

2006 Project Report to NSF

RESESS Goals and Objectives

The original goal and objectives in our original proposal for Research Experiences in Solid Earth Science for Students (RESESS) are listed below.

Goal: Increase the number of individuals from underrepresented populations who complete Masters' and PhD degrees in solid earth geoscience.

Objectives:

1. Build a robust, independent program of research experiences and mentoring of individuals from underrepresented populations.
2. Educate faculty and other researchers in solid earth geoscience about mentoring, the value of undergraduate research in successful graduate careers, and the culture of science and how it relates to recruitment and retention of individuals from underrepresented populations.
3. Build a sustainable program that can endure past the time period of this proposed grant.

However, we were awarded a much smaller budget to provide a pilot project more closely tied to SOARS with the intent of seeing whether the geophysics community (UNAVCO and IRIS) could recruit and successfully mentor students from underrepresented groups. We were charged with that as our main activity with the mandate of using the existing SOARS infrastructure to run the summer program. Working with our external evaluator, we have restructured the goals above into the more measurable goals listed below.

The RESESS program goals are consistent with those of SOARS:

- To enhance protégé interest in the discipline
- To facilitate enrollment of students from under-represented groups as protégés
- To encourage and support protégés entry into graduate school, preferably in the geosciences
- To promote protégés' socialization into the science community, including the enhancement of research and writing skills.

To promote systems change by:

- Teaching the UNAVCO community the value of the RESESS program and of mentoring undergraduate and graduate students in general
- Teaching the community beyond UNAVCO (ie GSA and AGU) the value of the RESESS program and of mentoring undergraduate and graduate students in general.

Activities

The main activities for the RESESS program can be categorized under

1. Recruitment
2. Coordination with SOARS on implementation of the summer program
3. Evaluation
4. Education of the community.

1. Recruitment

Recruitment involves recruiting the protégées and the various mentors for each protégée. The goal for Year 1 of RESESS was three protégées with accompanying mentors.

Protégées recruited for summer 2006

- Stephen Hernandez, University of Texas at El Paso
- Miriam Garcia, University of Texas at El Paso
- Lennox Thompson, Coppin State University, Baltimore MD (an historically black college)

Recruited Mentors

Science Mentors

- Dr. Eric Calais, Purdue University with the help of Dr. David Phillips, UNAVCO
- Dr. Penina Axelrad, U. Colorado, Aerospace Eng.
- Dr. Roger Bilham and Walkter Szeliga, U. Colorado, geophysics

Writing and Communication Mentors

- Dr. Fran Boler, UNAVCO
- Blaise Stephanus, UNAVCO
- David Aragon, Director of Minorities in Engineering Program, University of Colorado

Community Mentors

- Kim Cabbagetalk, UNAVCO
- Dr. Fran Coloma, National Center for Snow and Ice
- No mentor was required for Stephen Hernandez as he was returning to the program. UNAVCO paid for a Year 0 intern in this program before funding was acquired.

Peer Mentors for new protégées who are SOARS protégées and selected by the SOARS staff.

- Keith Goodman for Lennox Thompson
- Stephen Hernandez for Miriam Garcia

Recruitment Techniques

RESESS is developing a multi-pronged approach to recruiting for the RESESS program. Based on recruitment for a UNAVCO intern for this program prior to RESESS funding starting in September 2005, we added more components resulting in:

Eriksson attended the following national conferences of organizations promoting students from underrepresented group to science and engineering.

- Association for Indians in Science and Engineering (AISES), Charlotte, NC: Eriksson attended sessions and distributed fliers to key individuals and to colleges and organizations with similar goals
- Society for the Advancement of Chicanos and Native Americans in Science (SACNAS): RESESS materials were available in the IRIS and EarthScope booths, UNAVCO organized a multi-organizational tour (UNAVCO, USGS, NCAR) one day field trip for geoscience students attending the national SACNAS meeting in Denver, fall 2005. 55 students from Puerto Rico and across the US visited UNAVCO
- National Association of Black Geologist and Geophysicist: Eriksson gave an invited keynote speech and distributed fliers on RESESS



SACNAS students tour UNAVCO headquarters fall of 2005 and learn about GPS.

