

DR. CHELSEA PEDERSON

Curriculum Vitae

PERSONAL DATA

Email: chelsea.pederson@rub.de
Telephone: +1 (707) 789-1326 / +49 162-2630657
Address: Universitätsstr. 150, IA 5/185, 44780 Bochum, Germany
Nationality: United States of America
Date of Birth: February 26, 1989

CURRENT POSITION

Research scientist (2019-present). Ruhr-University Bochum, Institute for Geology, Mineralogy and Geophysics; Bochum, Germany. Supervisor: Dr. Adrian Immenhauser

Projects:

Geochemistry and petrography of modern carbonates
Experimental diagenesis of carbonate archives and potential reservoirs
Characterization of Devonian carbonate facies in NW Europe

EDUCATION

- 2017 **Ph.D.** Marine Geology and Geophysics, Rosenstiel School of Marine and Atmospheric Science, University of Miami; Miami, FL, USA. Dissertation: "Deposition and Diagenesis of Subtropical Microbial Carbonates"
- 2011 **B.Sc.** Biology and Marine Science majors, and chemistry minor. University of Miami; Coral Gables, FL, USA. Thesis: "Reef Succession and Dynamics in Correspondence to Climate and Sea Level Changes During the Pleistocene in the Dominican Republic"

WORK EXPERIENCE

- 2017-2019 Ruhr-University Bochum; Postdoctoral researcher. Supervisor: Adrian Immenhauser. Bochum, Germany.
- 2015 ExxonMobil Exploration Company; Geoscience intern. South America New Opportunities Group. Supervisors: Deanna Tavernier and Linda Price. Houston, TX, USA.
- 2010-2012 Rosenstiel School of Marine and Atmospheric Sciences; Research assistant. Pleistocene Reef Systems. Supervisors: Dr. Donald McNeill and Dr. James Klaus,

Coral Gables, Florida, USA.

2010 Hawaii Institute of Marine Biology; Intern. Supervisor: Dr. Marc Lammers, Oahu, HI, USA.

PEER REVIEWED PUBLICATIONS

ORCID: orcid.org/0000-0002-0480-4597

Google scholar: scholar.google.com/citations?user=7QxMdksAAAAJ&hl=en

*Student authors are underlined

Pederson, C.L., Swart, P.K., McNeill, D.F., and Klaus, J.S. Diagenesis of freshwater carbonate mud during early burial in the Florida Everglades. *In prep.*

Ge, Y., **Pederson, C.L.**, Lokier, S., Vonhof, H., Strauss, H., Fiorini, F., Schurr, S., and Immenhauser, A. Seawater geochemistry of the modern Abu Dhabi environment: influence of organic decomposition on early marine diagenesis. *In prep.*

Ge, Y., **Pederson, C.L.**, Della Porta, G., Lokier, S., Hoffman, R., and Immenhauser, A. Botryoidal and spherulitic aragonite: direct precipitation or diagenetic replacement product? *In prep.*

2020 **Pederson, C.**, Mavromatis, V., Dietzel, M., Rollion-Bard, C., and Immenhauser, A., 2020. Variation in the diagenetic response of aragonite archives to hydrothermal alteration. *Sedimentary Geology*. 10.1016/j.sedgeo.2020.105716.

Cai, C., Hu, Y., **Pederson, C.**, Liu, D., Jiang, L., He, X., Shi, S., Immenhauser, A., 2020. Dolomitization history and porosity evolution of a giant, deeply buried Ediacaran gas field (Sichuan Basin, China). *Precambrian Research*. 105595.

Ge, Y., Lokier, S., Hoffman, R., **Pederson, C.**, Immenhauser, A., 2020. Composite micrite envelopes in the lagoon of Abu Dhabi and their application for the recognition of ancient firm- to hardgrounds. *Marine Geology*. 423, 106141.

