Annual Report

Collaborative Research: GP-EXTRA: Geo-Launchpad: Preparing Colorado Community College Students for Geoscience–Focused Careers

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Program-track: IUSE-Engaged Student Learning: Exploration
Accomplishments

What are the major goals of the project?

The IUSE program: The Geo-Launchpad Program (GLP) is a collaborative effort between Front Range Community College (FRCC) and UNAVCO, a non-profit, university-governed consortium that facilitates geoscience research and education, to provide community college students in Colorado with experiential learning opportunities in geoscience through summer internship programs that impart technical knowledge and development of students’ soft skills for advancement along career pathways in the geosciences. The project also builds curriculum and new instruction materials to support these and other internship/employment opportunities, career exploration through seminars and workshops, and a mentorship program. The project has three overall goals:

Goal 1: Build students’ interest and capacity to engage in geoscience-focused STEM (science, technology, engineering, mathematics) career pathways.

Goal 2: Professional development of community college STEM faculty as mentors to students in geoscience focused careers.

Goal 3: Increase the number of students from community colleges that transition to geoscience-focused careers.

What was accomplished under these goals?

Major Activities

Two tracks of primary activity took place. The first of these activities was to provide academic pathways for students to learn, engage, and pursue further academic, research, and career opportunities in STEM related fields focusing on geoscience related fields. The second of these activities involved a summer internship for students at UNAVCO in Boulder, Colorado.

Academic Pathways

The primary academic activity of the Geo-Launchpad program is the development of curriculum. Other activities included on-campus seminars and professional development activities for faculty at two-year colleges.

Curriculum Development – a course, “GEO 210 Careers/Research in the Geosciences” was offered as a one credit course at the Larimer Campus of Front Range Community College.

The course included presentations of internship opportunities (including but not limited to Geo-Launchpad), student investigation of current research, information on transfer to four-year colleges, expectation of courses required for admission to four-year colleges and
future careers, a field trip to UNAVCO, and guest speakers. Guest speakers included a representative from the Research Experience for Community College Students (RECCS at the Cooperative Institute for Research in the Environmental Sciences (CIRES)), a retired hydrologist from U.S. Geological Survey (USGS), and former interns with the RECCS and Geo-Launchpad program.

“GEO 210 Careers/Rsrch in Geoscience,” was presented and to and approved by FRCC and unanimously by the State Faculty Curriculum Committee (SFCC) for inclusion in the Colorado Community College Common Course Numbering System (CCNS). The course is now available for adoption by community colleges throughout the state. The course has run twice at Front Range’s Larimer Campus and is currently on the Spring 2018 schedule.

Seminar – Seminars were presented at the three main Front Range Community College campuses. These seminars were led by UNAVCO personnel and Front Range Community College faculty. Both students and faculty were welcome to attend. These seminars included information about UNAVCO, information on the Geo-Launchpad internship, recommended coursework for internships like the Geo-Launchpad internship, and a question and answer session.

Professional Development for Faculty – In addition to a faculty mentor program associated with the UNAVCO internships, faculty were offered opportunities to learn of internships, careers, and recent research in the geosciences for the purpose of passing this knowledge on to students. Faculty were invited to the above noted seminars. Further, earth science faculty and college administration were invited to attend an end-of-internship poster symposium, which included UNAVCO interns and students from multiple Research Experiences for Undergraduates (REU) opportunities in the Boulder, Colorado area.

Internship

The primary activity for the Geo-Launchpad program is a summer internship for Colorado community college students. The focus of the internship is to help develop research ready skills, rather than conducting independent scientific research. Interns spent eight weeks of the summer working at UNAVCO in Boulder, Colorado. Their experience included the following major activities:

Team-Building Workshop. During orientation week, interns participated in an afternoon of activities that emphasized team building and communication. Through the various activities, interns were able to explore each-others’ skill sets, personalities, and work ethics by collaborating as a team to problem-solve and complete exercises. Interns reported that participating in this workshop helped to 'break the ice’ and gain familiarity with teammates early on in the program.

