

Assistant Professor
Department of Geological Sciences
University of Texas at El Paso
El Paso, TX 85287-1404



I am interested in how biologic networks influence their life environment and how external forcing affects biologic communities in their mode of function and biologic composition. Stable isotopes are my tool of choice for investigating biogeochemical processes from single cells to global biogeochemical cycles and from today's environment to Earth's geologic past.

ETH Zurich Geochemistry Ph.D., 2004
DISS. ETH NO. 15197: *The sulfur cycle: From bacterial microenvironment to global biogeochemical cycles*

2014 - current	Assistant Professor Department of Geological Sciences, University of Texas at El Paso
2013 - 2013	Associate Professor Department of Biosciences, Aarhus University, Denmark
2013 - 2013	Research Scientist Center for Geomicrobiology, Aarhus University, Denmark
Autumn 2011	Guest Professor Department of Geodynamics and Sedimentology, Vienna University, Austria
2007 - 2012	Research Scientist Max Planck Institute for Marine Microbiology, Bremen, Germany
2004 – 2007	Postdoctoral Scholar at Jet Propulsion Laboratory, NASA/Caltech Center for Life Detection, Astrobiology Group

AWARDS

STARS AWARD (\$250,000) to build a new light stable isotope laboratory at the University of Texas at El Paso.

University (UTEP) Research Incentive (URI) Program Award (\$5,000) to develop a new method for studying microbial sulfur cycling.

Phase II (2017-2022) of Salt-Sediment Research Consortium: Salt-Sediment Interaction Research Consortium (S-SIRC / ITS: Institute of Tectonic Studies), Katherine Giles (Lead PI), Rip Langford (PI), Benjamin Brunner (PI); Currently: \$270,000 (5 yrs: 2017-2022 Phase II, currently 5 industry sponsors, expect 1-2 more to join in 2018)

Can Phototrophy-Driven Sulfur Cycling Make Crystallization Water of Gypsum Bioavailable? – Defining a New Habitability Index for Gypsum-Dominated Extreme Environments; Jie Xu (PI), Benjamin Brunner (Co-I), Gail Lee Arnold (Co-I), Rip Langford (Co-I); Revised Budget: \$285,662 (2 yrs); Funding: NASA, ROSES 2016 Habitable Worlds.

MENTORING EXPERIENCE

Current:

Primary supervisor of PhD candidate Amanda Labrado (UTEP, Geological Sciences)

Title: “Authigenesis of calcite, dolomite and native sulfur – links between microbial activity and openness/closedness of sedimentary systems explored from microcosm to the field scale”. Successfully passed Comps I and Comps II, December 2017, Expected date of completion, Summer 2021

Past:

Primary supervisor of Master student Andre Llanos (UTEP, Geological Sciences)

Title: “Genesis of unique carbonate fans in a pre-salt reservoir analogue, Lower Cretaceous yucca formation, Indio Mountains, West Texas”. Successfully defended, December 2017

Primary supervisor of Master student Kevin M. Lerer (UTEP, Geological Sciences)

Title: “Gypsum, calcite, and dolomite fabrics and geochemistry from the Gypsum Valley salt diapir, Paradox Basin, Southern Colorado”. Successfully defended, December 2017

Primary supervisor of Master student Marisela Montelongo (UTEP, Geological Sciences)

Title: “A New Method for Ultra-Low Sulfate Extraction and a Pilot Study in Arid Soils”. Successfully defended, May 2017

Primary supervisor of Master student Michael Mathuri (UTEP, Geological Sciences)

Title: “Evaluation of Cryptic Sulfur Cycling in Marine Sediments”. Successfully defended, May 2017

Primary supervisor of Master student Eric Bergersen (UTEP, Geological Sciences)

Title: “Geochemical signatures as a chemostratigraphic tool to correlate stacked carbonates of the Glorieta and San Andres formations, West Dog Canyon, Guadalupe Mountains, New Mexico”. Successfully defended, December 2016

