

**Field XP Evaluation Report**  
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**Background and Purpose of the Evaluation**

The Field XP experience is part of the NSF funded Academic Year Pathways Research Experience Program (AY-PREP). Aaron Velasco of UTEP is the PI. John Taber of IRIS is a Co-PI. The AY-PREP program exposes students to a wide-range of career opportunities, emerging geoscience topics and environmental issues through hands-on activities and research experiences, and prepares them as future geoscientists through stratified mentoring and training of professional and soft skills.

According to the NSF abstract, the program includes:

1. An academic year interdisciplinary research experience for a cohort of six undergraduates per year
2. Weekly seminars and workshops to expose students to cutting-edge research, graduate programs, and career opportunities, and prepare students for technical, professional, and soft skills
3. A stratified mentoring program
4. Opportunities for the cohort to participate in the deployment of a seismic field experiment
5. A two-week summer bridge camp that brings together incoming AY-PREP students, undergraduate students, senior high school students, and pre-service teachers

The summer camp includes field trips to the Jemez Critical Zone Observatory in New Mexico, integration of IRIS Education and Outreach programming, training on geophysical/geochemical instrumentation and sensor technology, and the synthesis of large datasets that serve as a foundation for undergraduate student research projects. Students receive a stipend of \$3600/semester for being in the program.

The purpose of this evaluation for IRIS was to understand how to support the field experience with seismologists in the future. For the summer of 2016, Danielle Sumy was able to place five students with seismologists on four projects.

**Methods and Measures**

All the PIs and students were interviewed by phone during the week of August 8, 2016 using the following questions as prompts.

**Student Questions**

1. Tell me about yourself: What year are you in college? What is your major? is this your first field experience? (if no, please list others)
2. Gender? background?
3. Tell me about your field experience (location, work, mentor, etc., prompt if necessary)
4. Was this field experience a good match for your interests and skill sets?
5. What were you able to contribute to the project?

6. Why did you sign up for this field experience? Was it what you expected?
7. How did you hear about the field experience?
8. How well did the spring course prepare you for the field experience? What would you have liked to have had in that course now that you have been through the field experience?
9. What do you feel you got out of the experience?
10. Would you recommend the experience to someone else? What would you say?
11. Will you look for another research experience?
12. Would you use an online matching tool for field experiences? Yes, no, please explain why or why not and what would make it workable for you?
13. How likely are you to go into a science, technology, engineering or math-related career?
14. What suggestions do you have to improve the spring course, the matching process, the logistics for getting to and working at the site, the research, the mentor-mentee relationship, other?

#### Seismologist Questions

1. Tell me about yourself – position, field, institution, project, gender, background....
2. In what field experience did you include the undergraduate student?
3. Why did you want a student to work with you in the field this summer?
4. How did you hear about the program?
5. What did you give the student to do?
6. How did you work with the student? (prompt if needed for side-by-side, independently, other communication, background prep, ...)
7. Was the student a good match for this field experience and the project needs? Was he/she a good match for you and your working style?
8. How likely are you to request a student when this program is offered next year?
9. Would you use an online matching tool for field experiences? Yes, no, please explain why or why not and what would make it workable for you?
10. Would you recommend this program to a colleague? Yes, no What would you say?
11. What suggestions do you have to improve the spring course, the matching process, the logistics for getting to and working at the site, the research, the mentor-mentee relationship, other?

#### Results

In the summer of 2016, there were four projects that offered field experiences for UTEP students. The projects with PIs and students are described below:

Project: Installing Gravity Monuments in NM

PI: Alex Rinehart, NM Bureau of Geology and Mineral Resources, Student: Jonathan Lucero

This three-day field experience involved setting up seismology field stations in Socorro, New Mexico. The team dug holes, carried cement, pounded stakes, and set up the instruments.

Project: Lake Erie Environmental Study

PI: Joe Ortiz, Kent State University, Student: Paola Soto-Montero

This two-week field experience was to support a water quality monitoring project in Lake Erie characterizing the harmful algal bloom. The student collected samples in the field, did some lab analysis, and designed an experiment to identify the best method and timing for drying the filters.

Project: Wyoming Seismic Station Repair

PI: Austin Holland, Albuquerque Seismological Laboratory, Students: Mark Hathazi, Aide Huerta

This two-week field experience took the two students to fairly remote places to work on ten stations doing things like repairs, set up, hooking up new power, and replacing batteries in solar panels. Students worked side-by-side with the PI and the technicians.

Project: [Oklahoma Wavefields Deployment](#)

PI: Marianne Karplus, University of Texas El Paso, Student: Vanessa Apodaca

This five-day field experience was part of a community experiment to collect a full wavefield dataset for use by the wider community. The experiment made use of new three-channel nodal seismometers that have only recently begun to be deployed for purely academic purposes. Over 50 people were deployed in six teams. There was one day of orientation on the project purpose, how to do field work, and how to be safe in the field. The project was designed as a learning experience as well as a deployment so it was good for an undergraduate field experience. There were science lectures and the opportunity to interact with a lot of different people in different roles.