Advertising

Without project funds, UNAVCO paid for development of a RESESS logo to aid in recruitment and identification of this program. This logo has been used on the RESESS website and on UNAVCO publications describing the program.



UNAVCO developed a one-page information sheet distributed at various national meetings. http://unavco.org/pubs_reports/brochures/2005-onepagers/resess.pdf. Over 250 have been handed out this year.

UNAVCO staff members Jennifer Yu and Susan Eriksson developed the RESESS website at www.resess.unavco.org. The application form was available in a pdf on this site.



RESESS pays SOARS to help with promotion and for the publications that show the protégés work. Last year SOARS:

- Included a small RESESS logo on its advertising poster.
- Included an article on RESESS in one SOARS newsletter.
- Acknowledged RESESS on the final colloquium abstract volume and provided several copies to RESESS.
- Distributed RESESS one-pagers during recruitment visits to various schools.

There is also information about RESESS on the SOARS website at <http://www.soars.ucar.edu/protegeRESESSinfo.php>.

RESESS advertised in the following journals and/or websites:

- SACNAS, Geological Society of America, American Geophysical Union, AISES, NABGG, HBCU – central career center
- UNAVCO website
- DLESE

E-mail distribution lists:

- Geo-ed listserv – DLESE
- UNAVCO community
- EarthScope community
- IRIS community

Personal contacts:

- Eriksson's professional contacts
- UNAVCO staff sent to professional contacts
- Information sent from USGS Golden to other regional offices

Other Long-term Recruiting Plan

Even though the funding is significantly reduced from what was requested, RESESS left the community college component in as the community college audience is a significant target for RESESS-type activities. The work plan for this component is given below. Dr. Baer has worked on this during the fall term, 2005. However, significant progress has not been made, and the RESESS Project Director will rethink this component in the fall of 2006, considering changing personnel for this activity.

Work Plan for Community College Component - 2006

Rationale for Work: The main goal of RESESS is to increase the number of individuals from underrepresented populations who complete Masters' and PhD degrees in solid earth geoscience. Two of the three RESESS objectives involve community colleges. Eric Baer, Department of Geology, Highline Community College, Des Moines, WA will lead the project tasks related to community colleges.

Recruiting: A disproportionate number of students from underrepresented groups go to two-year colleges (54% Hispanic, 52% American Indian, and 46% African Americans compared to 44% of all U.S. undergraduates). Highline Community College in the Seattle, Washington area has a total student population of 17,227 (63% female and 37% male) and a total of 45% non-white student population (18% Asian/Pacific Islander, 13% African American, 8% Hispanic, 1% Native American or Native Alaskan and 5% Other (self reported data)). Eric Baer will both recruit students from Highline Community College for RESESS and help RESESS build a national network of community colleges who can send students to RESESS.

Project Management: Eric Baer is participating in the Program Management Team because of his experience in teaching a diverse group of students, particularly in increasing quantitative skills, in a 4-person geology department in a community college with a large population of students from underrepresented populations and with strong ties to UNAVCO's research community.

Baer will provide leadership in bridging community college students to a 4 year institutions, disseminating lessons learned through the regional project, and interacting with community colleges nationally. Baer will also present papers, with protégés were appropriate, at professional meetings (e.g. AGU, GSA, DLESE, EarthScope, IRIS, UNAVCO).

Bridging: RESESS has a component that includes bridging from community college to degree-granting institution. Demographics at community colleges reflect the changing demographics of our nation. Highline CC will establish a bridging program from the Puget Sound Community colleges to Central Washington University Department of Geological Sciences through field trips and visits to the four-year institution. In addition, Baer will also conduct research on the current state of community college students who go finish degrees at 4-year institutions and do not go on to graduate school.

Funding for Baer: We have budgeted one month summer salary for Eric Baer, Highline Community College annually (years 1-3) to support his participation and leadership in building regional and national groups of community colleges from which RESESS can recruit. Funding for Baer also supports his research and dissemination regarding the project.

