, P., Burrows, J. P., Richter, A., Steffen, A., Staebler, R., Obrist, D., Moore, C., Bottenheim, J., Platt, U., Pöhler, D., General, S., Zielcke, J., Fuentes, J. D., Hall, D. K., Kaleschke, L., Woods, J., Hager, C., Smith, J., Sweet, C. R., Pratt, K., Custard, K., Peterson, P., Walsh, S., Gleason, E., Sait, E., Webster, M., **Lieb-Lappen, R.**, Linder, C., Nuemann, G. 2013. Arctic Sea Ice Reduction and Tropospheric Chemical Processes. *Proceedings of the Fourth International Conference on Bioenvironment, Biodiversity and Renewable Energies: BIONATURE 2013*. Lisbon, Portugal.

FIELD EXPERIENCE

- Feb – Mar '15 Barrow, AK:** ICE-MITT (Ice Core Extraction while Maintaining In-Situ Temperature Transitions)
Two month expedition collecting sea ice cores and transporting them back to Dartmouth College while maintaining their in-situ temperature gradient for microstructural analysis
- Oct – Nov '12 Ross Sea, Antarctica**
Two month expedition collecting sea ice cores, surface snow, and blowing snow samples for chemical analysis to study the transport and activation of bromine
- Mar '12 Barrow, AK:** BROMEX (Bromine Ozone Mercury Experiment)
Two week expedition as a member of the BROMEX team studying the “Bromine Explosion” and tropospheric ozone depletion events

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CONFERENCE ABSTRACTS

Obbard, R., Pauls, S., Shah, S., Lieblappen, R. 2018. A Network Model for Characterizing Brine Channels in Arctic Sea Ice. Polar 2018, Davos, Switzerland.

Lieblappen, R., Courville, Z., Fegyveresi, J. Barbato, R., Thurston, A. 2017. Microbes and Microstructure: Dust's Role in the Snowpack Evolution. American Geophysical Union, Fall Meeting. New Orleans, LA.

Light, B., Frantz, C. M., Farley, S., Lieb-Lappen, R., Courville, Z., Junge, K., Orellana, M. 2017. X-ray tomography of "rotten" Arctic sea ice. Workshop on X-ray micro-tomography of porous ice media, Trondheim, Norway.

Lieb-Lappen, R., Courville, Z., Obbard, R. 2017. Brine Channel Morphology in Sea Ice using X-Ray Micro-Computed Tomography. 9th International Conference on Porous Media & Annual Meeting. Rotterdam, Netherlands.

Lieb-Lappen, R., Courville, Z. R., Albert, D., Taylor, S., Lever, J., Barbato, R., Obbard, R. W., Song, A., Fegyveresi, J. M. 2016. Broad Applications for X-Ray Micro-Computed Tomography in the Geosciences. American Geophysical Union, Fall Meeting. San Francisco, CA.

Courville, Z. R., Albert, D. A., Lieb-Lappen, R., Fegyveresi, J. 2016. High Frequency Acoustic Reflections from an Air-Snow Interface. American Geophysical Union, Fall Meeting. San Francisco, CA.

Light, B., Frantz, C., Junge, K., Orellan, M., Carpenter, S., Farley, S., Lieb-Lappen, R., Courville, Z. 2016. Characterizing the Physical Properties of Arctic Sea Ice Under Conditions of Extreme Summer Melt. American Geophysical Union, Fall Meeting. San Francisco, CA.

Frantz, C., Light, B., Orellan, M., Carpenter, S., Farley, S., Crump, B., Courville, Z., Lieb-Lappen, R., Junge, K. 2016. Rotten Ice: Structural and Biological Changes in First-Year Arctic Sea Ice during Advanced Summer Melt. Geological Society of America Annual Meeting. Denver, CO.

Lieb-Lappen, R., Obbard, R. W. 2015. Mapping the Microstructural Location of Salts and Metals in Sea Ice with X-Ray Micro-Fluorescence Spectroscopy. American Geophysical Union, Fall Meeting. San Francisco, CA.

Obbard, R. W., Lieb-Lappen, R. 2015. A Krill's Eye View: Sea Ice Microstructure and Microchemistry. American Geophysical Union, Fall Meeting. San Francisco, CA.

Hammonds, K., Lieb-Lappen, R., Baker, I., Wang, X., Courville, Z. 2015. Investigating the Thermophysical Properties of the Ice-Snow Interface Under a Controlled Temperature Gradient. European Geophysical Union, Fall Meeting. Vienna, Austria.

Lieb-Lappen, R., Obbard, R. W. 2014. The Role of Blowing Snow in the Activation of Bromine over First-Year Antarctic Sea Ice. American Geophysical Union, Fall Meeting. San Francisco, CA.

