

Date: Monday, September 9, 2013

Present: L. Dahlman, B. Douglas, L. Ely, E. Patlan, J. Ryan, D. Schmidt, S. Schwartz, S. Semken, J. Taber, M. Miller, D. Charlevoix, A. Morris, B. Pratt-Sitaula, M. Weber

Absent: R. Anthes, A. Krause, B. Walker, M. Berg, S. Olds,

Agenda Items

- I. Approval of last meeting's minutes – J. Ryan
- II. GAGE budget reduction and impact to ECE – D. Charlevoix
- III. RESESS Support post 2014 brainstorming – J. Ryan
- IV. Month of next teleconference – J. Ryan

J. Ryan opens meeting at 2:04pm MDT

I. Approval of last meeting's minutes – J. Ryan

J. Ryan motions to approve last May's meeting minutes. D. Schmidt moves to approve. L. Dahlman seconds. Committee votes to approve.

II. GAGE budget reduction and impact to ECE – D. Charlevoix

D. Charlevoix discusses changes to proposed budget. The good news is UNAVCO has been awarded \$13M for FY 14 GAGE funding. It is less than what we were advised to request - \$17.4M. ECE's portion of the original request was \$729,000. With the reduction ECE will have an operating budget for FY14 of \$601,000. M. Miller had the senior management team get together to brainstorm on how to deal with the significant reduction. Directors were asked to document what their current state of work is and then what would be the future state, year one and beyond. From that, they were asked to review what staffing needs will be. The result for ECE is attached in the Summary of Scope of Work for ECE- Year One Focus.

With the budget cut, Participant Support was impacted, including support to the Science Workshop and Short Courses throughout the next fiscal year. Based upon, guidance the K-12 support was not deemed a high priority and it made sense to remove. ECE will shift focus to an undergrad and grad level training. Moving forward, we have a smaller budget for presence at conferences. ECE contributed significant staff time to the UNAVCO web team. With the reductions, we cannot afford to do that any longer.

With this reduction in budget, changes in staffing were inevitable. Staffing changes were dictated by change in scope of work. Megan Berg has voluntarily moved to .50 FTE, with a 6-month assessment to determine if we need to shift salary. Shelley Olds was reduced to 0.75 FTE. ECE is looking for development and external funding to bring S. Olds back up to full-time as soon as possible. Ultimately we'd like to bring Aisha Morris salary into the core GAGE funding. The broader picture is – every department had impact. Meghan Miller was in clear in her commitment to ECE throughout the process.

M. Miller further states she is grateful to D. Charlevoix and other directors for their efforts.

QUESTIONS AND COMMENTS

D. Schmidt – In regards to A. Morris' FTE funding – please clarify the moving from RESEES to GAGE?

D. Charlevoix – A. Morris is currently .25 FTE GAGE, .75 FTE RESESS. The RESESS award ends 2014. With the caveat that ECE/RESESS is looking for additional funding, the plan is to move A. Morris' to 100% GAGE starting September 2014 (minus any additional funding secured before that time)..

J. Ryan – Please clarify the reduction in website support, what impact it has it had on ECE workforce?

D. Charlevoix – The current UNAVCO web team, consists of 4-5 staff including one ECE member. Currently S. Olds is the ECE representative, and works on the content and technical side. The team is working to update and make changes to the information architecture, meeting at least 2 hours a week with additional work hours focused on the broader UNAVCO website. S. Olds puts more time working into the broader UNAVCO side, not just on ECE. This is an area that we need to cut back on and focus more on updating and improving our ECE section. With GAGE, ECE does not have the funding to support that many hours.

J. Ryan – What is the budget impact to the support of workshops/short courses next year?

D. Charlevoix - \$40k will go to support short courses. ECE is committed to 3 courses at GSA (1 TLS and 2 Education Support courses) but realistically, ECE can only support 3 courses for FY 14. Currently scheduled is a Strainmeter short course in October, and there is a request for a spring TLS course, with one more potential short course next summer, topic TBD.

J. Ryan – How has subscribership for GSA courses been in the past?

B. Pratt-Sitaula - TLS short courses have been well attended and we get a good pricing deal with GSA to host.

D. Charlevoix comments: Additionally, Chris Crosby just received funding from SCEC for TLS course in California. There is a big demand for TLS.