Research Support Project. Interns worked collaboratively in teams on a research support project under the direct supervision of UNAVCO or USGS technical staff. Students were provided office space and any required computing resources and supplies within the facility where they worked. Technical training was provided throughout the experience.
Geology Field Trips. Interns participated in two geoscience field trips. Geo-Launchpad interns visited Rocky Mountain National Park (RMNP) along with upper-division undergraduate interns, graduate interns, and postgraduate interns involved in internship programs at UNAVCO. The field trip focused on the geological history of the Rocky Mountains and included a tour from a University of Colorado (CU) graduate student and a park ranger from RMNP. The interns also joined students from the RESESS (Research Experience in Solid Earth Science for Students) internship program for an overnight field trip to the University of Colorado Mountain Research Station, led by CU faculty and graduate students.

Communications Seminar. Interns participated in weekly seminars for formal and informal communications as a student and a scientist. These seminars were collaborative with RESESS interns and allowed for opportunities for near-peer mentoring.

Geoscience Career Circles. Guest speakers from various geo-workforce sectors joined the interns over lunch every Monday for an informal discussion about their jobs and career paths. Sectors included industry, research, academia, government, non-profit, and consulting. Students from other internship programs within UNAVCO also participated, which led to a broad scope of discussion during the question and answer period.

Skills Workshop. Interns met weekly for a skills workshop that provided professional development on topics including digital file organization, time management, email etiquette, and basics of select software packages including Google Earth and Adobe Illustrator.

Portal to the Public Network (PoPNet). Along with interns in the UNAVCO Student Internship Program (USIP), Geo-Launchpad interns participated in a weekly workshop that provided hands-on scientific communication training to enable meaningful experiences between geoscientists and the public. This program concluded with two outreach events at the Boulder County Farmers Market.

Communication with Faculty Mentors. Interns communicated with their faculty mentors throughout the summer, sharing work highlights and internship summaries. This allowed their faculty mentors to stay abreast of the intern's experiences.

Project Dissemination. Students presented their work in a poster symposium at the end of the summer. Interns from similar geoscience summer programs also participated, totaling over 60 posters presented. Members of the local scientific community were invited to the symposium and interacted with the interns.

Faculty Mentorship

The Geo-Launchpad Program includes faculty mentorship to develop a supportive relationship with a faculty member from the intern’s home institution. The goal is for the student to have an individual to follow up with after the internship program concludes and to help guide them as they continue on a path toward a career in science, technology, or
engineering. All interns were required to apply to the internship with a faculty mentor. Faculty mentors were asked to:

- write a letter of recommendation for the student as part of the application process,
- regularly communicate with the intern about their work/research throughout the summer internship,
- travel to UNAVCO in Boulder on August 2\textsuperscript{nd} and 3\textsuperscript{rd} to participate in a workshop on mentoring students and attend the student poster symposium, and
- conduct one formal meeting with the student in the Fall 2017 semester to discuss career paths, opportunities on campus, how to stay connected to the scientific community, and any other advice that will help the student in pursuit of their academic and professional goals.

The student was required to submit a summary of the fall meeting. Faculty were encouraged to set up additional meetings with the student to maintain a mentoring relationship with the student. Faculty were compensated for their time with a modest honorarium after the conclusion of the fall meeting and submission of the student summary.

**Specific Objectives**

Data were collected by an external evaluator using both formative and summative elements utilizing mixed-methods measures including pre-post intern surveys and student and faculty interviews. Student evaluations of the special topics course were also collected from students who participated in this course. Overall, first-year benchmarks were met.

Four students participated in the special topics course (GEO 210) in the Spring 2017 semester. All four completed the course. Student feedback forms (standard to the college) were completed by all four students. All students specified in their response to the open-ended question on the post survey “How did this course influence your career or educational plans?” that the course helped them develop more knowledge about geoscience careers and the academic preparation they needed to enter them. Students’ only complaint about the course is that it did not include more guest speakers from 4-year university faculty in addition to geoscience professionals.

The internship also proved to be highly successful. The eight interns selected were highly enthusiastic, as were UNAVCO staff working with the interns and seven faculty mentors. Data were collected using a modified version of the Undergraduate Research Student Self-Assessment (URSSA) instrument (Hunter, Weston, Laursen & Thiry, 2009). The URSSA was developed with funding from the National Science Foundation to assess students’ personal, professional, and intellectual outcomes from participating in undergraduate research, including REU experiences. Because Geo-Launchpad is not strictly a research internship, items were adapted to better fit the technical work and fieldwork of the Geo-Launchpad
internship. The survey gains scales items are rated on a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). Survey scales include networking/collaboration, intellectual gains, scientific communication, organizational skills, technical skills, career knowledge and career preparation. The survey also measures other aspects of the internship experience, including the impact of the internships on students’ educational and career aspirations.