Mueller, M., Igbokwe, O.A., Walter, B., **Pederson, C.L.**, Riechelmann, S., Richter, D.K., Albert, R., Gerdes, A., Buhl, D., Neuser, R.D., Bertotti, G., and Immenhauser A., 2020. Testing the preservation potential of early diagenetic dolomites as geochemical archives. *Sedimentology*. 67(2), 849-881.

2019 **Pederson, C.L.**, Mavromatis, V., Dietzel, M., Rollion-Bard, C., Nehrke, G., Jöns, N., Immenhauser, A., 2019. Diagenesis of mollusc aragonite and the role of fluid reservoirs. *Earth and Planetary Science Letters*. 514, 130-142.

- Pederson, C.L., Weiss, L.,** Mavromatis, V., Rollion-Bard, C., and Immenhauser, A., 2019. Significance of fluid chemistry revealed by experimental hydrothermal diagenesis of aragonitic *Porites* coral. *The Depositional Record*. 5(3), 592-612.
- McNeill, D.F., **Pederson, C.L.,** Brownlow, D., Klaus, J.S., and Blackwelder, P., 2019. Quantifying carbonate sediment mixing across a formational sequence boundary, an example from the Late Pleistocene Miami Limestone. *The Depositional Record*. 5(3), 578-591.
- Ge, Y., Pederson, C., Lokier, L., Traas, J.P., Nehrke, G., Neuser, R., Immenhauser, A. Late Holocene to Recent aragonite-cemented transgressive lag deposits in the Abu Dhabi lagoon and intertidal sabkha. *Sedimentology*. 67, 2426-2454.
- Hu, Y., Cai, C., Liu, D., **Pederson, C.L.,** Jiang, L., Shen, A. and Immenhauser, A., 2019. Formation, diagenesis and palaeoenvironmental significance of upper Ediacaran fibrous dolomite cements. *Sedimentology*. 67(2), 1161-1187.
- 2018 **Pederson, C.L.,** Klaus, J.S., Swart, P.K. and McNeill, D.F., 2018. Deposition and early diagenesis of microbial mud in the Florida Everglades. *Sedimentology*. 66(6), 1989-2010.
- Fichtner, V., Strauss, H., Mavromatis, V., Dietzel, M., Huthwelker, T., Borca, C.N., Guagliardo, P., Kilburn, M.R., Göttlicher, J., **Pederson, C.L.** and Griesshaber, E., 2018. Incorporation and subsequent diagenetic alteration of sulfur in *Arctica islandica*. *Chemical Geology*, 482, 72-90.
- 2015 **Pederson, C.L.,** McNeill, D.F., Klaus, J.S., and Swart, P.K., 2015. Deposition and diagenesis of marine oncoids: implications for development of carbonate porosity. *Journal of Sedimentary Research*, 85(11), 1323-1333.

ADDITIONAL PUBLICATIONS

- 2018 McNeill, D.F., Klaus, J.S., and **Pederson, C.L.,** 2018. Geology of Everglades National Park Guidebook. R.N Ginsburg Symposium. Rosenstiel School of Marine and Atmospheric Science, University of Miami, FL.
- 2017 **Pederson, C.L.,** 2017. *Deposition and Diagenesis of Subtropical Microbial Carbonates*. University of Miami.

TEACHING EXPERIENCE

- Co-lecturer, M.Sc. sedimentology course at the Ruhr-University Bochum, Germany (2018, 2019)
- Co-leader, B.Sc. field course. Glacial deposits and geomorphology. Brandenburg,

- Germany. (2019)
- Co-leader, B.Sc. mapping course for Ruhr-University Bochum, Germany. Carboneras, Spain. (2018, 2019)
- Co-leader, field course. Lateral and vertical heterogeneity of carbonate facies in platform margin complexes. Eleuthera, Bahamas. (2015, 2019)
- Teaching assistant for undergraduate geology at the University of Miami. (2012-2013)

