

# Engaging Early Career Scientists in Future Scientific Ocean Drilling

## Report on a USSSP Workshop Held from 30 March to 1 April 2011 College Station, Texas

Convenors: Susan E. Humphris (WHOI)  
Brandon Dugan (Rice University)  
Katrina Edwards (University of Southern California)  
Ben Flower (University of South Florida)

### Executive Summary

The purpose of the workshop was to bring together a diverse group of early career scientists to explore new, multidisciplinary approaches to studying Earth's systems through scientific ocean drilling. The workshop engaged 41 national and international participants in discussing and providing feedback on the themes highlighted in the Science Plan for the new drilling program, in simulating the creation and development of an outline of a drilling proposal, and in developing contacts and collaborations with their peers. Evaluations completed at the end of the workshop indicated that it has been very successful in achieving its goals.

### Motivation for Workshop

The current ocean drilling program (the Integrated Ocean Drilling Program – IODP) is scheduled to end in 2013. Planning for a new program was initiated in September 2009 when the INVEST meeting was held in Bremen, Germany. Five hundred and eighty three scientists from 21 countries attended, including 166 U.S. participants, of whom 19 were graduate students.

The focus of this community meeting was to define ambitious and exciting scientific research goals for a new ocean drilling program. The participants discussed both traditional and new research fields, such as ocean acidification, earthquakes and tsunamis, and carbon sequestration. There was also considerable interest in the emerging capability to go beyond coring and use boreholes to design experiments and observe processes in real time, and furthermore, to manipulate and conduct controlled experiments in the natural environment, giving a completely new meaning to the concept of a “natural laboratory”.

Subsequent to the INVEST meeting, the Science Advisory Structure Executive Committee (SASEC) appointed a 14-member Science Plan Writing Committee (SPWC) based on nominations submitted by the international community. An initial draft was made available in summer 2010 for community comment. After several stages of revision, a

near final version was posted for comment early in 2011 while also being circulated to an international panel of senior leaders in earth and biological science for independent review. It is hoped that there will be a smooth transition to a new drilling program (to be called the International Ocean Discovery Program – IODP) in 2013, and preparations are already underway for transitioning the proposal process and the science advisory structure.

A new ocean drilling program provides the opportunity to energize a new generation of scientists interested in using this powerful tool to obtain unique insight into understanding and predicting Earth's dynamic system and its impacts. A new program also opens scientific ocean drilling to communities that traditionally have not been part of the program. With a new 10-year program, the drilling community has a responsibility to foster the involvement of early career scientists (defined for this workshop as senior graduate students, post-doctoral researchers, and scientists <10 years post-Ph.D.). Given that many of the scientists currently active in the decision-making in IODP are relatively senior, the ultimate goal is to encourage leadership for scientific ocean drilling by a new cohort.

Given this motivation, the workshop was designed to accomplish three objectives:

- Introduce all aspects of IODP to a new generation of potential participants – including writing proposals, sailing on an expedition, serving in an advisory capacity, working with archived samples and data
- Provide input from early career scientists to the final version of the new Science Plan for ocean drilling
- Foster the development of contacts, collaborations, and associations among early career scientists that will persist for decades and will enable future interactions and implementation of new and innovative applications of ocean drilling technology.

Why was a separate forum deemed necessary for this group? Scientific planning meetings tend to be dominated by senior scientists who are comfortable articulating their opinions in an open meeting. More junior scientists are often intimidated in such settings and are hesitant to share their ideas. By holding a workshop specifically for them, their views can be heard in a more nurturing forum. Furthermore, such a workshop demonstrates the drilling program's commitment to hear their ideas and get their feedback, and to actively engage them in planning and executing ocean drilling science.

## **Selection of Participants**

The workshop was advertised in late 2010 in EOS and on a number of websites with a deadline for on-line applications of 15 January 2011. Sixty-two U.S. applications were received; funds were sufficient to accept 30 participants.

The goals in the selection of participants for the proposed workshop included:

- scientists from a wide range of disciplines with potential interests in ocean drilling

- a mix of senior graduate students, post-doctoral researchers, and early career scientists
- a mix of students and scientists with a range of involvement in IODP (from none to having participated in a cruise).

