

CURRICULUM VITAE

Nina Keul

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PERSONAL INFORMATION

Contact: Nina Keul, Harriesstr. 18, 24114 Kiel, Germany
Nationality: German
Date of birth: October 30, 1982

CURRENT POSITION

2014 –present **Postdoc**, Christian Albrechts Universität zu Kiel (Kiel, Germany)
Project title: "Double trouble: Tracing the effect of Ocean Acidification and Ocean Warming in the shells of pteropods and potential proxy implications" within the Cluster of Excellence 'Future Ocean'.

EDUCATION & WORK EXPERIENCE

2013/14 **Postdoc**, Columbia University, Department of Earth and Environmental Sciences Lamont-Doherty Earth Observatory (Palisades, USA)
Biology and Paleo Environment
Research adviser: Prof. Peter deMenocal
Studies on trace elemental incorporation and biomineralization of pteropods

2012 **PhD**, Marine Geosciences, Jacobs University (Bremen, Germany), & Biogeosciences, Alfred-Wegener-Institute (Bremerhaven, Germany),
Research adviser: Prof. Jelle Bijma, "The consequences of Ocean Acidification on benthic foraminifera: calcification and potential proxy applications"

2009 **Diplom**, Biological Oceanography, Christian-Albrechts Universität zu Kiel (Kiel, Germany) & GEOMAR (Kiel, Germany)

2006 **Vordiplom**, Biology, Christian-Albrechts Universität zu Kiel, (Kiel, Germany)

PUBLICATIONS

PEER- REVIEWED

under review Langer G., Nehrke G., **Keul N.**, Littmann S., Kuypers M., Greaves M., Bijma J., 2016, Mg and Sr banding in the symbiont-barren foraminifer *Ammonia aomoriensis* as revealed by NanoSIMS analyses.

2017 **Keul N.**, Peijnenburg K.T.C.A, Andersen, N., Kitidis V., Goetze, E., Schneider, R., Pteropods are excellent recorders of surface temperature and carbonate ion concentration (accepted at Scientific Reports)

2017 Manno C., (et al., inkl. **Keul N.**), Shelled pteropods in peril: Assessing vulnerability in a high CO₂ ocean, *Ear.-Sci. Rev.*, 169: 132-145, doi: 10.1016/j.earscirev.2017.04.005.

2016 **Keul N.**, Langer G., Thoms S., de Nooijer L., Reichart G.-J, Bijma J., Exploring foraminiferal Sr/Ca as a new carbonate system proxy, *Geochim. Cosmochim. Acta*, 202, 374 - 386, doi: 10.1016/j.gca.2016.11.022.

2016 Langer G., Sadekov A., Thoms S., **Keul N.**, Nehrke G., Mewes A., Greaves M., Misra S., Reichart G.-J., de Nooijer L., Bijma J., Elderfield H., 2016, Sr partitioning in the benthic foraminifera *Ammonia aomoriensis* and *Amphistegina lessonii*, *Chemical Geology*, 440, 206 - 312, doi:10.1016/j.chemgeo.2016.07.018.

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- 2013 Nehrke G., **Keul N.**, Langer G., de Nooijer L., Bijma J., Meibom A., A new model for biomineralization and trace-element signatures of foraminifera tests, *Biogeosciences* 10, 6759-6767, doi:10.5194/bg-10-6759-2013.
- 2013 **Keul N.**, Langer G., de Nooijer L., Bijma J., Effect of ocean acidification on the benthic foraminifera *Ammonia* sp. is caused by a decrease in carbonate ion concentration, *Biogeosciences* 10, 6185-6198, doi:10.5194/bg-10-6185-2013.
- 2013 **Keul N.**, Langer G., de Nooijer L., Nehrke G., Reichart G.-J., Bijma J., Incorporation of uranium in benthic foraminiferal calcite reflects seawater carbonate ion concentration, *Geochem. Geophys. Geosyst.*, doi:10.1029/2012GC004330.
- 2012 Glas M., Langer G., **Keul N.**, Calcification acidifies the microenvironment of a benthic foraminifer (*Ammonia* sp.), *Journal Mar. Biol. Ecol.*, 424-425, p53-58.
- 2010 **Keul N.**, Morse J., Wanninkhof R., Gledhill D., Bianchi T., Carbonate Chemistry Dynamics of Surface Waters in the Northern Gulf of Mexico, *Aquatic Geochemistry*, Vol 16, Nr 3, p337-351.