Primary supervisor of PhD student Inigo A. Müller (MARUM, MPI-MM, Bremen, Germany)

Title: “The pivotal rule of sulfite species in shaping the oxygen isotope composition of sulfate: new insights from a stable isotope perspective”. Successfully defended 19 March 2013 (*Magna Cum Laude*)

Co-supervisor of three master projects (International Max Planck Research School of Marine Microbiology, Bremen, Germany)

Zainab Beiruti: Sulfur isotope effects during sulfide oxidation to sulfate: model meets reality

Petra Pjevac: Metabolism of elemental sulfur and pyrite in intertidal sediments

Olga Matantseva: Nitrogen and oxygen isotope effects during anammox

Primary mentor of a Bachelor thesis (Hochschule Bremerhaven, Germany)

Katharina Gräfe: Extraktion und Aufbereitung von in Porenwasser gelösten Gasen aus Sedimenten zur Konzentrations- und Isotopenanalyse mittels Massenspektrometrie (Translation: Extraction and preparation of gases from pore-water for concentration and isotope analysis by mass spectrometry)

Co-supervisor of three student projects at Jet Propulsion Laboratory (NASA, Caltech)

Lilian Pan: The oxygen isotope composition of evaporite minerals

Lyndsey Earl: Oxygen isotope exchange between sulfate and water

Megan Rohrsen: The hydrogen and oxygen isotope composition of hydration water of gypsum

FIELD AND RESEARCH CRUISE EXPERIENCE

Manus Basin, Papua New Guinea R/V Sonne June – July 2011

BAMBUS, hydrothermal venting in Manus Basin, Papua New Guinea, Chief Scientist W. Bach

Equatorial Pacific R/V Knorr January – March 2009

Oceanic control and global distribution of seafloor microbial life and activity, Chief Scientist S. D'Hondt

Swiss Alps Fieldwork Summers – 1997-1999

Independent geological (stratigraphy & tectonics) mapping

SYNERGISTIC ACTIVITIES

Co-convenor of 4 special sessions at Goldschmidt and AGU since 2007

Reviewer of publications for Science, Geochimica et Cosmochimica Acta, Earth and Planetary Science Letters, Environmental Science & Technology, Chemical Geology, Contaminant Hydrology, Isotopes in Environmental Health and Sciences, Geology

Reviewer of grant proposals for National Science Foundation, European Space Agency

External examiner of Ph.D. thesis of Christian R. L. von Sperber (July 2, 2014). The effect of phosphatases on the oxygen isotope composition of phosphate, Department Umweltsystemwissenschaften, ETH Zurich, Prom.-Nr. 22095.

PUBLICATIONS

Balci, N., B. Brunner, A.V. Turchyn (2017). Tetrathionate and Elemental Sulfur Shape the Isotope Composition of Sulfate in Acid Mine Drainage. *Front. Microbiol.* **8**.

Gischler, E., D. Birgel, B. Brunner, A. Eisenhauer, G. Meyer, S. Buhre, J. Peckmann (2017). A Giant Underwater, Encrusted Stalactite from the Blue Hole, Lighthouse Reef, Belize, Revisited: a Complex History of Biologically Induced Carbonate Accretion Under Changing Meteoric and Marine Conditions. *J. Sediment. Res.* **87**, 1260–1284.



Wehrmann L. M., N. Riedinger, B. Brunner, A. Kamysny Jr, C. R. J. Hubert, L.C. Herbert, V. Brüchert, B. B. Jørgensen, T. G. Ferdelman T. G., M. J. Formolo (2017). Iron-controlled oxidative sulfur cycling recorded in the distribution and isotopic composition of sulfur species in glacially influenced fjord sediments of west Svalbard. *Chem. Geol.* **466**, 678–695.