III. RESESS Support post 2014 brainstorming – J. Ryan

J. Ryan states that there is a need to review the workforce component with ECE for the RESESS program - UNAVCO/ECE must retain RESESS. Funding for RESESS ends August 31, 2014. ECE will ask for a no-cost funding grant to carry us over into fall months of 2014. Original funding is from an NSF-OEDG grant, which is no longer supported within NSF. In July, D. Charlevoix met with Jill Karsten and Lina Patino to discuss ideas for funding of RESESS. D. Charlevoix asked them about a REU site proposal for RESESS with expansion to include community colleges. The overall consensus was an REU Site proposal was not a good fit for RESESS but that UNAVCO was encouraged to submit a proposal for one component of the expansion of RESESS to focus on lower-division undergraduates and community college students. The proposal was submitted in late August.

Additional efforts are ongoing to develop relationships and eventually funding to help support RESESS. D. Charlevoix asks A. Morris to summarize her efforts. J. Ryan gives the floor to A. Morris to provided feedback.

A. Morris continues. She recently came back for attending the NABG (National Association of Black Geoscientists) conference in Houston, TX last week and met with a few contacts, including an Exxon Mobil connection. This connection has a shared interest in workforce development. Through conversation it was mentioned that they are very interested in RESESS program, and could host a

possible 1-day, or 1-week workshop. They are very interested in working together to support RESESS program. A. Morris and D. Charlevoix will be meeting with this contact later at GSA or AGU, to discuss more support opportunities.

J. Ryan states there is a serious workforce problem with people retiring within the Oil/Gas industry, and they want to get more young people in. The hope is to bring in more employees with a geoscience background. An REU will allow some things, but look at some other angles to find that funding. UNAVCO should consider getting a baseline of federal dollars and then fund additional elements by industry (mining, petroleum etc.).

QUESTIONS AND COMMENTS

J. Ryan – *You say you have an REU accepted, is there any other registered REUs?*

D. Charlevoix – *The TUES proposal was awarded. The REU Site proposal was submitted on August 28; 3-year, \$300k funding. This REU will allow UNAVCO/ECE to approach community college and lower division students with an opportunity to work as a group on process of research. ECE can't ask much for salary, but we have submitted for two months of full-time director and one month of admin support. Community College, and lower division college classmen typically have lower math and other knowledge skills, which make it difficult to pursue RESESS internship option. This REU would allow for group work, and joint adventures with the RESESS interns.*

J. Ryan thinks this is a marvelous idea. You have to get them started somehow.

J. Taber agrees and says NSF has been pushing to include community colleges etc.

D. Charlevoix – *ECE has been working with someone from Community College System of Colorado, who has provided a supportive letter and seemed very happy to provide additional help.*

E. Patlan – *Another idea to save budget would be to allow interns to borrow computers and work remotely (cloud based computing). Also there is an Extreme Science and Engineering webcast, which operates a 2-hour webcast or teleconference course. Some of these webcasts run free of cost, or they will have a minimal fee attached.*

ACTION: E. Patlan to send link to Extreme Science and Engineering Webcast to committee for review.

J. Ryan – *Anyone else have prospective on finding ways to support RESESS?*

S. Schwartz – *Have PIs write in support for RESESS within their proposals. They need a core program, initially 2nd year interns, but still need core support.*

D. Charlevoix – *Interestingly, a month ago, we found Corné Kreemer had written proposal with Susan Eriksson allowing for \$16k in support for RESESS student for 2014.*

J. Taber – *What has been successful at IRIS is suggesting to PIs that if they can support 1 student, IRIS will provide one. However, if they can provide funding for two students than they can select the two they would like.*

D. Schmidt – Send a community-wide email to members to include RESESS in their proposals. Each time a reminder call goes out, attach a call for RESESS dollars.

M. Miller agrees. Core costs need to be divided.

B. Douglas – If feasible, also develop materials that could also be sent to oil and energy, which are all interested in the same. Maybe partner with PI to split company and PI costs.

J. Ryan – What is the word on the TUES proposal?

B. Pratt-Sitaula – ECE received the news it was awarded after Labor day and had the first PI call this week. ECE is anticipating initial planning to be complete within the third week of February 2014. Between now and then, there is a need to work on input from the community on what they would like to do.

