

Postdoctoral Researcher in Palaeolimnology  
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Birthdate: 6. 7. 1984  
Nationality: USA

**EDUCATION**

- Dec. 2014 PhD in Oceanography, University of Washington, Seattle, WA  
Dissertation – *Tropical paleoclimate reconstructions from stable isotopes of mangrove lipid biomarkers*  
Committee members: Julian Sachs (chair), Paul Quay, Anitra Ingalls, Charles Nittrouer, Elizabeth van Volkenburgh
- June 2011 MS in Oceanography, University of Washington, Seattle, WA
- May 2008 MS in Education, University of Pennsylvania, Philadelphia, PA
- May 2006 BA in Geological Sciences, Brown University, Providence, RI

**PROFESSIONAL APPOINTMENTS**

- 2017 - Present Postdoctoral Researcher, ETH-Zurich Department of Earth Sciences, Zurich, Switzerland. Research focus: Molecular reconstructions of early anthropogenic impacts and past hydroclimate changes in Remote Oceania. Supervisor: Nathalie Dubois
- 2015-2017 NSF-EAR Postdoctoral Fellow, Eawag Department of Surface Waters – Research and Management, Kastanienbaum, Switzerland. Research focus: Hydrogen isotope composition of algal lipid biomarkers. Scientific Mentors: Carsten Schubert and Nathalie Dubois

**FUNDING AND AWARDS**

- 2018 ETH-Zurich Career Seed Grant (CHF 30,000)
- 2015 – 2017 US National Science Foundation Earth Sciences Postdoctoral Fellowship (\$184,000)
- 2016 Swiss Quaternary Society Early Career Travel Grant (CHF 500)
- 2015 European Association of Geochemistry Early Career Science Ambassador (€1,256)
- 2014 LacCore and Continental Scientific Drilling Coordination Office Visiting Graduate Student Travel Grant Program (\$1000)
- 2014 University of Washington Graduate School Fund for Excellence and Innovation Student Travel Award (\$300)
- 2014 University of Washington College of the Environment Student Travel Fund (\$300)
- 2010 - 2013 National Science Foundation Graduate Research Fellowship (\$135,000)
- 2009 - 2012 Achievement Rewards for College Scientists (ARCS) Foundation, Graduate Fellowship (\$17,500)
- 2006 Inducted into *Phi Beta Kappa* Honor Society, Alpha Chapter of Rhode Island
- 2006 Inducted into *Sigma Xi* Honor Society
- 2006 Geological Sciences departmental honors for excellence in undergraduate research, Brown University
- 2002 National Merit Scholarship (\$2,500)

