

**Trinity University and the Associated Colleges of the South**  
**Second Report to**  
**The W.M. Keck Foundation of Los Angeles**  
**The Reform of Introductory Science Courses for Non-Science Majors Program**  
**December 31, 2004**

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Reform of Introductory Science Courses for Non-Science Majors Program  
December 31, 2004

Trinity University and the Associated Colleges of the South present the second report on the program activities made possible by a grant awarded on June 12, 2003, by the W. M. Keck Foundation of Los Angeles. This report covers the twelve-month period ending December 2004.

**1. Progress Since Last Interim Report Dated 12/31/03**

a. Program Committee membership

There was a change in the representative from Hendrix College. A list of committee members for the 2004-05 academic year is found in Appendix A.

b. The Course Design and Assessment Workshop planned as part of Year One activities, was held January 10, 2004, at Rollins College, Winter Park, Florida. Fifteen ACS institutions were represented by 23 faculty members. Bruce Callen, Chair of the Physics Department, Drury University, was the keynote speaker. He shared information about the course assessment/design/revision and about the implementation process that has been undertaken in the natural sciences at Drury. In addition, as one of the principal Drury developers of the SaM-VI (Science and Math Values Inventory), which received funding from NSF in July 2003, Bruce shared information about this instrument and the part that ACS may play in its beta testing.

Five ACS faculty members presented information about specific science reform efforts underway on their campuses:

- *The Use of Studio-Format Classes in an Introductory Biology Course*  
Beth Leuck, Centenary College
- *Summary of Models for Non-Majors Science Courses*  
Preston Miles, Centre College
- *A First Year Experience: Teaching "How Things Work," For Non-Science Freshman At Sewanee*  
Ben Szapiro, University of the South
- *Exploring Earth, A Revised Geoscience Course*  
Glenn Kroeger, Trinity University
- *Super Science*  
Tim Ward and Stan Galicki, Millsaps College

A majority of these workshop presentations are posted on the ACS Science Reform website at <http://www.colleges.org/sciencereform/workshop/index.html#design>. Others will be posted as they are received. Science faculty who were not able to attend this workshop have expressed appreciation for being able to view the presentations.

The discussion at the January workshop was very lively, and the participants rated "high" their level of satisfaction with this event. A copy of the agenda and a summary of the participant evaluations are included in Appendix B.

c. The Science Literacy, Course Design, and Assessment workshop was held November 13, 2004, at Millsaps College, Jackson, Mississippi. 45 persons representing 15 ACS institutions participated in this workshop.

This workshop was a combination of the Information Workshop that was originally scheduled during Spring of Year One and the Year Two “Course Implementation/Assessment” workshop scheduled for fall 2004. The intent was to (1) consider what science literacy means, how each campus defines it, and how these definitions and understandings inform course design, implementation, and course assessment; (2) provide opportunity for information sharing on Science Reform efforts already underway on ACS campuses; (3) provide a forum for mini-grant recipients to share what they are doing; and (4) foster communication among ACS science faculty. A *Working Paper on Science Literacy* was distributed to participants before the workshop and served as a basis for all of the Saturday morning and early afternoon sessions. A copy of this paper is found in Appendix D.

Drs. Jeanette Norden, Vanderbilt University and Medical School, and Linda Nilson, Clemson University, provided the leadership for this workshop. An agenda is found in Appendix C.1., and biographical information on the two workshop facilitators is found in Appendix C.2.

On Saturday afternoon, a poster session was held where recipients of the 2004-05 Course Mini-grants shared what they are doing and where invited institutions shared information about their redesigned and/or new introductory science courses for non-science majors. The list of sixteen posters and presenters is found in appendix C.3. As part of the poster session, Drs. Don Deeds and Bruce Callen, from Drury University, provided an update on the SaM-VI (Science and Math Values Inventory) and recruited ACS faculty to use the instrument in the Spring 2005 term and in future courses.

