The J. Robert Beyster and Life Technologies 2009-2010 Research Voyage of the Sorcerer II Expedition

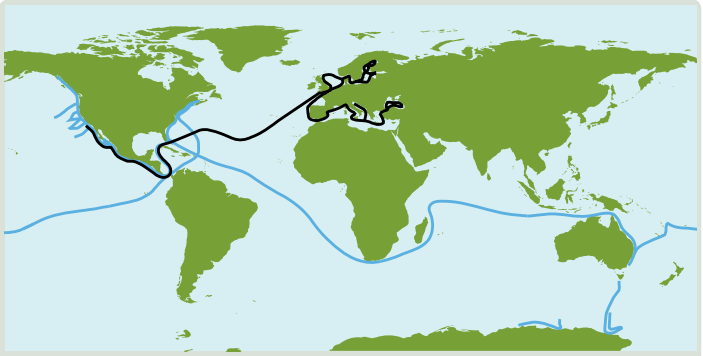
A global ocean sampling voyage of genomic discovery in the Baltic, Black, and Mediterranean Seas

Fact Sheet

Having successfully completed a circumnavigation of the global oceans, conducted ongoing sampling in waters off California and the west coast of the United States, and carried out sampling with other collaborators in extreme conditions such as Antarctica and deep sea ocean vents, Sorcerer II and Dr. J. Craig Venter are setting sail again to the waters of Europe. This two year leg of the Sorcerer II Expedition, funded by generous donations from the Beyster Family Foundation Fund of The San Diego Foundation and Life Technologies, will explore the microbial life in the waters of the Baltic, Black and Mediterranean Seas—bodies of water that are of scientific interest because they are among the world's largest seas isolated from the major oceans and therefore will likely contain unique microbial communities.

Objective

The Expedition's goal is to evaluate the microbial diversity in the world's oceans using the tools and techniques developed to sequence the human and other organisms' genomes. With a better understanding of marine microbial biodiversity, scientists will be able to understand how ecosystems function and to discover new genes of ecological and evolutionary importance. The JCVI will be using tools, reagents and other materials from Life Technologies to analyze the data from this voyage.



2003 – 2008 Routes 2009 – 2010 Routes

Sampling Route

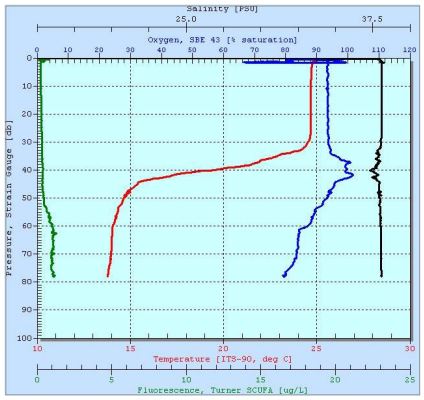
The Sorcerer II departed her home dock in San Diego, California on March 19, 2009. She is sailing south sampling along the coast of Mexico, and through the Panama Canal. From Panama, she will head north for a brief stopover in Florida and then off to Bermuda, the Azores, and landing in Plymouth, England for a week of sampling and collaborations with the Plymouth Marine Laboratory. The vessel will then head to the Baltic Sea where she and her crew will spend considerable sampling the waters in the Swedish Archipelago, and in the waters of Finland, Denmark, Norway, Estonia and other Baltic countries. In 2010 the Sorcerer II will head to the Black and Mediterranean Seas.

Funding for 2009-1010 Expedition

Beyster Family Foundation Fund at The San Diego Foundation has donated funds for the costs associated with Sorcerer II Expedition. Life Technologies and other anonymous donors are providing matching funds.

Beyster Family Foundation Fund · The San Diego Foundation · life technologies FOUNDATION · J. Craig Venter INSTITUTE

Collaborators to Date



The Sorcerer II Expedition research team, led by Dr. Venter, is a multidisciplinary team of microbiologists, bioinformatics specialist, and DNA sequencing staff at the JCVI. In addition, host country collaborators in each region complement the expertise for sampling and analysis. For the Beyster-Life Technologies Voyage of the expedition, Dr. Venter and his team will be collaborating with a variety of in country experts including those at the Plymouth Marine Laboratory, Stockholm University, Kalmar University, University of Helsinki, Danish National Environmental Research Institute, University of Tartu, and CIESM (the Mediterranean Science Commission).

Countries Visiting

Mexico, Panama, Nicaragua, El Salvador, Guatemala, Bermuda, Azores, United Kingdom, Netherlands, Denmark, Norway, Sweden, Finland, Estonia, Latvia, Germany, Spain, Portugal, Italy, and Greece.