RESESS will contract with Highline Community College (invoice) for one course release for Eric Baer for each fall semester (years 1-3) to plan a joint field trip with University of Central Washington and to build a pool of students from other community colleges in the Puget Sounds area. Baer will work with UNAVCO scientists Tim Melbourne and Megan Miller in the bridging program to UCW.

2. Collaborating with SOARS

Part of the condition of this award was for RESESS to recruit protégées and mentors and to use the SOARS infrastructure in running the program. SOARS and RESESS have worked together toward this end with funds moving from RESESS to SOARS to cover expenses for the leadership and writing components, protégée apartments, and a few miscellaneous administrative costs. RESESS through UNAVCO has handled all of the travel, stipends, recruitment, and other functions such as providing computers, email, etc. SOARS and RESESS staff met prior to the 2006 summer session and have communicated via email and phone during the summer. RESESS and SOARS have shared some events such as opening and closing receptions as well as the final research colloquium. RESESS hosted a picnic for all protégées at UNAVCO about three weeks into the summer program. Hence, SOARS protégées have the opportunity to see the work that UNAVCO supports.



This has been a large time commitment from both SOARS and UNAVCO which has not been funded through this current award.

3. Evaluation

During the past year, Eriksson identified a local external evaluator as reduction of funding made it more feasible to work locally than bring someone from Georgia to Colorado to conduct interviews. External evaluation will be done by Dr. Liane Pedersen-Gallegos, Ph.D., Director, Ethnography & Evaluation Research Center to Advance Research and Teaching in the Social Sciences (CARTSS), University of Colorado, Boulder, Colorado. Dr. Pedersen-Gallegos conducted an extensive, NSF-funded evaluation of the SOARS program <http://www.soars.ucar.edu/documents/SOARS%20Evaluation%20Report.pdf> and RESESS can benefit from her knowledge of SOARS and not replicating certain aspects of our evaluation.

Eriksson and Pedersen-Gallegos worked closely with AIR evaluator Roger Levine in 3 conference calls in January-February 2006 to ensure that the RESESS evaluation is aligned with the goals of the OEDG project and that the data needed by AIR can be obtained within the qualitative evaluation of RESESS. Pedersen-Gallegos has integrated the two different evaluation plans. The final plan for her work is listed below. For 2006, protégée interviews have been conducted, mentors will be interviewed in September 2006, and demographic data on applicants, selected protégées, and mentors is collected internally.

UNAVCO Research Experiences in Solid Earth Science for Students (RESESS) Project

Evaluation Plan

Scope of Work

This is an evaluation of the RESESS program, which is a program patterned after, and affiliated with the SOARS program, for which E&ER also conducted an evaluation. The RESESS project has a geo-science focus, based in east Boulder County, and runs alongside, overlapping with, the SOARS program. The evaluation will include in-depth, ethnographic interviews with key program participants, and in cooperation with a national evaluation effort from the AIR program, administration of their survey to protégé participants. Interviews with protégés will be conducted during the summer sessions when they are in the Boulder area, and interviews with their respective mentors will be conducted shortly after the conclusion of each summer session. Reports, oral and written, will be delivered to Susan Eriksson, PI of the RESESS program, at times listed below, in accordance with funders' requirements. Reports in years 2006 and 2007 will be formative evaluation progress reports designed to optimize the program, and the final report in 2008 will be summative in nature, to include any findings that may be helpful to future projects.

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Each year's scope of work is outlined below:

Year One

3 protégés

- In-depth interviews with three protégés.
- Administration of the AIR survey.
- In-depth interviews with the protégés' mentors (estimated at twelve, some of whom are graduate students, from SOARS and UNAVCO community).
- One focus group interview with administrators/managers, not fully-coded (quick coded, for protocol development, to inform report-writing)

- One focus group interview with Steering Committee (two members from UNAVCO on SOARS committee and two from SOARS on UNAVCO's committee), not fully-coded (quick coded, for protocol dev, to inform report writing)

Year one = 15 interviews fully-coded, 2 quick-coded focus group with admin.

