



Curriculum Vitae Professor Dr Susan Trumbore

Name: Susan Trumbore
Born: 23 January 1959

Research Priorities: Climate change, materials cycle, mineralisation, cultivation, accelerator mass spectrometry, sustainable agriculture

Susan Trumbore is a US-American geologist. She researches the ecosystems of earth, where her focus lies on the role of soils and vegetations for these cycles. She investigates how different forms of cultivation and species communities affect the amount of carbon storage in the soil. Here, she wants to understand how land use and climate mutually affect each other. With her findings she, wants to contribute to the development of sustainable strategies in agriculture.

Academic and Professional Career

- since 2013 Honorary Professor, Faculty of Chemistry and Earth Sciences, Friedrich-Schiller-University Jena, Jena, Germany
- since 2009 Director and Scientific Member, Max-Planck-Institute for Biogeochemistry, Jena, Germany
- 2000 - 2009 Professor for Earth System Science, University of California, Irvine (UCI), Irvine, USA
- 1996 - 2000 Associate Professor, UCI, Irvine, USA
- 1991 - 1996 Assistant Professor, UCI, Irvine, USA
- 1989 - 1991 Post-doctoral Researcher, Center for Accelerator Mass Spectrometry, Lawrence Livermore Laboratory, Livermore, USA, Lamont-Doherty Earth Observatory, Columbia University, New York City, USA and Eidgenössische Technische Hochschule (ETH) Zürich, Zurich, Switzerland
- 1989 PhD in Geochemistry, Columbia University, New York City, USA
- 1977 - 1981 Studies in Geology, University of Delaware, Newark, USA

Functions in Scientific Societies and Committees

- 2005 Chair, Nominating Committee, Section Geology and Geography, American Association for the Advancement of Science (AAAS), USA
- 2004 - 2006 Member, Steering Committee, Visiting Scientist Program, University Corporation for Atmospheric Research (UCAR), Boulder, USA
- 2004 - 2005 Member, Committee on Metrics for Global Change Research Nuclear Regulatory Commission (NRC), USA
- 2002 - 2005 Member, Nominating Committee, Section Geology and Geography, American Association for the Advancement of Science (AAAS), USA
- 2002 - 2004 President, Section Biogeochemistry, American Geophysical Union (AGU), USA
- 2000 - 2001 Member, Committee on Global Environmental Change, AGU, USA
- 1996 - 2000 Member, Paleoceanography and Paleoclimate Committee, AGU, USA
- 1994 - 1997 Member, Editorial Board, Geology Magazine

Project Coordination, Membership in Collaborative Projects

- since 2019 Cluster of Excellence (EXC) 2051 "Balance of the Microverse", German Research Council (DFG), Germany
- since 2014 Project "Nonlinearities and Alternative States of Biogeochemical Cycling in Terrestrial Ecosystems", DFG, Germany
- since 2013 Subproject "INFRA2", Integrated Research Training Group "AquaDiva", Collaborative Research Centre (SFB) 1076, DFG, Germany
- since 2013 Subproject "FLUX 3 – Sources and Sinks of Gases in the Earth's Critical Zone: In situ Sensors and Isotopic Constraints", SFB 1076, DFG, Germany
- since 2011 Subproject "Impact of land-use of functional diversity and stability of grassland communities in fragmented landscapes", Priority Programme (SPP) 1374, DFG, Germany
- since 2010 Research Unit (FOR) 1451 "Exploring mechanisms underlying the relationship between biodiversity and ecosystem functioning", DFG, Germany
- since 2009 Coordinator for Germany, Project "Atto-Amazon Tall Tower Observatory", Federal German Ministry of Education and Research (BMBF), Germany, and Ministry of Science, Technology and Innovation (Ministério da Ciência, Tecnologia e Inovação), Brasil
- since 2007 Graduate School (GSC) 214 "Microbial Communication", Jena, DFG

2006 - 2015 Research Training Group (GRK) 1257 “Alteration and Element Mobility at the Microbe-mineral Interface”, DFG, Germany

Honours and Awarded Memberships

2022 William Kaula Award, AGU, USA

2021 Vladimir Ivanovich Vernadsky Medal, European Geosciences Union (EGU)

2020 Balzan Prize for Earth System Dynamics, International Balzan Prize Foundation, Milan, Italy

2018 Benjamin Franklin Medal, Franklin Institute, Philadelphia, USA

since 2015 Member, German National Academy of Sciences Leopoldina, Germany

since 2010 Member, National Academy of Sciences, USA

Research Priorities

Susan Trumbore is a US-American geologist. She researches the ecosystems of earth, where her focus lies on the role of soils and vegetations for these cycles. She investigates how different forms of cultivation and species communities affect the amount of carbon storage in the soil. Here, she wants to understand how land use and climate mutually affect each other. With her findings, she wants to contribute to the development of sustainable strategies in agriculture.

Soils are the biggest terrestrial repository for carbon and one of the most important natural sources for carbon dioxide (CO₂) in the atmosphere. The amount of greenhouse gases that are deposited or released depends, amongst other things, on the mixture of the soil and the concentration of organic substances. Together with her team, Susan Trumbore researches how climatic and environmental changes bear on the concentration of carbon in soils.

For example, she wants to find out whether a warming climate accelerates degradation processes under ground and releases more CO₂. Dead plant matter, which is decomposed by soil inhabitants, is the most important supplier of carbon dioxides in the ground. These microorganisms alter the carbon in the ground to CO₂ (mineralisation). The team around Susan Trumbore found that the mineral composition of the soil plays a special role for carbon-retainment. Soils, in which the carbon is largely bound to minerals, emit less CO₂.

To trace the path of carbon in the soil, Susan Trumbore developed new research methods. She marked plants with stable isotopes (¹²C, ¹³C). The isotope ratio remains constant during the process of degradation. With that, she can determine the ‘plantal’ amount of carbon and thereby compare the degradation processes by various soil organisms. She further employs accelerator mass spectrometry (AMS) to determine the median age of the carbon on soil-samples. In experiments, she attempted to mobilise mineral-bound carbon in order to remove it.

During further research she analysed the dependence of CO₂-Emission from the soil to temperature, moisture, and various other soil qualities. She asks how different land use, vegetation, forms of cultivation, fertilization, and species communities bear on the retainment of carbon within the soil.

Furthermore, Susan Trumbore researches whether the efficiency of carbon retainment in tropical forests can be altered. She investigates the mechanism of drought-induced forest decline and the role of biodiversity in the material cycle of the elements. Susan Trumbore conducts her research globally. With her work, she wants to contribute to the development of sustainable strategies in agriculture.