The inclusion of a few students and scientists who had some exposure to ocean drilling was important for two reasons. First, there was a concern that during the current IODP, the ship delays, funding problems, and other issues have introduced uncertainty into the program and so there has likely been some disengagement by early career scientists. Hence, including some students and scientists who could convey their personal experiences, and the opportunities afforded by drilling for their own research, was thought to be motivational. Second, inclusion of some participants with IODP experience would help focus the breakout groups' discussions on science that requires the unique capabilities offered by drilling platforms.

Interestingly, we also had 5 applications from scientist outside the U.S. who were not eligible for USSSP funding. As we referred these individuals to their Program Member Offices, we received a request from ECORD to allow inclusion of 5 participants that would be funded through their own funds. We then made the same offer to Japan and ANZIC to enable others to participate. The outcome of this was the participation of 5 ECORD and 5 Japanese scientists. In addition, we received a request from NEPTUNE Canada to send a scientist, to which we agreed given the close collaboration between the two programs.

Appendix 1 provides the list of participants and their institutions. The 41 participants represented 34 institutions – 24 U.S., 9 international, and 1 from NEPTUNE Canada – and broke down by experience approximately into 12 faculty/researchers, 11 post-docs, and 18 graduate students.

## The Workshop

The workshop was held 28 March - 1 April 2011 at IODP-TAMU in College Station, TX. The venue was chosen to introduce and expose the participants to the organization and people responsible for providing science services, ranging from vessel and drilling operations on the *D/V JOIDES Resolution*, to ship- and shore-based science laboratories, and for maintaining the Gulf Coast core repository.

The agenda for the meeting is presented in Appendix 2. Early on the first day, the participants were introduced to IODP through presentations on the history of scientific ocean drilling through the current program, and on the basic technologies of drilling and coring. The rest of the day was structured around the new draft Science Plan. After a brief overview, participants broke into four groups focused on each of the major research themes addressed in the plan:

- Climate and Ocean Change: Reading the Past, Informing the Future
- Biosphere Frontiers: Deep Life, Biodiversity, and Environmental Forcing of Ecosystems

- Earth Connections: Deep Processes and Their Impact on Earth's Surface Environment
- Earth in Motion: Processes and Hazards on Human Time Scales.

The charge to each group consisted of two tasks:

1. Provide comments on the appropriate Science Plan chapter for feedback to the group revising it
2. Brainstorm ideas for experiments/drilling programs and produce an outline of a 'mock' drilling proposal for 1 or 2 of the ideas.

Late in the day, the groups reported out on their progress. All had completed the first assignment, and their feedback on the new Science Plan was compiled (Appendix 3) and distributed to the group responsible for final revisions that met in Washington DC the following week. All breakout groups had generated some preliminary ideas for a mock drilling proposal. However, it was clear that (i) more time was needed, and that (ii) the thematic groups needed to be mixed to provide the multidisciplinary teams necessary to work on outlining a proposal.

A reception and poster session was held on the evening of the first day. Participants had been encouraged to contribute posters that highlighted either their own research interests or emerging science directions that will require scientific ocean drilling. While ~30 posters were expected based on poster titles submitted during the application process, only about 10 participants actually brought them to the meeting. The hope had been that such a poster session would provide a mechanism for participants to learn about each other's interests and research, so the poor response was disappointing.

The second day began with a panel of five participants talking about how they got involved in scientific ocean drilling. They had been selected to represent a number of paths into drilling, including participation in an expedition, in education and outreach, in an ECORD summer school, as a shore-based scientist, and a Schlanger Fellow.

The presentations for the second day focused on how to become an active member of the drilling community through site surveys, proposal writing, sailing on an expedition, and serving on an advisory panel. A final presentation was a primer on how to access cores, samples, and data, followed by a tour of the core repository and some of the instrumentation available there.

Prior to breaking up on the second day, the participants selected one of the five 'mock' proposal groups that they wished to join:

- How Does the Structure and Fluid Composition of an Accretionary Prism Evolve Over Time?
- RIGHT PRICE: Research In Global High Temperatures: Proxy Reconstructions in Cenozoic Environments
- Asian-Indo Monsoon
- COAST: Cascadia Orthogonal Aseismic-Seismic Transects
- Lau Basin: Mantle to Microbes .