Riedinger N. R., B. Brunner, S. Krastel, G. L. Arnold, L. M. Wehrmann, M. J. Formolo, A. Beck, S. M. Bates, S. Henkel, S. Kasten, T. W. Lyons (2017). Sulfur cycling in an iron oxide-dominated, dynamic marine depositional system: The Argentine continental margin. *Front. Earth Sci.* **5**.

Gischler E., K. Heindel, D. Birgel, B. Brunner, J. Reitner, J. Peckmann (2017). Cryptic biostalactites in a submerged karst cave of the Belize Barrier Reef revisited: Pendant bioconstructions cemented by microbial micrite. *Palaeogeogr. Palaeoclimatol. Palaeoecol.* **468**, 34–51.

Brunner B., G.L. Arnold, H. Røy, I.A. Müller, BB. Jørgensen (2016). Off limits: sulfate below the sulfate-methane transition. *Front. Earth Sci.* **4**.

von Sperber C., F. Tamburini, B. Brunner, S.M. Bernasconi, E. Frossard E. (2015). The oxygen isotope composition of phosphate released from phytic acid by the activity of wheat and *Aspergillus niger* phytase. *Biogeosciences* **12**, 4175–4184.

Deusner C., T. Holler, G.L. Arnold, S.M. Bernasconi, M.J. Formolo, B. Brunner* (2014). Sulfur and oxygen isotope fractionation during sulfate reduction coupled to anaerobic oxidation of methane is dependent on methane concentration. *Earth and Planetary Science Letters*, 399, 61–73. *corresponding author.

Riedinger N. and B. Brunner (2014). Data Report: Concentration and sulfur isotope composition of iron monosulfide and pyrite from sediments collected during IODP expedition 316, Nankai Trough, Japan. *IODP Proceedings*.

Arnold G.L., B. Brunner, I.A. Müller, H. Røy (2014). Modern applications for a total sulfur reduction distillation method - what's old is new again. *Geochemical Transactions*, 15, 4.

Yoshinaga M.Y., T. Holler, T. Goldhammer, G. Wegener, J.W. Pohlman, B. Brunner, M.M.M. Kuypers, K.U. Hinrichs, M. Elvert (2014). Carbon isotope equilibration during sulphate-limited anaerobic oxidation of methane. *Nature Geoscience*, **7**, 190–194.

Brunner B., S. Contreras, M.F. Lehmann, O. Matantseva, M. Rollog, T. Kalvelage, G. Klockgether, G. Lavik, M.S. Jetten, B. Kartal, M.M.M Kuypers (2013). Nitrogen isotope effects induced by anammox bacteria. *PNAS* **110**, 18994–18999.

Müller I.A., B. Brunner, C. Breuer, M. Coleman, W. Bach (2013). The oxygen isotope equilibrium fractionation between sulfite species and water. *Geochimica et Cosmochimica Acta*, **120**, 562–581.

Müller I.A., B. Brunner B., W. Bach (2013). Isotopic evidence of the pivotal role of sulfite oxidation in shaping the oxygen isotope signature of sulfate. *Chemical Geology*, **354**, 186–202.

Wehrmann L.M., S. Arndt, C. März, T. G. Ferdelman, B. Brunner (2013). The evolution of early diagenetic signals in Bering Sea subseafloor sediments in response to varying organic carbon deposition over the last 4.3 Ma. *Geochimica et Cosmochimica Acta* **109**, 175–196.

Heindel K., D. Birgel, B. Brunner, V. Thiel, H. Westphal, E. Gischler, S.B. Ziegenbalg, G. Cabioch, P. Sjövall, J. Peckmann (2012). Post-glacial microbialite formation in coral reefs in the Pacific, Atlantic, and Indian Ocean. *Chemical Geology* **304–305**, 117–130.

Brunner B., F. Einsiedl, G.L. Arnold, I.A. Müller, S. Templer, S.M. Bernasconi (2012). The reversibility of dissimilatory sulphate reduction and the cell-internal multistep reduction of

sulphite to sulphide: insights from the oxygen isotope composition of sulphate. *Isotopes in Environmental & Health Studies* 48, 33-54.

