

Prof. Dr. Kai-Uwe Hinrichs

EDUCATION

**Institute for Chemistry and Biology of the Marine Environment, University of Oldenburg –
*Diploma, Chemistry***

1994, OLDENBURG, GERMANY

**Institute for Chemistry and Biology of the Marine Environment, University of Oldenburg,
Germany – *Ph.D. (Dr. rer. nat.), Chemistry***

1997, OLDENBURG, GERMANY

APPOINTMENTS

Dept. of Geosciences, University of Bremen, Bremen, Germany – *Full Professor (W3, with tenure)*

2004 – present

Dept. of Geosciences, University of Bremen, Bremen, Germany – *Professor (C3, with tenure)*

2002 – 2004

**Dept. of Geology & Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA, U.S.A.
– *Adjunct Scientist***

2004 – 2010

**Dept. of Geology & Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA, U.S.A.
– *Assistant Scientist, tenure-track***

2000 – 2002

**Dept. of Geology & Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA, U.S.A.
– *Postdoctoral Investigator/Fellow***

1997 – 2000

**Institute for Chemistry and Biology of the Marine Environment, University of Oldenburg –
*Research Assistant***

1994 – 1997

Graduate and Post-Graduate Advisors: Prof. J. Rullkötter, Oldenburg; Prof. J. M. Hayes, Woods Hole
(deceased)

BRIEF RESEARCH STATEMENT

My research group studies the interactions between microbial life and the carbon cycle on a range of spatial, temporal and molecular scales. We are interested in how and which microbes shape element cycles and what the related environmental consequences are. To this end, we study the information encoded in distributions and isotopic compositions of organic molecules in sediments and water. We combine environmental observations with experimental approaches. We are actively developing novel assays for the interrogation of modern and ancient microbial communities and their relationship to environmental conditions; for example, we have introduced mass spectrometry imaging of sedimentary matrices in order to reconstruct marine paleoenvironments at extremely high temporal resolution, various protocols of lipid-based stable and radio-isotope probing to dissect the flow of carbon in natural microbial communities, and expanded the analytical window of informative microbial metabolites accessible in environmental samples. Systems studied include the deep sub-seafloor biosphere, cold seeps and hydrothermal environments, microbial mats, suspended particulate matter in the ocean, sedimentary pore fluids and gases, paleoenvironments, and the microbial lipidome.

PROFESSIONAL ACTIVITIES (SELECTION)

External

Editorships: Science - Board of Reviewing Editors (BoRE, May 2011–present); PeerJ - Academic Editor (2018 - present); Organic Geochemistry, Associate Editor (2006–2015); Geology, Editorial board (2004-2006)

Memberships in Panels and Advisory Boards (examples):

Deep Carbon Observatory (DCO): Deep Life Directorate (2011–present; since Feb 2013 as Co-Chair) & Member of Executive Committee of DCO (since Mar 2013)

Hanse Institute of Advanced Studies, Delmenhorst, Germany: Scientific Advisory Board, Chair 2017-2020; Vice-Chair Oct 2013 – Dec 2016; Member since Oct 2013; Chair: Search Committee for new Director (2017 - 2018)

Geochemical Society, Publication Advisory Committee (July 2012–June 2015)

Integrated Ocean Drilling Program: Science Steering and Evaluation Panel (2007–2010)

Conference chairman, 24th International Meeting on Organic Geochemistry, Bremen, Sept 2009; Gordon Research Conference Deep Carbon Science: 2018 in Smithfield, RI, USA: Vice-Chair; 2020 in Lewiston, ME, USA: Co-Chair

Conference steering committee memberships: 23rd International Meeting on Organic Geochemistry, Torquay 2007; 8th International Symposium of Subsurface Microbiology, Garmisch-Partenkirchen 2011

Session chair: Gordon Research Conference Organic Geochemistry (2006, 2008) and Goldschmidt Conferences (2001, 2007, 2013)

Leadership IODP: Co-Chief Scientist, IODP Exp. 337, Deep Coalbed Biosphere, with DV Chikyu (July–Sept 2012); Lead-proponent, IODP Exp. 370 T-Limit (Sept–Nov 2016, with DV Chikyu)

Major seagoing expeditions: participated in three ODP/IODP Expeditions (Leg 155, Leg 201, Exp. 337) and three international expeditions on major national research vessels (RV Meteor: Gulf of Mexico, 2006; RV Atlantis: Guaymas Basin, 2009; RV Meteor: Mediterranean Sea, 2012)

At University of Bremen and partner institutions

Dean (10/2011–9/2013) Dept. of Geosciences, U Bremen; Vice-Dean (10/2013–3/2015; 6/2010–9/2011)

Research Leadership, Cluster of Excellence & DFG Research Center “The Ocean in the Earth System”: Board of Directors (2004–2018), Principal Investigator and Co-Leader of Research Areas: Seepage of Fluid and Gas (2005–2006); Biogeochemical Processes (2006–2009); Geosphere Biosphere Interactions (2009–2018); Cluster of Excellence “The Ocean Floor – Earth’s Uncharted Interface”: Vice-Speaker and Principal Investigator (2019–2025); Principal Investigator: ERC Advanced Grant DARCLIFE (2010–2015), ERC Advanced Grant ZOOMEULAR (2015–2020).