Overall, the participants found the workshop very helpful and appreciated the opportunity to meet with their colleagues to share information and resources. In fact, one participant sent an e-mail to the ACS Atlanta Office after the event to indicate that as a result of the November workshop he and another colleague converted their winter term syllabus for the majors’ course into the outcome format that was discussed at this workshop. Even though the workshop focused on introductory courses, at least one participant found the information useful for a majors course, too. The evaluation summary is found in Appendix C.4.

d. The first Course Mini-Grant recipients were announced in early May 2004. Nine proposals were received. Six mini-grants were awarded to faculty in Biology (3); Geosciences (1); Chemistry (1); and collaboration among Biology, Chemistry, and Geology (1). A complete recipient list is included in Appendix E.1, and interim reports from each of the mini-grant recipients are included in Appendix E.2.

e. Second Annual Meeting of the Program Committee

The second meeting of the Program Committee for the Reform of Introductory Sciences course was held on November 14, 2004, at Millsaps College, Jackson, MS, following the Science Literacy Workshop on Saturday, November 13. Preston Miles, Centre College, chaired the meeting in the absence of Ed Roy, Trinity University. The agenda and a meeting summary are found in Appendix F.

The agenda included a review of the two workshops held to date, the Course Mini-Grant Guidelines and proposal format/form, the Mentoring mini-grant guidelines, and plans for the rest of the Year Two and for Year Three. Additional agenda items included discussion about dissemination efforts, ongoing assessment efforts, future grant proposals for science reform of introductory science courses for non-majors, a budget review, the ACS Science Reform website (<http://www.colleges.org/sciencereform/index.html>), and the 2005 meeting.

Minor changes for clarification were made in the Course Mini-grant Guidelines, including the clarification that stipends are intended to be supplemental rather than salary replacement. The deadline for round two of the proposals was set for March 15, 2005. Recipients will be announced the week of May 2, 2005. The revised Guidelines are included in Appendix G. Five members of the program committee will serve as a review committee for the proposals received. In addition, the Program Committee members agreed to encourage their science colleagues to submit proposals for the Course Mini-Grants, as well as to send information to their department and division chairs.

The Mentoring Guidelines were adopted early in 2004. While the mentoring focus continues to be on junior faculty, particularly those at the post-mid-tenure stage, it was felt that it was not clear that any faculty who teach introductory science courses for non-majors are invited and encouraged to participate. Thus, the wording was changed in the first and third paragraphs to reflect this. See Appendix H for these revised guidelines.

As part of the mentoring activities, the Year One report mentioned that “on-site visitation by seasoned ACS natural science faculty to other ACS natural science departments should be fostered and be the principal use of funds allocated for mentoring,” and that the “visiting facilitator-discussion leader would be invited to lead a discussion with the target faculty about their ideas on non-majors science curriculum and have a private meeting with individual faculty members during a one-day visit.” In order to identify these discussion facilitators, the ACS Council of Deans was asked to nominate natural science faculty who have expertise and experience in areas of relevance to the target audience and the goals of this grant. Once nominated, each faculty member was contacted about this activity, the goals, and his/her availability to serve in this capacity. The list of ACS Faculty Mentors is included in Appendix I.1.

The three members of the Mentoring Subcommittee further suggested that other mentoring activities should be encouraged, as well, and that campuses should be able to design mentoring activities that would best suit the individual campus needs, meaning that the discussion sessions with an outside discussion facilitator would be just one option for which the mentoring mini-grants could be used. Possible Discussion Topics and other activities are listed on the ACS Science Reform web site, along with the mentoring proposal guidelines and forms, at <http://www.colleges.org/sciencereform/index.html>. These also are included in Appendix I.2 and I.3.

Since another workshop, per se, is not included in Year Three activities, the suggestion was made and approved that if the rate of applications for mentoring grants continues to be low that some of these funds be used to bring together the recipients of the Years I and II Course Mini-Grants, along with a person from each campus who is interested in applying for a grant in Year III, and “mentor” them in their work, to share “lessons learned,” and to promote dissemination efforts.

Dissemination continues to be a major concern of the Science Reform Program Committee. Articles about the Science Reform Program made possible by the grant from the W.M. Keck foundation appeared in the Winter, Spring, and Fall 2004 issues of the *Palladian*, a publication of ACS. Copies of these issues are included in Appendix J.

