Summary of MARGINS Educational Activities to Date

This document contains a summary of MARGINS educational activities to date. This has been drawn from a number of documents, including the decadal review report, notes from MARGINS/MEAC meetings, and workshop summaries. The MARGINS Education Advisory Committee (MEAC) guides MARGINS educational programs. MEAC was established in 2004 in response to a mid-term review of the MARGINS program.

MARGINS is a strongly interdisciplinary research program, drawing together observationalists, experimentalists and theorists to understand the processes that form and shape continental margins. Having now hosted approximately 25 international meetings since 2000, the MARGINS web site and science plans are rich with materials that can be mined to provide resources for educators.

In the past, the MARGINS education and outreach effort has been primarily focused at the college level: on undergraduate students, graduate students, and early-career post-doctoral researchers. This emphasis was chosen because the teaching duties of many MARGINS investigators provide direct access to undergraduate students and courses, and to their graduate student advisees. In addition, undergraduate courses, particularly upper division, courses were identified as a primary target area where MARGINS data could be incorporated in the curriculum.

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Existing Programs administered by MEAC

1) Distinguished Lecturer Program (DLP)

The DLP program was started in 2005 as a mechanism to take MARGINS science to institutions that are not heavily involved in MARGINS research, in particular to smaller schools that otherwise do not
have the resources to attract such high-profile speakers. Some key facts are:

- The DLP program is widely advertised through listservs, advertisement in GSA Today and EOS, and brochures sent to approximately 900 degree granting colleges and universities.
- Due to the high demand for speakers the number of speakers was doubled in 2007.
- Up to the end of the 2009 academic year a cumulative total of 330 institutions had applied to host a DLP speaker.
- MARGINS has sent distinguished lecturers to 75 institutions.
- For the current academic year there were 66 applications, 55% of which were from institutions primarily serving underrepresented student groups and four of which were from undergraduate only institutions.
- During the current academic year the 7 distinguished lectures will visit a total of 23 institutions.
- Power-point files from many DLP presentations and video recordings from a number of talks are available on the MARGINS web page.

2) Mini-Lessons

The mini-lesson program was initially funded by an NSF CCLI grant that was submitted by Geoff Aber, Cathy Manduca, Jeff Ryan, and Don Reed in spring 2006. The overall goal was to adapt materials produced by the world-class scientists doing MARGINS-related research to lecture segments, laboratory exercises, and teaching modules that could be easily used by teachers to instruct students about current MARGINS areas of research. Engagement of MARGINS researchers in the construction and testing of modules is an important component of the program. Some key facts are:

- The NSF CCLI grant was awarded in December 2006.
- Two workshops and a number of individual contributions have resulted in a collection of more than 30 mini-lessons that cover the full range of MARGINS science.
- Additional workshops and sessions at GSA/AGU have focused on data resources and mini-lessons that are in use today.
- The mini-lessons are externally reviewed by the MARGINS steering committee (MSC) and end-users.
- Detailed assessments are being carried out on specific mini-lessons.
- The mini-lessons website has been visited by more than 6000 users in 2009.
- Web page: http://serc.carleton.edu/margins/collection.html

3) NSF-funded MARGINS Post-Doctoral Fellow program

As part of its regular MARGINS solicitation, NSF has since 2003 included a Post-Doctoral Fellowship Program, designed to support promising early-career scientists in conducting MARGINS-related research. Post-docs identify an advisor, whose home institution submits the proposal, to provide mentoring. Several early MARGINS post-docs have gone to faculty or research positions, and some are now MARGINS PIs. Key fact: Nine post-doctoral fellowships have been awarded.

4) Fall AGU MARGINS student prize

The MARGINS student prize was first started as the “Best Student Paper” competition at the 2003 Fall AGU. Since that time it has expanded to become the broader MARGINS Student prize, judged by past and current members of the MARGINS Steering Committee. Key facts:

- Awards are given for the best talk and best poster at each Fall AGU.
- Recipients are recognized each spring in the MARGINS newsletter.
5) MARGINS Student and Community Forum at Fall AGU

This is an opportunity for graduate students to mingle in an informal setting with fellow graduate students, MARGINS investigators and NSF program managers.

6) MARGINS Workshops

A broad range of workshops and meetings sponsored by MARGINS has attracted over 900 different scientists, post-docs and students and provided focused settings for younger scientists to interact with established researchers. The events range from mini-workshops to large Theoretical and Experimental Institutes.