## PEER REVIEWED PUBLICATIONS

- 2018 **Ladd S.N.**, Nelson, D.B., Schubert, C.J., and Dubois, N. "Lipid compound classes display diverging hydrogen isotope responses in lakes along a nutrient gradient." *Geochimica et Cosmochimica Acta* 237, 103-119.
- 2018 Nelson, D., **Ladd S.N.**, Schubert, C.J., and Kahmen, A. "Rapid transport and large-scale deposition of recently synthesized plant biomarkers through aerosol processes." *Geochimica et Cosmochimica Acta* 222, 599-617.
- 2017 **Ladd, S.N.**, Dubois, N., and Schubert, C.J. "Interplay of community dynamics, temperature, and productivity on the hydrogen isotope signatures of lipid biomarkers." *Biogeosciences* 14, 3979-3994.
- 2017 He, D., **Ladd, S.N.**, Sachs, J.P., and Jaffé, R. "Inverse relationships between salinity and  $^2\text{H}/^1\text{H}$  fractionation in leaf wax *n*-alkanes from Florida mangroves." *Organic Geochemistry* 110, 1-12.
- 2017 **Ladd, S.N.**, and Sachs, J.P. " $^2\text{H}/^1\text{H}$  fractionation in lipids of the mangrove *Bruguiera gymnorhiza* increases with salinity in marine lakes of Palau." *Geochimica et Cosmochimica Acta* 204, 300-312.
- 2015 **Ladd, S.N.**, and Sachs, J.P. "Influence of salinity on hydrogen isotope fractionation in *Rhizophora* mangroves from Micronesia." *Geochimica et Cosmochimica Acta* 168, 206-221.
- 2015 **Ladd, S.N.**, and Sachs, J.P. "Hydrogen isotope response to changing salinity and rainfall in Australian mangroves." *Plant, Cell & Environment* 38, 2674-2687.
- 2014 Myrhvold, C.L., Janny, F., Nelson, D., **Ladd S.N.**, Atwood, A., and Sachs, J.P. "Holocene Closure of Lib Pond, Marshall Islands." *PLoS One* 9(3): e90939.
- 2013 **Ladd, S.N.**, and Sachs, J.P. "Positive correlation between salinity and *n*-alkane  $\delta^{13}\text{C}$  values in the mangrove *Avicennia marina*." *Organic Geochemistry* 64: 1-8.
- 2012 **Ladd, S.N.**, and Sachs, J.P. "Inverse relationship between salinity and *n*-alkane  $\delta\text{D}$  values in the mangrove *Avicennia marina*." *Organic Geochemistry* 48: 25-36.
- 2011 Dvořák, M., Michl, M., Almonasy, N., Nepraš, M., **Ladd, N.** and Fidler, V. "Fluorescence Anisotropy of Branched Molecules Containing 1-Aminopyrene Chromophores." *Journal of Fluorescence* 21: 971-974.
- 2010 Sachs, J.P. and **Ladd, S.N.** "Climate and oceanography of the Galapagos in the 21<sup>st</sup> century: expected changes and research needs." *Galapagos Research* 67: 50-54.

## PUBLICATIONS UNDER REVIEW OR IN REVISION

*(Manuscript available upon request)*

- Guillemot, T., **Ladd, S.N.**, Nelson, D.B., Bechtel, A., Robert, S., and Schubert, C.J. "Lake Van long-chain alkenones: characterization, quantification, and  $\delta^2\text{H}$  measurements on lacustrine sediments from MIS 7 to 6. In review at *Organic Geochemistry*.
- Ishikawa A., Kabeya N., Ikeya K., Kakioka R., Cech J., Osada N., Leal M., Kume M., Toyoda A., Tezuka A., Nagano A., Yamasaki Y., Suzuki Y., Kokita T., Takahashi H., Lucek K., Marques D., Takehana Y., Naruse K., Mori S., Monroig O., **Ladd N.**, Schubert C., Matthews B., Peichel C., Seehausen O., Yoshizaki G., Kitano J. (submitted to *Science*) "A key role for a fatty acid desaturase Fads2 in stickleback freshwater colonization."

## TEACHING EXPERIENCE

- 2016-2017 Lecturer, Isotopic and Organic Tracers in Biogeochemistry (Masters' Level), ETH Zurich
- 2016 Lead Instructor, Isotopic and Organic Tracers in Biogeochemistry Practical Course (Master's level), ETH Zurich
- 2015-2017 Assistant Field Instructor, Limnogeology (Master's level) and Environmental Chemistry (introductory Bachelor's level), ETH Zurich

- 2015, 2017 Assistant Laboratory Instructor, Isotopes and Organic Tracers Practical Course (Masters' level), ETH Zurich
- 2014 Teaching Assistant, Chemical Oceanography (upper Bachelor's level), University of Washington
- 2011, 2010 Co-instructor, Conservation, Climate and Culture on Kosrae, Micronesia; University of Washington undergraduate summer study abroad program
- 2006-2008 High School Chemistry, Physics, and Physical Science Teacher, W.B. Saul and Lankenau High Schools, School District of Philadelphia

