Our mission is to explore life beneath the seafloor and make transformative discoveries that advance science, benefit society, and inspire people of all ages and origins.

This document serves as the manual for operations at C-DEBI, covering the main activities in research, education, outreach, and administration. It is a ‘living document’ that can and will be revised as necessary and appropriate. This manual highlights the main functions of key individuals and groups, and summarizes only the most important activities in the Center; it does not provide detailed information on every aspect. Also, it gives only a brief introduction to the mission and major objectives of C-DEBI—for more detail, go to www.darkenergybiosphere.org.

1. **Personnel**
   - Directorship; Executive Committee; Administration; Senior Scientists; Knowledge Transfer, Data Management and Integration; Education, Outreach, and Diversity Administration; External Advisory Board; Ethics Panel; External Evaluator; Education and Outreach Steering Committee

2. **Science and Technical Operations**
   - Research Themes; Developing External Funding Proposals for C-DEBI Projects; C-DEBI Communications and Community Engagement; Technology, Resources and Facilities

3. **Education and Diversity**
   - Postdoctoral Researchers and Graduate Students; Undergraduate Students; High School Students; Teachers

4. **Professional Development for Graduate Students and Postdoctorals**
   - Primary Advisor; C-DEBI Program

5. **Outreach**
   - Small Education and Outreach Grants; Teacher-at-Sea Programs; Ship-to-Shore Programs; Ad Hoc Public Talks and General Publications; Exhibition Booths at National Meetings; Networked Speaker Series; Newsletter and Email List

6. **Grants and Fellowships**
   - Small Research Grants; Graduate Student and Postdoctoral Fellowships; Small Education & Outreach Grants; Travel Grants; Reporting Requirements

7. **Meetings**
   - Admin Meetings; ExCom Meetings; Site Review; Annual Meeting

8. **Ethics**

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1. **Personnel**

C-DEBI has an international membership of more than 900 people from approximately 30 countries, with the majority being at U.S. educational and research institutions. Members have expertise in microbiology, geochemistry, geophysics, hydrogeology, engineering, education, science communication, and related fields and disciplines. C-DEBI members include K-12 students and teachers, undergraduate and graduate students, postdoctoral researchers, technicians, engineers, research scientists, and junior and senior faculty.

Our management plan facilitates the achievement of the principal scientific, education, and diversity goals of C-DEBI. We maintain a simple hierarchy in the management structure (rectangles below) with several
advisory groups (ovals below) to encourage communication and collaboration, as well as provide transparency in decision-making.

1.1. Directorship
The Center is led by the Director and Associate Director.

Director, Jan Amend (USC)
The Director is responsible for overall C-DEBI coordination and performance. He provides leadership in C-DEBI scientific, education, diversity, outreach, and administrative activities; he represents C-DEBI in interactions with USC administration and funding agencies; and he promotes the Center worldwide. The Director is a member of ExCom and works closely with the Managing Director at USC.

Associate Director, Julie Huber (MBL)
The Associate Director is the ‘right hand’ of the Director; she assumes all responsibilities and powers of the Director should he, for any reason, be unable to carry out his duties. Together with the Managing Director, she coordinates the grants program and communicates with grant recipients about outcomes, products, and dissemination of results. The Associate Director is a member of ExCom.

1.2. Executive Committee (ExCom)
ExCom manages, supports and leads the direction of the Center’s science initiatives. ExCom also provides guidance to integrate research, education, and data across the Center. ExCom coordinates with the Senior Scientists on C-DEBI research directions. ExCom generates calls for proposals and serves with the Senior Scientists as the review panel, with mechanisms to avoid conflict-of-interest.

ExCom consists of seven permanent members and two rotating members. The permanent members are Director and PI Jan Amend (USC), Associate Director and co-PI Julie Huber (MBL), co-PI Steven D’Hondt (URI), co-PI Andrew Fisher (UCSC), co-PI C. Geoffrey Wheat (U Alaska-Fairbanks), Data Management Director John Heidelberg (USC), and Education Director Stephanie Schroeder (USC). The rotating members consist of Senior Scientists serving 15-month terms (currently Steven Finkel (USC) and Victoria Orphan (CalTech)).

ExCom maintains communication via weekly videoconference meetings, an annual face-to-face meeting, and ad hoc meetings at selected C-DEBI, national and international meetings, with participation by the Managing Director and as needed by members of the Administration; Research; Knowledge Transfer, Data Management and Integration; and Education, Outreach and Diversity Teams.
1.3. Administration
The administrative staff, led by the Managing Director, is at USC, where they manage the Center’s day-to-day activities. They link to C-DEBI activities at the partner institutions and communicate with all participants worldwide.

Managing Director, Rosalynn Sylvan (USC)
The Managing Director manages fiscal matters and grants administration and oversees the administrative staff. The Managing Director attends the weekly ExCom videoconference meeting and any other face-to-face ExCom meetings as the administrative liaison.

