

KAI ZIERVOGEL

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RESEARCH INTERESTS

- Biogeochemical cycling of organic matter in the ocean
- Heterotrophic microbial metabolism associated with marine snow
- Bacterial activities in oil-contaminated seawater

EDUCATION

- Ph.D. in Marine Biology; Baltic Sea Research Institute Warnemünde at the University of Rostock, Germany, 01/2004
- Diploma (equivalent to Masters) in Marine Biology; University of Rostock, Germany, 06/2000
- University-entrance Diploma from German secondary school; Nordsee-Gymnasium-Büsum, Germany, 06/1991

PROFESSIONAL EXPERIENCE

- Research Assistant Professor, Ocean Process Analysis Laboratory (OPAL), Institute for the Study of Earth, Oceans, and Space (EOS), University of New Hampshire, 07/2015-present
- Lecturer, Department of Marine Sciences, University of North Carolina- Chapel Hill, 01/2015-06/2015
- Research Associate, Department of Marine Sciences, University of North Carolina- Chapel Hill, 06/2011-12/2014
- Postdoctoral Research Associate, Department of Marine Sciences, University of North Carolina-Chapel Hill, 09/2007-05/2011
- Postdoctoral Research Fellow of the German Science Foundation (DFG), Department of Marine Sciences, University of North Carolina-Chapel Hill, 09/2005-08/2007
- Postdoctoral Research Associate, Department of Biological Oceanography, Baltic Sea Research Institute Warnemünde, Germany, 01/2005-04/2005
- Research Assistant (Graduate Student), Department of Biological Oceanography, Baltic Sea Research Institute Warnemünde, Germany, 04/2000-09/2004
- Teaching the general public in natural science as a National Park Ranger in the Schleswig-Holstein Wadden Sea National Park, Germany, 06/1991-08/1992

GRANTS AND AWARDS

RESEARCH GRANTS

- Co-PI - National Science Foundation (Chemical Oceanography). *Aggregate formation under turbulence: small-scale biophysical interactions driving carbon flux in the ocean*. With B. White (lead PI) and A. Marchetti (co-PI), all UNC; 09/2013 – 08/2016
- Co-PI - National Science Foundation (Chemical Oceanography). *Collaborative Research: Planktonic Sources of Chromophoric Dissolved Organic Matter in Seawater*. With C. Osburn (lead PI, NC State); 05/2015 – 04/2018.
- Co-PI - Gulf of Mexico Research Initiative/BP. *Ecosystem impacts of oil and gas inputs into the Gulf 2 (ECOGIG 2)*. S. Joye (lead PI, UGA); 01/2015 – 12/2018.

CONFERENCE TRAVEL GRANTS

- ASLO 2013 Aquatic Sciences Meeting; New Orleans, LA, 02/2013
- The 4th International Conference-Enzymes in the Environment; Bad Nauheim, Germany, 07/2011
- ASLO 2009 Aquatic Sciences Meeting; Nice, France, 01/2009
- INTERCOH 2003 – 7th International Conference on Nearshore and Estuarine Cohesive Sediment Transport Processes, Virginia Institute of Marine Science College of William & Mary; Gloucester Point, VA, 10/2003

OTHER AWARDS

- UNOLS Chief Scientist Training Workshop; University of Rhode Island, 10/2013
- Postdoctoral Scholars Award for Research Excellence; UNC-Chapel Hill, 08/2009
- City of Rostock Science Award for Diploma thesis; Rostock, Germany, 01/2000
- ERASMUS Study-Abroad Fellowship; Reading University, England, 09/1996-04/1997