Permits

Permits to conduct sampling have been secured for: Guatemala, Panama, Mexico, El Salvador, Nicaragua, Bermuda and the United Kingdom. Work is ongoing to secure permits to sample in the other countries the Sorcerer II will visit.

Sorcerer II Onboard Team

The Sorcerer II has a permanent professional sailing crew of four and an onboard expedition coordinator along with Dr. Venter and at least one other JCVI scientist. Additional collaborator and in country scientists are often onboard. The Sorcerer II's new sailing crew is led by long-standing Captain Charlie Howard, and includes: Jeff Hoffman, Sarah Dyste, Karolina Ininbergs, John Henke, and Jeremy Niles.

Sorcerer II Global Sampling Expedition History

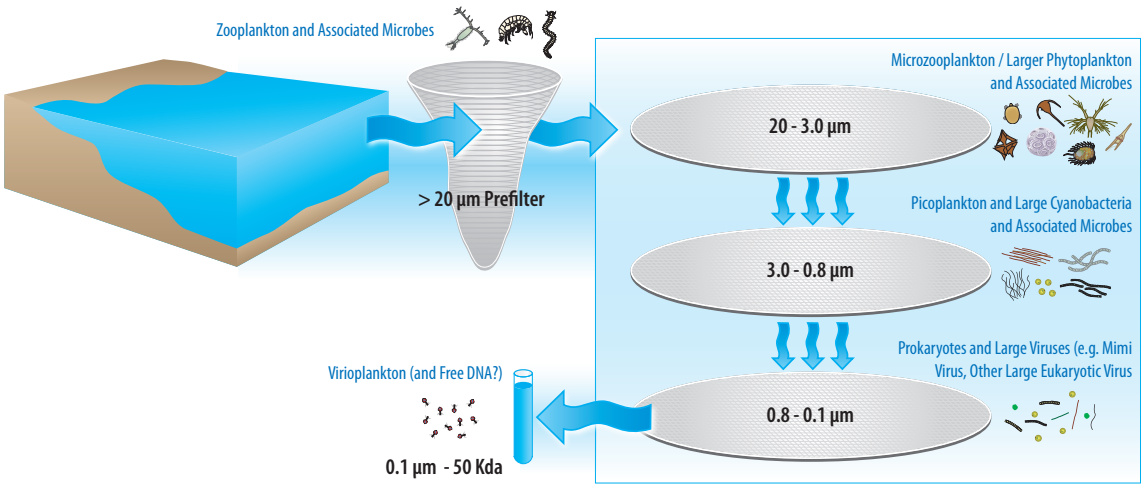
The Genesis of the Expedition

A scientific expedition of discovery that was inspired by the voyages of Darwin on the H.M.S. Beagle and Captain George Nares on the H.M.S. Challenger during the 19th Century. Following in their footsteps, the first Sorcerer II Expedition circumnavigated the globe for more than two years, spanning nearly 32,000 nautical miles, visiting 23 different countries and island groups on four continents.

The scientific goals and ideas sprung from the sequencing and analysis of *Methanococcus jannaschii,* by Dr. J. Craig Venter and his research team after the organism was isolated from a hot, deep sea vent in the Pacific. *M. jannaschii* is from the Archeal branch of life and is also known as an autotroph, in that it makes all it needs for survival from carbon dioxide, nitrogen, and hydrogen in water. This stimulated Dr. Venter's thinking that there was obviously an unknown and unseen world in the oceans that could be vital to better understanding diversity on the planet. As well, he and the team knew this work could potentially solve some of the planet's growing environmental issues, such as climate change.

Methodology for Water Sampling

Scientists take a 200 to 400 liter seawater sample approximately every 200 miles as the vessel sails. In certain coastal areas, additional samples are taken to complement the ongoing studies of regional scientists. The collected water then passes through a series of progressively smaller filters to capture microorganisms of various sizes onto filter paper. The filtered samples are immediately frozen to prevent degradation and are shipped to the J. Craig Venter Institute (JCVI) laboratories in Rockville, MD and San Diego, CA where scientists extract the microorganisms' genomic DNA, analyze it and store the information in computer databases. Using precise mathematical algorithms, researchers are able to reassemble by computer the DNA code of genes and large sections of genomes from the diverse microbial communities found in the ocean.



Beyster Family Foundation Fund
The San Diego Foundation
A foundation for your passion
life technologies FOUNDATION
J. Craig Venter INSTITUTE