Career knowledge and preparation

- Students from GEO 210 displayed the most growth in career knowledge (survey mean on career knowledge scale rose from 3.75 to 4.36 on a 5-point scale) (Figure 3: Pre-post survey means, GEO 210).
- All 4 students from GEO 210 reported that the course strengthened their commitment to their pre-existing goals, including pursuing a bachelor’s degree and/or graduate study in geoscience, a GIS certificate, or a future geoscience career.
- All GEO 210 students reported that their knowledge about geoscience career options increased substantially (e.g., survey mean increased from 3.75 to 4.36 on a 5-point scale) (Figure 3: Pre-post survey means, GEO 210).
- All GEO 210 students felt more prepared to study geoscience at a 4-year institution (e.g., survey mean increased from 4 to 4.25 on a 5-point scale) (Figure 3: GEO 210, Gains in Career Knowledge).
- Two GEO 210 students reported that they are more confident and solidified in their interest in pursuing work in the geosciences.

Technical and research skills gains

- Interns made very strong growth in technical skills/instrumentation (survey mean rose from 2.78 to 3.64 on a 5-point scale) (Figure 1: Pre-post means on survey scales, GLP interns).
- Interns reported that they benefited from working side-by-side with UNAVCO and USGS scientists on real world, engaging projects that involved trouble-shooting and problem solving.

Scientific communication skills

- Students from GEO 210 made strong gains in scientific communication skills including writing and analyzing scientific reports (survey mean rose from 2.75 to 3.75 on a 5-point scale) (Figure 5: GEO 210, Gains in scientific communication skills).
• Interns’ knowledge of how to prepare a scientific poster increased markedly (survey mean rose from 2.42 to 4.57 on a 5-point scale) (Figure 2: Growth in interns’ ability to prepare a scientific paper).

A discussion of specific objectives follows.

**Goal 1: Build students’ interest and capacity to engage in geoscience-focused STEM career pathways**

*Objective 1.1: Increase student awareness of academic and career opportunities in geoscience-related fields via a website and electronic media, workshops/seminars, webinars and annual mini-symposia at UNAVCO.*

*Objective 1.2: Increase students’ knowledge and skills in geoscience fundamentals, methods, and techniques to prepare for internship experience through workshops, symposia, and a special topics course in geoscience.*

Seminars were conducted at all three campuses of Front Range Community College. Several students participating in these seminars applied for the UNAVCO internship and/or enrolled in the special topics course. Of the 18 completed, eligible applications received by UNAVCO for the internship, 13 were from Front Range Community College, suggesting that the seminars may have played an influence in students’ applying to the Geo-Launchpad internship. Six of the eight internship students were from Front Range Community College, one was from Community College of Aurora and one was from Community College of Denver. The internship was promoted by the project Principal Investigator, other faculty members at Front Range Community College, and through faculty colleagues who know about the program. UNAVCO staff contacted all Colorado community college faculty from departments of science, geology, and geography via email to share information about the internship program, application details and a flyer to post in their department.

Four students participated in the special topics course (GEO 210), with students reporting an increased awareness of careers and internships.

**Goal 2: Professional development of community college STEM faculty as mentors to students in geoscience focused careers.**

*Objective 2.1: Increase faculty knowledge of existing private sector and government geo-STEM careers via workshops, networking and symposia*

*Objective 2.2: Develop partnerships between faculty and UNAVCO staff to support students*

*Objective 2.3 Develop resources for faculty mentoring and instruction*
According to the external evaluation, the GLP internships had a positive impact on the faculty mentors themselves, expanding their awareness of the different types of projects undertaken by the geoscience workforce and keeping them apprised of current work in the field. Several faculty members noted that this knowledge would influence their teaching and work with students. Faculty mentors also reported that they had become better mentors from the experience because of the intentional mentoring workshop and the formal mentoring arrangement they developed with their intern mentee. Faculty also felt that they had received helpful mentoring resources from the intentional mentoring workshop.