Year Two

- In-depth interviews with six protégés; three who are new, three returning.
- Observe Steering Committee meeting (not fully coded)
- Interview mentors in focus groups at an event/meeting where they would be anyway
4 groups: research, writing, community, and peer mentors

Year two = 7 interviews, 3 new protégés, 4 focus groups

Year Three

- In-depth interviews with six protégés, two from each of first two years, plus two new ones.
- 15 interviews: 6 protégés, 4 mentor focus groups (research, writing, community, peer), 3 admin: steering committee, admin, staff, 2 individual mentors who can't make the focus group interviews.

E&ER Personnel: Liane, transcribers. Other direct costs: tapes, ink cartridges, paper.
CU Human Research Committee approval has been secured.

Deliverables and Budget - Three years: June, 2006 – December 2008

Year one:	\$8,000	Evaluation to be conducted end of summer 2006
Year two:	\$5,000	Evaluation to be conducted end of summer 2007
Year three:	\$8,000	Evaluation to be conducted end of summer 2008

Year One: June-Sep 2006 \$8,000

Formative Evaluation Report due Dec 1, 2006

Year Two: June – Sep 2007 \$5,000

Formative Evaluation Report due Dec 1, 2007

Year Three: June – Sep 2008 \$8,000

Verbal report to RESESS Principal Investigator, Susan Eriksson Sep 15, 2008
Summative Evaluation Report due Dec 1, 2008

4. Education of the Community

SOARS and RESESS collaborated on a presentation for fall, 2005 AGU.

AGU 2005 Abstract

ED31B-1214

Providing Opportunities for Interdisciplinary Research through Partnering two Undergraduate Research Programs: RESESS and SOARS *

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Undergraduate research provides a unique opportunity to explore scientifically novel questions, particularly those at the intersection of disciplines. This opportunity should be balanced with the need to provide the strong discipline-based training that undergraduate students require to continue their academic careers. This need for balance is especially acute for students from groups who are historically under-represented in geosciences; their status as minorities and women makes them especially vulnerable to the devaluing of their research if it isn't along traditional lines.

Combining undergraduate research with a strong, diverse learning community is one way to balance the opportunity of interdisciplinary research with the need for depth of understanding in a field. In this model, students individually pursue focused research in partnership with a particular scientist as they work collaboratively across disciplines to prepare scientific papers, presentations, and posters to share the results of their research. Over time, programmatic success can even help insulate students from the risks of interdisciplinary work. Research Experience for Students in Solid Earth Science (RESESS) and Significant Opportunities in Atmospheric Science (SOARS) implement this approach. SOARS is a program with a 10-year history in the atmospheric science; RESESS is a new program focused on Solid Earth Sciences. The two currently collaborate by merging their learning communities while maintaining distinct research focuses. While still in the pilot phase of partnering, initial discussions by the student participants indicate a growing awareness of potential for cross-disciplinary collaboration. In fact, two projects, both by graduate students who have participated for multiple summers, straddle the disciplines of geology and meteorology. One project characterized dust storms in the Southwest US using remote sensing, and a second project studied wind-driven migration of sand dunes on the Navajo Nation. Based on the RESESS/SOARS partnership in 2005 and plans for a three-year collaboration, we describe the ongoing process of navigating the partnership and developing a cohesive learning community. We also provide evidence of the growing acceptance of interdisciplinary research within the SOARS and RESESS students and the scientists who work with them.

DE: 0805 Elementary and secondary education

DE: 0850 Geoscience education research

DE: 0855 Diversity

SC: Education and Human Resources [ED]

Eriksson was lead on a session at the UNAVCO Science Workshop in March, 2006 which focused on broadening participation in our science. RESESS was discussed.

The UNAVCO polar community submitted two proposals this past year. RESESS interns were included in both proposals, both with a bit of prodding and encouragement by UNAVCO E&O and by the President. The first is funded and will fund one intern in year 2 and 3 of the engineering project and the other proposal is outstanding at this time. We have included this information here as RESESS is becoming known within the geoscience community and we are gaining support for this project, even though it is in its beginning stages.