STUDENT ADVISING

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| Current | Yuzhu Ge, Ph.D., Ruhr-University Bochum, started October, 2017, co-supervised with A. Immenhauser, “Spatial variability of recent seawater properties and its relation to early marine cements” |
| | Charlotte Brodtrueck, M.Sc., Ruhr-University Bochum, started July, 2020, “Preservation of proxy data during early alteration of carbonate sediments in the Abu Dhabi Lagoon” |
| Completed | Leonie Weiss, M.Sc., Ruhr-University Bochum, 2018, “Alteration features in hydrothermal experiments using aragonitic corals” |
| | Laura Lippock, B.Sc., Ruhr-University Bochum, 2018, co-supervised with A. Immenhauser, “Diagenesis of calcareous skeletal material encased in Neogene volcanic deposits” |
| | Anika Beule, M.Sc., Ruhr-University Bochum, 2019, “Hardgrounds and their underlying sediment from the intertidal environment of Abu Dhabi” |
| | Ozioma Uwakwe, M.Sc., Ruhr-University Bochum, 2020, “Spatial distribution of carbonate grain size and isotope geochemistry in the modern Abu Dhabi lagoon” |
| | Sven Lersch, M.Sc., Ruhr-University Bochum, 2020, “Characterization of major facies of Devonian carbonates – Implications for Deep Geothermal Energy” |

CONFERENCE PROCEEDINGS

- 2020 **Pederson, C.**, Mavromatis, V., Dietzel, M., and Immenhauser, A. “Diagenetic variation of aragonite material and controlling factors”. CHARON Scientific Meeting; Göttingen, Germany.
- 2019 **Pederson, C.**, Ge, Y., Lokier, S., Traas, J., Nehrke, G., Neuser, R., and Immenhauser, A. “Marine hardground deposition in the Abu Dhabi lagoon”. Russian Lithological Conference; Kazan, Russia.

- Pederson, C.**, Immenhauser, A., Lokier, S., and Ge, Y. Early lithification of marine sediments in the Abu Dhabi coastal system. International Association of Sedimentology Conference; Rome, Italy.
- Pederson, C.**, Mavromatis, V., Dietzel, M., and Immenhauser, A. “Alteration features of aragonite archives”. Goldschmidt Conference; Barcelona, Spain.
- 2018 **Pederson, C.**, Mavromatis, V., Breitenbach, S., Jons, N., Nehrke, G., Kluge, T., Purgstaller, B., Dietzel, M., Buhl, D., Neuser, R., and Immenhauser, A. “Diagenetic Susceptibility of Biogenic Carbonate Archives”. International Sedimentological Congress; Quebec, Canada.
- Pederson, C.**, Mavromatis, V., Breitenbach, S., Jons, N., Nehrke, G., Kluge, T., Purgstaller, B., Dietzel, M., Buhl, D., Neuser, R., and Immenhauser, A. “Experimental Alteration and Diagenetic Susceptibility of Carbonate Bivalves”. European Geophysical Union Conference; Vienna, Austria.
- Pederson, C.**, Mavromatis, V., Breitenbach, S., Rollion-Bard, C., Jons, N., Nehrke, G., Kluge, T., Purgstaller, B., Dietzel, M., Buhl, D., Neuser, R., and Immenhauser, A. “Diagenetic Susceptibility of Biogenic Carbonates”. CHARON Scientific Meeting. Kiel, Germany.
- 2017 **Pederson, C.**, Klaus, J., Swart, P., and McNeill, D. “Evolution of Microbial Carbonates During Early Burial: A Multi-Proxy Approach”. European Geophysical Union Conference; Vienna, Austria.
- Pederson, C.**, Purgstaller, B., Mavromatis, V., Jons, N., Dietzel, M., Buhl, D., Neuser, R., Breitenbach, S., Hoffman, R., Kwiecien, O., Riechelmann, S., and Immenhauser, A. “Diagenetic Susceptibility of Carbonate Archives – an Experimental Approach”. American Geophysical Union Conference; New Orleans, USA.
- Pederson, C.**, Purgstaller, B., Mavromatis, V., Jons, N., Dietzel, M., Buhl, D., Neuser, R., Breitenbach, S., Hoffmann, R., Kwiecien, O., Riechelmann, S., and Immenhauser, A. “Carbonate Diagnosis: an Experimental, Multi-Proxy Approach”. CHARON Scientific Meeting. Bochum, Germany.
- 2016 **Pederson, C.**, Klaus, J., McNeill, D., Swart, P. “Freshwater Microbial Mud in the Florida Everglades: Insight to Preservation Potential of Key Geochemical and Textural Signatures During Early Burial”. International Association of Sedimentology conference; Marrakech, Morocco.
- Pederson, C.**, Klaus, J., McNeill, D., Swart, P. “Evolution of Microbial Carbonates During Early Burial: a Multi-Proxy Approach”. CSL Sponsors Meeting. Miami, FL.
- 2015 **Pederson, C.**, Klaus, J., McNeill, D., Swart, P. “Geochemical and Textural Comparison of Modern and Ancient Freshwater Microbial Mud: A Direct Calibration in the Florida Everglades”. American Geophysical Union conference; San Francisco, California.
- Pederson, C.**, Klaus, J., McNeill, D., Swart, P. “Geochemical and Textural Evolution of Organic-Rich Freshwater Microbial Mud During Early Diagenesis”. CSL Sponsors Meeting. Miami, FL.
- 2014 **Pederson, C.**, Klaus, J., McNeill, D., Swart, P. “Origin and Diagenesis of Microbial