Iverson, N., Dunbar, N., Lieb-Lappen, R., Kim, E., Golden, E., Obbard, R. W. 2014. Phreatomagmatic Eruptions Under the West Antarctic Ice Sheet: Potential Hazard for Ice Sheet Stability. American Geophysical Union, Fall Meeting. San Francisco, CA.

Lieb-Lappen, R., Obbard, R. W. 2014. Microstructural Analysis of First-Year and Multi-Year Antarctic Ice. International Conference on the Physics and Chemistry of Ice. Hanover, NH.

Lieb-Lappen, R., Obbard, R. W. 2013. Examining the Microstructural Location of Bromide in Arctic and Antarctic Sea Ice Using Synchrotron X-Ray Microfluorescence. American Geophysical Union, Fall Meeting. San Francisco, CA.

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Lieb-Lappen, R., Obbard, R. W. 2013. Inside a Sea Ice Core: Where is the Bromide? Math Climate Research Network, Annual Meeting. Chapel Hill, NC.

Nghiem, S. V., Shepson, P. B., Simpson, W., Perovich, D. K., Sturm, M., Douglas, T., Rigor, I. G., Clemente-Colón, P., Burrows, J. P., Richter, A., Steffen, A., Staebler, R., Obrist, D., Moore, C., Bottenheim, J., Platt, U., Pöhler, D., General, S., Zielcke, J., Fuentes, J. D., Hall, D. K., Kaleschke, L., Woods, J., Hager, C., Smith, J., Sweet, C. R., Pratt, K., Custard, K., Peterson, P., Walsh, S., Gleason, E., Sait, E., Webster, M., **Lieb-Lappen, R.**, Linder, C., Nuemann, G. 2013. Science Progress from the Bromine, Ozone, and Mercury Experiment (BROMEX). Davos Atmosphere and Cryosphere Assembly 2013. July 2013. Davos, Switzerland.

Lieb-Lappen, R., Obbard, R. W. 2012. Microstructural Considerations of Transporting Sea Ice Samples from Polar Regions. American Geophysical Union, Fall Meeting. San Francisco, CA.

Webster, M., Rigor, I., Nghiem, S. V., Sturm, M., Kurtz, N., Farrell, S., Gleason, E., Lieb-Lappen, R., Sait, E. 2012. Springtime Snow Conditions near Barrow, Alaska. Graduate Climate Conference. Pack Forest, WA.

Nghiem, S. V. et al. 2012. Study of Impacts of Arctic Sea Ice Reduction on Atmospheric Chemical Processes – The BROMEX Field Campaign. American Geophysical Union, Fall Meeting. San Francisco, CA.

Webster, M., Rigor, I., Nghiem, S. V., Sturm, M., Kurtz, N., Farrell, S., Gleason, E., Lieb-Lappen, R., Sait, E. 2012. Snow Conditions Near Barrow in Spring 2012. American Geophysical Union, Fall Meeting. San Francisco, CA.

Danforth, C., Lieb-Lappen, R., Allgaier, N., Harris, K. 2011. Dynamical Systems Approaches to Climate Prediction. AMS Eastern Sectional Meeting, Spring. Worcester, MA.

Lieb-Lappen, R. M., Costanza-Robinson, M. S. 2007. The Influence of Surface Roughness on Air-Water Interfacial Areas in Porous Media. Vermont Genetics Network Research Symposium, Burlington, VT.

Costanza-Robinson, M. S., Harrold, K. H., Lieb-Lappen, R. M., Estabrook, B. D. 2007. Measurement of Air-Water Interfacial Areas in Unsaturated Sandy Porous Media Using Synchrotron X-ray Microtomography. Vermont EPSCoR Symposium. Burlington, VT.

Costanza-Robinson, M., Harrold, K., Brussea, M.L., Lieb-Lappen, R. 2006. Measurement of Air-Water Interfacial Areas in Unsaturated Water-Wet Sandy Porous Media Using Synchrotron X-ray Microtomography. American Geophysical Union, Fall Meeting. San Francisco, CA.

Costanza-Robinson, M. S., Harrold, K. H., Brusseau, M. L., Lieb-Lappen, R. M. 2006. Measurement of Air-Water Interfacial Areas in Unsaturated Water-Wet Sandy Porous Media Using Synchrotron X-ray Microtomography. American Geophysical Union, Fall Meeting. San Francisco, CA.