Berndmeyer C., D. Birgel D., B. Brunner, L.M. Wehrmann, N. Jöns, W. Bach, E.T. Arning, K.B. Föllmi, J. Peckmann (2012). The influence of bacterial activity on phosphorite formation in the Miocene Monterey Formation, California. *Palaeogeography, Palaeoclimatology, Palaeoecology* 317-318, 171-181.

Pirlet H., L.M. Wehrmann, A. Foubert, B. Brunner, D. Blamart, L. de Mol, D. Van Rooij, J. Dewanckele, V. Cnudde, R. Swennen, P. Duyck, J.-P. Henriot (2012). Unique authigenic mineral assemblages reveal different diagenetic histories in two neighbouring cold-water coral mounds on Pen Duick Escarpment, Gulf of Cadiz. *Sedimentology* 59, 578-604.

T. Holler, G. Wegener, H. Niemann, C. Deusner, T.G. Ferdelman, A. Boetius, B. Brunner*, R. Widdel (2011). Carbon and sulfur back flux during anaerobic microbial oxidation of methane and coupled sulfate reduction *PNAS Plus* 108, E1484-E1490 *corresponding author

Goldhammer T., B. Brunner, S.M. Bernasconi, T.G. Ferdelman, M. Zabel (2011). Phosphate oxygen isotopes: insights into sedimentary phosphorus cycling from the Benguela upwelling system. *Geochimica et Cosmochimica Acta*, 75, 3741-3756.

Eckert T., B. Brunner, E.A. Edwards, U.G. Wortmann (2011) Microbially mediated re-oxidation of sulfide during dissimilatory sulfate reduction by *Desulfobacter latus*. *Geochimica et Cosmochimica Acta*, 75, 3469-3485.

Goldhammer T., T. Max, B. Brunner, F. Einsiedl, M. Zabel. (2011) Marine sediment pore-water profiles of phosphate $\delta^{18}\text{O}$ using a refined micro-extraction. *Limnology and Oceanography: Methods* 9, 110-120.

Lindtke J., S. B. Ziegenbalg, B. Brunner, J.M. Rouchy, C. Pierre, J. Peckmann (2011) Authigenesis of native sulphur and dolomite in a lacustrine evaporitic setting (Hellín basin, Late Miocene, SE Spain). *Geological Magazine* 148, 655-669.

Wehrmann L.M., S.P. Templer, B. Brunner, S.M. Bernasconi, L. Maignien, T.G. Ferdelman (2011). The imprint of methane seepage on the geochemical record and early diagenetic processes in cold-water coral mounds on Pen Duick Escarpment, Gulf of Cadiz. *Marine Chemistry*, 282, 118-137.

Riedinger N., B. Brunner, M.J. Formolo, E. Solomon, S. Kasten, M. Strasser, T.G. Ferdelman (2010). Oxidative sulfur cycling in the deep biosphere of the Nankai Trough, Japan. *Geology* 38, 851-854.

Riedinger N., B. Brunner, Y.-S. Lin, A. Vossmeier, T.G. Ferdelman, B.B. Jørgensen (2010). Methane at the sediment-water transition in Black Sea Sediments. *Chemical Geology* 274, 29-37.

Ziegenbalg S.B., B. Brunner, J.M. Rouchy, D. Birgel, C. Pierre, M.E. Böttcher, A. Caruso, A. Immenhauser, J. Peckmann (2010). Formation of secondary carbonates and native sulphur in sulphate-rich Messinian strata, Sicily. *Sedimentary Geology*, 227, 37-50.

Turchyn A. V., V. Brüchert, T.W. Lyons, G.S. Engel, N. Balci, D.P. Schrag, B. Brunner (2010). Kinetic oxygen isotope effects during dissimilatory sulfate reduction: A combined theoretical and experimental approach. *Geochimica et Cosmochimica Acta* 74, 2316-2326.