Oncolites”. SEPM Carbonate Research Session; American Association of Petroleum Geology conference; Houston, Texas.

Pederson, C., Klaus, J., McNeill, D., Swart, P. “Geochemical and Textural Comparison of Modern and Ancient Microbial Muds: a Direct Calibration in the Florida Everglades”. CSL Sponsors Meeting. Miami, FL.

2012 **Pederson, C.**, Klaus, J., McNeill, D., Swart, P. “Composition, Distribution, and Diagenesis of Microbial Oncolite Beds Capping the Uplifted Atoll of Maré, Loyalty Islands, New Caledonia”. American Association of Petroleum Geology; Microbial Carbonate Reservoir Characterization, Hedberg Conference; Houston, Texas.

Pederson, C., McNeill, D., Klaus, J., Swart, P. “Origin and Diagenesis of Microbialites on the Uplifted Atoll of Maré, New Caledonia”. CSL Sponsors Meeting. Miami, FL.

EXTERNAL FUNDING

- DFG (German research foundation) proposal (co-PI): Formation and diagenetic evolution of authigenic, aragonite-cemented seafloor carbonates (50,000 €), 2019
- External funding to run a field course (university specific) (18,200 €), 2019
- Ruhr University Bochum: External Event Grant (1,500 €), 2018
- International Union of Soil Scientists – EGU conference funding (500 €), 2017
- American Association of Petroleum Geologists, G. Archie Grant (3000 USD), 2014
- ExxonMobil Global Geoscience Grant (5000 USD), 2014
- International Association of Sedimentologists Post Graduate Grant (1000 €), 2013
- Gulf Coast Association of Geological Societies Grant (2000 USD), 2013
- Picou Fellowship, Gulf Coast SEPM (1000 USD), 2013
- SEPM Foundation Award (750 USD)

PROFESSIONAL EXPERIENCE

- Journal reviewer; Sedimentary Geology (2020-present); Geochimica et Cosmochimica Acta (2019-present), Earth and Planetary Science Letters (2019-present), The Depositional Record (2018-present)
- Early Career Scientist Committee member; International Association of Sedimentologists (2019-current)
- Workshop coordinator; CHARON scientific meetings (Goettingen, Germany, 2020; Kiel, Germany, 2018; and Bochum, Germany, 2017).
- Session co-convenor; European Geophysical Union conference (2020), International Association of Sedimentologists (2019), International Sedimentological Congress (2018), European Geophysical Union conference (2018)
- Early career scientist and student poster judge; International Association of Sedimentologists (2019), International Sedimentological Congress (2018), European Geophysical Union conference (2018)
- Field trip coordinator and secretary for the University of Miami Hurricanes American

