

Moritz S. Schmid, M.Sc., PhD candidate

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Oceanography and Underwater Imaging, Machine Learning, GIS and Climate Change Predictions

Track record of research projects spanning from the Arctic to the Antarctic with the main theme being the utilization of machine learning in various approaches, including automatic species identification and predicting species ranges under climate change. Research examples:

- Arctic: Automated species identification from *in-situ* underwater imagery. Future predictions of Arctic zooplankton distribution.
- Antarctic: Species distribution modeling for several species, including marine mammals and birds, and forecasting their future range using IPCC climate change scenarios in order to identify key Antarctic regions of future change.
- Atlantic: Modeling vertical distribution of plastic particles in the Ocean.
- Methodological: Research on model averaging of machine learning ensemble methods in order to increase predictive accuracy and decrease false positive identification.

Education

Université Laval - CAN

PhD in Oceanography, expected early 2017

Title: The race for lipids: ontogeny of the fine-scale vertical co-distribution of Arctic calanoid copepods and their phytoplankton food as elucidated by an imaging profiler.

University of Göttingen - GER; University of Lincoln, - NZ; University of Alaska Fairbanks - USA

MS in International Nature Conservation, 2012

Title: Model-predicting the effect of freshwater inflow on saltwater layers, migration and life history of zooplankton in the Arctic Ocean: towards scenarios and future trends.

University of Göttingen - GER

BS in Biology, 2010

Selected Publications

Schmid, M.S., Aubry, C., Grigor, J., Fortier, L. (2016, in press) The LOKI underwater imaging system and an automatic identification model for the detection of zooplankton taxa in the Arctic Ocean. *Methods in Oceanography*, <http://dx.doi.org/10.1016/j.mio.2016.03.003>.

Lieske, D.J., Mahoney, M., **Schmid, M.S.** (in review) Ensembles of Ensembles: Combining the Predictions from Multiple Machine Learning Methods. In: Huettmann, F., et al. (eds.) *Machine Learning*. Springer, New York.

Kooi, M., Reisser, J., Slat, B., Ferrari, F., **Schmid, M.S.**, Cunsolo, S., Brambini, R., Noble, K., Sirks, L-A., Linders, T.E.W., Schoeneich-Argent, R., Koelmans, A.A. (in review) In Depth: correcting plastic sea surface measurements for vertical mixing. *Scientific Reports*.

Schmid, M.S., Aubry, C., Grigor, J., Fortier, L. (2015) ZOOMIE v1.0 (Zooplankton Multiple Image Exclusion). <https://dx.doi.org/10.5281/zenodo.17928>.

Huettmann, F., **Schmid, M.S.**, Humphries, G.R.W. (2015) A first overview of open access digital data for the Ross Sea: complexities, ethics, and management opportunities. *Hydrobiologia* 761:97–119, <http://dx.doi.org/10.1007/s10750-015-2520-x>.

Huettmann, F. and **Schmid, M.S.** (2014) Climate change and predictions of pelagic biodiversity components. In: De Broyer C., et al. (eds.) *Biogeographic Atlas of the Southern Ocean*. Scientific Committee on Antarctic Research, Cambridge, pp. 390-396.

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Huettmann, F. and Schmid, M.S. (2014) Climate change in the Arctic. In: Hund, A. (ed.) Antarctica and the Arctic Circle: A Geographic Encyclopedia of the Earth's Polar Regions. Vol I. ABC-Clio, Santa Barbara, pp. 189-193.

Awards

- Fonds Richard-Bernard Award for excellence in doctoral studies, Université Laval, Jun 2016, Canada.
 - Best oral presentation award, Québec-Océan Conference, Nov 2014, Canada.
 - Best poster presentation award, Arctic Frontiers Conference, Jan 2013, Norway.
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Selected Research Fellowships

- Doctoral fellowship from the Takuvik Joint International Laboratory, Université Laval, CAN, 2012 - 2015.
 - Scholarship of Excellence in Scientific Leadership and Sustainable Development, Université Laval, CAN, 2012 - 2014.
 - Otto Bayer Fellowship from the Bayer Foundation for studies at the University of Alaska Fairbanks, USA, 2011-2012.
 - ISAP Fellowship from the German Academic Exchange for studies at Lincoln University, NZ, 2011.
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Invited Oral Presentation

Schmid, M.S., Aubry, C., Grigor, J., Fortier, L. (2014) Zooplankton imaging with the Lightframe On-sight Keyspecies Investigation (LOKI) system. 5ème Rencontre des Technologies Marines, Réseau National Technologies Marines et la Direction Technique de l'INSU, Benodet (France), Nov 2014.

Supervision

Co-supervision of two honors theses (01/2015 - 04/2016).

Service to Profession

Reviewer for 1) Earth System Science Data Discussions and 2) International Journal of Biodiversity and Conservation.

University Service

Student representative of the PhD program in oceanography at Université Laval (10/2014 – present).

Affiliations

The Oceanography Society, Association of Polar Early Career Scientists (APECS)

Computer Science Specializations

1) R Programming, Coursera, taught by Roger Peng et al., Johns Hopkins University 2) Machine learning, Coursera, taught by Andrew NG, Stanford University 3) Introduction to interactive programming in Python (part 1 & 2), Coursera, taught by Joe Warren et al., Rice University

Languages

English:
Mother tongue

German:
Mother tongue

French:
Fluent

Spanish:
Basic knowledge