Development of proposal ideas continued in the evening and early next morning.

The two presentations on the final day focused on NSF funding for drilling-related research and a discussion of the planned new Science Advisory Structure and how proposals will be selected. Each breakout group then gave a presentation of their proposal outline before the end of the meeting.

All plenary session presentations from the meeting, as well as the final breakout groups' presentation have been made available on an ftp site through the Consortium for Ocean Leadership.

## Evaluation

An evaluation form, created with input from Charna Meth (COL), was distributed to all participants on the last day of the meeting. Thirty-seven responses were received and the results are summarized in Appendix 4. They demonstrate that overall the workshop was very successful in achieving its three goals. The opportunity to provide feedback on the Science Plan prior to its being finalized was appreciated by many participants. Information that they found particularly useful included that relating to proposals, organization of IODP, how to access samples and data, and the variety of ways to get involved in the program.

Some participants also pointed out a number of areas that could be improved if this workshop were to be repeated – and there were several comments that holding it every couple of years would keep up the momentum of continually working to engage early career scientists. Several others pointed out the U.S.-centric focus of some of the presentations (e.g., funding). While this is a valid point, the workshop was originally created for the U.S. community and hence its focus; however, future workshops could easily overcome this problem if there is international participation. Several others commented on the need for more information on education and outreach opportunities within IODP. Although more extensive discussion of this workshop was in our original plan, the limitations of a 2.5 day workshop combined with the large amount of basic information about IODP that we needed to convey, precluded it. However, this is an area that should be given more emphasis in the future – and that should be possible given that the time spent at this meeting on feedback to the draft Science Plan would not be part of any subsequent meeting. Finally, a number of participants pointed out the repetition among some of the presentations. Since this was the first time this workshop had been presented, this was difficult to avoid. However, in the future, better coordination among the speakers could address this issue.

The mock proposals met with a mixed review. Some really liked the activity; others found it the least useful. It was also clear that some participants who are already involved in drilling proposals came with background material that could be presented, while others were working from no data. In the future, more thought on preparation and more thorough guidelines need to be defined if this activity is continued.

## Post-Workshop

While the participants left with plans for maintaining their interests and activities with scientific ocean drilling, or becoming involved for the first time, continued nurturing of this group would be extremely beneficial. The first step is to keep them informed by ensuring that they receive all information about drilling workshops, special sessions and town meetings at various conferences, and the Scientific Drilling journal. Hence addition of all participants to COL and IODP distribution lists is important.

Second, it will be important to involve participants in the planning process post-workshop. While participation in advisory committees may not be appealing to scientists at this stage of their career, invitations to make presentations of exciting new science at planning workshops will not only keep them engaged, but will also bring fresh ideas and approaches into the program. In addition, changes in the proposal development process to more emphasis on workshop-based proposals coming from the community could result in early career scientists becoming more easily involved. In addition, if the proposal submission process changes to require a short pre-proposal as the first step, early career scientists could put forward exciting new ideas without a major time investment.

Several participants also requested that there be reunion meetings – most conveniently to coincide with the AGU Fall meeting – that would ensure continued dialog among this new and upcoming group of scientists.

## **Appendix 1 Participant List**

### **Workshop Conveners**

Susan Humphris, Woods Hole Oceanographic Institution (chair)  
Brandon Dugan, Rice University  
Katrina Edwards, University of Southern California  
Ben Flower, University of South Florida

### **Consortium for Ocean Leadership Representative**

Emily Powell

### **Workshop Speakers**

Gary Acton, University of California, Davis  
Peter Blum, Texas A&M University  
Rick Carlson, National Science Foundation  
Gail Christeson, University of Texas at Austin  
Adam Klaus, Texas A&M University  
Jay Miller, Texas A&M University  
Will Sager, Texas A&M University

