Overview – Ten years of experience

The Boulder Solar Alliance (BSA) has been hosting REU students since 2007 as part of a distributed REU site, with students conducting research at up to 8 institutions a year. To date, 152 students have participated in the program with an unprecedented 72% of them female.

Here we present some lessons learned in recruitment, multi-institutional logistics, team building, preparing students for the research environment, and dealing with imposter syndrome.

A grant from the National Science Foundation provides funding for 8 US students per year. Additional funding comes from BSA partner institutes or individual mentor funds.

Best practices in:

Student recruitment
- The Boulder Solar Alliance REU program has had great success in recruiting female applicants, with 72% of applicants over the last 5 years.
- Increasing recruiting practices at small, liberal arts colleges has played a major role in this success.
- This well-established program has the benefit of word of mouth, but active recruitment within these schools (HOW) has been a vital effort.
- Moving forward, recruitment will be focused on female students of minority ethnic backgrounds – a historically underrepresented group.
- This will be achieved through partnership with community college faculty who will be invited to recommend students.
- A recruitment video under development will help prospective students understand what the research environment is like, and what they can expect.

Preparing students for the research environment
- Since many of our participants come from small schools with little or no research opportunities, preparing them for the research environment is vital to their success.
- Week 1 is the Solar and Space Physics Summer School: Overview lectures on the Sun-Earth system plus practical training in data analysis. Two afternoons are run by graduate students as part of a Professional Development Program on inquiry-based learning.
- Cohort-building group project conducted in week 1. Introduction to collaborative research, where teams work together to achieve a larger outcome than any single member could do on their own within the time constraints of the summer school (e.g. building a balloon payload radiosonde in 2016).
- Professional Workplace Rules. Training on what constitutes sexual harassment, scientific integrity, ethics, campus drug policies.

Generating a team-spirit with a distributed REU cohort
- Students are conducting research at up to 8 different institutions.
- Don’t have the same opportunity to bond as they don’t spend as much time together.
- Housing the students together in 4 bed dormitories allows natural bonding.
- Cohort development during week 1 is essential – group project.
- Ongoing weekly meetings at one of the 8 institutions provide professional updates and an opportunity to see new research environments, hosted by students located there – taking ownership over their institute.

Dealing with Impostor Syndrome:
- Help students to realize that all scientists have this experience to some degree.
- Facilitated a discussion led by graduate students that was especially well received by students from smaller colleges and non-traditional backgrounds.

Expanding career opportunities
- Weekly “Brown Bag” lunchtime meeting provides participants at all institutions the opportunity to get together and share experiences.
- Brown bag lunches also facilitate professional development seminars:
  - Going to grad school: Pros and Cons; Life as a graduate student; How to choose which schools to apply to; Preparing your application; Finding a field of interest.
  - International opportunities.
  - Effective networking strategies
  - Career opportunities that don’t require a PhD: industry, law, teaching, business, consultancy.
  - Practice in resume/CV generation, presentation and communication skills, professional writing.
- STEM career panel: Program manager at Ball Aerospace, Science writer, CU professor, and a science outreach specialist. First question to the panel from the students: “How do I get a job like yours?”