NON-REFEREED

- 2016 Repschläger J., (et al., inkl. **Keul N.**), NASGAF: North Atlantic Subtropical Gyre and Azores Front Geometry, Cruise No. MSM58- September 10 - October 07, 2016 - Reykjavik (Island)- Ponta Delgada (Portugal), *Maria S. Merian Berichte*, 2016.
- 2016 Schneider R., (et al., inkl. **Keul N.**), LISA: Baltic Sea water budget and sediment transport changes since the Littorina Transgression and their effects on the ecosystem, Cruise No. MSM51-1 - February 01 - February 09, 2016 - Warnemünde (Germany) - Kiel (Germany), *Maria S. Merian Berichte*, 2016.
- 2015 Schneider R., (et al., inkl. **Keul N.**), PULSE: Paleoclimate- Understanding Labrador Sea, PULSE, Cruise No. MSM45 - August 02 - August 21, 2015 - Nuuk (Greenland) - Halifax (Canada), *Maria S. Merian Berichte*, 2015.
- 2015 **Keul N.**, Langer G., de Nooijer L., Nehrke G., Reichart G.-J., Bijma J., Schneider R., New Carbonate System Proxies: Foram Culturing and Pteropod Potentials, *Nova Acta Leopoldina* NF 121 408, 305 - 309.
- 2007 Hansen I., **Keul N.**, Sørensen J., Erichsen A., Andersen J., Baltic Sea Oxygen Maps 2000- 2006 Balance Interim Report No. 17.

GRANTS AND FELLOWSHIPS

- 2015 Daimler Benz Stiftung Postdoctoral Scholarship (40 000 EUR)
"Double trouble: Tracing the effect of Ocean Acidification and Ocean Warming in the shells of pteropods and potential proxy implications"
- 2014 Cluster of Excellence-Future Ocean Research Grant (270 000 EUR)
"Double trouble: Tracing the effect of Ocean Acidification and Ocean Warming in the shells of Arctic Pteropods and potential proxy implications"
- 2013 Columbia University Climate Center, Research Grant (10 000 USD)
"Pteropods, the new foraminifera? Establishing an Oxygen isotope- temperature calibration"
- 2013 Columbia University Climate Center, Research Grant (10 000 USD)
"Double trouble: Tracing the effect of Ocean Acidification and Ocean Warming in the shells of Arctic Pteropods"

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- 2011 BioVisionNxt Scholar 2011 (ca. 1 000 EUR)
2009 AXA Research Fund Doctoral Fellowship (120 000 EUR)
"The consequences of Ocean Acidification on benthic foraminifera: calcification and potential proxy applications"

TEACHING AND MENTORING

- 2017 Seagoing Practical and Seminar (5 SWS)
2017 Geological field excursions (3 SWS, co teaching)
2016-present Introduction to Paleooceanography (2 SWS, co-teaching)
2015-present Paleoclimate Research Lecture and Seminar (2 SWS, co-teaching)
2015-present Biomineralization Lecture and Seminar (2 SWS)
2015-present Padi Divemaster (assistant diving instr., regular teaching at nice4you, Scharbeutz)
2011 Teaching assistant for course "Bioarchives"
2005 Teaching assistant for course "Biol. Großpraktikum"
- 2017 supervisor Master Thesis Charlotte Eich
2017 supervisor Bachelor Thesis Maria Paulsen
2017 supervisor Bachelor Thesis Marlene Stark
2016 supervisor Bachelor Thesis Sarina Schmidt
2016 co-supervisor Master Thesis Lia Brunke
2016-present Rebecca Dettbarn, student assistant
2015 co-supervisor Bachelor Thesis Karl Meier
2015-present Matthis Frey, student assistant
2013-2014 Jessica Schenkman, high school student, final year project
2011 Caroline Otten, Marc Bullwinkel and Yvette Bublitz, apprentices