### **Workshop Participants**

Chandranath Basak, University of Florida  
Rachel Brackenridge, Heriot-Watt University  
Caroline Burberry, University of Nebraska-Lincoln  
Laurel Childress, Northwestern University  
Kristine DeLong, Louisiana State University  
Aurora Elmore, University of New England  
Matthias Forwick, University of Tromsø  
Sarah Friedman, Southern Illinois University  
Patrick Fulton, University of Texas at Austin  
Martin Heesemann, NEPTUNE Canada  
Shari Hilding-Kronforst, Texas A&M University  
Katherine Inderbitzen, University of Miami  
Priyank Jaiswal, Oklahoma State University  
Joel Johnson, University of New Hampshire

Craig Joseph, Oregon State University  
Nabil Khélifi, IFM-GEOMAR  
Yoshimi Kubota, University of Tokyo  
Ola Kwiecien, ETH Zürich  
Rachel Lauer, Pennsylvania State University  
Agathe Lisé-Pronovost, Université du Québec á Rimouski  
Paul Liu, North Carolina State University  
Katherine Maier, Stanford University  
Kylara Martin, University of Texas at Austin  
Heath Mills, Texas A&M University  
Zohra Mokeddem, Columbia University  
Masahiro Ooga, Doshisha University  
William Orsi, Northeastern University  
Tsubasa Otake, Tohoku University  
Anand Patel, University of Southern California  
Elizabeth Pierce, Columbia University  
Pratigya Polissar, Columbia University  
Patrick Rafter, Princeton University  
Harunur Rashid, Ohio State University  
Brandi Reese, Texas A&M University  
Matthew Rioux, Massachusetts Institute of Technology  
Jonathan Rotzien, Stanford University  
Tetsuya Sakuyama, University of Tokyo  
Anja Schleicher, University of Michigan  
Rachel Scudder, Boston University  
Julio Sepulveda, Massachusetts Institute of Technology  
Jason Sylvan, University of Southern California  
Yasuhiro Takashimizu, University of Niigata  
Jaime Toney, Brown University



## Appendix 2 Workshop Agenda

**Wednesday, 30 March 2011:** Main Conference Room C126

8:00-8:30	Coffee and Pastries Available	
8:30-8:45	Welcome	S. Humphris; B. Clement (Director, Science Services, TAMU)
8:45-9:00	Introductions, Logistics, Overview	S. Humphris
9:00-9:30	A Brief History of Scientific Ocean Drilling	S. Humphris
9:30-10:15	Drilling 101	J. Miller (IODP-TAMU)
10:15-10:30	BREAK	
10:30-11:00	The New Science Plan	S. Humphris
11:00-12:00	General Discussion of New Science Plan	All
12:00-1:00	LUNCH	
1:30-3:00	Breakout Groups: Climate and Ocean Change – B. Flower Biosphere Frontiers – K. Edwards Earth Connections – S. Humphris Earth in Motion – B. Dugan	
3:00-3:30	BREAK	
3:30-4:30	Presentations by Breakout Groups	
4:30-5:00	Summary of the Day	
5:00-7:00	POSTER SESSION and RECEPTION	

**Thursday, 31 March 2011:** Main Conference Room C126

- 8:00-8:30 Coffee and Pastries Available
- 8:30-10:00 Panel: How I Got Involved in Scientific Ocean Drilling  
Rachel Brackenridge, Heriot-Watt University  
Katie Inderbitzen, U. Miami  
Joel Johnson, U. New Hampshire  
Patrick Rafter, Princeton University  
Jason Sylvan, U. Southern California
- 10:00-10:30 BREAK
- 10:30-11:15 Sailing on a Drilling Expedition A. Klaus (IOD-TAMU)
- 11:15-12:00 How to Propose a Project W. Sager (TAMU)
- 12:00-1:00 LUNCH
- 1:00-2:00 Site Surveys for IODP Expeditions G. Christeson (UTIG)
- 2:00-2:30 Discussion
- 2:30-4:00 (i) Accessing the Archives: Cores, Samples, and Data P. Blum (IODP-TAMU)  
(ii) Tour of the Core Repository Others
- 4:00-5:00 General Discussion