Data Manager, Matthew Janicak (USC)
The Data Manager is responsible for supporting the database infrastructure and development and maintenance of the website and other community communications. The Data Manager is also a member of the Data Management and Integration team (see Data Management and Integration below).

Administrative Assistant, Nerissa Rivera (USC)
The Administrative Assistant implements day-to-day activities of the center and is responsible for meeting coordination.

1.4. Senior Scientists
We have transitioned to three new research themes related to the renewal phase to encourage synthesis and integration across themes and sites. Five Senior Scientists were added to C-DEBI leadership to complement the co-PI expertise on these themes: Fluxes, Connectivity, and Energy (Theme 1); Activities, Communities, and Ecosystems (Theme 2); and Metabolism, Survival, and Adaptation (Theme 3). The Senior Scientists are Steven Finkel (USC), John Heidelberg (USC), Beth Orcutt (Bigelow), Victoria Orphan (CalTech), and Alfred Spormann (Stanford).

1.5. Knowledge Transfer, Data Management and Integration
Knowledge Transfer is central to all of C-DEBI’s research, education, and outreach programs, and hence, it is the responsibility of all our senior personnel. The Data Management and Integration (DMI) team has the primary objective to make C-DEBI data and products accessible to the world via a data portal.

Knowledge Transfer Director, C. Geoffrey Wheat (UAF)
The Knowledge Transfer Director coordinates and tracks the various knowledge transfer activities, with a special focus on dissemination of scientific and technical knowledge, increasing public awareness of the subseafloor biosphere, and promoting development and application of novel technologies through commercialization and entrepreneurial use of C-DEBI products.

Data Management and Integration Director, John Heidelberg (USC)
The DMI Director leads the DMI effort, with support from personnel at USC and URI. The DMI Director is also responsible for ensuring that C-DEBI participants have access to the Center’s computational resources and/or bioinformatics expertise, as well as making certain C-DEBI generated data are properly deposited in public archives and databases, including future EarthCube initiatives.

The DMI team supporting the database infrastructure and website includes Data Manager Matthew Janicak (USC), Data Portal Lead Robert Pockalny (URI), and Bioinformatics Postdoctoral Researcher Benjamin Tully (USC).
1.6. **Education, Outreach, and Diversity (EOD) Administration**
The EOD team is based at USC and develops, implements, and coordinates EOD programs and activities.

**Education Director, Stephanie Schroeder (USC)**
The Education Director provides oversight, leadership, and commitment to the integration of C-DEBI research with our EOD efforts at all levels. The Education Director also leads the professional development and mentoring efforts for undergraduate and graduate students, postdoctoral scholars, and K-12 teachers, as well as serves as review chair of the small education and outreach grants proposals.

**Diversity Director, TBN (USC)**
The Diversity Director leads programs to entrain members of underrepresented groups into STEM fields with a special focus on microbiology, geochemistry, and oceanography. The Diversity Director reports to the Education Director.

**Senior Advisor for EOD, Linda Duguay (USC)**
The Senior Advisor for EOD advises on the integration of C-DEBI research with our EOD efforts at all levels.

**Summer Undergraduate Course Instructors**
The Global Environmental Microbiology (GEM) Summer Course Instructors develop, manage and teach the course with assistance from the Diversity Director. The current instructors are John Heidelberg (USC), Eric Webb (USC), and Paige Connell (USC Teaching Assistant).

1.7. **External Advisory Board (EAB)**
The External Advisory Board provides annual assessments of the science, education, mentoring, management, and functioning of C-DEBI as a whole to the Directorship. The EAB is invited to participate in annual C-DEBI meetings, such as the NSF Site Review and the Annual Meeting. The membership of the EAB is changed by ExCom as needed and appropriate. The committee consists of national and international leaders in both science and education including chair Susan Humphris (WHOI), Doug Bartlett (Scripps), Jon Kaye (Moore Foundation), Rina Roy (American River College), and Judy Wall (University of Missouri).

1.8. **Ethics Panel**
The Ethics Panel advises ExCom on any issue pertaining to ethics, including concerns regarding administration, funding, and scientific conduct. This Panel handles all C-DEBI ethics complaints and convenes electronically or in person on an ‘as needed’ basis or on request of ExCom. The panel also makes recommendations to ExCom with respect to ethics training programs for C-DEBI members. The Ethics Panel consists of Chair Karen Lloyd (Assistant Professor at U Tennessee), Frederick Colwell (Professor at Oregon State), Andrew Fisher (ExCom), Sharon Cooper (Associate Education Director at Consortium for Ocean Leadership), and William Orsi (Postdoctoral Researcher at WHOI), representing several groups within C-DEBI. To date, the committee has not received any ethical complaints. Membership on the Panel is changed by ExCom as needed and appropriate.