At the November 2004 meeting of the Program Committee, the group set the goal of having a poster about the ACS Science Reform Program presented at all twelve of the 2005 State Academy of Science/Sciences meetings which the ACS member institutions attend. Leo Pezzementi, Birmingham-Southern College, developed such a poster for the 2004 Alabama Academy of Science meeting and graciously shared it with all of the Program Committee members for adaptation. The abstract for Dr. Pezzementi's poster is included in Appendix K.

Furthermore, it was decided to encourage the recipients of the Course Mini-grants to make presentations at ABL, as well as at their disciplinary meetings, and to compile a list of suggested publication venues, particularly those on-line, for dissemination of consortial and individual faculty efforts in the reform of introductory science courses for non-science majors. Publications mentioned at the meeting included the Journal of College Sciences, Cell Biology Education, and the American Biology Journal.

The Program Committee also will make a concerted effort to send to the Atlanta ACS office copies of campus press releases that deal with science reform on the individual campuses (awards, new courses, grants, presentations, etc.)

Development of the ACS Science Reform Web site is an on-going activity. Reports on workshops, including the posting of presentations, links to science departments at ACS member institutions, the text of annual reports to the W.M. Keck Foundation (excluding financial reports), a bibliography, names of Program Committee members, basic information on the grant and program goals, guidelines for Course and Mentoring mini-grants, and more features are included on the current website. The URL for this site is <http://www.colleges.org/sciencereform/index.html>.

On-going assessment efforts also were discussed at the November Program Committee meeting. Ed Roy (Trinity University), Preston Miles (Centre College), and Beth Bowser (ACS) will initiate efforts to secure an outside consultant to assist with the overall evaluation of the grant activities, as suggested in the original proposal (p.15). One component of such an assessment should include information on how ACS member institutions are institutionalizing and plan to institutionalize progress fostered by the grant activities.

The development of the ACS Science Reform Website is an ongoing effort. Since the 2003 report, the web site has expanded to include basic information about the grant and its goals, campus representatives to the program committee, the submission and selection criteria for the course mini-grants and mentoring grants, workshop agendas and presentations, links to all ACS natural science departments, a bibliography, and the Working Paper on Science Literacy. Additional information and resources will be posted as it becomes available. The URL for this site is <http://www.colleges.org/sciencereform/index.html>.

The e-mail lists created for use by Program Committee members and ACS science faculty continue to be used to facilitate communication among and share resources with each set of constituents.

## **2. Problems Encountered Or Unanticipated Developments in Project/Program Since Last Interim Report**

a. The November 2004 workshop held at Millsaps College originally was scheduled for September 18, 2004, at Millsaps. However, Hurricane Ivan forced us to cancel this workshop and reschedule it for November 13, 2004. This date was chosen because it was the only weekend between the original September date and the end of 2004 when the College, the motel, and the workshop leaders were available. Even though canceling the workshop created difficulties for everyone, all but four of the original participants were able to reschedule for the November date.

b. Participating in the beta testing of the SaM-VI continued to present a challenge. When the SaM-VI was not ready for introduction at the January 2004 workshop, the persons at Drury University who are developing this instrument indicated that the survey probably would be ready by the Fall 2004 workshop and could be incorporated into the workshop as a major component. When the SaM-VI was not ready by mid-July, and it looked like it would not be ready by mid-September, those planning the Fall 2004 workshop removed it from the workshop agenda. In late August word arrived that the SaM-VI would be ready for introduction and the training of faculty to use it. By this time, however, the workshop agenda had been set and the session leaders had all of their materials in place and were ready to go. The compromise was to invite Bruce Callen (Drury), who had talked about this survey at the January 2004 workshop, and Don Deeds (Drury), a co-designer of the SaM-VI, to participate in the poster session, which they did. Bruce and Don also were given time at the very end of the workshop to elaborate on their poster and encourage use of the SaM-VI in courses that begin in January 2005. While the response to their recruitment efforts may not have been as high as desired, a significant number of the participants indicated they wanted to use the survey at some time, if not in introductory courses that begin in January 2005.

c. Due to scheduling conflicts of the persons drafting the Mentoring Grant guidelines, it took longer than anticipated to complete this process and to have the guidelines approved by the entire Science Reform Program Committee and the ACS Council of Deans. By the time the guidelines were ready for distribution to the individual campuses, the timeline was rather short for campus plans to be implemented before the end of the 2004 spring term.