PEER-REVIEWED PUBLICATIONS

30. **Ziervogel K.**, Dike C., Asper V., Montoya J., Battles J., D'souza N., Passow U., Diercks A., Esch M., Joye S., Dewald C., Arnosti C. (2015) Enhanced particle fluxes and heterotrophic bacterial activities in Gulf of Mexico bottom waters following storm-induced sediment resuspension. *Deep-Sea Research II*: 10.1016/j.dsr2.2015.06.017i
29. Bullock A., **Ziervogel K.**, Ghobrial S., Jalowska A., Arnosti C. (2015) Microbial activity and organic matter degradation at three sites in the coastal North Atlantic: Variations in DOC turnover times and potential for export off the shelf. *Marine Chemistry*: 10.1016/j.marchem.2015.06.023
28. Prairie J. C., **Ziervogel K.**, Camassa R., McLaughlin R.M., White B.L., Arnosti C. (2015) Delayed settling of marine snow: Effects of density gradient and particle properties and implication for carbon cycle. *Marine Chemistry* 175: 28-38.
27. Arnosti C., **Ziervogel K.**, Yang T., Teske A. (2014) Oil-derived marine aggregates – hot spots of polysaccharide degradation by specialized bacterial communities. *Deep-Sea Research II*: 10.1016/j.dsr2.2014.12.008
26. **Ziervogel K.**, D'souza, N., Sweet, J., Yan, B., Passow, U. (2014) Natural oil slicks fuel surface water microbial activities in the Gulf of Mexico. *Frontiers in Aquatic Microbiology* 5: 10.3389/fmicb.2014.00188
25. **Ziervogel, K.**, Joye, S.B., Arnosti, C. (2014) Microbial enzymatic activity and secondary

- production in sediments affected by the sedimentation event of oily-particulate matter from the Deepwater Horizon oil spill. *Deep-Sea Research II*: 10.1016/j.dsr2.2014.04.003
24. D'Ambrosio L., **Ziervogel K.**, MacGregor B., Teske A., Arnosti C. (2014) Bacterial community composition and extracellular enzymatic function in marine waters. *ISME Journal*: 10.1038/ismej.2014.67
 23. Cardman Z., Arnosti C., Durbin A., **Ziervogel K.**, Cox C., Steen A.D., Teske A. (2014) Composition and enzymatic function of particle-associated and free-living bacteria: a coastal/offshore comparison. *Applied Environmental Microbiology* 80: 3749-3756.
 22. Brym A.J., Paerl H.P., Montgomery M.T., Handsel, L.T., **Ziervogel K.**, Osburn C. (2014) Optical and chemical characterization of base-extracted particulate organic matter in coastal marine environments. *Marine Chemistry* 162: 96-113.
 21. **Ziervogel K.** and Arnosti C. (2013) Enhanced protein and carbohydrate hydrolysis in plume-associated deep waters initially sampled during the early stages of the Deepwater Horizon oil spill. *Deep Sea Research II*: 10.1016/j.dsr2.2013.09.003i
 20. Prairie J. C., **Ziervogel K.**, Arnosti C., Camassa R., Falcon C, Khatri S., McLaughlin R.M., White B.L., Yu S. (2013) Delayed settling of marine snow at sharp density transitions driven by fluid entrainment and diffusion-limited retention. *Marine Ecology Progress Series* 487: 185-200.
 19. **Ziervogel K.**, Leech D., Arnosti C. (2013) Extracellular enzymes in shallow lakes of differing trophic status. *Biogeochemistry*: 10.1007/s10533-013-9874-9.
 18. **Ziervogel K.**, McKay L., Rhodes B., Osburn C.L., Dickson-Brown J., Arnosti C., Teske A. (2012) Microbial activities and dissolved organic matter dynamics in oil-contaminated surface seawater from the Deepwater Horizon oil spill site. *PLoS One* 7(4): e34816: 10.1371/journal.pone.0034816.
 17. Steen A.D, **Ziervogel K.**, Ghobrial S., Arnosti C. (2012) Functional variation among polysaccharide-hydrolyzing microbial communities in the Gulf of Mexico. *Marine Chemistry* 138-139: 13-20.
 16. Passow U., **Ziervogel K.**, Asper V., Diercks A. (2012) Marine snow formation in the aftermath of the Deepwater Horizon oil spill. *Environmental Research Letters* 7: 10.1088/1748-9326/7/3/035301.
 15. Martinez-Garcia M., Brazel D., Swan B.K., Arnosti C., Chain P.S., Reitenga G., Xie N.J., Poulton N.J., Lluesma Gomez M., Masland D.E.D., Thompson B., Bellows W.K., **Ziervogel K.**, Lo C.-C., Ahmed S., Gleasner C., Detter C., Stepanauskas R. (2012) Capturing single cell genomes of active polysaccharide degraders: an unexpected contribution of *Verrucomicrobia*. *PLoS One* 7(4): e35314.
 14. Steen A.D. and **Ziervogel K.** (2012) Comment on the review by German et al "Optimization of hydrolytic and oxidative enzyme methods for ecosystem studies" [Soil Biology & Biochemistry 43: 1387-1397]. *Soil Biology & Biochemistry* 48: 196-197.
 13. Arnosti C., Steen A.D., **Ziervogel K.**, Ghobrial S., Jeffrey W.H. (2011) Latitudinal gradients in degradation of marine dissolved organic carbon. *PLoS One* 6 (12): e28900: 10.1371/journal.pone.0028900
 12. Teske A., Durbin A., **Ziervogel K.**, Cox C., Arnosti C. (2011) Microbial community composition and function in permanently cold seawater and sediments from an Arctic fjord of Svalbard. *Applied and Environmental Microbiology* 77: 208-218.
 11. **Ziervogel K.**, Steen A.D. Arnosti C. (2010) Changes in the spectrum and rates of