1.9. **External Evaluator**
The External Evaluator, Beth Rabin, assesses and evaluates the effectiveness of C-DEBI research (specifically the drilling expeditions), education, outreach, and diversity programs and provides thorough, rigorous, independent, and results-based assessments to ExCom.
1.10. Education and Outreach Steering Committee
The Education & Outreach Steering Committee serves in an advisory role to the EOD Administration and also helps to review the small education and outreach grant proposals. The committee consists of current or previous STC Education and Diversity Directors Sharnnia Artis (UC Berkeley), Diana Dalbotten (U Minnesota), Vanessa Green (Oregon Health & Science U), and Keith Oden (Georgia Tech).

2. Science and Technical Operations
Our research mission is to produce transformative, synergistic research through an inclusive collaborative culture that crosses disciplinary and institutional boundaries and is embedded throughout the Center’s activities.

2.1. Research Themes
C-DEBI Phase 1 major field programs are led by members of ExCom, while cross-cutting research themes are led by ExCom and the Senior Scientists. Co-PI Fisher leads the Juan de Fuca Ridge field program, Co-PI D’Hondt leads the South Pacific Gyre field program, and Co-PI Wheat leads the North Pond and Dorado Outcrop field programs. We have transitioned to three new research themes related to the renewal phase to encourage synthesis and integration across themes and sites:

**Theme 1: Fluxes, Connectivity, and Energy**—centering on subseafloor environmental conditions.
(1.1) Constrain the extent, variability, and controls on fluxes and connectivity within subseafloor biomes and between the subseafloor and the overlying ocean.
(1.2) Map the geochemical energy sources in subseafloor ecosystems at a range of spatial scales.
(1.3) Develop and test the next generation of coupled geochemical-hydrological-microbial models for subseafloor ecosystems.

**Theme 2: Activities, Communities, and Ecosystems**—emphasizing resident microbial communities.
(2.1) Determine community composition, functional potential, and patterns of natural selection in subseafloor ecosystems.
(2.2) Determine metabolic activity of subseafloor microbial communities.
(2.3) Advance understanding of subseafloor microbe-virus interactions.

**Theme 3: Metabolism, Survival, and Adaptation**—concentrating on the actions and traits of individual microbial species.
(3.1) Isolate and characterize novel bacteria and archaea from diverse subseafloor habitats.
(3.2) Examine fundamental physiology of subseafloor microbes under conditions of low growth rates and low energy flux.
(3.3) Perform adaptive evolution and long-term survival experiments with subseafloor microbes to characterize molecular genetic signatures associated with particular phenotypes.

2.2. Developing External Funding Proposals for C-DEBI Projects
C-DEBI researchers considering solicitation of external funding are encouraged to work within the community to develop highly competitive proposals and co-PI teams. C-DEBI may be able to facilitate these activities through: (a) topical workshops focusing on specific scientific and/or technical issues, (b) breakout sessions at C-DEBI meetings, (c) and support through C-DEBI travel awards, small grants, or fellowships. Internal C-DEBI calls for proposals are typically announced on the C-DEBI website, through regular newsletters, and through focused emails. See Grants and Fellowships Section 6.
2.3. C-DEBI Communications and Community Engagement

2.3.1. Research Themes and Field Programs Developments
C-DEBI is intended to add value to programs through opportunities for networking, cross-training of personnel, interdisciplinary collaboration, and adding new scientific components to existing and planned programs. It is essential that the leaders of the Research Themes and Field Programs keep the C-DEBI community informed of plans and research progress. This can be accomplished through the C-DEBI newsletter and website, oral and poster presentations at C-DEBI community meetings, at national and international scientific conferences and workshops, through departmental and other seminar presentations (including those to technical groups and the public at large), and peer-reviewed publications. In each case, it is also important that components of research that were supported or otherwise facilitated by C-DEBI be identified/acknowledged, and the C-DEBI logo, website URL, and other information be presented.

2.3.2. Prospectuses and Preliminary Reports
C-DEBI researchers who are lead investigators on Research Themes and Field Programs have an obligation to keep the community informed of project planning and progress, and to provide opportunities for other researchers and students to join in community efforts. To facilitate these goals, lead investigators should prepare a prospectus that describes project technical and scientific goals, logistics, and schedules in advance of significant activities (for example, a major research expedition, or a workshop intended to result in generation of proposals). In the case of a field program, the prospectus should be posted in time so that it can be referenced by those responding to a RFP for funding in support of related projects, including internal C-DEBI proposals and external proposals to bring in new resources. C-DEBI prospectuses will be posted on the web site and links will be provided when related RFPs are issued to the community.

Similarly, soon after completion of an expedition (or following completion of major components of a research effort), C-DEBI research teams should prepare and post for general release a preliminary report. This report should summarize primary expedition (or other research) activities, and indicate the nature of future plans and opportunities. C-DEBI preliminary reports will be posted at the STC web site.