Since the guidelines have been distributed, the lack of applications for the Mentoring grants has been somewhat surprising and disappointing. At the November meeting of the Program Committee, some of the committee members felt there was confusion about the target audience. This led to a revision of the first and third paragraphs in the guidelines (see Appendix H). The revised guidelines are posted on the ACS website and have been distributed to ACS campuses. One or two committee members wondered if the word "Mentoring" might be problematic. Others suggested that it was more a matter of actual and perceived time available, trying to fit one more additional activity into already overloaded schedules. A considerable amount of time was spent discussing this at the November Program Committee meeting, and an alternative plan was created and will be put into place if the response rate continues to be low. The

alternative plan is the fall 2005 workshop that is described above in item 1, in the fourth paragraph under Mentoring.

### **3. Further Progress Anticipated Within The Next 6 Months**

- The second round of mini-grant recipients will be announced the week of May 2, 2005.
- A fall 2005 event, with a mentoring focus, will be planned. The target audience will be recipients of the Course mini-grants in Years I and II. Also invited will be a person from each campus who either is interested in applying for a course mini-grant in Year Three or already is designing, redesigning, evaluating, or implementing an introductory science course for non-science majors.
- The next Program Committee meeting place and date will be announced early in 2005. It is anticipated that this meeting will occur in conjunction with the fall 2005 workshop mentioned above.
- Dissemination will continue to occur via the *Palladian*, *e-Palladian*, the ACS website, and disciplinary state and regional meetings.
- The inventory of current science (and mathematics) requirements for non-majors at each ACS institution will be completed and shared with the Program Committee.
- A list of possible publication venues, particularly on-line journals, will be compiled and shared with ACS science faculty.

### **4. Other Support Solicited/Received Since Last Interim Report**

None solicited/received

### **5. In Hindsight, Would You Have Structured This Grant Differently, And If So, How?**

In hindsight, one of the aspects of this grant that we would have structured differently is the length of the grant. Under the present structure, the third and last round of the course mini-grants will be awarded in May 2006. Since the original grant period ends June 2006, we will need to request a one year extension in order to complete the course mini-grant cycle to receive the final mini-grant reports from the recipients and complete the assessment of this program activity. This means the length of the grant period will be four rather than three years.

Additionally, in hindsight, a content driven workshop would have been included in Year Three, like it was in Years I and II. The response to the first two content (or topic) driven workshops was extremely positive, and those who participated in these first two events are disappointed that another one is not planned for 2005. This concern is being addressed on a limited basis by combining mentoring, design, implementation, and assessment issues in the proposed fall 2005 workshop (see above, #3, second bullet) that will bring together the recipients of the course mini-grants in Years I and II and another interested science faculty member from each campus, who teaches introductory science

courses for the non-science major, to focus on and to share experiences in areas. The “Lessons Learned,” that are identified through these conversations, will be documented and disseminated to all of the ACS natural science faculty members, via e-mail and the ACS Science Reform website, and included in the final evaluation of the grant activities and programs.

## **6. Related Activities**

An article about the availability of Mentoring Mini-Grants was published in the Spring 2004 *Palladian*, and the recipients of the Course Mini-Grants were announced in the Fall 2004 *Palladian*. Copies of these two editions are included in Appendix J.

Leo Pezzementi, Professor of Biology, Birmingham-Southern College, and chair of the Course Mini-Grant Review Committee, made a PowerPoint presentation at the Southeastern Branch of the American Society of Microbiology on the ACS Reform of Introductory Science Courses for Non-Majors and the support from the W.M. Keck Foundation of Los Angeles. A copy of his abstract is attached in Appendix K.

## **7. Relevant Honors and Awards**

a. Edward C. Roy, Jr., the Pryon Distinguished Professor of Geosciences, Trinity University, received the Distinguished Educator Award in April 2004, from the 31,000-member American Association of Petroleum Geologists. The press release is included in Appendix L.

b. Edward C. Roy, Jr, the Pryon Distinguished Professor of Geosciences, Trinity University, received the Don R. Boyd Medal for Excellence in Gulf Coast Geology in 2004, from the Gulf Coast Association of Geological Societies. The press release is included in Appendix L.