**Beyond the numbers: Supporting an increasingly diverse LTER community**

> "The dynamic cultural and intellectual transactions that occur at the intersections of diverse perspectives and knowledge systems spur the kind of questioning and innovative thinking that advance and even *define* discovery and scholarly excellence."[1]

Diversity is a driving force and a *necessary condition* for cutting-edge scientific excellence. The LTER Network must continually engage with diverse cultures and perspectives in order to achieve our vision of exemplary science in the service of environmental and societal well-being.

As a step towards this goal, our synthesis working group sought to understand the status and drivers of diversity and inclusion among LTER undergraduate and graduate students. Numerical diversity (how many students belong to particular groups) is only part of the issue. It is important to also consider questions of equity, access, and inclusion. How well are we, as LTER sites, supporting the full inclusion of all students? Who is facing barriers to success? Who is struggling with a system designed for a culture different from their own? How do these barriers or support systems affect students in both the short and long term? To reap the benefits of a diverse scientific community, we must work to identify and counteract the systemic biases and barriers that hamper our students' success.

Diversity and inclusion are complex topics. To begin with, there is no clear single definition for what constitutes "diversity." In our synthesis meeting, we decided not to hammer out a fixed definition. We want to consider students facing barriers other than just NSF's "under-represented groups," yet at the same time we do not want to lose focus on those key groups. We must approach diversity work in terms of coalitions, intersections, and partnership, not just individual topics and issues. Most importantly, we cannot think of "diverse students" as a homogenous group who all have the same needs.

Likewise, LTER sites vary greatly from one another, and as a result they require different approaches to diversity and inclusion work. Even within sites, it is important to recognize that there are different pools of students in different situations. Sites with an REU-Site program, for example, often also have undergraduate students working as summer research assistants who do not have the same financial, housing, and programmatic structures. Graduate students are often even more removed from the centralized structures at the LTER site. We found that even in sites whose REU-Site program has attracted and supported a high level of under-represented minority students, graduate students and undergraduate research assistants are not similarly diverse. It is imperative that we continue to improve diversity and inclusion for all students at LTER sites, not just those in specific programs.

There is also not a clear metric of "success" for students' educational or career outcomes. Most undergraduate students are only involved with an LTER site for a summer, so measures of retention are less applicable. We often talk of measuring success by the proportion of students who go on to graduate school or other ecology-focused career paths, but LTER participation equips students with skills, capabilities, and passions that can benefit them in many disciplines and sectors. In this synthesis project, we focused on students' current interactions with their LTER sites, but it is important to recognize that these experiences will resonate throughout their lifetimes.

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[1] *from* Reimagining Equity and Diversity: A framework for transforming the University of Minnesota

**Key Findings and Recommendations**

Currently, student diversity is low at most LTER sites. Starting with NSF's definition of "under-represented groups": almost all sites report a relatively equitable male/female gender balance, and no students with known disabilities. Based on our interviews and other data, we coarsely classified LTER sites as having high/medium/low numbers of under-represented racial and ethnic minority students. Seven LTER sites had at least one high-diversity program, five sites had medium levels of diversity, and fourteen had few or no under-represented racial or ethnic minority students.

The LTER supervisors/coordinators we spoke with were less likely to know about other aspects of students' backgrounds and identities, such as LGBT identities, first-generation college students, socioeconomic class, etc. While we do not have numbers for these more "invisible" aspects of diversity, our interviews highlighted specific barriers to full access and inclusion that exist for these students as well.

1) Dedicated resources – money, effort, infrastructure, and more – achieve real results.

Five LTER sites in our interview pool had NSF-funded REU-Site programs, or similar programs, that have been successful in attracting and supporting a relatively high proportion of students from under-represented racial minority groups: HFR, KBS, KNZ, LUQ, SEV (It should be noted that we did not interview all LTER sites, but from our group's knowledge of other sites we identified two more that we believe are also similarly successful: BES and FCE) However, these sites did not have similarly high diversity among non-REU students nor graduate students. These successful programs often have substantial recruiting programs, and all of them are supported by a strong resource base: travel and housing are funded for participants, and there are dedicated staff working with the students (e.g. program coordinators, resident mentors).