2.3.3. Documenting Achievements
Funding agencies and foundations supporting C-DEBI Research Themes and Field Programs will have specific reporting requirements, but it is also important to document achievements in terms of value added through C-DEBI. See Reporting Requirements Section 6.5.
2.4. Technology, Resources and Facilities

Many C-DEBI researchers benefit from availability of expertise or specific technical capabilities developed through C-DEBI. These include borehole and seafloor sampling and measurement systems; systems for working with survey tools, submersibles, and ROVs; and custom or modified software used to address topics of specific interest to the STC. Some laboratories also contain instruments that were purchased and/or developed as a community resource, with access made available to community members. Several examples are listed below, full information at http://www.darkenergybiosphere.org/resources/shared.html.

2.4.1. CORK Technology

CORKs (Circulation Obviation Retrofit Kits) are deep biosphere observatories that seal cored boreholes at the seafloor, and enable researchers to deploy instruments, experiments, and sampling devices down inside the borehole, that can communicate with the surface through specialized sensors and fluid umbilical lines. Since the deployment of the first CORKs in 1990, components and technology have evolved to accommodate ambitious scientific objectives. Some of the early improvements are documented in IODP and other literature. Much of this technology will be posted on the C-DEBI website. In addition, a team of engineers and scientists from the community is developing a data, tool, and technology repository for CORK-related materials and products. Contact: Geoff Wheat

2.4.2. GeoMICROBE Sled and Mobile Pumping System

The GeoMICROBE Sled and Mobile Pumping System collect large volumes of basement fluids for a variety of geochemical and microbial studies through highly inert PVDF, Teflon or titanium components, permitting noncontaminating collection. The GeoMICROBE system couples with CORK fluid delivery lines to draw large volumes of fluids (at up to 5 L min\(^{-1}\)) from basement aquifers to the CORK’s seafloor platform. This constantly evolving system has an open architecture and can be adapted to additional sensors and sampling experimental devices. The Mobile Pumping System (MPS), possesses many of the same components as the GeoMICROBE Sled (e.g., pump, sensors, controller), but is powered and controlled in real time via submersible operations. MPS allows large volume fluid collections and/or in situ filtration, with or without in situ treatments. Contact: Mike Rappe

2.4.3. Core Sequencing Facility at USC

A new USC genomics core facility began full operations in 2013. The facility includes three different sequencing platforms (Ion Torrent, Roche 454, Illumina) and a flow cytometer (purchased with C-DEBI funds). Support for the facility is provided by the Dornsife College of Letters, Arts, and Sciences at USC (equipment service contracts and technical support). The resources are available to a broad community of researchers at USC and beyond. Contact: Daniel Campo (Facility Director).

3. Education and Diversity

C-DEBI seeks to create distinctive, targeted education programs at the K-12, undergraduate, graduate and postdoctoral levels in order to train and foster a diverse next generation of deep subseafloor biosphere researchers.

3.1. Postdoctoral Researchers and Graduate Students

Postdoctoral researchers and graduate students receive professional development (see Section 4) and financial support through C-DEBI’s fellowship program (see Section 6.2). In addition, they benefit from C-DEBI sponsored programs, including the Agouron International Geobiology Course and the Agouron Southern California Geobiology Symposium. More information at http://www.darkenergybiosphere.org/education/gradpostdocs.html.
3.2. Undergraduate Students

3.2.1. Global Environmental Microbiology (GEM) Course
The GEM course is an annual field-based, hands-on summer undergraduate course based at USC that introduces microbiology and microbial ecology to freshmen and sophomores. Underrepresented students and students from community colleges are the target audience. More information at http://www.darkenergybiosphere.org/education/undergrads/GEMcourse.html.

Participation
- Applications (posted in November) are due February 1
- Selected participants (maximum of 16) are notified by April 1
- Coordinated by the Diversity Director

Schedule
- The course runs for 4 weeks in July and August and includes one week at USC, one week in the Eastern Sierra Mountains, and two weeks at the Wrigley Marine Science Center on Santa Catalina Island

3.2.2. NSF REU: Community College Cultivation Cohort (C4)
C4 is a residential NSF Research Experience for Undergraduates (REU) program providing cutting edge research opportunities in USC labs for highly motivated community college students interested in environmental microbiology. More information at http://www.darkenergybiosphere.org/education/undergrads/c4.html.

Participation
- Applications (posted in November) are due February 15
- Selected participants (maximum of 8) are notified by April 1
- Coordinated by the Education Director

Schedule
- The course runs for 9 weeks from June to August at USC

3.2.3. Community College Research Internship for Scientific Engagement (CC-RISE)
CC-RISE is a non-residential Research Experience for Undergraduates (REU)-style program begun in 2013 providing academically competitive community college students with an intensive research experience in labs at USC, MBL, and UC Santa Cruz. More information at http://www.darkenergybiosphere.org/education/undergrads/cc-rise.html.