**Goal 3: Increase the number of students from community colleges that transition to geofocused careers.**

*Objective 3.1: Provide students with authentic and experiential opportunities in geoscience-related work through internships at UNAVCO involving its science and technology consortium members.*

Eight interns participated in the UNAVCO internships (four at UNAVCO and four at the United State Geological Survey). Interns reported strong growth in technical/instrumentation skills and communication skills.

**Significant Results**

(Referenced figures and quotes are from attached External Evaluation Report.)

Of the four students participating in GEO 210, three applied for internships at UNAVCO and/or other REU programs. One student was accepted into the UNAVCO internship (another student was selected as an alternate to another REU program, but did not ultimately participate in the internship). At least one student has since transferred to the University of Northern Colorado, and another student is accepted into Colorado State University for the Spring 2018 semester. Both are pursuing degrees in geoscience related fields. A third student is receiving a GIS certificate from Front Range Community College.

Students’ strongest growth over the summer internship was in their understanding of instrumentation in their field and their ability to use scientific and technical instrumentation and tools (Figure 1: Pre-post means on survey scales, GLP interns). Students also reported strong gains in career knowledge and communication skills. Students demonstrated the lowest growth in collaboration/teamwork and organizational skills, largely because they entered the internship with strong abilities in these areas.

Faculty mentors and students both thought that one of the most valuable aspects of the GLP internship was the interaction that students had with geoscience professionals and the opportunity to learn more about their work and career paths. Mentors felt that students’
career options had been broadened and that students might be encouraged to pursue
career paths that they may not have previously considered.

Interns also felt that they benefited from the opportunity to learn about geoscience career
paths during Career Circles and work side-by-side with UNAVCO and USGS staff. The
students particularly appreciated gaining a better understanding of the breadth of
geoscience careers and the often indirect paths that professionals followed to their current
careers.

Interns’ second strongest gains were in their ability to use instrumentation in geosciences.
Students felt that they also gained a better awareness of the major instruments that are
used in geoscience. Thus, students became more aware of the common instrumentation
used in the discipline and gained the confidence and ability to use it.

Technical Skills/Instrumentation

Technical skills were interns’ largest gain according to the pre/post survey and interviews.
Students reported that working with the instrumentation available at UNAVCO and USGS
provided a real-world context for the science that they had learned about in coursework.
Most importantly, the GLP internship offered opportunities that they would not have in
their coursework to apply their geoscience knowledge and career path.

Students reported that the opportunity to learn about a variety of instruments and to
actually use them in the field was the most beneficial aspect of the GLP internship. Students
appreciated the exposure to new instrumentation and software such as 3D printers,
drones, and GIS software.

Communication Skills

Students in the careers course saw an overall increase in communication skills. Survey
means rose from 3.39 to 3.92 in this area (Figure 3: Pre-post survey means, GEO 210). The
greatest gain was seen in understanding of scientific reports (Figure 5: GEO 210, Gains in
scientific communication skills).

Interns reported strong growth in communication skills from the GLP internship, especially
in areas involving creating and presenting a scientific poster (Figure 2: Growth in interns’
ability to prepare a scientific paper). Students also reported strong growth in using data to
discuss ideas in geosciences and understanding geoscience journal articles (Figure 5: Geo
210, Gains in scientific communication skills).

Organizational and Project Management Skills

Surprisingly, given the breadth and depth of their projects undertaken over the summer,
interns declined slightly in their perceptions of their organizational skills. This is largely
because they entered the program with exceptionally strong skills.
Career Preparation

Students in the careers course made the greatest gains in career knowledge (survey mean rose from 3.75 to 4.36) (Figure 3, Pre-post survey means, GEO 210). Gains were also seen in students’ sense of career preparedness (3.95 to 4.6) (Figure 3, Pre-post survey means, GEO 210). Especially strong was an increased knowledge in how to prepare a resume for a science-related career or internship (Figure 4: GEO 210, Career Preparation, item means).

Interns reported gains in feeling prepared for future education and careers in geoscience. Students felt quite well prepared already for their future in geoscience when they started the GLP internship. However, they still reported some gains in their beliefs and confidence that they could succeed in a geoscience field.