J. Ryan – Agrees that this is good. So there are dollars for staffing for TUES?

D. Charlevoix – Actually, it is a little of opposite. There is a small amount of funding for B. Pratt-Sitaula in the budget. However, not enough for her to continue her participation with ECE activities, we will redirect some of the GAGE funding toward salary for Beth. This is a huge win and we need B. Pratt-Sitaula to continue.

IV. Month of next teleconference – J. Ryan

J. Ryan states that given the upcoming GAGE funding, the committee should meet again in a month.

D. Charlevoix agrees, and adds that a bi-monthly or monthly input and support could be discussed from there.

J. Ryan states that Monday's at 2p works best for him, if that works for everyone else?

D. Charlevoix agrees and in particular, meeting Oct 2nd would work better for her.

ACTION: M. Weber to send doodle poll to committee

J. Ryan closes meeting at 3:02pm

**Education and Community Engagement
GAGE Scope of Work**

July 2013

ECE is responsible for four areas of focus: Training, Educational Materials Support, Community Engagement & Communications, and Workforce Development

Training

Technical short courses will continue to be organized by ECE and led by community members. Frequency of offerings and/or student support will be reduced. There is a need to offer more training with an online component to primarily compliment (not replace) the in-residence courses. The additional of online components does not reduce the internal workload and initially, during setup and testing, will cause an additional surge in work tasks. Bi-annual UNAVCO Science Workshop support is reduced. Educational workshops focused on K-12 are eliminated.

Educational Materials Support

Educational materials focus to supporting undergraduate and graduate education. ECE will serve as a facilitator for materials development with the community doing the primary development. ECE will partner with organizations and professional societies whose focus is K-12 STEM (science, technology, engineering, mathematics) education to disseminate existing K-12 materials. No new materials develop in year 1 of GAGE

Community Engagement / Communications

ECE will continue all of the services for UNAVCO staff and community in the current state with a focus on efficiency and improved collaboration with UNAVCO staff and sister organizations such as GSA, IRIS, EarthScope and AGI to the extent possible.

Current state includes: social media channels, Wikipedia, program highlights, outreach materials/Tri-fold cards (print and online), graphic design, branding materials including business cards, letterhead, swag, etc. Provides publication design, presentation preparations, museum exhibit development, and digital content for Active Earth Monitor, conference exhibit booth coordination for GSA and AGU, video production, on-site photographer, and supports science snapshots. Maintains UNAVCO photo gallery. Support for UNAVCO Event Response including web design and general event description. Maintains community bibliography. Coordinates with EarthScope National Office publications and social media.

ECE communications also supports the RESESS program through photography, videography, website maintenance, poster printing and newsletter development. Also maintains the COCONet website and provides coordination support to the COCONet working groups. ECE will maintain web pages related to ECE activities

Workforce Development

RESESS program management (under separate award) but integrated into UNAVCO. Coordinated efforts to support graduate students and early career professionals. Additional workforce development infrastructure managed by RESESS director to support a network for underrepresented geoscience students.

EOAC Summary: June – August 2013**Travel**

July

- Donna @ NSF to meet with L. Patino and J. Karsten and explore future funding opportunities.
- Donna @ Washington D.C. to meet with AGI, Anne Benbow, IRIS, John Taber & NSTA, Ted Willard to explore points of collaboration

August

- Shelley to Newport, Oregon to contribute to CEETEP (Cascadia Earthscope Earthquake and Tsunami Education Program) EarthScope workshop
- Donna to San Clemente to visit S. California UNAVCO regional office to learn more about PBO and maintenance of the network.

Training*2013 Short courses and workshops:*

- Finite Element Modeling of Deformation at Volcanoes; May 21-23
- InSAR: An introduction to Processing and Applications using ROI_pac and GIANt; July 29-31
- GPS Data Processing and Analysis with GAMIT/GLOBK/TRACK; July 8-12
- InSAR Processing and Theory with GMTSAR; June 26-28

Upcoming:

- Introduction to Terrestrial Laser Scanning (Ground-Based LiDAR) for Earth Science Research. (GSA course 501); October 25
- Yellowstone National Park as a Hotbed for Inquiry—For Teachers. (GSA course 520B); October 26
- Integrating GPS, LiDAR, InSAR, and Other Geodesy Data into Undergraduate Courses. (GSA course 526); October 26
- Working with Strainmeter Data; @ UNAVCO Headquarters October 31 -November 1, 2013
- Planning for TLS short course at Boulder Headquarters in spring 2014.