**Friday, 1 April 2011:** Main Conference Room C126

- 8:00-8:30 Coffee and Pastries Available
- 8:30-9:15 Funding Drilling-Related Research R. Carlson (NSF)
- 9:15-10:00 How do Expeditions Get Selected? G. Acton (UC Davis)
- 10:00-10:30 BREAK
- 10:30-11:30 Ways to Get Involved -- Discussion
- 11:30-12:00 Closing Remarks
- 12:00 ADJOURN

## **Appendix 3**

### **Feedback on the new Science Plan**

#### **General**

- 8-page document designed for politicians, etc. needs to have more informative pictures that enable the reader to be informed through images, not solely the text.
- Incredibly important to highlight, right at the beginning of the Plan, how ALL of the challenges are related despite being divided into 4 distinct chapters.
- Overlapping and repetitive talking points. Can the 14 Challenges be streamlined?
  - o The science plan overall appears to be repetitive.
- Assumption in plan of public awareness of current issues (e.g. climate change) – they are not explained.

#### **Title/Cover**

- Not enthused with title and cover – needs to convey more science (especially considering the new name of the program includes “discovery”).
- Why does it show an ice-free Arctic and an ocean surrounded by continents when that is not primarily where we work?
- Check for photos labeled stock photo.

#### **Chapter 2 Ocean and Climate Change**

##### General “Likes”:

- nice to read, good tone
- simple wording; relatively easy to read
- clear figures
- allowed for some thoughts on expanding our own research
- purposely general to accommodate lots of different scientific goals

##### Things to be Included:

- Better balance between the poles (current draft is Arctic-focused)
- High frequency climate variability should be a focus of the new program
- Note that the themes can be examined on a wide variety of time-scales
- Mention integration of terrestrial (high resolution) with the marine records and models
- **Paleomagnetism**
  - One of the seminal tools of ODP, dominantly used for chronostratigraphy, is not represented in the text

- Also useful for paleo-circulation, geodynamo changes/ changes in the magnetic field
- **'New proxies'**
  - Some proxies identified as 'new' are actually not new
  - Ground-truthing of proxies often requires coretops or *in situ* studies... so proxy establishment is not within IODP's message
  - But examining proxy results during greenhouse periods (i.e., Cretaceous) of the past is also critical for proxy development
- **Improved discussion of collaborative endeavors**
  - add a summary figure of the type of science that can be completed with the cores- to encourage collaboration
  - list some possible contributions to other disciplines.

### Chapter 3 Biosphere Frontiers

- Better communication between the dead record and the live record and the need for them work together
  - More emphasis on cross-disciplinary communication nature of plan; e.g., mineral and rock alteration is affected and changed by biological processes.
  - Are we really looking at the past record or are we looking at a record that has been changed *in situ* post deposition? (e.g., PEAT Expedition 319 – Did the carbon deposition cease in the geologic past or did the carbon get remineralized by the *in situ* microbial community?)
- High resolution sampling for microbiology necessary similar to the paleo sampling
- Other microorganisms (eukaryotes including fungi, and viruses)
- Link from Challenge first two challenges to last (ecosystem change and humans) is awkward, although hominid evolution box is interesting.

### Chapter 4 Earth Connections

- Introduction needs a section on possible research partners - e.g. AAPG, Margins, EarthScope etc. Make sure all chapters are formatted in the same way!
- "Ophiolite" is inconsistently used/defined by multiple authors
- Could have a definitions box at the start of each chapter for non-specialists.

### Challenge 8 - What are the composition, structure, and dynamics of Earth's upper mantle

- Justification of continuing Mohole: is it emphasized enough?
- Are our drilling objectives vague: what are we actually trying to achieve?
- Can we extrapolate heterogeneity outwards from one data point? (NB this is one data point, perhaps Proof of Concept). Using logging data? Using new seismic techniques, such as full wave inversion, that may improve the resolution but the question on how to get rock properties extrapolated remain!

Challenge 9 - Interconnections between mantle melting and plate spreading that controls mid-oceanic ridge architecture

- Title – text mainly about the crustal section, so should be “mid-ocean ridge crustal architecture”
- Overall good and fits together
- Initiation of rifting per se is not in the science plan except as related research because no strong case made at INVEST. Should it be included? Would Might make a good complement to subduction initiation. Rift margins/rift initiation of great interest to hydrocarbon community

Challenge 10 - What are the mechanisms, magnitudes, and history of chemical exchanges between the oceanic crust and seawater.