## **Recruitment**

The three female and two male students found out about the summer field experience opportunity through their participation in the AY-PREP program. All the students are geology majors. Other students were interested but had conflicts in their schedules or found out too late to make arrangements in their personal lives to be able to go. PIs found out about the opportunity to have an undergraduate researcher through IRIS. Several PIs were willing and able to take more students, but the students were not available. Additional PIs also requested students.

Both students and PIs recommended that recruitment and placement come earlier, preferably in the spring. The PIs said they would be able to identify projects earlier in the spring and identify dates before the end of the semester so students would be able to plan around summer school and family commitments. Students said they would like to have had more information about the project before they went so they could have learned more ahead of time and been better prepared.

A couple of the mentors offered to talk about their projects virtually with the AY-PREP students during the spring and then to be in touch with those who sign up. One is looking for additional funding outside the grant to bring in more UTEP students next summer.

The reasons students signed up for the field experience was to learn more about the field, to have a new experience, and to learn more about careers.

- *I was very interested in getting field experience and networking outside of El Paso, maybe go to school out of town, experience different areas.*

All the PIs had mentored students before. They offered to mentor an undergraduate this year because they had benefitted from internships, they wanted to increase diversity in the field, they are a UTEP alumnus, the student was funded to come, they like working with students, and they needed help.

- *I did an internship in a seismology and ended up being a seismologist.*
- *The main thing is about having students is that there are not a lot of groups doing this time-lapse gravity research. I'm just learning the method myself. It's important for students who are from different backgrounds to be exposed to these higher tech methods*
- *It's good for my professional development to teach students.*
- *I grew up in NM, am middle class white and we don't see many Hispanic students involved in this work.*

### **Arrangements and Preparation**

Internships ranged from 3-4 days to two weeks. They all involved transportation, lodging, and food allowances. Four of the five students said their arrangements were made for transportation, lodging and food. One of the mentors reported that his student did not have (or understand) an arrangement for food until two days into the experience.

Mentors recommended that the logistical arrangements should be made sooner and clearer to the students. Four of the five students did not have any experience with a research experience of this kind, or even with travel on their own so more information and guidance earlier and throughout the process would be helpful. All the students were positive and accepting of the support they did receive, especially from Danielle Sumy at IRIS. Perhaps students could also be prepared in the research course for how the logistics of joining a field experience works.

Several students said that they felt the local field experiences and research they did in the spring course helped prepare them for the summer field experience. They talked about how useful it was to develop a research topic and figure out how to pursue it.

- *The spring course helped out very much. I learned what to look for, how to interpret data, and the different types of research. When we were deploying the instrument, I already knew it had to be balanced and set up. I knew some of the apparatus.*
- *AY-PREP showed me that something might go wrong when you are in the field, you don't have to panic about it. I learned how to take notes, do presentations, so when I came here, my mentor told me to read many articles, and I wasn't completely lost even though the vocabulary was a little harder than I'm used to.*

### **Projects**

Mentors reported they were impressed with the undergraduates. They had some relevant skills and background and picked up new things easily in order to contribute to the project. The students also reported that they felt they were able to contribute to the projects, and were able to learn what they needed to learn to participate on the team. All the mentors and students reported that the students and field experiences were well matched.

- *Our student was very enthusiastic and had a good attitude about persevering through the hot weather.*
- *The student worked side-by-side with my technicians. He stepped right in and quickly caught on to things. He did everything that my technicians were doing in the field so he could see how the communication worked, what the work was, and what the results we would get.*
- *I was impressed with the quality of the training when he came in - smart and competent. He could handle himself in the field. I had him navigating to the sites, reading the map for me. He picked up on the site requirements. He didn't have much geomorphology background so this project was an opportunity for him to learn more.*
- *I will look forward to working with more students from UTEP if they are like her in their ability and personality.*
- *I liked that they ran as a course for the students that sort of vetted them through the program. I talked with the student about her coursework and projects. It's clear that they have a lot of inquiry based instruction at UTEP.*

The mentors thought carefully about to involve the students in something meaningful and in which they could be successful. They all felt they were successful in this based on how students were able to get involved and accomplish tasks. The students reported that they did feel challenged, like they contributed, and not overwhelmed, confirming the success of the mentors in designing the project/experience for the students.

The mentors communicated with their students onsite and had them talk and work with others, such as other researchers and graduate students. They would like more communication ahead of time. One mentor sent his student basic content questions to look up the answers to, then sent out the answers a week later.

- *The way he was working with me was great. Of course, if I had any questions, I would ask. Since I found out a couple of weeks ahead of time, we communicated via email about reimbursements and travel.*
- *If we had access to the projects, we could read ahead, prepare for it more.*
- *I was so glad I took my laptop. I really needed it. I wasn't sure if I would but I brought it anyway.*

All the mentors plan to stay in touch with their students and continue to support their career development. One student will be following up on the data analysis part of the project made possible by the installation. Another will be working on a poster presentation with the mentor on the work done during the field experience.