Educational Materials

NSF-TUES award. Award made in August. M. Miller (PI) and B. Pratt-Sitaula (Co-PI) and project lead; kick-off meetings last week and this week. Will fund development and testing of four undergraduate-level modules featuring geodesy data (two each at majors' and intro level). Collaborative with Indiana University (Bruce Douglas) *Strain curriculum materials.* Majors-level module beta-tested at six institutions in 2012-2013 academic year. Related intro-level activities tested by Becca Walker in spring 2013 with additional testing in 1-2 more institutions this fall. Final version of majors-level module will be published to UNAVCO and SERC websites September 2013. Intro level activities will be posted shortly thereafter.

Community Communications

Hatfield Museum Display. Hands-on museum display focused on the role of high-precision GPS in plate tectonics and natural hazards is moving forward and scheduled for completion/installation this fall.

New Exhibit Booth. New exhibit booth structures have arrived and will be used at GSA in Denver and AGU. The new booth will be less expensive to ship and much easier to set up. The design also allows for updating of the look of the booth backdrop in a few years if needed.

Social Media. Increased focus on Facebook and You Tube engagement including posting presentations from EarthScope meeting and RESESS intern colloquium talks.

Workforce Development

RESESS Summer 2013

- 11 interns representing 11 different educational institutions; 4 returning, 7 new interns
- 2 interns off-site
- Mentors from UNAVCO, NCAR, Univ. Colorado, NEON
- Total students served by the program = 44
- Program elements: leadership week, weekly writing & communications workshop, computing workshop (MATLAB-focused) by Susan Schwartz, overnight field trip to CU Mountain Research Station by Kevin Mahan
- Closing colloquium at UNAVCO attended by Wendy Harrison, Director of Division of Earth Sciences at NSF. Poster session at UCAR, joint with SOARS and NEON interns.

RESESS Program reception. July 24, Boulder Colorado. Friends of RESESS invited to celebrate 9 years of the program and the 2013 intern cohort. Approximately 75 people in attendance.

NSF REU Site Proposal: August 28, UNAVCO submitted a proposal to NSF to host an REU Site. 3-years, 10 interns per year with a focus on community college and lower-division university students. Project summary appended. D. Charlevoix (PI and A. Morris (Co-PI). \$363,110 over 36 months.

NABG conference. Houston, Texas, A. Morris attended to network and recruit September 4-7.

Recent technological innovations in geodesy (the measurement of the size, shape, and mass distribution on Earth and changes over time) have allowed a wide range of advances in our understanding of Earth processes on topics critical to society such as natural hazard mitigation, climate change, and water resource management. Undergraduate teaching resources have not kept pace; thus this project's objectives are: 1) improve geoscience (particularly geodetic) knowledge base of undergraduate students both for general science literacy (introductory) and future science workforce (majors-level) and 2) improve effectiveness of teaching resources and pedagogy employed by faculty members teaching geodesy, geoscience, and allied sciences.

Intellectual Merit

Geodesy Curriculum for Undergrads (GECU) proposes to develop, test, revise, and disseminate curricular modules that address important societal issues through student investigations using geodetic data. GECU will be the largest undergraduate geodesy curriculum effort to date, the first strongly grounded in STEM educational research and student learning assessment, and the first to feature newer applications (climate change, water resources) alongside more traditional ones (earthquake/volcanic hazards, tectonic plate motions). Lessons learned can inform future curriculum development featuring authentic data (both geodetic and other) and will be codified in a Developer's Manual to be disseminated with the curricular modules. The GECU partnership includes a university consortium (UNAVCO), community college (Mt San Antonio College), university (Indiana University), a STEM education center (Science Education Resource Center [SERC]), and geoscience educators professional organization (National Association of Geoscience Teachers [NAGT]). In keeping with research-based best practices, modules will include inquiry activities using authentic data, quantitative skill development, small group learning, measureable outcomes, and embedded assessments. Module design teams will bring together instructional, geodetic, and assessment expertise to produce high quality materials that marry cutting edge research discoveries with effective classroom practices. To ensure ease of adoption at different sites, modules will be tested in at least three institutions, one or more of which include significant numbers of students from underrepresented groups. SERC will evaluate the overall program using student learning gain data and faculty use metrics.