Participation
- Applications (posted in November) are due March 1
- Selected participants (maximum of 4) are notified by April 1
- Coordinated by the Education Director at USC, scientist Julie Huber at MBL, and faculty Adina Paytan at UCSC

Schedule
- The course runs for 8 weeks from June to August at USC, MBL, and UC Santa Cruz

3.2.4. Genomics and Geology Undergraduate Research Experience (GGURE)
GGURE is a new undergraduate research internship program targeting underrepresented minorities consisting of both a part-time program during the academic year and a full-time program over 10 summer weeks at USC. This program builds on an 11-year effort led by renewal Senior Scientist Steven Finkel to recruit and maintain undergraduate students in STEM fields as a part of USC’s Center for Excellence in
Genomic Science as part of the National Human Genome Research Institute’s Minority/Diversity Action Plan. This highly successful program has been adapted to emphasize genomics, geoscience and other STEM fields.

Participation
- The maximum number of participating students is 37
- Coordinated by USC faculty Steven Finkel

Schedule
- The course runs for during the academic year and 10 summer weeks at USC

3.3. High School Students

3.3.1. C-DEBI/USC SeaGrant/Wrigley High School in Science Camp
The High School in Science Camp Program exposes high school students from underrepresented backgrounds to science. More information at http://dornsife.usc.edu/uscseagrant/summer-science-programs/.

Participation
- Applications are due March 15
- Selected participants are notified by June 1
- 20 local and national high school students
- Coordinated by SeaGrant staff Linda Chilton under the direction of the Diversity Director

Schedule
- One week at Wrigley Marine Science Center on Santa Catalina Island with curriculum that relates to C-DEBI research and technologies

3.3.2. USC Young Researchers Program
The USC Young Researchers Program brings Los Angeles high school rising seniors into research laboratories at USC. More information at http://youngresearchers.usc.edu.

Participation
- Applications are due April 25
- Selected participants are notified by late May
- 9 Los Angeles rising high school students
- Coordinated by USC Earth Sciences graduate students

Schedule
- Six weeks from early July to August at USC research laboratories

3.4. Teachers
Teachers may be eligible for education and outreach grants (see Section 6.3). Other opportunities include several C-DEBI sponsored programs, including the MBARI EARTH Teacher Workshop, the UH-NAI Ali’i Teacher Workshop and the College of Exploration Online Teacher Training Workshops. More information at http://www.darkenergybiosphere.org/education/teachers.html.

3.4.1. K-12 Teacher Small Grants
The K-12 Teacher Small Grants program supports K-12 teachers who have attended a C-DEBI teacher training program and have incorporated C-DEBI content into their classrooms. These awards up to $2500 support classroom implementation and extensions of C-DEBI content into the classroom. More information at http://www.darkenergybiosphere.org/education/teachers/teacherSmallGrants.html.
Participation
- Applications are due February 15
- 3 awards maximum to K-12 teachers who have participated in a C-DEBI sponsored or partnered education workshop
- Coordinated by the Diversity Director

3.4.2. Community College Instructor Workshops
Community college instructors are invited to attend a day-long workshop to learn about deep biosphere research being conducted by C-DEBI scientists and to collaborate with fellow instructors to integrate the information into their current curriculum.

Participation
- 10-15 Los Angeles area community college instructors
- Coordinated by the Education Director

Schedule
- One workshop is held in each of the Fall and Spring semesters at USC

4. Professional Development for Graduate Students and Postdoctorals
The professional development program\(^1\) relies on the primary advisor and the C-DEBI program.

4.1. Primary Advisor
Each graduate student or postdoctoral fellow will have a primary advisor who agrees to sponsor them and manage logistical aspects of their support. The primary advisor will be required to meet at least twice monthly with the graduate student or postdoctoral fellow to discuss research progress and to provide means of allowing broader discussion about her or his research—this can be in the form of departmental seminars, group meetings, etc. The primary advisor is also required to provide support for the fellow to attend a national meeting (\textit{e.g.}, AGU) that is appropriate for deep biosphere researchers to attend.

4.2. C-DEBI Program
C-DEBI as a program will help the graduate student or postdoctoral fellow through directed networking—our annual meetings, web and cyber infrastructure, interdisciplinary expeditions; these components are critical for the broader success of C-DEBI, but also intrinsically provide opportunities for our graduate students and postdoctoral fellows. A mailing list only for graduate students and postdoctorals is maintained by the Education Director who disseminates professional development opportunities as well as organizes PD webinars. The Education Director also coordinates a one-day, in-person PD workshop prior to each annual meeting for active graduate students and postdoctorals. Finally, all fellows will be required to participate in a Broader Impacts activity as planned in their proposals to further integrate research and education with a focus on early career professional development:

\(^1\) Refer to the “C-DEBI Graduate Student and Postdoctoral Mentoring Plan” document at http://www.darkenergybiosphere.org/internal/docs/C-DEBIMentoringPlan_2015.pdf
5. Outreach

C-DEBI translates knowledge in and of our field to the broader public, in part through our core education programs (which will flow to public policy, administration, and other education fields in addition to academic fields) — but also via programs that promote broader dissemination of information and increased awareness to the public of the deep biosphere.