Interns showed the most growth in the understanding of the everyday work of geoscientists (survey mean rose from a 3.5 to a 4.25) (Figure 3: GEO 210, Gains in Career Knowledge). In addition, at the end of the summer, 100% of students “strongly agreed” that they are “prepared to study geoscience at a 4-year university.” Students in GEO 210 made strong gains in their sense of preparedness to pursue advanced studies in the geosciences (Figure 4: GEO 210, Career Preparation, item means).

Faculty mentors noticed that their students had solidified their educational plans as a result of the GLP internship, and had begun to think about career plans. Interns gained confidence that they belonged in geoscience and could succeed in geoscience from the GLP program.

Intellectual Gains

Students reported fewer intellectual gains than they did in other skills domains, as their conceptual understanding of the discipline remained relatively steady over the summer. Nonetheless, interns developed a more sophisticated understanding of the process of sciences especially that it is a slow process that moves in fits and starts, and can be ambiguous. Interns reported the strongest gains in their readiness to pursue a research experience in the geosciences. Interns developed a better understanding of the scientific research process, topics, and methodologies that fall within the geosciences.

Preparation for research

Mentors and interns reported that the GLP internship had helped to prepare students for future research experiences. The comments from focus groups reflect that students appreciated the exposure to research that resulted from their interactions with graduate students.

Collaboration and Networking

Students made slight gains in collaboration and networking skills, primarily because they entered the internship with very strong confidence in their ability to network with
scientific professionals. However, students recognized the importance of networking and became more comfortable working in teams. Students learned how to more effectively collaborate on scientific projects with graduate students and conduct informational interviews.

**Mentoring**

Most students and mentors reported that they communicated relatively frequently over the summer.

**Influence on Career Intentions**

Interns reported that the GLP internship had not necessarily changed their career path, but confirmed that they were on the right track. Students noted that they had strengthened their commitment and confidence to geoscience and that they had chosen the right field. Mentors also noticed that the GLP internship had influenced students’ career paths by providing information about future careers and education in geoscience and solidifying their educational decisions.

Interns also reported that they are more likely to pursue graduate school because of the GLP internship.

**Faculty Outcomes**

The GLP internship also had a positive impact on the faculty mentors themselves, expanding their awareness of the different types of projects undertaken by the geoscience workforce (specifically UNAVCO and USGS) and keeping them apprised of current work in the field. Several faculty members noted that this knowledge will influence their teaching and work with students.

Faculty mentors also reported that they had become better mentors from the experience. Faculty also felt that they had received helpful mentoring resources.

**Key outcome and other achievements**

Perhaps the biggest achievement of the seminars, special topics course, and internships, is building confidence in the student that this type of work is indeed something they can do.

Students and faculty were very positive about the format of the GLP internship and its benefits for students. Students and faculty expressed a lot of positive feedback about the implementation of the GLP internship. Some of the highlights from interviews and survey written responses were:
• Interns
  o “Basically I learned about new technologies that are up and coming that I would be better off having under my belt. Like GIS and the drone technology and programming skills.”
  o “It was really great talking to a lot of the professionals that came in to tell us about their career path. That was an invaluable experience, definitely. It’s not a straight line, it’s definitely not like that.”
  o “I think the most beneficial thing was the professional development... All of these things were so, so helpful... They are things that we can take with us throughout the rest of our education and through our careers.”
  o “There’s something to taking a project from the beginning and running it all the way through... that I think is very invaluable. That is an experience that I had not had.”
  o “I feel more confident in pursuing my goals and in making my thoughts be known.”
  o “I would say that there was a really amazing exposure to the research that’s happening now.”
  o “I think everyone at UNAVCO did a really great job with mentoring. It seems like they're very, very interested in cultivating a great batch of future scientists and they very much care about enhancing our knowledge as much as they possible can.”
• Faculty mentors
  o “I think that greatly increased her confidence of being able to work in that type of environment, and then helped her shape her academic and careers goals a bit more specifically.”
  o “I think it was really, it seems like it was really good for her in that aspect, kind of reaffirm what she was doing.”

What opportunities for training and professional development has the project provided?

Training and professional development was implemented with four distinct groups: students, interns, UNAVCO and USGS staff, and faculty mentors.