Pirlet H., L.M. Wehrmann, B. Brunner, N. Frank, J. Dewanckele, D. Van Rooij, A. Foubert, R. Swennen, L. Naudts, M. Boone, V. Cnudde, J.-P. Henriët (2010). Diagenetic formation of gypsum and dolomite in a cold-water coral mound in the Porcupine Seabight, off Ireland. *Sedimentology* 57, 786-805.

Holler T., G. Wegener, K. Knittel, A. Boetius, B. Brunner, M.M.M. Kuypers, F. Widdel (2009) Substantial $^{13}\text{C}/^{12}\text{C}$ and D/H fractionation during anaerobic oxidation of methane by marine consortia enriched in vitro. *Environmental Microbiology Reports* 1, 370-376.

Arning E.T., D. Birgel, B. Brunner, J. Peckmann (2009). Bacterial formation of phosphatic laminites off Peru. *Geobiology* 7, 295-307.

Brunner B., J.-Y. Yu, R.E. Mielke, J. MacAskill, S. Madzunkov, T.J. McGenity, M.L. Coleman (2008) Different isotope and chemical patterns of pyrite oxidation related to lag and exponential growth phases of *Acidithiobacillus ferrooxidans* reveal a microbial growth strategy. *Earth and Planetary Science Letters* 270, 63-72.

Rohrssen M., B. Brunner, R.E. Mielke, M.L. Coleman (2008). Method for simultaneous oxygen and hydrogen isotope analysis of water of crystallization in hydrated minerals. *Analytical Chemistry* 80, 7084-7089.

Christensen L. E., B. Brunner, K.N. Truong, R.E. Mielke, C.R. Webster, M.L. Coleman, M. (2007). Measurements of Sulfur Isotope Compositions by Tunable Laser Spectroscopy of SO_2 . *Analytical Chemistry* 79, 9261-9268.

Wortmann U. G., B. Chernyavsky, S.M. Bernasconi, B. Brunner, M.E. Boettcher, P.K. Swart (2007). Oxygen isotope biogeochemistry of pore water sulfate in the deep biosphere: Dominance of isotope exchange reactions with ambient water during microbial sulfate reduction (ODP Site 1130). *Geochimica et Cosmochimica Acta* 71, 4221-4232.

Brunner B. and S.M. Bernasconi (2005). A revised isotope fractionation model for dissimilatory sulfate reduction in sulfate reducing bacteria. *Geochimica et Cosmochimica Acta* 69, 4759-4771.

Brunner B., S.M. Bernasconi, J. Kleikemper, M.H. Schroth (2005). A model for oxygen and sulfur isotope fractionation in sulfate during bacterial sulfate reduction processes. *Geochimica et Cosmochimica Acta* 69, 4773-4785.

Kleikemper J., M.H. Schroth, S.M. Bernasconi, B. Brunner, J. Zeyer (2004). Sulfur Isotope Fractionation during Growth of Sulfate Reducing Bacteria on Various Carbon Sources. *Geochimica et Cosmochimica Acta*, 68, 4891-4904.

INVITED TALKS

Carbonate caprock on salt diapirs – where dolomite, native sulfur and microbes meet - *UT San Antonio Geology Department Seminar* (2017)

S-SIRC: Salt-Sediment Interaction Research Consortium. (2014, 2015, 2016, 2017) Geochemistry of Carbonate Caprocks

Lifestyles of the slow and lonely – a story told by sulfate isotopes. *Goldschmidt Conference* (2013) Isotope Geochemistry Across Environmental and Redox Gradients: Tracing Biological and Geochemical Processes, Florence, Italy, invited & keynote speaker.

Chances and challenges in applying sulfur-oxygen isotope relationships of sulfate to studying sulfur cycling in engineered environments. *Goldschmidt Conference* (2013) Geomicrobiology of Sulfur Cycling in Engineered Ecosystems, Florence, Italy, invited speaker.