PRESENTATIONS & COMMUNITY OUTREACH

“Climate, Math, Ice Cores, and You: Hands-On Data from Planet Earth.” National Math Festival. Washington, D.C. 2017

* *Joint with M. Zeeman, M. Brennan, S. Cowall, E. Cutler, D. Dilla, H. Engler, W. Harden, K. Hill, H. Kaper, I. Klasky, Z. Mazumdar, K. Meyer, S. Negaard, V. Padron, R. Rossi-Goldthorpe, G. Simonson, M. Serman*

“We Lost Our Sea Ice, Now What?” Middlebury College Rohatyn Center for Global Affairs, Middlebury VT. 2017

“From Antarctica to the Arctic: A Story of Snow, Sea Ice, and the Frigid Cold.” Harbour's Edge Senior Living Community, Delray Beach, FL. 2016.

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“The Microstructure of Sea Ice and its Influences on the Polar Transport of Salts.” Applied Physics Laboratory, University of Washington, Seattle, WA. 2016.

“From Barrow, With Ice: The Story of the ICE-MITT.” Ice and Climate Seminar. Dartmouth College, Hanover, NH. 2015.

“From Antarctica to the Arctic: A Story of Snow, Sea Ice, and the Frigid Cold.” Center for Student Coastal Research, Cohasset, MA. 2015.

“ICE-MITT: Engineering in the Arctic.” Boggs Education Center, Detroit, MI. 2015.

**Joint with E. J. Golden and R. W. Obbard*

“ICE-MITT: Engineering in the Arctic.” Libertyville High School, Chicago, IL. 2015.

**Joint with E. J. Golden and R. W. Obbard*

“ICE-MITT: Engineering in the Arctic.” Jones College Prep High School, Chicago, IL. 2015.

**Joint with E. J. Golden and R. W. Obbard*

“ICE-MITT: Engineering in the Arctic.” Robert Lindblom Math & Science Academy, Chicago, IL. 2015.

**Joint with E. J. Golden and R. W. Obbard*

“ICE-MITT: Engineering in the Arctic.” Monona Grove High School, Monona, WI. 2015.

**Joint with E. J. Golden and R. W. Obbard*

“ICE-MITT: Ice Core Extraction while Maintaining In-Situ Temperature Transitions.” Tellus World of Science, Edmonton, Alberta, Canada. 2015.

**Joint with E. J. Golden and R. W. Obbard*

“ICE-MITT: Ice Core Extraction while Maintaining In-Situ Temperature Transitions.” Geophysical Institute, University of Alaska, Fairbanks, AK. 2015.

**Joint with E. J. Golden and R. W. Obbard*

“The ICE-MITT Team.” *The Radio Hotline with Dennis Price*. March 31, 2015.

**Joint with E. J. Golden*

“Ice and Climate Change.” *The Radio Hotline with Dennis Price*. April 29, 2014.

“Polar Detectives, Apply Here.” USA Science & Engineering Festival. Washington, D.C. 2014

** Joint with A. Adolph, M. Albert, B. Kopec, L. Morris, E. Osterberg, K. Schild, A. Whelsky, G. Wong*

“Polar Detectives, Apply Here.” Montshire Science Museum. Norwich, VT. 2014

** Joint with A. Adolph, B. Kopec, K. Schild, A. Whelsky, G. Wong*

“Bromide: It's What's Blowing in the Wind.” Ice and Climate Seminar. Dartmouth College, Hanover, NH. 2014.

“Salty Snow and Radical Reactions: The Activation of Bromide in the Sea Ice Zone.” Department of Mathematics, University of Vermont, Burlington, VT. 2013.

“Bromide in Snow in the Sea Ice Zone.” Research in Progress. Thayer School of Engineering, Dartmouth College, Hanover, NH. 2013.

“Bromide in Snow in the Sea Ice Zone.” McMurdo Station, McMurdo, Antarctica. 2012.

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“Radical Reactions and Salty Snow: The Activation of Bromide in the Sea Ice Zone.” Department of Geography, Otago University, Dunedin, New Zealand. 2012.

“Radical Reactions and Salty Snow.” Ice and Climate Seminar. Dartmouth College, Hanover, NH. 2012.

“Bromine, Ozone, Mercury Experiment.” Department of Earth Sciences, Dartmouth College, Hanover, NH. 2012.

“Life in the Cold.” Cohasset High School, Cohasset, MA. 2012.

“Bromine, Ozone, Mercury Experiment (BROMEX).” Barrow Schoolyard Science Series, Barrow, AK. 2012.

*Joint with S. V. Nghiem, P. Shepson, E. Gleason, A. Steffan, I. Rigor.