5.1. Small Education and Outreach Grants

Small education and public outreach grants are available to the C-DEBI community (see Section 6.3).

5.2. Teacher-at-Sea Programs

C-DEBI encourages PIs to invite K-12, community college instructors and other educators to participate in research cruises when berth space allows. C-DEBI can help to facilitate with activity planning (e.g., Ship-to-Shore Programs below), teacher recruitment and follow-up effectiveness surveys/metrics. Funding for teacher participation support can be requested as part of original research grants or as supplemental requests through educational programs (e.g., Research Experiences for Teachers at NSF).

5.3. Ship-to-Shore Programs

C-DEBI has supported the Ship-to-Shore programs below on previous research cruises and will support participants with interest in hosting them on their cruises.

5.3.1. Classroom Connection Program

The Classroom Connection Program exposes students of all ages and levels to the wonders of the deep and sparks enthusiasm in them for science and research while teaching curriculum standards through daily activities in the classroom and online. More information at http://www.darkenergybiosphere.org/classroomconnection/.

Participation
- Open to any online viewer/classroom, some classroom ROV kits (consisting of PVC pipes of different lengths, a variety of PVC connectors, floats) available
- Program led by Amanda Haddad (graduate student); web interface managed by program leader and Administrative Assistant, Janicak

Schedule
- Daily on any research cruise with an interested participant as host

5.3.2. Adopt-A-Microbe Program

This interactive project introduces K-12 students to the complex environment and lifestyles of deep biosphere microbes. More information at http://aam.darkenergybiosphere.org/.

Participation
- Open to any online viewer, some classroom science kits (containing glass vials, clay, sand, pyrite, basalt, calcite, hand lens, Petri dishes, agar powder) available
- Program led by Beth Orcutt (Bigelow Laboratory scientist) or members of the Deep Earth Academy; web interface managed by program leader and Administrative Assistant, Janicak, or Deep Earth Academy (Consortium for Ocean Leadership)

Schedule
- Daily on any research cruise with an interested participant as host
5.3.3. **Blogging**

**Participation**
- Open to any online viewer
- Bloggers can be anyone!
- Web interface managed by Administrative Assistant, Janicak, or other outreach programs (e.g., Deep Earth Academy, Consortium for Ocean Leadership)

**Schedule**
- Daily on any research cruise with an interested participant as host

5.4. **Ad Hoc Public Talks and General Publications**
Scientists speak about their research and careers at public venues and with science journalists.

**Participation**
- Any scientist in contact with aquaria, museums, schools, etc. and science journalists

**Schedule**
- Ad hoc throughout the year

5.5. **Exhibition Booths at National Meetings**
C-DEBI participants can directly reach out to those not aware of C-DEBI and its opportunities in the geosciences, marine sciences, microbial ecology, education and diversity programs.

**Participation**
- C-DEBI community driven
- Hundreds of direct interactions with participants at national meetings, e.g.,
  - American Geophysical Union (AGU)
  - Association for the Sciences of Limnology and Oceanography (ASLO)
  - International Society for Microbial Ecology (ISME)
  - National Science Teachers Association (NSTA)
  - National Marine Educators Association (NMEA)
  - National Biology Teachers (NBT)
  - California Science Teachers Association (CSTA)
  - Society for the Advancement of Chicanos and Native Americans in Science (SACNAS)
- Organized by Managing Director at research conferences and Education and Diversity Directors at education conferences

**Schedule**
- 3-5 meetings per year

5.6. **Networked Speaker Series**
The Networked Speaker Series enhances communication and exchange of ideas across the distributed participants of the Center via short online presentations by junior scientists, including graduate students and postdoctoral researchers. More information at [http://www.darkenergybiosphere.org/resources/speakerseries](http://www.darkenergybiosphere.org/resources/speakerseries).
Participation
- Graduate student and postdoctoral speakers can be nominated by anyone in the C-DEBI community throughout the year, including self-nomination
- Speakers selected by program organizer, Julie Huber, in consultation with ExCom and the Managing Director
- Up to 100 viewing groups can participate live
- Recordings of the lectures are archived online

Schedule
- Three speakers per year, 30 minute presentations plus Q&A time

5.7. Newsletter and Email List
The semi-monthly electronic newsletter informs the C-DEBI community of C-DEBI and other relevant research and outreach organization activities, publications and opportunities (e.g., IODP, Consortium for Ocean Leadership, InterRidge, SACNAS, etc). More information at http://www.darkenergybiosphere.org/resources/newsletters.html.