- extracellular enzyme activities in seawater following aggregate formation. *Biogeosciences* 7: 1007-1015.
10. Steen A.D., **Ziervogel K.**, Arnosti C. (2010) Comparison of multivariate microbial datasets with the Shannon index: An example using enzyme activity from diverse marine environments. *Organic Geochemistry* 41: 1019-1021.
 9. **Ziervogel K.** and Arnosti C. (2009) Enzyme activities in the Delaware Estuary affected by elevated suspended sediment load. *Estuarine, Coastal and Shelf Science* 84: 253-258.
 8. Arnosti C., **Ziervogel K.**, Ocampo L., Ghobrial S. (2009) Enzyme activities in the water column and in shallow permeable sediments from the northeastern Gulf of Mexico. *Estuarine, Coastal and Shelf Science* 84: 202-208.
 7. **Ziervogel, K.** and Arnosti, C. (2008) Polysaccharide hydrolysis in aggregates and free enzyme activity in aggregate-free seawater from the northeastern Gulf of Mexico. *Environmental Microbiology* 10: 289-299.
 6. Forster S., Turnewitsch R., Powilleit M., Werk S., Peine F., **Ziervogel K.**, Kersten M. (2008) Thorium-234 derived information on particle residence times and sediment deposition in shallow waters of the south-western Baltic Sea. *Journal of Marine Systems* 75: 360-370.
 5. **Ziervogel, K.**, Karlsson, E., Arnosti C. (2007) Surface associations of enzymes and organic matter: Consequences for hydrolytic activity and organic matter remineralization in marine systems. *Marine Chemistry* 104: 241 – 252.
 4. **Ziervogel K.** and Forster S. (2006) Do benthic diatoms influence erosion thresholds of coastal subtidal sediments? *Journal of Sea Research* 55: 43-53.
 3. **Ziervogel K.** and Forster S. (2005) Aggregation and sinking behavior of resuspended fluffy layer material. *Continental Shelf Research* 25: 1853-1863.
 2. **Ziervogel K.** and Bohling B. (2003) Sedimentological parameters and erosion behavior of submarine coastal sediments in the southwestern Baltic Sea. *Geo-Marine Letters* 23: 43-52.
 1. Leipe T., Loeffler A., Emeis K., Jähmlich S., Bahlo R., **Ziervogel K.** (2000) Vertical patterns of suspended matter characteristics along a coastal-basin transect in the western Baltic Sea. *Estuarine, Coastal and Shelf Science* 51: 789 - 804.