COURSES TAUGHT

VERMONT TECHNICAL COLLEGE

PHYS 3121 Modern Physics – Summer 2018
PHYS 1042 Physics II – Spring 2017, Spring 2018
PHYS 1041 Physics I – Fall 2017
BIO 1020 Environmental Biology – Fall 2017

MIDDLEBURY COLLEGE

ENVS 1110 Ice Cores: By Land and By Sea – Winter 2017

CHAMPLAIN COLLEGE

MATH 350 Numerical Methods – Fall 2016

COLORADO COMMUNITY COLLEGE ONLINE

PHYS 211 Physics I, Calculus-Based – Spring 2011

UNIVERSITY OF VERMONT

MATH 019 Fundamentals of Calculus I – Fall 2009, Spring 2010
MATH 010 Pre-Calculus – Summer 2009, Summer 2010
MATH 009 College Algebra – Fall 2008, Spring 2009

MENTORING EXPERIENCE

‘18 Two summer research assistants analyzing the microstructure of wood pellets
‘13 – ‘16 Mentor 5 freshmen women through Dartmouth's Women in Science Project (WISP)
‘13 – ‘16 Mentor 4 undergraduate students with collaborative research (separate from WISP above)

HONORS

‘07 Phi Beta Kappa Society
‘07 Departmental High Honors for senior thesis
‘03-‘07 Middlebury College Scholar or Dean’s list
‘03-‘07 Henry David Thoreau Scholarship
‘06 Truman Scholarship foundation finalist
‘05 Franklin G. Williams and Sara H. Williams Award: *For the sophomore who displays deep human qualities of natural kindness, perceptivity of the needs of others, and an abiding sense of personal responsibility.*
‘05 John M. McCardell, Jr. Public Service Award
‘05 AmeriCorps Education Award Only Program
‘05 Madeleine M. Kunin Public Service Award Nominee
‘04 Middlebury College Public Service Leadership Award

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'04 Middlebury College Outstanding Emerging Leader

PROFESSIONAL SERVICE

- '13 – '16 Group leader of Cryosphere focus group for Math Climate Research Network (MCRN)
Jan. '16 Session convener at the Joint Mathematics Meeting in Seattle, Washington: *AMS Special Session on Differential Equations, Probability, and Sea Ice*
'13 – '17 Journal Referee for *Geosciences*, *The Cryosphere*, *Chaos*, and *Journal of Hydrology*

COMMUNITY INVOLVEMENT

- '18 – Present Middlesex Conservation Commission
'14 – '17 President Norwich Meadows Condominium Association
'11 – '13 Committee member of American Cancer Society Relay For Life at Dartmouth/Lebanon/Hanover
'11 – '13 Adult leader for Appalachia Service Project
Winter '11 Ski instructor for Vermont Adaptive Ski & Sports
Winter '11 Habitat for Humanity Burlington, VT
'07 – '11 Instructor for Bridge for Beginners & Intermediates workshops at Middlebury College
Summer '10 GPS volunteer for Itgel Foundation, Mongolia
Summer '10 Volunteer for New Choice at an orphanage near Ulaanbaatar, Mongolia
'09 Chair and founder of Hope on the Slopes fundraiser for the American Cancer Society
Summer '09 Habitat for Humanity New Orleans, LA
'07 National American Cancer Society Relay For Life guidebook workgroup
'04 – '07 New England Division Task Force for American Cancer Society Relay For Life
'03 – '07 Committee member of American Cancer Society Relay For Life at Middlebury College
'03 – '05 Chair and founder of the American Cancer Society Relay For Life at Middlebury College
'05 Middlebury Hillel Alternative Spring Break Sustainable Development Trip to El Salvador
'05 Coach for Bridport VT Middle School Basketball Team
'03 – '04 Dialogues for Peace founder and treasurer

EMPLOYMENT

Employer	Job Title	Dates
US Army Corp of Engineers	Post-Doctoral Fellowship	Spring 2016 – present
Self-employed	Math and Chemistry Tutor	2014 – 2016
Thayer School of Engineering	Graduate Research Assistant	Fall 2011- Winter 2016
Self-employed	Bridge Instructor	2012 - 2013
Dartmouth Skiway	Ski Instructor	Winter 2012
University of Vermont	Graduate Teaching Assistant	Fall 2008- Spring 2010
Bolton Valley	Ski Instructor	Winter 2008 & 2009
Outdoor Gear Exchange	Sales Associate	Summer 2008
American Cancer Society	Website Development and Event Assistant	2008
Olssen's Vineyard (New Zealand)	Seasonal Laborer	Fall 2007
American Cancer Society	Intern – Assistant Researcher	Summer 2007
Dr. Molly Costanza-Robinson	Environmental Chemistry Lab Researcher	Summer 2006
Ecosphere	Intern – Environmental Consulting	Summer 2005
Crossroads for Kids	Camp Counselor	Summer 2004
Board of Health	Intern to Center for Student Coastal Research	2001-2003

PROGRAMMING SKILLS

Matlab, Latex, Geographic Information Systems (GIS), some HTML, Linux/Unix & Windows OS