## **Results**

All the students would recommend the field experience to other students as expanding their awareness of careers, seismology, and other places and organizations. All of them plan careers in geology areas. Most plan to go to graduate school.

- *I hope to grad school in geology. I like seismology and geophysics.*
- *I will continue to work with my mentor on looking at the data and how to process it.*
- *I'm definitely going to grad school*
- *Now I'm going to look at grad schools in other places. I liked going to a new place.*

The students reported they benefitted from the field experience by learning specific skills, meeting interesting people, and learning doing research.

- *I finally know how to deploy instruments. In case I have a site where I need to deploy an instrument. I'll know how to do it more or less. I'll be able to get more out of my school work.*
- *There were two people from Argentina on the project – PhD students. They were very interesting to talk to. I liked the diversity.*
- *I really liked it – being in a new place, going outside, getting to know my surroundings.*
- *In my opinion, if you are given an opportunity, you should take it, you are always going to learn something. For example, since I went on the field experience, it was a new area, a new group of people, new contacts – a new experience and that is very important. Some people just go study and that's it. They don't do other things, and at the end, they don't know what they will do, or enter a job and don't like it. I had not been away by myself. I feel like I can manage it now.*
- *I'm not really sure what I actually want to do for a job. My mentor was telling me how he ended up as a professor. I asked him what environmental jobs there are. I'm looking at geology but need to find out more about the jobs. I want to continue for my masters and maybe my PhD.*
- *Good to know about research in “deep”, getting to know what they are doing and finding solutions.*
- *There were people with different backgrounds. The people who read the data are degreed. People placing the sensors were ex-military. Honeywell contractors do all the global sensors. It was great to see all the options.*

All the PIs would be interested in taking students next year. They all have already recommended the program to other researchers as a way to interest undergraduates in their field, get help with their projects, and as an opportunity to mentor students who are under-represented in the field.

- *I would love to take another student. I do a lot of field work.*
- *There are a couple of other projects that would be good for an undergraduate.*

### **Matching Students and Mentors for Field Experiences**

Students and mentors were asked about what they thought about using an online matching tool for field experiences. It was described to them as a site where students would put in their resumes, course work and interests and PIs would put in their projects and what students would be doing in a field experience with them.

The students liked the idea of this online matching tool because most of them didn't know anything except where they were going and the name of their PI. While they all acknowledged that they had great experiences, they felt it would have been better to know a little more before they went. All the students plan to pursue additional field experiences next summer, so it would be especially helpful to them in identifying their top choices for different projects.

The mentors liked the idea of the matching tool because they felt it would reach more students earlier in the spring so they might get more students. It would also help them to make a plan for how to work with the student based on the students' coursework, skills, interests, and

background knowledge. With this information, they said they all said they would be in touch multiple times with the students before the field experience. Several mentioned wanting to send background reading to the students ahead of time and one actually did that this year which the student appreciated.

One mentor expressed concern that the matching tool might be good for the mentors but not the students in that mentors might choose students that had the skills and background for the field experience, and one of the big benefits of these kinds of field experiences for students is that they get introduced to things they don't know anything about.

When students were asked how they would feel if they didn't get their first choice for a field experience, they were accepting, saying, "You don't always get your first choice," and "I know I will learn from any situation I'm in."

Mentors also requested more background on the grant to be able to support its goals before, during and after the field experience. One mentor suggested a one-page overview of the grant goals and activities and a briefing for the mentors on what the PI expects from the field experience.

### **Summary**

Based on the interviews with the students and scientists, the first year Field XP was a success for those involved. The mentors reported that the students had good attitudes and were hard working. The students reported that they enjoyed working on the projects, learned a lot, and enjoyed meeting everyone.

Since arrangements were made in late spring or early summer, the students chose the location of their field experience based on their availability for the dates it was offered (with the exception of one project which was scheduled when the student was available). Most of them only knew the location and not anything about the overall project or their role in it until they arrived. The mentors had no input into the assignment of students to their projects and didn't know anything about their backgrounds or interests until they arrived. Mentors would like to interview students to be sure they can handle the field conditions and that the tasks they have in mind would be a good match for the students.

Both students and mentors liked the idea of an online matching tool that would involve them earlier, give them more information about each other and the projects, and allow them to be in communication earlier. The 2016 students and mentors interviewed would be available to review the design and beta version of an online matching tool.

Mentors would like more information about the NSF grant's goals for these students and suggestions for pre-work and follow up so they can support them better. They also want to understand the travel arrangements and reimbursement methods in case the student does not. They would like to have more lead time to identify an appropriate plan for the students. All the mentors have already recommended the project to other scientists and would be willing to take additional students next year.