- Point out overlap with real-time measurements discussed in EIM
- Like the new twist of using alteration to track past seawater composition changes. (11?) as an example of good solid data that we can already collect well.
- need samples from deep crust, likely to be most altered. Samples of basement, not necessarily Really Deep Holes.

Challenge 11 - How do subduction zones initiate, cycle volatiles, and generate continental crust.

- Like the approach of stressing fluxes rather than continental crust formation. But should include mention of other fluxes besides C and water; e.g. nitrogen which is important to biosphere.
- Understanding of the alteration and contribution of the sedimentary section in subduction is lacking – this is something we do well, and should be highlighted.

## **Chapter 5 Earth in Motion**

Challenge 12 – What mechanisms control the occurrence of destructive earthquakes, landslides and tsunamis?

- The title of challenge 12 is a bit confusing. Not predicting, but identifying recurrence intervals, monitoring, and characterizing the underlying physics?
- What does “human time scale” mean?
- Should be more focus on connecting land / marine investigations of same processes (e.g., paleoseismology)
- CORKS: hard to relate to both scientists and public (early warning system potential?, limited expertise, knowledge, and accessibility)
- Although observatories are important, don’t lose sight of value of cores.

Challenge 13 – What properties and processes govern the flow and storage of carbon in the seafloor?

- Tone down CO<sub>2</sub> sequestration and maybe remove figure. Too much emphasis on this aspect of C cycle. Focus should be on characterizing reservoir/ basement aspect, rather than the applied aspect as maybe promising something beyond our capabilities.

- Focus more on carbon cycle / methane fluxes. Note that shelf methane fluxes are not mentioned. Potential use of mission specific platforms for shallow sampling of methane?

Challenge 14 – How do fluids link subseafloor tectonic, thermal, and biogeochemical processes?

- P. 74: Sentence 2: “The submarine hydrogeologic cycle is linked to groundwater systems on land, including massive flows between terrestrial and marine realms across continental margins.”

Too restricting. Land and marine hydrogeology not always linked. Much of the oceanic crust ) i.e. most of the largest aquifer on Earth is away from margins.

- Ocean fluxes of heat and volatiles are largely controlled through advection by fluid flow:

- volumetric distribution of these fluxes and underlying controls are poorly characterized. These have implications for biology, chemical cycles, and seismogenesis.

**Education and Outreach**

- Where are the concrete examples in the "education program" section? e.g. School of Rock. These are really important for the funding bodies to see what could/will be done.

## Appendix 4 Summary of Evaluations

### No. Responses: 37

#### 1. How did you first hear about this short course? (Check all that apply)

- 2\_ Consortium for Ocean Leadership website  
 5\_ EOS advertisement  
 15\_ e-mail liststerv (please circle one: **IODP**, RIDGE, other: **ECORD, ESSAC, Deep Carbon Observatory, JDESC, \_\_\_\_\_**)  
 15\_ Colleague  
 5\_ Other (please describe below):

- *AGU Town Hall Meeting*
  - *Supervisor*
  - *Department e-mail*
- 

#### 2. What motivated you to attend this workshop? (Please check all that apply)

I wanted to:

- 30\_ gain a better understanding of the structure of the drilling program.  
 17\_ learn how to apply to sail on an IODP expedition.  
 13\_ learn how to access IODP cores and data.  
 23\_ learn how to write an IODP proposal.  
 28\_ meet some of the leaders of IODP.  
 32\_ network with other colleagues who want to become involved in IODP.  
 3\_ other (please describe below):

- *Contribute to the new science plan*
  - *Network with US researchers because I want to do a post-doc in the US; practice English*
  - *Learn more about international collaborations (not discussed)*
- 

#### 3. Please describe your experience with ocean drilling prior to this workshop. (Please check all that apply)

I have:

- 22\_ used DSDP/ODP/IODP samples or data in my research.  
 5\_ participated in pre-cruise planning.  
 16\_ applied to sail on an ODP/IODP expedition.  
 9\_ sailed on an ODP/IODP expedition.  
 served on an advisory panel or committee.  
 2\_ participated in preparing a drilling proposal.