Sulfur and oxygen isotope fractionation during sulfate reduction: a look at the lifestyle of survivors. *Lawrence Berkeley National Laboratory*, Berkeley, CA, USA (2012), invited by Dr. T. Torok and Dr. F. Wolfe-Simon.

Intracellular phosphorous-compounds: shuttles for oxygen isotopes between oxyanions and water. *IsoPhos* (2012), Development of Isotopic Tracers for a Better Understanding of the Phosphorus Cycle Centro Stefano Franscini, Monte Verità, Ascona, Switzerland, hosted by the Group of Plant Nutrition (Institute of Agricultural Sciences) and the Stable Isotope Laboratory (Geological Institute) of the ETH Zürich, invited speaker.

The reversibility of dissimilatory sulfate reduction and the cell-internal multistep reduction of sulfite to sulfide. *Stable Isotope Network Austria – SINA* (2011), Vienna University, *keynote* lecture.

The oxygen side of sulphate: Sulphur and oxygen isotope effects related to microbial sulphur cycling. *Cambridge University*, UK (2009), invited by Dr. A. V. Turchyn

TEACHING EXPERIENCE

Assistant Professor at University of Texas at El Paso (Spring 2014 - current)

Responsibilities: Independent development of the curriculum and teaching of lectures (including preparation of lecture and handouts), preparation of exercises and exams and grading of exams.

- Inquiry in Math & Science: Follow the Yellow Brick Road (Fall 2015, 2016, 3 hours class for undergraduates, i.e. freshman level)

In this class explores the origin of a peculiar rock that contains a brilliant yellow mineral – sulfur. Our geologic journey leads us from the basics of Earth Science to the cutting edge of research. Our path touches on themes from Biology, Chemistry, Geology, Math and Physics and show how they all work together.

- Geomicrobiology (Spring 2016, 3 hours class, PhD level)

This course aims at developing from scratch the material (literature, handouts, exams, presentations) for a Geomicrobiology course at the Master's level. It addresses students who envision teaching such a class in their future. The course is held in seminar-style, and is heavily front-loaded. With the help of journal articles and text books we aim to rapidly gain an overview over the vast field of Geomicrobiology.

- Introduction to Low Temperature Geochemistry (Spring 2015, 2016, 3 hours class, offered both on senior undergraduate and MS level)

Students often find Geochemistry a field that is hard to access. One of the reasons for that challenge is the fact that Geochemistry combines the fields of Geology – bringing in a multitude of minerals with complex chemical compositions – with Chemistry, a topic that some students might feel out of touch with since their first Chemistry studies a few years back. Moreover, Geochemistry is quite often 'spiced up' with a hefty dose of Mathematics and Physics. At best, this combination of challenges creates a fairly steep learning curve; at the worst it renders the topic a daunting hurdle.

This class takes a new approach: we oscillate between geochemical questions that we can understand on a qualitative basis and the review/refreshment of basic tools from Chemistry, Mathematics and Physics that allow for more quantitative approaches. Developing from

qualitative to quantitative understanding, we refresh our skillset in Chemistry, Mathematics and Physics, making our joyful first steps in the exciting field of Geochemistry.

- Light Stable Isotopes in Biogeochemistry (Spring 2014, 3 hours class, MS & PhD level)

Light elements such as hydrogen (H), carbon (C), nitrogen (N), phosphorous (P) and sulfur (S) are essential building blocks for every living organism. For the investigation of how organisms affect our environment, Earth's geologic past or the detection of extraterrestrial life, light stable isotope biogeochemistry is a powerful tool.

Part I: language of isotope biogeochemists, basic principles of isotope fractionation, mass balances to decipher isotope fingerprints, how isotope compositions are measured.

Part II: application of gained knowledge to the study of selected examples of H, C, N, P and S cycling in the environment.