#### **MENTORING AND SUPERVISION**

- 2017-2018 Christiane Krentscher, ETHZ MS student, direct supervisor of Master's research project: Lipid distributions in leaf waxes of indigenous and agricultural plants of Vanuatu.
- 2016 Anton Hertler, Rottenburg University of Applied Forest Sciences undergraduate. Influence of nutrient availability on fatty acid distributions in algae.
- 2016 Julian Stauffer, University of Zurich Biology undergraduate. Algal lipid production rates from <sup>13</sup>C-labeled incubations.
- 2015-2016 Kathrin Bross, University of Tübingen Env. Science MS student, direct supervisor of Master's research project: Influence of 20<sup>th</sup> Century Eutrophication on Algal Lipid Biomarkers in Lakes Baldegg and Lucerne.
- 2013-2014 Ariel Townsend, University of Washington Oceanography undergraduate. Preparation of mangrove leaf lipids for isotopic analysis.
- 2013-2014 Johnny Huynh, University of Washington Oceanography and Chemistry undergraduate. Purification of mangrove lipid biomarkers from swamp sediments for isotopic analysis.
- 2012-2013 June Landenburger, University of Washington Biology undergraduate. Growing mangrove seedlings under controlled greenhouse conditions.
- 2011-2012 Thien-Y Li, University of Washington Biology undergraduate. Growing mangrove seedlings under controlled greenhouse conditions.
- 2011 Jake Zaragoza, Gonzaga University Chemistry undergraduate and University of Washington Joint Institute for Study of the Oceans and Atmosphere Summer Intern. HPLC purification of taraxerol.
- 2010-2012 Tory Johnson, University of Washington Environmental Science undergraduate. Mangrove cultivation, mangrove lipid biomarker purification from leaves and sediment for isotopic analysis.

#### **SELECTED TALKS**

- 2018 **Ladd, S.N.**, Matthews, B., Nelson, D.B., Dubois, N., and Schubert, C.J. A Pond-Scale Experimental Test of How Community Composition Affects Lipid Hydrogen Isotopes. Goldschmidt Conference, Boston, MA.
- 2017 **Ladd, S.N.**, Maloney, A.E., Nelson, D.B., Sachs, J.P., Dubois, N. "South Pacific Convergence Zone Changes during the Late Holocene Identified from Hydrogen Isotope Ratios of Terrestrial and Aquatic Biomarkers from Freshwater Lake Sediments in Vanuatu." American Geophysical Union Fall Meeting. San Francisco, CA.
- 2017 **Ladd, S.N.**, Dubois, N., Nelson, D.B., Schubert, C.J. "Effect of nutrient availability in freshwater lakes on hydrogen isotope fractionation in algal lipid biosynthesis." International Meeting of Organic Geochemists (IMOG). Florence, Italy.
- 2017 **Ladd, S.N.**, Bross, K., Dubois, N., Schubert, C.J. "Links between nutrient loading, community structure, and net hydrogen isotope fractionation of algal lipid biomarkers." Goldschmidt Conference. Paris, France.
- 2016 *Invited* **Ladd, S.N.**, Dubois, N., Schubert, C. "Hydrogen isotope fractionation in lacustrine algae." Lamont-Doherty Earth Observatory Chemical Oceanography Seminar. Palisades, NY.

- 2016 **Ladd, S.N.**, Dubois, N., Schubert, C. "Seasonal changes in hydrogen isotope fractionation between algal biomarkers and lake surface water correspond to lipid production rates." Swiss Geosciences Meeting. Geneva, Switzerland.
- 2016 **Ladd, S.N.**, Bross, K., Dubois, N., Schubert, C. "Effect of nutrient availability on hydrogen isotope fractionation in algal lipid biomarkers." Gordon Research Seminar in Organic Geochemistry. Holderness, NH.
- 2015 *Invited* **Ladd, S.N.**, Wolfshorndl, M., Sachs, J.P. "Isotopic controls of rainwater and water vapor on mangrove leaf water and lipid biomarkers." American Geophysical Union Fall Meeting. San Francisco, CA.
- 2015 **Ladd, S.N.**, Sachs, J.P. "Salinity dependent H isotope fractionation in *Bruguiera gymnorhiza* mangroves growing in brackish marine lakes of Palau." Plant Waxes Meeting. Ascona, Switzerland.
- 2014 *Invited* **Ladd, S.N.**, Sachs, J.P. "Mangroves, mud, and rain: Reconstructing tropical paleoclimate from hydrogen isotopes of paired mangrove and algal lipid biomarkers." ETHZ Geobiochemistry Lunch Seminar. Swiss Federal Institute of Technology, Zurich, Switzerland.
- 2011 **Ladd, S.N.**, Sachs, J.P. "Salinity and  $\delta D_{\text{water}}$  Determinations from Paired  $\delta D$  &  $\delta^{13}C$  in Mangrove Lipids." American Geophysical Union Fall Meeting. San Francisco, CA.