Student professional development

Students in the special topics course met and interacted with professionals from a number of related fields. Further, students were required to prepare a resume, distinguish between a resume and a curriculum vita, and analyze technical papers.
Intern professional development

A significant element of the Geo-Launchpad program was structured professional development for interns. A weekly, 2-hour skills workshop was implemented to provide interns basic training in applications such as Google Earth and Adobe Illustrator. Soft skills such as time management, digital organization, and email etiquette were also addressed. The weekly two-hour communication seminar was offered jointly with the RESSESS internship program, facilitating near-peer mentoring between the upper division undergraduates conducting independent research projects (RESSESS) and the two-year college students conducting research support projects (Geo-Launchpad). The joint seminar also enabled staffing efficiencies as content was delivered to both internship programs at one time. The seminar highlighted the diverse types of professional communication, including writing cover letters, the differences between resumes and CVs (as well as UNAVCO staff review of intern resumes and cover letters), developing and presenting a scientific poster, and preparing an elevator speech. Two senior graduate students from the University of Colorado Boulder delivered several of the seminars, encouraging professional development for the two graduate assistants as well as for the internship participants.

Faculty mentors

Seven community college faculty members participated in the Geo-Launchpad program. They participated in two days of professional development at UNAVCO headquarters in Boulder. They attended the RESESS intern research colloquium, participated in an Intentional Mentoring Workshop, and attended and served as judges for the Student Poster Symposium. The Intentional Mentoring Workshop focused on best practices in mentoring including differences in mentoring versus advising, mentoring students from minority populations, and strategies for addressing challenges in mentoring.

UNAVCO and USGS staff mentors

Three UNAVCO technical staff worked daily with the Geo-Launchpad interns. Prior to the start of the summer, these staff met with program staff. During these meetings technical staff were provided with guidance on how to develop a project appropriate for the interns, tips on how to manage the work of undergraduate interns, and general tips on managing others’ work. Some of the staff involved in the program are engineers (field and data) and do not manage people as a part of their normal duties. This was an opportunity for them to develop and practice managerial skills. Although no meeting was held with the USGS technical staff directly managing the four interns working at USGS, UNAVCO staff met with the USGS manager to provide information similar to what was provided to the UNAVCO technical staff.

How have the results been disseminated to communities of interest?

The results of student internships were shared with faculty mentors at the end of the internship, as were posters presented at an annual Student Poster Symposium in Boulder, Colorado. Faculty and administrators from Front Range Community College attended this
event. Results of the work of interns is available on the UNAVCO website. Front Range Community College has also written a blog about the student participation and presentation. Presentations about the program also have been made at the 2016 American Geophysical Union Fall Meeting in San Francisco, the Earth Educators' Rendezvous in Albuquerque, New Mexico, the Geological Society of America annual meeting in Seattle, and at the annual meeting of the Great Plains/Rocky Mountain Division of the Association of American Geographers in Grand Forks, North Dakota.

What do you plan to do during the next reporting period to accomplish the goals?

The second year of the program introduced the internships to community college students outside Front Range Community College. The next year will focus on expanding that outreach to other community college students around the state of Colorado, including a greater introduction of the GEO 210 Careers/Research course along with continued promotion of the UNAVCO internship. This effort will include one on one meetings with faculty at sister institutions and working with faculty at those institutions to consider similar programs. Further, faculty from a number of community colleges will be invited to attend end of internship activities, including the Intentional Mentoring Workshop, at UNAVCO. We are also reaching out to a community college outside Colorado to expand the faculty mentorship program.

The programmatic elements of the 2018 internship will be implemented in a similar way to 2017, with a few modifications based on the positive evaluation data and post-summer program team discussions. Significant efforts will be made to inform community college faculty across the state of Colorado about the internship program including again contacting individuals from geology, geography, and physics departments. Within UNAVCO, the program structure will be reviewed and modified as needed to ensure the technical staff working with interns are receiving the support and training they need. We will review the student summer project design process to ensure both students and technical staff receive benefit from the experience. The number of interns in summer 2018 will be 4, and all interns will likely work at UNAVO to facilitate a more cohesive cohort. Interns selected in previous years have included students attending a two-year college to obtain certificates, particularly in GIS. The design of the program is structured to assist students who have not yet obtained bachelor’s degrees, and in order to ensure students benefit from the programming, next summer we will target community college students who demonstrate an intention to transfer to a four year university to continue their studies.