- Introduction to Mass Spectrometers (Fall 2014, 1 hour class, MS & PhD level)

Compounded with a striking flair for outrageous acronyms chosen by producers and users, the amazing variety of mass spectrometers leads to a seemingly un-penetrable jungle, where newcomers get lost when they try to find a simple answer to the question “what instrument is good for what application?”. This course provides students with a basic understanding of what mass spectrometers and their many relations do. This course provides students with a basic understanding of what mass spectrometers and their many relations do.

- Carbonate Geochemistry (Fall 2014, 2 hour class, Fall 2016, 3 hour class, MS & PhD level)

Carbonate minerals are common and important components of sediments, soils and sedimentary rocks, and also exist as components of metamorphic (e.g. marble) and igneous rocks (carbonatites). Environmental conditions are often intimately linked to carbon cycling (e.g. pH, redox conditions, or CO₂ pressure in the atmosphere). Carbonates, as the main inorganic carbon pool on Earth's surface, play a key role in regulating these cycles. A considerable portion of hydrocarbon reservoirs are hosted in carbonates and carbonate cements strongly affect the porosity and permeability of rocks and thus their properties as reservoirs for water, hydrocarbons, and also CO₂ sequestration. Moreover, the paleontological, petrographic and geochemical interpretation of carbonate rocks and minerals contributes massively to our understanding of Earth's geologic past.

Part I: Earth's carbon cycle, carbonic acid-carbonate system, carbonate minerals, role of kinetics and thermodynamics in controlling carbonate geochemistry, basic understanding of how carbon and oxygen isotopes of carbonates can be used to reconstruct the environmental conditions of carbonate formation, insights on why some carbonates are more pure than others when it comes to their trace constituents.

Part I: application of acquired knowledge to the study of selected examples from the literature.

Guest Professor at Vienna University (Winter Semester 2011)

- Stable isotopes in the sedimentary environment

Responsibilities: Independent development of the curriculum and teaching of block course consisting of: Morning lectures (including preparation of lecture and handouts) / Afternoon tutorials (including preparation of exercises) / Preparation of exams and grading of exams

Covered topics: Analysis of mass balances and fluxes: analytical solutions (derivatives, integrals) and numerical modeling / Introduction to isotopes and isotope nomenclature / Principles of isotope fractionation / Isotope fractionation by biogeochemical processes / The redox tower in marine sediments / Transport processes in sediments: open vs. closed systems

Max Planck Institute for Marine MICROBIOLOGY (MPI Bremen, 2007-2012)

- Stable isotope biogeochemistry - within framework of the International Max Planck Research School of Marine Microbiology (MARMIC)

Responsibilities: Independent development of the curriculum and teaching of yearly block course consisting of: Lectures (including preparation of lecture and handouts) / Tutorials (including preparation of exercises) / Preparation of exams and grading of exams

Covered topics: Analysis of mass balances and fluxes: box models and the concept of steady state / Analytical solutions (derivatives, integrals) / Introduction to isotopes and isotope nomenclature / Principles of isotope fractionation / Isotope fractionation by biogeochemical processes.

- Introduction to mass spectrometry & and application of stable isotopes (MARMIC, Greenhouse-gas Removal Apprenticeship and Student Program (EU-GRASP), general audience)

Responsibilities: Independent development of the curriculum and teaching of block course consisting of lecture and tutorial

Covered topics: Introduction to different types of mass spectrometers, peripherals, and sample preparation techniques and their respective application / Basics of mass balances and fluxes: box models and the concept of steady state / Introduction to isotopes and isotope nomenclature / Isotope fractionation by biogeochemical processes.

Tutoring at Swiss Federal Institute of Technology (ETH Zurich, 1995-2000)

Geology 101 / Geology of Switzerland / Geologic mapping / Math and Computer Science / Co-organization of geologic fieldtrips to the Sinai Peninsula (Egypt) and to the Swiss Alps.