INVITED SEMINARS/CONFERENCE PRESENTATIONS

- American Society for Microbiology, New Orleans, LA, 06/2015
- University of New Hampshire, EOS/OPAL, Durham, NH, 08/2014
- Bermuda Institute of Ocean Sciences, St. Georges, Bermuda, 04/2014
- University of California, Santa Barbara, Marine Science Institute 11/2013
- Skidaway Institute of Oceanography, Savannah, GA, 10/2011
- Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, ME, 03/2011
- Woods Hole Oceanographic Institution, Woods Hole, MA, 10/2010
- Limnological Research Centre of EAWAG-Swiss Federal Institute of Aquatic Science and Technology, Kastanienbaum, Switzerland, 04/2008
- Department of Oceanography, Dalhousie University, Halifax, Canada, 08/2001

OCEANOGRAPHIC CRUISES

- 05/2015: Mid-Atlantic Bight, RV *Endeavor* (1 week).

- 10/2013: Mid-Atlantic Bight, RV *Endeavor* (1 week).
- 06/2013: Gulf of Mexico/Louisiana Shelf, RV *Endeavor* (2 weeks).
- 06/2012: Gulf of Mexico/Louisiana Shelf, RV *Endeavor* (2 weeks).
- 09/2012: Gulf of Mexico/Louisiana Shelf, RV *Endeavor* (2 weeks).
- 10/2010: Chesapeake Bay/North Carolina Shelf, RV *Cape Hatteras* (1 week).
- 11/2009: Gulf of California, Guaymas Basin, RV *Atlantis* with a descent in DSV *Alvin* (3 weeks).
- 09/2007: Gulf of Mexico/Louisiana Shelf, RV *Cape Hatteras* (1 week).
- 12/2006: Delaware Estuary, RV *Hugh Sharp* (1 week).
- 1997-2003: Baltic Sea, ten research cruises (up to 10 days each cruise) aboard RV *Professor Albrecht Penck* and RV *Alexander von Humboldt* (now EV *Nautilus*).

TEACHING AND MENTORING EXPERIENCE

LECTURER AT UNC (SPRING 2015)

- *The Marine Environment* for undergraduate non-science majors (MASC 101/GEOL 103)

MENTOR TO UNDERGRADUATE STUDENTS AT UNC

- Carolin Dewald: Microbial enzymatic activities in sinking marine snow (Fall 2012). *Carolin was a visiting student from the University of Greifswald in Germany. Carolin is a co-author of Prairie et al. (2015) and Ziervogel et al. (2015).*
- Kim DeLong, Avery Bullock, Shannon Smith, Johanna Dresser, Audrey Horne: Microbial processing of organic matter in the Tar and Neuse River, NC (2010 – 2012 funded by the Eddie and Jo Allison Smith Family Foundation, NC). *Kim and Avery presented their work at the 2011 International Estuarine Biogeochemistry Symposium, Atlantic Beach, NC.*
- Benjamin Rhodes: Microbial dynamics in the water and sediments at the Deep Water Horizon oil spill site (2010-2011 funded by a NSF Rapid Response grant awarded to A. Teske). *Benjamin is a co-author of Ziervogel et al. (2012).*
- Analise Jenkins: The association of extracellular enzymes with aggregates and the resultant effects for carbon remineralization in marine communities (2009 funded by the Office of Undergraduate Research at UNC, Summer Undergraduate Research Fellowship). *Analise presented her work at the 2010 Ocean Sciences Meeting, Portland, OR.*
- Jacob Moore: Detection of microbial enzymes in complex communities: Development of new fluorescent probes for simultaneous measurement of enzyme activities in seawater and sediments (2009, Chem 395).
- Caitlin Cox: Bacterial clone libraries using PCR to amplify bacterial 16S rDNA in Arctic waters (in collaboration with A. Teske's lab, 2008-2009). *Caitlin is a co-author of Teske et al. (2011).*
- UNC undergraduates onboard the RV *Cape Hatteras* during two 5 days' cruises (chief scientist C. Arnosti, UNC): 2007 - Gulf of Mexico/Louisiana Shelf (*Results published in Steen et al. 2012*) 2010 - Chesapeake Bay/North Carolina Shelf (*Results published in Bullock et al. 2015*). Both cruises were funded by the Duke-UNC Oceanographic Consortium.