DATA MANAGEMENT PLAN
Generated with the BCO-DMO DMP Tool

DATA POLICY COMPLIANCE
We will comply with the data management and dissemination policies described in the NSF Award and Administration Guide and the NSF Division of Ocean Sciences Sample and Data Policy.

PRE-CRUISE PLANNING
Pre-cruise planning will be done via teleconferencing and email. Sampling will be performed primarily with a CTD / niskin rosette modified to accomodate high-pressure sampling bottles. Detailed plans for the sampling locations, depths, and water allocation will be specified in an excel spreadsheet and distributed to all cruise participants ahead of time. Actual sampling events will be recorded on paper logs (scanned into PDFs) and an excel spreadsheet in real time.

DESCRIPTION OF DATA TYPES
The project will include the collection of physical samples, as well as observational and experimental datasets, as described below. Samples and data will be collected on several expeditions, one in the Mediterranean Sea (*R/V Antedon II*), one in the Northeastern Pacific Ocean (*R/V Sally Ride*), and 2-3 in Monterey Canyon (*R/V John H. Martin*).

Physical samples:

- **Deep-sea microbial cells:** Cells will be collected and preserved by filtering seawater onto 0.2 um filters and either (1) freezing at -80C or (2) fixing with paraformaldehyde. Respository: Dekas Laboratory, excess samples available upon request.
- **Deep-sea water:** Water will be filtered through 0.2 um filters to remove cells and frozen at -20C. Repository: Dekas Laboratory, excess samples available upon request.

Observational Datasets:

- **CTD and Niskin bottle data:** CTD data will be collected using a Seabird SBE CTD package and processed using Seabird's software. Data will include standard environmental measurements (e.g., pressure, temperature, salinity, fluorescence, oxygen). Files types: Raw (.con, .hdr, .hex, .bl) and processed (.cnv, .asc, .btl) ASCII files. Repository: BCO-DMO.
- **Event log:** Detailed summary of all sampling events including event numbers, start/end times, locations, and notes. File types: paper files scanned to PDF and a summary file in .xlsx. Repository: BCO-DMO.
- **Cruise underway data:** Underway data collected along the ship's track including all standard sea surface measurements (temperature, salinity, fluorescence, etc.). File types: .csv and ASCII. Repository: BCO-DMO.
- **Seawater geochemistry/nutrients:** Concentrations of bio-relevant chemical species such as ammonium, nitrate, nitrite and urea will be measured in filtered seawater using colorimetric/fluorometric assays and data compiled into an Excel spreadsheets. File types: .xlsx. Repository: BCO-DMO.
- **DNA and RNA sequencing:** Metagenomes, metatranscriptomes, and 16S rRNA gene amplicon sequences will be obtained from samples frozen immediately after collection. File types: short-read archive (.sra) and .fasta files. Repository: NCBI Genbank. Bioproject accession numbers will be submitted to BCO-DMO.
- **Epifluorescence Microscopy:** Cells will be imaged after DAPI staining and/or fluorescence *in situ* hybridization with a Nikon TIE Inverted Epifluorescence Microscope running NIS-Elements software

with deconvolution. Cell count, morphology, and area will be extracted from images. File types: .nd2, .jpg, and .xlsx. Repository: Dekas lab for .nd2 files, BCO-DMO for .jpg and .xlsx files.

Experimental Datasets:

Stable isotope incubations: Seawater amended with stable isotopes will be incubated at both in situ pressure and sea-level pressure. The following datasets will be generated.

- **Stable-isotope incorporation:** Isotopic imaging and quantification of single-cells will be carried out by nanoSIMS analysis. File types: .im, .xlsx. Repository: Dekas Lab for .im files, BCO-DMO for .xlsx files.
- **Metabolic rates:** Rates of total anabolic activity, chemoautotrophy, and heterotrophy (determined by uptake of isotopically-labelled substrates), aerobic heterotrophy (net consumption of O2) and nitrification (evolution of 15NO3- from 15NH4+) will be determined and recorded in Excel spreadsheets. File types: .xlsx. Repository: BCO-DMO.
- **Geochemistry/nutrients:** Same as in Observational datasets.
- **Epifluorescence Microscopy:** Same as in Observational datasets.

DATA AND METADATA FORMATS AND STANDARDS
Metadata will be collected and reported according to BCO-DMO conventions (using the BCO-DMO metadata forms) and will include date, time, lat, long, depth, etc., as appropriate, and descriptions of collection and analysis procedures. Any data points with questionable accuracy for any reason will be flagged and additional information provided.

DATA STORAGE AND ACCESS DURING THE PROJECT
Data will be generated on individual laboratory and personal computers and then transferred to a shared group account on Stanford Google Drive (unlimited storage) for storage and cross-group accessibility. Individual and laboratory computers are continuously backed-up with Stanford Crash Plan and/or Apple Time Machine to external hard-drives.

MECHANISMS AND POLICIES FOR ACCESS, SHARING, RE-USE, AND RE-DISTRIBUTION
Cruise data will be deposited to BCO-DMO immediately after return, and other datasets will be submitted to NCBI and BCO-DMO (along with complete metadata forms) upon submission of publications or the end date of the project, whichever is sooner. We will work with the BCO-DMO managers to ensure compliance with the OCE Sample and Data policy and the BCO-DMO Terms of Use. Data and samples collected under this project can be made publicly available without restriction. Data produced in this project may be of interest to biological and chemical oceanographers, environmental microbiologists, marine biogeochemists, and climate scientists. The metabolic rates may be of interest to marine and climate modelers, and the DNA and RNA sequencing data may be mined by bioinformaticians to further explore the metabolic potential of marine microorganisms.

PLANS FOR ARCHIVING
Both NCBI and BCO-DMO are long-term repositories where the data will be preserved and accessible.

ROLES AND RESPONSIBILITIES
PI Dekas will lead the data deposition and archiving effort and be responsible for proper data management. All members of the team will be involved in the preparation of both data and metadata files for deposition into repositories.