Participation
- All members of the C-DEBI community signed up for the e-mailing list
- Content managed by Data Manager

Schedule
- Published on the 1st and 15th of each month

6. Grants and Fellowships
C-DEBI facilitates scientific coordination and collaborations by supporting student, postdoctoral, and faculty research and education initiatives to build, investigate, educate and train the deep subseafloor biosphere community. There are four grant programs within C-DEBI. These are the Small Research Grants, Graduate Student and Postdoctoral Fellowships, Small Education & Outreach Grants, and Travel Grants.

6.1. Small Research Grants

6.1.1. Proposal Call
- Call developed by ExCom
- Applications are due January 31 (posted on C-DEBI website 4-6 weeks prior to due date)
- Criterion for review also posted. Proposals must clearly state how each criterion is met.

6.1.2. Schedule
- 1 call per year
- Funding decisions made within 2 months of proposal due date
- Projects expected to start April 1
- Typical project duration is 1 year

6.1.3. Funding Availability and Eligibility
- Approximately 7-8 total Research Grant and Fellowship awards per year
- Typical funding in the range of $50,000-$80,000 each; in rare cases, we will consider awarding up to an additional $20,000
- Eligible to any investigator (except C-DEBI Co-PIs and Senior Scientists) at US institutions able to receive federal funding

6.1.4. Review Process
- Conflict of interest is considered at every step of the review process
- Reviews (minimum of 3) and decisions for funding made by ExCom

6.1.5. Management and Renewal
- Applications submitted to and awards administration managed by Managing Director
- Completion of mandatory ethics training by 1 month into award, see Ethics Section 8
- Annual reporting due 2 months prior to the due date of the C-DEBI annual report, i.e., November 1 annually; see Reporting Requirements Section 6.5
- One year no-cost extensions may be granted by request one month prior to the end of the award
- There is no formal option for “renewal,” but previous grant recipients may compete for future funding to continue their research. A competitive request for additional funding will likely require a particularly compelling application.

6.2. Graduate Student and Postdoctoral Fellowships

6.2.1. Proposal Call
- Call developed by ExCom
- Applications are due January 31 (posted on C-DEBI website 4-6 weeks prior to due date)
- Criterion for review also posted. Proposals must clearly state how each criterion is met.

6.2.2. Schedule
- 1 call per year
- Funding decisions made within 2 months of proposal due date
- Projects expected to start April 1
- Typical funding duration is 1 year with possibility for a second year “renewal” pending progress

6.2.3. Funding Availability and Eligibility
- Approximately 7-8 total Research Grant and Fellowship awards per year
- Funding for a fellowship can include stipend/benefits (typical salaries on the order of $32K for graduates and $50K for postdoctorals), a research and/or travel budget of $1000 for graduate students and $2500 for postdoctorals, and institutional overhead
- Eligible to any student and postdoc with an advisor at US institutions able to receive federal funding excluding Co-PI or Senior Scientist students and postdocs in existing labs

6.2.4. Review Process
- Conflict of interest is considered at every step of the review process
- Reviews (minimum of 3) and decisions for funding made by ExCom and Senior Scientists

6.2.5. Management and Renewal
- Applications submitted to and awards administration managed by Managing Director
- Completion of mandatory ethics training by 1 month into award, see Ethics Section 8
- Annual reporting due 2 months prior to the due date of the C-DEBI annual report, *i.e.*, November 1 annually; see Reporting Requirements Section 6.5
- One year renewal may be granted by request, due 3 months prior to end of award to be reviewed by Education Director
- Three month no-cost extensions may be granted by request one month prior to the end of the award
- Previous fellowship recipients may NOT compete for future fellowship funding

### 6.3. Small Education & Outreach Grants

#### 6.3.1. Proposal Call
- Call developed by Education Director
- Applications are due January 31 (posted on C-DEBI website 4-6 weeks prior to due date)
- More information at [http://www.darkenergybiosphere.org/education/proposals.html](http://www.darkenergybiosphere.org/education/proposals.html) and [http://www.darkenergybiosphere.org/research/grantFAQs.html](http://www.darkenergybiosphere.org/research/grantFAQs.html)

#### 6.3.2. Schedule
- 1 call per year
- Funding decisions made within 2 months of proposal due date
- Projects expected to start April 1
- Typical project duration is 1 year

#### 6.3.3. Funding Availability and Eligibility
- Up to $50,000 and approximately 1-2 per year
- Eligible to any investigator (except C-DEBI Co-PIs and Senior Scientists) at US institutions able to receive federal funding

#### 6.3.4. Review Process
- Conflict of interest is considered at every step of the review process
- Proposals assigned to a committee headed by the Education Director as review chair
- Minimum of three reviews from Education and Outreach Steering Committee or other experts in the field selected by the review chair
- Ranking of proposals and recommendations for funding made by Education Director to ExCom for decisions for funding

#### 6.3.5. Management and Renewal
- Applications submitted to and awards administration managed by Managing Director
- Completion of mandatory ethics training by 1 month into award, see Ethics Section 8
- Annual reporting due 2 months prior to the due date of the C-DEBI annual report, *i.e.*, November 1 annually; see Reporting Requirements Section 6.5
- One year no-cost extensions may be granted by request one month prior to the end of the award
- There is no formal option for "renewal," but previous grant recipients may compete for future funding to continue their research. A competitive request for additional funding will likely require a particularly compelling application.