Products

Conference Papers and Presentations


Other Publications


Lucas, Brandon, Schaeffer, Elizabeth, Mencin, Dave, “The Slumgullion Slide: Using Drones (UAVs) for Structure from Motion (SfM),” Boulder Student Poster Symposium, UCAR Center Green, Boulder, Colorado, August 2017.


Websites

“Geo-Launchpad,” http://www.unavco.org/geolaunchpad

“Geo-Launchpad,” http://www.frontrange.edu/geo-launchpad
“Summer Research Experience Propels Students Deeper into Science Studies,” Front Range Community https://blog.frontrange.edu/2017/10/06/summer-research-experiences-propel-students-deeper-into-science-studies/

Other Products

“Launch Your Career with a Paid Internship in Geoscience,” flyer for all Colorado community college students.

“Launch Your Career with a Paid Internship in Geoscience,” for Front Range Community College students.

“Be a Geo-Launchpad Mentor,” for all faculty interested in becoming a mentor.

“Geo-Launchpad Internship - Experience UNAVCO!” video highlighting the internship opportunity - https://youtu.be/TmOlUcUmMyc

Participants

What individuals have worked on this project?

[Redacted]

What other organizations have been involved as partners?

USGS. Four interns worked at USGS for the summer internship.

Have other collaborators or contacts been involved?

Yes

[Information is redacted]

Impacts

What is the impact on the development of the principal discipline(s) of the project?

The geosciences, as a STEM field, are noted for low participation by underrepresented groups. Geo-Launchpad has proven effective in engaging community college students (which is commonly the first postsecondary school for many underrepresented groups).

What is the impact on other disciplines?

Students participating in the summer internship learn about working in the field of geoscience through their experience with technical instrumentation. Students are also exposed to scientific data management (a key aspect of data engineering).
What is the impact on the development of human resources?

The Geo-Launchpad program provided UNAVCO technical staff the opportunity to develop people management skills including time management, project management, and interpersonal skills. Interns were provided opportunity to develop skills helpful to working in a collaborative environment. Faculty as FRCC, Community College of Denver, and the Community College of Aurora developed mentoring skills.

What is the impact on physical resources that form infrastructure?

Nothing to report.

What is the impact on institutional resources that form infrastructure?

Front Range Community College personnel have gained valuable experience on working with collaborative faculty led grants. Some of the departments touched by unique requests created by the Geo-Launchpad grant include Human Resources, Academic deans, and Fiscal. FRCC has made improvements to its processes to accommodate future projects.

Within UNAVCO Geo-Launchpad is executed by the Education and Community Engagement program with support from the Business Affairs (BA) program. The processes within the BA program have been updated and adapted to accommodate the interns working at UNAVCO for eight weeks. Updated processes include the on-boarding of interns, method of payment for work, procurement processes for internship materials, and IT support services tailored for students.

What is the impact on information resources that form infrastructure?

Nothing to report.

What is the impact on technology transfer?

Nothing to report.

What is the impact on society beyond science and technology?

The program has provided formal education of careers and research in the geosciences, has provided technical training of the future geoscience workforce, has taught valuable professional skills inside and outside of science, and has engaged students to seek future education. Faculty and students at both two-year are now more aware of geoscience career opportunities open to students.

Changes/Problems

Changes in approach and reason for change:
Objective 1.1 includes the development of a webinar to build students’ interest in geoscience focused careers. After two years of the project and a one-year separate pilot project, PIs, co-PIs, and Senior Personal have come to understand that one of the most effective aspects of the Geo-Launchpad project has been personal and one-on-one interactions. As such, resources have been shifted toward increasing acceptance and participation in the Careers/Research course (GEO 210) and working directly with faculty at sister institutions to expand the impact of Geo-Launchpad.

**Actual or Anticipated problems or delays and actions or plans to resolve them:**

No actual or anticipated problems or delays exist at this time.

**Changes that have a significant impact on expenditures:**

No changes that have a significant impact on expenditures exist at this time.

**Significant changes in use or care of human subjects:**

Nothing to report.

**Significant changes in use or care of vertebrate animals:**

Nothing to report.

**Significant changes in use or care of biohazards:**

Nothing to report.