TALKS

INVITED TALKS

- 2016 Naturalis (Leiden, The Netherlands)
"Pteropods, the new foraminifera? Establishing an Oxygen isotope- temperature calibration"
- 2016 TU Dresden (Dresden, Germany)
"Ocean acidification- the evil twin of climate change"
- 2015 Yale University (New Haven, USA)
"Culturing foraminifera- biomineralization insights and new C-system proxies"
- 2015 Daimler und Benz Stiftung (Ladenburg, Germany)
"Ocean Acidification- the other CO₂ problem"
- 2014 Woods Hole Oceanographic Institution (Falmouth, USA)
"Double trouble: tracing Ocean Acidification and Ocean Warming in the shells of pteropods"
- 2014 Christian-Albrechts Universität zu Kiel, Future Ocean Excellence Cluster (Kiel, Germany)
"Double trouble: Tracing the effect of Ocean Acidification and Ocean Warming in the shells of Arctic Pteropods and the potential proxy implications"
- 2013 Christian-Albrechts Universität zu Kiel, Institute of Geosciences (Kiel, Germany)
"Carbonate system proxies- novel insights from culturing"

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- 2012 Utrecht University, Department of Earth Sciences (Utrecht, The Netherlands)
"Impacts of ocean acidification on foraminiferal calcification and (trace) element incorporation"
- 2012 Cambridge University, Department of Earth Sciences (Cambridge, United Kingdom)
"Vesicle dynamics in foraminifera"
- 2011 GEOMAR, Department of Marine Ecology (Kiel, Germany)
"Impacts of ocean acidification on foraminiferal calcification"
- 2010 Interuniversity Institute for Marine Sciences (Eilat, Israel)
"The influences of seawater Mg/Ca on Mg/Ca of foraminiferal calcite as a function of temperature"

DEPARTMENTAL TALKS

- 2014 Lamont-Doherty Earth Observatory at Columbia University (Palisades, USA)
"Double trouble: tracing Ocean Acidification and Ocean Warming in the shells of pteropods "
- 2012 Alfred-Wegener-Institute, Biogeosciences (Bremerhaven, Germany)
"Impacts of ocean acidification on foraminiferal calcification and (trace) element incorporation"
- 2012 Jacobs University, School of Engineering and Sciences (Bremen, Germany)
"U/Ca in benthic foraminifera as a proxy for carbonate ion concentration"
- 2011 Alfred-Wegener-Institute, Biogeosciences (Bremerhaven, Germany)
"Vesicle dynamics in foraminifera"
- 2010 Alfred-Wegener-Institute, Biogeosciences (Bremerhaven, Germany)
"Sr/Ca incorporation in benthic foraminifera"
- 2009 Alfred-Wegener-Institute, Biogeosciences (Bremerhaven, Germany)
"Aragonite saturation state in the Greater Caribbean Region"

CONFERENCE PARTICIPATION

- 2017 Goldschmidt 2017, August 13 – 18 2017, *"NEW CARBONATE SYSTEM PROXIES: Sr/Ca and U/Ca in Foraminifera"* (Oral Presentation)
- 2017 European Geosciences Union General Assembly 2017 (EGU 2017), April 23 – 28 2017, *"Exploring foraminiferal Sr/Ca as a new carbonate system proxy"* (Poster Presentation)
- 2016 12th International Conference on Paleoceanography (ICP12), August 29 – 31 2016, *"Exploring foraminiferal Sr/Ca as a new carbonate system proxy"* (Poster Presentation)
- 2016 ICES/ PICES 6th Zooplankton Production Symposium, May 9 – 13 2016, *"Pteropod abundance in correlation to sea ice- finally some good news for Southern Ocean pteropods? Results from a 20-year sediment trap study"* (Oral Presentation)
- 2016 Ocean Sciences Meeting, February 21 – 26 2016, *"The smallest gliders in the ocean- temperature recordings from pteropods using SIMS"* (Oral Presentation)