- **Leverage existing resources to benefit more students and sites.** Growing out of our work, some of the REU-Site programs are developing a joint portal and application for prospective REUs, as well as mechanisms to share their application pool with other job opportunities across LTER sites. These programs invest significant resources in recruiting a large, diverse pool of high-caliber applicants, and this is an opportunity to leverage their recruiting effort to benefit both the students and other LTER sites. We are continuing to look for similar low-hanging fruit where existing resources can be more fully utilized.
- **Seek out additional resources to provide the necessary support for diversity and inclusion.** Our data provide compelling evidence that these resources bring results. Recruiting efforts, coordinator/mentor staff, and organized programming are currently not in many LTER sites' budgets. Diversity work cannot be an unfunded mandate; it will require changes in the way budgets are prioritized, both by the sites and their reviewers.
- **Explore ways to make improvements with existing resources.** Even as we work to increase funding, we recognize that not all parts of all LTER sites will be funded to the extent of the REU-Site programs. We encourage sites to seek out creative ways to make even small improvements with the resources available, and to use these as "demonstration projects" to help make the case for increasing resources. For example, because our findings highlighted the importance of having dedicated personnel to support students, Cedar Creek hired a graduate student part-time this summer to organize a reading group and professional-

development workshops for undergraduate interns. Lacking additional funds for salary, they paid the graduate student with free housing on site for the summer.

2) The depth, precision, and availability of data on diversity all need to be augmented and systematically collected.

Data collection and centralization practices vary among sites and among student groups/programs within sites, but no site we interviewed had solid centralized data for all their students' basic demographics. These are being reported to individual funding streams in most cases, but never compiled for all students at the LTER site. Sites generally do not have a clear list of LTER-associated undergraduate and graduate students, especially those not funded directly by LTER funds.

Many of the LTER supervisors believe they are not allowed to collect data about student demographics. It should be noted that personal data can be requested so long as sharing those data is voluntary. It is also important to explain why these data are being collected, and how they will be used. A privacy policy will be needed and adhered to.

- **Inventory and gather existing sources of data on student diversity and inclusion.** NSF collects demographic data on all participants; the LNO has already started working to access these data. Individual sites may also have similar information. REU-Site and similar programs have end-of-summer evaluations from their students that could provide extremely valuable insight into the students' experiences.
- **Collect additional data on students' experiences, and the role of structured support programs** (such as resident mentors, organized group/cohort activities, etc.). We currently hypothesize that these support programs are important, especially for students facing barriers to full participation in the sciences, but we have no data to test this. Led by Manisha Patel and Clarisse Hart, we are sending out a survey to LTER students in September 2013 to begin collecting these data.
- **Develop systematic methods to include all LTER-associated students.** Currently, many individual sites have trouble identifying the students associated with their site, especially if they are not funded directly through LTER. For this and future data-gathering efforts, we recommend that the Network help and encourage sites to create systems for identifying all students who are part of the site community. Language also needs to be developed to explain why these data are being collected, who will have access to the data, and how they will be used.
- **Develop privacy policy on personal data at both LTER site and Network levels.**
- **Develop LTER-wide tools for helping sites track student alumni.** Many sites are interested in evaluating alumni experiences and success beyond their time at the LTER site. Sites are currently using ad-hoc methods to do so, and would benefit from Network level support.
- **Include diversity-related data among the long-term datasets that LTER sites routinely collect, manage, and centralize.** This sort of data collection should not be limited to sporadic efforts, but should become part of the regular expectation for LTER sites.

3) More leadership on diversity is needed, both at individual sites and at the Network level.

Comparing different sites' experiences demonstrated the importance of intentional, sustained, systematic efforts, in contrast with ad-hoc or "lucky" happenings. This level of commitment requires clear diversity and inclusion leadership, both at the LTER Network level as well as within each individual site. We recommend that this leadership take multiple forms, including but not limited to: Network-wide governance structures, individual champions in leadership positions (Chairs, LNO, Site PIs, etc), site governance structures, and dedicated personnel within individual sites.

- **Create an ad-hoc LTER Diversity Committee, charged with developing Network-wide visioning, goals, and structures.** This was accomplished in the May 2013 Science Council meeting, acting on our working group's recommendation. All members of the working group are serving on the ad-hoc committee. An ad-hoc committee is the first step in formalizing diversity work and inclusion within LTER governance structures. Although diversity must become part of everyone's everyday work, it is important to have an identified group taking leadership and accountability. We expect the ad-hoc committee to consider questions of developing a Network-level diversity plan, creating a standing committee, and either housing or coordinating a range of different targeted diversity efforts like the existing Education Committee diversity sub-group.
- **Support and encourage individual sites to develop diversity visioning, goals, and structures.** Because each LTER site is different in its needs, goals, and operations, leadership and accountability are most important at the site level. Frank Day is working with VCR on their site diversity plan, and we hope to offer both their plan and their process as guidance for other sites.
- **Build a network of diversity point-of-contact people at all sites, similar to the communications contacts.** This will be an easy peer network for questions and information-sharing as the LTER Network and individual sites explore new resources and strategies for fostering diversity and inclusion. Future data-collection efforts can also start with this network.
- **Ensure that the Network and individual sites sustain dedicated personnel for key aspects of diversity and inclusion.** Many sites already do this without labeling it "diversity" work – coordinators for student programs, REU resident mentors, etc. Because these roles are vital to building and supporting a diverse community of students, it is important that there are always people with these responsibilities in their job description.
- **Build diversity and inclusion as core commitments when re-competing the LTER Network Office.** Diversity and inclusion cannot be seen as separate from our science; they are part of what make it possible for us to do cutting-edge science. When the LNO is re-competed, we have an opportunity to establish diversity and inclusion as core commitments in the fabric of the LNO and the LTER Network.