Chair, Doctoral Graduation Board, University of Bremen, Department of Geosciences, (2004–2010)

Search committees, Member and/or Chair of 10 search committees for professorial chair positions at U Bremen incl. directorship of Leibniz-Center for Marine Tropical Ecology Bremen; accompanied three additional professorial searches as dean; membership in two search committees of the Max-Planck Society for the establishment of MPG Junior Research Groups at U Oldenburg; advising member of search committee for professorial chair in Organic Geochemistry at U Oldenburg

HONORS AND AWARDS

2020	Alfred Treibs Award, Geochemical Society
Since 2019:	Elected Member, Leopoldina - German National Academy of Sciences
2017	C.C. Patterson Award, Geochemical Society
2017	Fellow, Geochemical Society
2015	European Research Council Advanced Grant ZOOMEULAR (2014 competition, 3.0 M€)
2011	Gottfried-Wilhelm Leibniz Prize, Deutsche Forschungsgemeinschaft
2011–2012	ECORD Distinguished Lecturer
2010	European Research Council Advanced Grant DARCLIFE (2009 competition, 2.9 M€)
2000–2002	Fellow, Hanse Institute of Advanced Studies, Delmenhorst, Germany
1997–1999	Research Fellowship, Deutsche Forschungsgemeinschaft

MENTORSHIP

Graduate Advisees (23 PhD theses completed, as primary advisor):

PhD–Previous (defense year): Susanne Alfken (2019), Kevin Becker (2015), Jonas Brünjes (2023), Felix Elling (2015), Tobias Ertefai (2009), Thomas Evans (2017), Shuchai GAN (2018), Matthias Kellermann (2012), Arne Leider (2012), Yu-Shih LIN (2009), Julius Lipp (2008), Xiao-Lei LIU (2011), Pamela Rossel (2009), Frauke Schmidt (2009), Jan Schröder (2015), Florence Schubotz (2009), Julio Sepulveda (2009), Min SONG (2020), Weichao WU (2018), Sitan XIE (2012), Qing-Zeng ZHU (2019), Rong ZHU (2014), Guangchao ZHUANG (2014) PhD–Current (expected defense): Andreas Greve, situated at and financed by MPI Bremen, Oliver Helten (2023, situated at and financed by BGR, Hannover), Bernhard Viehweger (2024), Jannis Viola (2025)

Post-Graduate Advisees (as primary advisor):

Previous: Rishi Adhikari, Marshall Bowles (now Asst. Prof. at Louisiana Universities Marine Consortium); Solveig Bühring (now tenured researcher at FB2/MARUM); Sarah Coffinet (now Marie-Curie Fellow at CNRS, U Rennes, France); Friederike Ebersbach (now postdoc at AWI), Marcus Elvert (now permanent senior scientist, Hinrichs Lab); Helen Fredricks (now member of senior technical staff, WHOI); Shuchai Gan (now scientist, National China Analytical Center);

Verena Heuer (now permanent scientist, Hinrichs Lab); Martin Könneke (now Heisenberg fellow and group leader at MARUM); Julius Lipp (now permanent scientist, Hinrichs Lab); Yu-Shih LIN (now Asst. Prof., tenure-track, National Sun Yat-Sen Univ., Taiwan); Xiaolei LIU (now Asst. Prof. at Univ. Oklahoma); Rainer Lohmann (now Full Prof., U Rhode Island, U.S.A.); Xiaoxia LÜ (now Assoc. Prof., China University of Geosciences, Wuhan); Travis Meador (Principal Investigator, Czech Academy of Sciences, Budejovice, Czech Rep.); Tiffany Napier (now Syracuse U, U.S.A.); Eoghan Reeves (now Assoc. Prof., U Bergen, Norway); Frauke Schmidt (maternity break, Australia); Florence Schubotz (now research scientist at MARUM); Julio Sepulveda (now Asst. Prof. at U Colorado, Boulder); Marcos Yoshinaga (now research scientist at U Sao Paulo); Chun ZHU (now research scientist at Exxon Mobil, Houston) Current: Benjamin Nettersheim, Igor Obreht, Lars Wörmer.

Co-advisor/examiner of international graduate students

Prof. Dr. Rienk Smittenberg (U Utrecht, 2003; external examiner); Dr. Andrea Jaeschke (U Utrecht, 2009; external examiner); Dr. Katherine Segarra (U Georgia, Athens; thesis committee member, co-advisor, defense 2012); Dr. Megumi Shimizu (Duke University; thesis committee member, co-advisor, defense 2017).