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- 2015 Sustainable Ocean Development Symposium, September 28 – 30 2015, “Assessing marine biodiversity – pteropods as indicator species for climate change” (Poster Presentation)
- 2015 XIX Inqua Congress, July 26 – Aug 2 2015, “Trace elements in pteropods: Proxy development and paleoceanographic implications” (Oral and Poster Presentation)
- 2015 Response of Pteropods to ocean acidification and climate change, Workshop, June 1 – 3 2015, “Double trouble: Tracing Ocean Acidification and Ocean Warming in the shells of pteropods” (Oral Presentation)
- 2015 Planktic gastropods: biology, ecology and paleontology, Annual Meeting Malacological Society London, April 1 2015, “Double trouble: Tracing Ocean Acidification and Ocean Warming in the shells of pteropods” (Oral Presentation)
- 2015 Deglacial Changes in Ocean Dynamics and Atmospheric CO₂, Leopoldina Symposium, March 18- 21 2015, “New Carbonate System Proxies: Foram Culturing and Pteropod Potentials” (Poster Presentation)
- 2014 Ocean Sciences Meeting, February 23- 28 2014, “Double Trouble: Tracing the effect of Ocean Acidification and Ocean Warming in the shells of Arctic pteropods” (Oral Presentation)
- 2013 American Geophysical Union Fall Meeting, December 9- 13 2013, “Double Trouble: Tracing the effect of Ocean Acidification and Ocean Warming in the shells of Arctic pteropods” (Poster Presentation)
- 2012 Japan Geoscience Union Meeting, May 20- 25 2012, “Impacts of ocean acidification on foraminiferal calcification” (Oral Presentation)
- 2011 American Geophysical Union Fall Meeting, December 5- 9 2011, “Impacts of ocean acidification on foraminiferal calcification” (Poster Presentation)
- 2011 Bioacid Meeting, September 26- 30 2011, “Seawater endocytosis not related to chamber formation in foraminifera” (Oral Presentation)
- 2010 Bioacid Meeting, September 27- 30 2010, “Vesicle dynamics in foraminifera” (Poster Presentation)
- 2010 FORAMS 2010- International Symposium on Foraminifera, September 5- 10 2010, “Vesicle dynamics in foraminifera” (Oral Presentation)
- 2010 European Geosciences Union General Assembly, May 2- 7 2010, “Impacts of ocean acidification on calcification in the benthic foraminifera *Ammonia tepida*” (Poster Presentation)

FIELD WORK AND CRUISES

- 2016 MSM 58 (September 10- October 7; Reykjavik, Iceland - Pt. Delgada, Portugal): Sampling of planktonic foraminifera for biomineralization studies
- 2016 MSM 51 (January 31- February 9; Warnemünde, Germany - Kiel, Germany): Sampling of benthic foraminifera for biomineralization studies
- 2015 MSM 45 (August 2- 21; Nuuk, Greenland - Halifax, Canada): Biomineralization and dissolution studies on pteropods
- 2009 –2012 Monthly sampling of foraminifera in intertidal flats in Wadden Sea (Dorum, Germany)
- 2010 8 weeks Field Campaign: Culturing of planktonic foraminifera (Inter-University Institute for Marine Sciences (Eilat, Israel)
- 2008 Cruise EotS, Caribbean Sea (December 1- 12, New York, USA - New York, USA)
- 2008 Cruise MCH, Gulf of Mexico (July 17- 20, Cocodrie, USA - Cocodrie, USA)

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ACADEMIC SERVICES & SOCIETY MEMBERSHIPS

REVIEWER

Biogeosciences Discussions
Geochemistry, Geophysics, Geosystems
Geochimica Cosmochimica Acta
Marine Biology
Marine Micropaleontology
NSF (National Science Foundation)
Proceedings of the Royal Society B
Quaternary Science Reviews

SOCIETY MEMBERSHIPS

American Geophysical Union
European Geosciences Union

ACADEMIC SERVICE & PUBLIC OUTREACH

Member in the Senate Committee for Ethics (2017-2019)
Member in the Senate Committee for Research and Knowledge Transfer (2015-2017)
Co-organizer of ECC 2015 (Early Career Conference, Kiel, October 5- 7)
Participation in press conference at the fall meeting of the American Geophysical Union 2011 ("Ocean Acidification 1: Increasing ocean acidification, declining reef health")
PhD representative at Alfred-Wegener-Institute (2010/ 2011)
Tutor for international students at Kiel University (2003- 2005)
Implementation of online learning webpage for school children on Ocean Acidification (online laboratory experiments://i2i.stanford.edu/AcidOcean/AcidOcean_DE.htm)

PROFESSIONAL SKILLS

ANALYTICAL TECHNIQUES

(LA)-ICP-MS ((laser ablation) inductively coupled mass spectrometry)
ICP-OES (inductively coupled optical emission spectrometry)
TIMS (thermal ionization mass spectrometry)
SEM (scanning electron microscopy)
CLSM (confocal laser scanning microscopy)

LANGUAGES

German (native)
English (fluent)
French (conversational)

COMPUTER SKILLS

R
ODV
Adobe Illustrator, InDesign, Photoshop
MS Office
Latex

PADI DIVEMASTER with over 150 logged dives and regular working experiences at Nicedive4you, Scharbeutz, Germany since 05/2014