Broader Impact

The project will benefit society by arming young people (many from underrepresented groups) with greater knowledge of how science research can inform societal decisions. Undergraduate curriculum featuring geodesy, an area of recognized need for improvement, will support overall Earth science literacy gains. GECU will leverage previous and ongoing investments by NSF through SERC's InTeGrate project and UNAVCO E&O. It shares with InTeGrate a strong grounding in societal issues and thus will utilize many of the same techniques and assessments. Rapid widespread availability of the modules and developer's manual will be ensured by publication on the well known SERC website (nearly 4 million visitors per year). Besides being housed in a geodesy-specific collection, they will be linked to Teach the Earth, InTeGrate, Cutting Edge, Quantitative Skills, and Using Data sites as appropriate. Dissemination will target both geodesy and larger geoscience instructional communities and seek to engage participants in community building across institutional lines. Efforts will include webinar series, talks/posters at meetings, inclusion in workshops, and news article (EOS or *In the Trenches*). The latter will be a particularly powerful venue for bringing together module authors and content experts with a broad spectrum of geoscience educators. This curriculum, grounded in geodetic knowledge and high quality pedagogical design, will contribute to the paradigm shift in STEM education.

Overview

Engaging lower-division undergraduates in research experiences is a key but challenging aspect of guiding talented students into the geoscience research pipeline. Many lower-division students do not have the science content knowledge or sufficient math skills to conduct independent research. Students from groups historically underrepresented in the geosciences may face additional challenges in that they often have a less robust support structure to help them navigate the university environment and may be less aware of professional opportunities in the geosciences.

We propose to develop a new REU Site: LeAiding UNDERgraduates in CHallenges to Power Academic Development in Geosciences (LAUNCHPAD) at UNAVCO under the leadership of PI Donna Charlevoix and Co-PI and LAUNCHPAD Director Aisha R. Morris (303-381-7488; morris@unavco.org). It will build on UNAVCO's successful RESESS program with a new focus on the research experience for less academically advanced students, who may not be ready for an independent research experience. The program will engage 10 community college and lower-division undergraduate students in an 8-week summer research and professional development experience with the desired outcome of increasing the number and diversity of undergraduate geoscience majors. The primary goals for the program are:

Goal 1: Serve lower-division university and community college students from underrepresented groups.

Goal 2: Build student interest in geosciences and related careers

Goal 3: Engage students in collaborative research projects in the geosciences that develop and improve research-ready skills

Goal 4: Provide ongoing support for students choosing to pursue degrees in geosciences and related fields

Intellectual Merit

The program will focus on engaging historically underrepresented groups in the research process through their participation in a collaborative research-support project. Students participating in LAUNCHPAD will develop research-ready, communication, mathematics, and computing skills, as well as geoscience content knowledge. The LAUNCHPAD REU will bring students to UNAVCO in Boulder, Colorado to work on collaborative geodesy-focused research projects in the GAGE facility (UNAVCO manages the GAGE facility) under the mentorship of a UNAVCO Project Manager. The facility supports geodetic science including instrumentation and infrastructure, data flow, archiving and data product development. Students will work as UNAVCO GAGE interns with UNAVCO staff and develop research-ready skills during the 8-week summer

experience. The NSF funded GAGE facility is uniquely positioned to facilitate this work in that we support all aspects of scientific research for a consortium of more than 100 universities and are able to expose students to a breadth of career possibilities in the geosciences.

Broader Impacts

The project will benefit society by preparing a diversity of students for academic and career opportunities in the geosciences through national recruitment at universities and community colleges with limited opportunities in STEM fields. LAUNCHPAD will reach out to students from groups historically underrepresented in the geosciences as well as provide access to information about the relevance of geoscience to the broader intern networks of family and friends, eventually reaching hundreds of individuals in communities that typically do not have access to such information. Results of the program will be shared with other REU programs through the REU-GEO network, at conferences such as AGU and GSA and the social media networks of UNAVCO and EarthScope reaching tens of thousands of individuals and hundreds of STEM

Approved