### 6.4. Travel Grants
Travel Grants for up to $5000 are available to any member of the C-DEBI community at US institutions. Up to 10 awards will be granted per year. Matching funds are required. These grants are intended to
support travel to a meeting, field site or other laboratory as well as costs incurred during that travel. This may include limited costs for analysis or supplies. Proposals can be submitted at any time at least one month in advance of the travel or activity to the Managing Director Sylvan. Proposals are reviewed by the Managing Director. Awards administrated by the Managing Director. See Section 6.5 for reporting guidelines. More information at http://www.darkenergybiosphere.org/research/exchange.html.

6.5. Reporting Requirements
Documentation of personnel and scientific products that result from any and all C-DEBI support is a critical component of the review, evaluation, and planning processes for the center. Annual reporting is November 1 annually, i.e., due 2 months prior to the due date of the C-DEBI annual report. The products and requirements include the affiliation with C-DEBI on websites and publications and reporting of publications, presentations and posters, patents, etc.².

7. Meetings
C-DEBI meets regularly within and across the various stakeholder groups with frequency related to the management of activities, i.e., weekly-biweekly among the Admin or ExCom, monthly-quarterly among the research themes, and quarterly-annually by all participants of C-DEBI.

7.1. Admin Meetings
Charge
- Planning and review of management and coordination activities
Schedule
- Weekly. Currently: Monday, 10:30-11AM PT
Participants
- Admin (Director, Associate Director, Managing Director, Education Director, Diversity Director, Data Management Director, Data Manager, Bioinformatics Specialist, Administrative Assistant)

7.2. ExCom Meetings: Videoconferences and Face-to-Face Retreat
Videoconference Charge
- Planning and review of research activities
Schedule
- Weekly. Currently: Monday, 11AM-12PM PT
Participants
- ExCom

Face-to-Face Retreat Charge
- Planning and review of research and administration activities
Schedule
- A two-day meeting annually
Participants
- ExCom, Senior Scientists, and Managing Director; others as needed

² Refer to the “C-DEBI Polices and Reporting Requirements” document at http://www.darkenergybiosphere.org/internal/docs/C-DEBIPoliciesAndReportingRequirements2015.pdf
7.3. Site Review
Charge
- Report past, present and future research and activities of C-DEBI
Schedule
- Two days annually, 1-2 months before funding increments, i.e., February
Participants
- Review Panel (External Reviewers and NSF Staff), ExCom, Senior Scientists, Admin, Funded Participants (Researchers, Fellows, E&O), Ethics Panel representatives, External Advisory Board representatives

7.4. Annual Meeting
Charge
- Summarize and evaluate achievements during previous 12 months (or since last annual meeting), assess how well Center has done in meeting objectives
- Share scientific and technical information on projects of mutual interest
- Engage in training and mentorship activities
- Plan for projects that are underway or anticipated to be operating in the next 12 months
- Engage in long term planning to guide the Center and its operations on a time frame of 2+ years
- More information at http://www.darkenergybiosphere.org/internal/annualmeetings.html
Schedule
- Two days annually
Participants
- ExCom, Senior Scientists, Admin, Funded Participants (Researchers, Fellows, E&O), Ethics Panel representatives, External Advisory Board representatives, invited C-DEBI “outsiders”
- Priority invitation will be given to those C-DEBI participants with active grants who have not presented on their work previously

8. Ethics
The C-DEBI ethics program includes a required training module and a system for anonymous complaints, concerns, or questions. The ethics training, which is overseen by the Ethics Panel (see Section 1.8), is web-based and required of all C-DEBI participants who receive financial compensation from C-DEBI (e.g., salary, stipend, grant support, travel support) and urged for all. The training module is available at the Ethics CORE website (http://nationalethicscenter.org/index.php?option=com_certi&view=toc).

Ethics complaints should be communicated through USC’s official telephone complaint system (http://ooc.usc.edu/help-hotline). This is available to all USC and non-USC members of C-DEBI and is confidential. If preferred, complaints, concerns, and questions can also be communicated directly to any member of the Ethics Panel. The Panel aims to advise ExCom and resolve all communicated ethics issues in a timely manner.