Leopoldina
Nationale Akademie
der Wissenschaften

Curriculum Vitae Professor Dr Alexandra Zoe Worden

Image: Tony Rinaldo

Name: **Alexandra Zoe Worden**
Date of birth: **June 1970**

Research Priorities: Ocean photosynthesis, plankton ecology, climate change, biogeochemical cycling, microbial interactions

Alexandra Zoe Worden is an American oceanographer, marine biologist and genome scientist. She researches the function and productivity of marine algae, microbial biogeochemical cycling, and microbial interactions in ocean ecosystems. Her core aim is understanding photosynthetic processes and fate of microbial cells (carbon) in the marine environment. She seeks to discover the effects of climate change on marine microbes – and the biochemical services they provide and to enable activity-based studies in the challenging ocean environment develops innovative methodologies and technologies. Her studies are contextualized within the background of earth history, evolutionary biology, and the molecular biology underpinning cell-to cell interactions.

Academic and Professional Career

since 2022	Senior Scientist Adjunct, Marine Biological Laboratory (MBL), Woods Hole, USA
since 2021	Fellow and Group Lead, Max Planck Institute for Evolutionary Biology, Ploen, Germany
since 2018	Head, Ocean EcoSystems Biology Research Unit, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany
since 2018	Professor of Ecology, GEOMAR Helmholtz Centre for Ocean Research, Kiel, Germany and Kiel University, Kiel, Germany
since 2015	Professor Adjunct, Ocean Sciences Department, University of California Santa Cruz (UCSC), Santa Cruz, USA
2011 - 2015	Associate Professor Adjunct, Ocean Sciences Department, UCSC, Santa Cruz, USA

2007 - 2020	Scientist (with promotion to Senior Scientist), Monterey Bay Aquarium Research Institute (MBARI), Moss Landing, USA
2007 - 2010	Assistant Professor Adjunct, Ocean Sciences Department, UCSC, Santa Cruz, USA
2004 - 2007	Assistant Professor, Rosenstiel School of Marine and Atmospheric Sciences (RSMAS), University of Miami, Coral Gables, USA
2004	Visiting Scholar, Station Biologique Roscoff, Roscoff, France
2000 - 2003	Postdoctoral Fellow, Scripps Institution of Oceanography, La Jolla, USA
2000	Ph.D. in Ecology, Odum School of Ecology, University of Georgia, Athens, USA
1994 - 2000	Doctoral Student, Odum Institute of Ecology, University of Georgia, Athens, USA
1993 - 1994	Research Technician, Massachusetts Institute of Technology, Cambridge, USA
1992 - 1994	Teaching Fellow, Harvard University und HU Extension School, Cambridge, USA

Functions in Scientific Societies and Committees

2022 - 2024	Co-Chair, Meeting “Comparative genomics of unicellular eukaryotes: Interactions and symbioses”, European Molecular Biology Organization (EMBO)
2017 - 2018	Member, Meeting Program Committee, International Society of Photosynthesis Research
2016 - 2017	Member, Program Committee, General Meeting, American Society for Microbiology
2016 - 2020	Member, Advanced Panel, European Research Council
since 2015	Member, Advisory Council, International Consortium for a Unified Taxonomy of Eukaryotes (UniEuk)
since 2015	Member, Editorial Board, ASLO Aquatic Science Meeting, Granada, Spain

Project Coordination, Membership in Collaborative Research Projects

2021 - 2026	Project, “Eastern Mediterranean Sea as a model for Future Ocean Research (EMS FORE)”, German-Israeli International Laboratory: The Early-Warning Model-System for Our Future Oceans, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany
2020 - 2025	Project, “Bermuda Institute of Ocean Sciences – Simons Collaboration on Ocean Processes and Ecology (BIOS-SCOPE)”, Simons Foundation International, New York City, USA
2018 - 2023	Project, “Coherent Lagrangian Pathways from the Surface Ocean to Interior (CALYPSO)”, Office of Naval Research, USA

2016 - 2023 Dimensions Collaborative Program, “Functional and genomic diversity in vitamin metabolism and impacts on plankton networks and productivity”, National Science Foundation, USA

2013 - 2023 Investigator Award, Marine Microbiology, Gordon and Betty Moore Foundation, Palo Alto, USA

Honours and Awarded Memberships

since 2022 Member, German National Academy of Sciences Leopoldina, Germany

2022 - 2023 Scholar, Department of Organismic and Evolutionary Biology, Harvard University, Cambridge, USA

2021 - 2022 Fellow, Radcliffe Institute for Advanced Study, Harvard University, Cambridge, USA

2020 Visiting Scholar, Woods Hole Oceanographic Institution, Woods Hole, USA

2016 Fellow, American Academy of Microbiology, USA

2015 - 2016 Fellow, Marine and Climate Research, Hanse-Wissenschaftskolleg, Delmenhorst, Germany

2013 - 2023 Investigator in Marine Microbiology, Gordon and Betty Moore Foundation, Palo Alto, USA

2011 - 2017 Senior Fellow, Canadian Institute for Advanced Research (CIFAR), Toronto, Canada

2009 - 2010 Scholar, Integrated Microbial Biodiversity Program, CIFAR, Toronto, Canada

2004 - 2008 Young Investigator in Marine Microbiology, Gordon and Betty Moore Foundation, Palo Alto, USA

2003 Women’s International Science Collaboration Award, American Association for the Advancement of Science (AAAS), USA

2000 - 2002 Postdoctoral Fellowship, Microbial Biology, National Science Foundation (NSF), USA

1996 - 1999 Graduate Student Fellowship, Earth Systems Science, National Aeronautics and Space Administration (NASA), USA

Research Priorities

Alexandra Zoe Worden is an American oceanographer, marine biologist and genome scientist. She researches the function and productivity of marine algae, microbial biogeochemical cycling, and microbial interactions in ocean ecosystems. Her core aim is understanding photosynthetic processes and fate of microbial cells (carbon) in the marine environment. She seeks to discover the effects of climate change on marine microbes – and the biochemical services they provide and to

enable activity-based studies in the challenging ocean environment develops innovative methodologies and technologies. Her studies are contextualized within the background of earth history, evolutionary biology, and the molecular biology underpinning cell-to cell interactions.

Worden's research has focused on ocean algae, a diverse group of organisms that are collectively responsible for approximately half of the global uptake of atmospheric carbon dioxide. These organisms also form the base of marine food chains. Climate change is expected to have a major impact on marine algae and therefore it is essential that knowledge of the mechanisms and controls of microbial dynamics in marine ecosystems is rapidly advanced – with attention to carbon transfer – and photosynthetic processes. She develops methods for investigating uncultivated marine microbes in the wild, and their role in the carbon cycle. In addition, she continues to develop a genetic model system that speaks both to developments in modern ocean algae as well as the evolution of land plants.

Worden's team therefore is highly interdisciplinary, combining microbial ecology with studies of algal evolution, the interaction between microbes and ecosystems, and molecular acclimation mechanisms. From a methodological perspective her research spans genetics, microbiology, ecology, oceanography, and biochemistry. More broadly, research in her lab is approached from an evolutionary perspective and with a focus on cell-to-cell interactions and host-virus dynamics.

Worden has led and regularly participates in international expeditions. These field programs examine, for example, carbon processing in deep sea sediments and photosynthetic and export processes that occur in overlying sunlight regions of the water column. To this end, she also performs research in the Caribbean Sea, the Bay of Bengal, the Mediterranean Sea, the North Atlantic and other global sites, including Antarctica. Her studies further extend to microbial communities in corals, mangroves and extreme environments.