MEAC Programs that were proposed, but not implemented

A) MARGINS REU program (October 2005)

Utilizing its cutting edge interdisciplinary science and outstanding investigators, who are typically both researchers and undergraduate teachers, it was suggested that the MARGINS program should develop a distributed REU program. Key facts:

- It was proposed that there would be 4-6 different summer undergraduate research centers, each with 3-9 students per year.
- The MARGINS office would serve as the central clearinghouse.
- Students would work at the host institute for 4-9 weeks during the summer.
- During and after the summer institute, a virtual classroom would support students, their academic advisors and research advisors in achieving their extended research goals and aiding professional development.
- The virtual classroom would center on a virtual weekly seminar meeting.
- Student advisors/mentors from the home institution would be actively engaged in advising academic year research and would visit the student at the host institution. This might provide an avenue to include researchers who are not typically involved in MARGINS research.
- Students would participate in the MARGINS community, including attending workshops, presenting at AGU/GSA, and providing material for the MARGINS newsletter and website.
- The program would mentor the students before, during, and after the summer.
- MARGINS PIs would be encouraged to submit REU supplements and participate in the program.
- Hosts would be offered a fellowship for one of their undergrads, along with one to visitor.
- Budget would include travel money for MARGINS workshop, AGU or GSA, travel to host institution, subsistence, research costs for student, and 1 site visit for the home advisor.
- The MARGINS Advisory Board chose not to pursue this program in 2005.

B) MARGINS undergraduate Research Grants – mini-grants

It was proposed that MARGINS initiate a yearly, competitive award of 3-4 grants/yr at ~$2,000-3,000 each to cover travel, field and analytical expenses. A $500 honorarium would be included that would be paid directly to the student. Key facts:

- The application would require a project description, CV, budget, 2 letters of recommendation, and a paragraph linking the project to the MARGINS science plan.
• Open to any US student or institution.
• The selection committee would comprise 1 MARGINS Steering Committee member, and 4 others from the research & teaching community.
• Student participants would be required to submit a write-up for the newsletter at end of summer or after 1 year.

New Education and Outreach Ideas suggested at the March 2009 MARGINS Steering Committee (MSC) meeting and MEAC meeting following the May 2009 Workshop:

• MARGINS themed, inter-initiative graduate student workshops or short courses.
• Enhancement of the AGU reception specifically to network young researchers between initiatives
• Expanding outreach to K-12 and public through linkages with existing geoscience programs, like COSEE
• Increased development of "top-down" mini-lessons to feature MARGINS breakthrough science and diminish the time interval between scientific results and classroom/textbook availability.

Examples of Existing General MARGINS Educational Efforts

Many MARGINS funded research programs have included a significant education and outreach component. Examples include:

• A Five-day short course on reflection seismology held at Universidad de Costa Rica by Steve Holbrook
• Incorporation of MARGINS database resources in MARGINS education effort:
  • Data portal (http://www.marine-geo.org/portals/margins/)
  • GeoMapApp (http://www.geomapapp.org/)
  • Virtual Ocean (http://www.virtualocean.org/)
  • Geochemistry databases (http://www.geoinfogeochem.org/);
• As part of the Source-to-Sink seagoing studies of Neil Driscoll and others in spring 2004 a three-day short course was held at the University of Papua New Guinea on data analysis and interpretation. Computers and software were donated to ensure that the participants could continue their research.
• Web page activities by David Hilton for event response field programs to Central America in 2001 (http://sio.ucsd.edu/volcano/) and the IBM focus site in 2004 (http://sio.ucsd.edu/marianas/).
• Web page development by Andrew Goodliffe for a multi-scale seismic imaging program of the Mariana Subduction Factory in 2003 (http://www.geo.ua.edu/MARIANA/);
• Spanish-language public outreach to under-represented groups by Joann Stock in the Los Angeles area with interview segments in print, TV, radio media.

Recommendations from the decadal review committee applicable to MEAC

As part of the decadal review of the MARGINS program a number of recommendations were made that are applicable to the education and outreach efforts. These include:

• The MARGINS office should extend education and Outreach to both undergraduate and
graduate students.

- The Steering Committee should consider adding a specific education and outreach component directly applicable to community college and K-12 audiences, similar to that done by R2k and IRIS.
- The Public Lecture of each Distinguished Lecturer should be videoed and made available to all. Each video should permanently remain on the website, leading to a large body of available lectures as the Program matures.

**Current MEAC members**

Geoffrey Abers (MSC Chair), Lamont Doherty Earth Observatory of Columbia University
Andy Goodliffe, University of Alabama
Rosemary Hickey-Vargas, Florida International University
Cathy Manduca, Carleton College
Don Reed, San Jose State University
Jeff Ryan, University of South Florida