- Association of Petroleum Geologists student chapter (2012)
- Student athlete tutor at the University of Miami (2008-2011)

LABORATORY TECHNIQUES

Sedimentology

Outcrop, core, and textural characterization of sediments and organics

Microscopy: normal light, fluorescence, scanning electron microscopy (SEM); Philips XL-30 environmental SEM, cathodoluminescence, electron backscatter diffraction (EBSD), and Raman

Geochemistry

Mineralogy via Panalytical X-Ray diffraction methods

Inorganic $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ stable isotope analysis via a Kiel III automated device interfaced with a Thermo-Finnigan Delta Plus mass spectrometer

Organic content composition and isotopic signatures ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) using Dumas type combustion on a Costech EA ECS 4010 and a continuous flow isotope-ratio mass spectrometer (Thermo Delta V Advantage)

Elemental analysis via a Varian Vista Pro axial ICP-OES

Dissolved inorganic $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ using a gas bench coupled with a continuous flow isotope-ratio mass spectrometer (Thermo Delta V Advantage)

Microbiology

Microbial community fixation, dehydration and imaging of modern and calcified microbial structures using environmental SEM

Exopolymeric substance quantification using a phenol-sulfuric acid method

DNA extraction via a FastDNA spin kit for Soil

DNA amplification using polymerase chain reaction using a Mastercycler gradient thermocycler (Eppendorf)

DNA imaging using multicapillary gel electrophoresis

FIELDWORK AND TRAINING

2020 Water and sediment sampling of modern coastal environments (Abu Dhabi, UAE)

2019 Mapping and regional tectonism (Carboneras, Spain)

Seawater and sediment sampling of modern lagoons (Abu Dhabi, UAE)

Devonian carbonate successions (North Rhine-Westphalia, Germany)

Distribution and geochemistry of modern and Recent carbonates (Eleuthera, Bahamas)

2018 Mapping and regional tectonism (Carboneras, Spain)

Transect sampling of seawater and sediments from proximal to distal settings (Abu Dhabi, UAE)

International Sedimentological Congress field course: Upper Ordovician Taconic foreland succession (Quebec, Canada)

- 2017 Assessing the significance of dolomitized limestone archives (German research foundation collaborative project, Latemar, Italy)
Examining hardground formation in coastal environments (Abu Dhabi, UAE)
- 2015 CSL field course. Lateral and vertical heterogeneity of carbonate facies in platform margin complexes (Eleuthera, Bahamas)
- 2014 Quaternary Depositional Systems of the East Texas Coast and Shelf: Analogs for Ancient Deposits (AAPG field trip, Houston, TX)
Sequence Stratigraphy short course by SEPM and ExxonMobil (Houston, TX)
- 2012 Microbialite analysis within the Exumas, Bahamas. Stromatolite and salt pond sampling, analysis of microbial structures and processes (Darby Island, Bahamas)
Field course. Late Cambrian and Cambrian Microbial Carbonates (Death Valley, CA)
- 2011 Marine ecology field work looking at diversity and competition (Bimini, Bahamas)
Drilling of cores on various island terraces, with outcrop-based stratigraphy (Dominican Republic)
Tropical ecology and diversity field course (Costa Rica)

EXTRACURRICULAR ACTIVITIES

Soccer; VfL Bochum (2018), University of Miami Women's Varsity Soccer (2007-2009),
NCAA Scholar Athlete (2007-2009)
PADI scuba certified
Yoga alliance certified instructor
Habitat for Humanity volunteer
Beach volleyball