#### **ANALYTICAL EXPERIENCE**

- Stable isotope analyses of H, C, and O in lipids, organic material, and water using a variety of gas-source and laser-based isotope ratio mass spectrometry systems (GC-IRMS, TCEA-IRMS, CRDS), including instrument maintenance
- High performance liquid chromatography-mass spectrometry (HPLC-MS) for lipid identification and purification, including method development
- Gas chromatography (mass spectrometry and flame ionization detection) analyses of organic matter (GC-MS, GC-FID), including instrument maintenance
- Cryogenic extractions of water from leaves and stems
- Infrared-gas analyzer (IRGA) for stomatal conductance, photosynthesis rates and carbon assimilation in plants
- Greenhouse cultivation of mangroves
- Laboratory cultivation of phytoplankton, including monitoring of growth rate through fluorescence and flow cytometry

#### **FIELD EXPERIENCE**

- Nine field expeditions to tropical Pacific islands and Australia – on five of these I was the primary organizer and responsible for gear and logistics
- Research cruise to Station Aloha
- Lake sediment coring with diverse systems (Geotek piston corer, Aquatic Research universal corer, gravity corer) in the Marshall Islands, Federated States of Micronesia, Palau, Vanuatu, and Switzerland
- Swamp sediment coring with Russian peat corer in the Marshall Islands, Federated States of Micronesia, and Vanuatu
- Sampling of water column suspended particles in lakes (Marshall Islands, Federated States of Micronesia, Nauru, Palau, and Switzerland) and the ocean (Station Aloha)
- Water column sampling (nutrients, DOC, DIC, water isotopes) in lakes and at Station Aloha
- Sediment trap sampling in lakes in Switzerland and at Station Aloha
- Plant sampling in the Marshall Islands, Federated States of Micronesia, Nauru, Palau, Australia, and Vanuatu

### **OTHER PROFESSIONAL EXPERIENCE**

- 2008-2009      Research Assistant, Faculty of Biomedical Engineering, Czech Technical University, Kladno, Czech Republic
- 2008-2009      Physical Science Institute Student Achievement Toolkit Author, Teach for America, Philadelphia PA
- 2008              Science Content Specialist, Teach for America Summer Institute, Philadelphia, PA
- 2003 -2005      Summer Intern, Exploration and Development Division, Kerr McGee Corporation, Denver, CO

### **PEER REVIEWING**

- 2015-  
present          Peer reviewer for *Geochimica et Cosmochimica Acta*, *Quaternary Science Reviews*, *Rapid Communications in Mass Spectrometry*, *Organic Geochemistry*, *Journal of Quaternary Science*, *Oecologia*, *Quaternary Research*, and *Wetlands*
- 2016              Grant Reviewer for NASA Earth and Space Science Fellowship Program

### **PROFESSIONAL MEMBERSHIPS**

- American Geophysical Union (AGU)  
European Association of Geochemistry (EAG)  
Swiss Quaternary Society (CH-Quat)  
European Association of Organic Geochemists (EAOG)

### **LANGUAGES**

- English: Native speaker  
Czech: Fluent (C1)  
German: Intermediate proficiency (B1)  
French: Basic proficiency (A2)