4) Networks and partnerships are vital to sites' successes.

Sites with successful diversity efforts identified a number of different partners, not only for recruiting but for supporting students as well. These range from national organizations and their local/regional chapters (e.g. ESA's SEEDS program, SACNAS, AISES. ASLO, SWS) to programs and services at their home universities (e.g. McNair Scholars programs, Safe Zone or Ally programs).

- **Help sites share ideas for potential networks and partnerships.** During the course of the interviews, some of our working group members realized that we have similar potential networks nearby that our LTER sites could tap into. We are compiling a brief annotated list of partner organizations and programs for sites to seek out – national organizations, regional/local chapters, programs and services at their home universities, etc. – for the LTER website.
- **Support and encourage sites in developing and expanding local partnerships with science-focused diversity organizations, minority-serving colleges/universities, and others.** Some of the successful REU-type programs have already established these partnerships, though from the interviews it sounded like many of them are recruitment-focused. It is important to ensure that we do not see these partners as only "suppliers" of LTER students, but equal collaborators and co-creators. We encourage collaborations between LTER sites (or the LNO) and these organizations. Growing out of our working group, Wren Walker Robbins is coordinating a joint effort between Cedar Creek and the Fond du Lac Tribe to create a new professional-development program in scientific mentoring, specifically of Native American students. They submitted a grant to NASA's EONS program in July 2013, and if funded will invite graduate students, postdoctoral scholars, and faculty from all LTER sites to participate in two multi-day workshops in Spring and Fall 2014.
- **Develop and expand Network-level partnerships with science-focused diversity organizations.** Some of these partnerships will also benefit from collaborating at the Network level. For example, a single LTER presence at national conferences can best represent our sites and our cross-site opportunities. We encourage national-level partnerships like these, in additional to local/regional partnerships by individual sites.

5) There is a widespread need for individual and collective transformation around diversity work.

The findings and recommendations so far in this report have been about "technical" changes – things like staff positions, systems, partnerships, and data. It is vital to recognize that these sorts of changes are necessary, but not sufficient. We must also engage in a process of individual and collective transformation, reshaping the ways we see ourselves, our science, our site and LTER communities, and our diversity work.

**Attitudinal barriers:** we identified a number of "attitudinal barriers" where LTER scientists expressed attitudes about people, science, or their site that are perpetuating barriers to full access and inclusion. An example is when we asked about students with disabilities. Most of our contacts said something along the lines of "This is rigorous fieldwork, so of course we don't have students with disabilities," thinking primarily of mobility disabilities. Other sites provide examples to challenge and expand this view. A few sites mentioned students who appeared to have learning disabilities, but the students did not request accommodations and the issue was not discussed. Two sites cited examples of students with pronounced mobility disabilities who are active, valuable participants in the site's fieldwork.

When we asked about LGBT students, responses ranged from "I have no idea; this is a professional work environment." to "Yes, we get to know our students pretty well." Both of these endpoint

examples were from sites that have similar, substantial programs with dedicated staff, illustrating that these sorts of attitudes are not simply reflections of the program structure or amount of contact with staff.

Some of our contacts also had ideas why minority students were not attracted to their LTER site, or what characteristics about their sites (especially location) made it difficult to attract minority students. These were broad generalizations about who minority students are and what they are or are not interested in – or, in some instances, good at.

Engaging openly and honestly in diversity and inclusion work will both require and facilitate shifting these attitudinal barriers. The different perspectives and approaches at different LTER sites will be a powerful asset in working to identify and question our attitudes around diversity.

**Cultural change:** At a deeper level, the work of increasing diversity and inclusion means shifting many components of our scientific cultures. An important first step is recognizing that science does have cultures, and is not a purely objective endeavor. A useful definition comes from the business world: "Strategy is what we do; culture is all the ways that we do it."

Cultural change is slow, messy, and often vulnerable, but essential. Although we did not ask our site contacts about individual or collective cultural shifts, we experienced some of this firsthand in our synthesis meeting. We deliberately built reflection into the synthesis process, and continued to engage and challenge one another throughout the formal and informal spaces of our meeting. For example, it was these messy transformational learnings, not an intellectual strategy decision, that led to ESA's new push to expand their diversity work beyond just students of color. It is imperative that site PI's, who shape much of the cultures and norms at LTER sites, become personally involved in diversity work. Unlike technical improvements, transformation cannot be delegated.