TEACHING AND CURRICULA DEVELOPMENT

I teach and co-teach several classes at the undergraduate and graduate level. My group is responsible for teaching organic chemistry to first-year majors in geosciences; I am responsible for the education in organic geochemistry in our bachelors and masters programs. My group organizes laboratory courses in organic geochemistry (BSc level) and biogeochemistry (MSc level). I contribute to lectures in geobiology (MSc level) and methane hydrates (MSc level). I have developed and I co-lead the mandatory research seminar, during which all masters' students in my department develop, and ultimately defend, their thesis proposals. I have been involved at all stages in the development of my department's curricula (BSc Geosciences; MSc Geosciences; MSc Marine Geosciences [taught in English]).

PUBLICATIONS SUMMARY AND 10 KEY PUBLICATIONS (AS LEAD/ SENIOR/ CORRESPONDING AUTHOR)

I have published 238 peer-reviewed publications, 115 of which as first and/or senior and/or corresponding author, and 20 technical reports and commentaries. Web of Science lists 260 items, which were cited 15,517 times and an H-index of 65 (June 26, 2023; <https://www.webofscience.com/wos/author/record/510592,16356460>). The citation count in Google Scholar is 23,099, the h-index 77, and the i-10 index 213 (June 26, 2023; <http://scholar.google.com/citations?user=joJPUYkAAAAJ&hl=en>).

1. Hinrichs, K.-U., Hayes, J.M., Sylva, S.P., Brewer, P.G., and DeLong, E.F. (1999) Methane-consuming archaeobacteria in marine sediments. *Nature*, 398, 802-805.
2. Hinrichs K.-U., Hmelo L.R., and Sylva, S.P. (2003) Molecular fossil record of elevated methane levels in late Pleistocene coastal waters, *Science*, 299, 1214-1217.
3. Lipp, J.S., Morono, Y., Inagaki, F., Hinrichs, K.-U. (2008). Significant contribution of Archaea to extant biomass in marine subsurface sediments. *Nature*, 454, 991-994.
4. Sepúlveda, J.C., Wendler, J., Summons, R.E., Hinrichs, K.-U. (2009) Rapid resurgence of marine productivity at the Cretaceous-Paleogene mass extinction event, *Science*, 326, 129-132.
5. Kellermann, M.Y., Wegener, G., Elvert, M., Yoshinaga, M.Y., Lin, Y.S., Holler, T., Mollar, X.P., Knittel, K., Hinrichs, K.-U. (2012) Autotrophy as predominant mode of carbon fixation in thermophilic anaerobic methane-oxidizing microbial communities, *Proceedings of the National Academy of Sciences, U.S.A.*, 109, 19321-19326.

6. Xie, S., Lipp, J.S., Wegener, G., Ferdelman, T.G., Hinrichs, K.-U., (2013) Turnover of microbial lipids in the deep biosphere and growth of benthic archaeal populations, *Proceedings of the National Academy of Sciences, U.S.A.*, 110, 6010-6014.
7. Bowles, M.W., Mogollón, J.M., Kasten, S., Zabel, M., Hinrichs, K.-U. (2014) Global rates of marine sulfate reduction and implications for sub-seafloor metabolic activities, *Science*, 344, 889-891.
8. Inagaki, F., Hinrichs, K.-U., and 44 co-authors (2015) Exploring deep microbial life down to ~2.5 km below the ocean floor, *Science*, 349, 420-424 (Inagaki and Hinrichs are joint study leaders/corresponding authors)
9. Wörmer, L., Hoshino, T., Bowles, M.W., Viehweger, B., Adhikari, R.R., Xiao, N., Uramoto, G.-I., Könneke, M., Lazar, C.S., Morono, Y., Inagaki, F., Hinrichs, K.-U. (2019) Microbial dormancy in the marine subsurface: Global endospore abundance and response to burial. *Science Advances*, 5, eaav1024.
10. Wörmer, L., Wendt, J., Alfken, S., Wang, J.-X., Elvert, M., Heuer, V.B., and Hinrichs, K.-U. (2019) Towards multiproxy, ultra-high resolution molecular stratigraphy: Enabling laser-induced mass spectrometry imaging of diverse molecular biomarkers in sediments. *Organic Geochemistry*, 127, 136-145.

INVITED PRESENTATIONS (SINCE 2009)

Since 2009, I have been given ~40 invited lectures (~4 per year) at universities, research institutions, symposia, and conferences in Austria, Canada, China, Denmark, England, France, Germany, Israel, Italy, Japan, Netherlands, Norway, South Korea, Switzerland, and the USA.

FUNDING HISTORY

I lead a research group with ~25 members (http://www.marum.de/en/HinrichsLab_Staff.html). Since I assumed responsibility as PI in 2000, I have raised in excess of 16 M€ in competitive third-party funding to support my laboratories in Bremen and Woods Hole. The current total annual budget of this program amounts to about 1.5 M€ in direct costs, of which about 1 M€ p.a. is being financed by competitive third-party grants. A list of current and past projects at U Bremen is available at: <https://www.marum.de/en/about-us/HinrichsLab-Projects.html>.