10 no previous experience  
3 other (please describe below):

- *ECORD summer school in Bremen in Paleoceanography; IODP Workshop on North Atlantic and Arctic Climate and Environments; INVEST meeting, Bremen*
  - *IODP Summer School*
  - *Participated in E/O with ODP and IODP through TAMU*
- 

**4. Please describe how you will use the information presented at the Workshop. (please check all that apply)**

Based on what I learned, I plan to:

- 28 use DSDP/ODP/IODP data in my research.  
17 participate in pre-cruise planning.  
25 apply to sail on an IODP expedition.  
16 volunteer to serve on an advisory committee.  
25 participate in preparing a drilling proposal.  
     none of the above.  
5 other (please describe below):

- *Site surveys*
  - *Participate as shore-based scientist*
  - *Help plan a CORK workshop for transfer of knowledge*
  - *Inform students in my Dept. about IODP opportunities, especially Schlanger Fellowship; request cores/samples for teaching*
  - *Include IODP resources in my ongoing outreach*
- 

**5. What information did you find the most useful?**

- *Review of new science plan in breakout groups (8)*
  - *How to get involved (6)*
  - *IODP structure and function (6)*
  - *Comprehensive guide on how to access cores and data (6)*
  - *How to apply for an expedition (2)*
  - *People's stories on how they got involved (3)*
  - *Proposal-related information (10)*
  - *Talks were very useful*
  - *What it is like to sail on an expedition*
  - *Repository tour (3)*
  - *Drilling technology lecture (2)*
  - *Advice on level of involvement at this point in my career*
  - *Mock proposal development (4)*
  - *Site survey lecture*
-



## **6. What aspects of the workshop did you find least useful?**

- *US funding possibilities and US focused information*
  - *There was no information “least useful” having had no IODP experience (2)*
  - *Development of mock proposals (4)*
  - *Too much time on discussion of new science plan*
  - *Detailed information about how to download data – could have been a handout (2)*
  - *Panel on how people became involved*
  - *Powerpoints were too long and repetitive (2)*
  - *Poster session needed to be better highlighted – also cramped*
- 

## **7. What other information on IODP would you appreciate receiving?**

- *Japan and ECORD funding possibilities; other international collaborations (2)*
  - *More information about education and outreach, and how it will improve in new program (5)*
  - *How to get involved in site survey work*
  - *Copies of presentations (3)*
  - *Research opportunities for early career scientists*
  - *COL’s connection/role with IODP*
  - *How to be involved in the advisory structure*
  - *How to be a Staff Scientist*
  - *Upcoming workshops, meetings, conferences*
  - *Information on how to work for IODP or COL as a career as a non-academic*
- 

## **8. Please provide any comments or suggestions for improvement:**

- *Congratulations for the workshop/ great workshop (16)*
- *Very useful to meet other early-career scientists (4)*
- *Have a follow-up meeting (at AGU?) (2)*
- *Make the workshop 0.5-1 day longer so that:*
  - *participants can present their work to help develop collaborations*
  - *people could spend more time discussing potential proposals*
- *Opportunity for Japanese student to meet US and European researchers*
- *Hold this workshop every 2 years (2)*
- *Invite more senior scientists to share their experience (e.g., M. Raymo, D. Hodell, R. Tiedemann)*
- *Tour of the repository could have been longer – loads of questions still when it ended*
- *Avoid repetition in the presentations (5)*
- *Need more on logging (left out of most talks)*

- *A large, mandatory(?) poster session would have been better (2)*
- *Have breakout groups and proposal preparation during the last day of the workshop instead of working in pieces over several days*
- *Have short talks by participants on what they do and outlining the basic science to encourage collaboration*
- *For the mock proposals – force more interdisciplinary projects (2)*
- *More time for breakout groups*
- *Better guidance before breaking up into mock proposal groups (3)*
- *Smaller breakout groups with Staff Scientist in each (2)*
- *Follow careers of this workshop to determine its success*
- *First name on tags just a bit larger font*
- *Fruit for breakfast*