

Work in Progress: Enhancing the Undergraduate Research Experience through Partnership with a Non-profit Organization

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Abstract

An innovative element of the Biomedical Engineering Community of Undergraduate Research Scholars for Cancer (BME CUREs) Research Experiences for Undergraduates (REU) Site at The University of Texas at Austin is partnership with a Texas 4000, a non-profit organization engaged in advocacy and philanthropy for cancer research. The goal is that the REU students will increase their understanding of the important roles of advocacy and philanthropy in advancing cancer research and that the Texas 4000 students will increase their understanding of how researchers are trained and what the everyday experiences of research are like.

Background about the BME CUREs REU Site

The Biomedical Engineering Community of Undergraduate Research Scholars for Cancer (BME CUREs) Research Experiences for Undergraduates (REU) Site in the Department of Biomedical Engineering at The University of Texas at Austin began in 2015 with 159 complete applications for 8 positions. The applicants were surveyed to collect demographic data (N = 62 responses). Approximately equal numbers of men (48%) and women (52%) applied to BME CUREs. Hispanics represented 16% of the applicant pool. The racial demographics endorsed by the applicants were: white (70%), Asian (30%), black or African American (8%), and American Indian or Alaskan Native (5%).

Applications were holistically reviewed. The selection process emphasized identifying promising students who were early in their undergraduate studies. The goal was to select students who would benefit from both the REU experience and the encouragement to pursue follow-on opportunities since admission to competitive graduate programs in BME typically requires more extensive undergraduate research experience than is obtained from a single summer program.

In BME CUREs in 2015, there were 3 male and 5 female students. 2/8 of the REU participants were Hispanic. 5/8 of the REU participants were white and 3/8 were Asian. Participating students were drawn from a diverse set of institutions (i.e., majority serving and minority serving; public and private; large and small; geographically dispersed).

Background about Texas 4000

Texas 4000 chooses riders 18 months in advance of a capstone charity bicycle ride based on a competitive application. Texas 4000 expects riders to raise money for their ride as well as act as leaders and advocates for cancer research. In preparation for that role, Texas 4000 engages students in 18 months of leadership training, culminating in the 10-week charity bike ride. During the training months, riders train by riding 2000 miles with their team, raise at least \$4500, and volunteer for 50+ hours in their community. The Texas 4000 training program includes a comprehensive curriculum based around Eight Foundational Skills - Self Awareness, Communication, Resiliency, Efficient Planning, Peer Respect, Situational Leadership, Technical Knowledge & Skills, and Vision & Action.

Goals of interaction between the BME CUREs REU Site and Texas 4000

The interaction of the BME CUREs and Texas 4000 was intended to be mutually beneficial in a number of ways. The first is that the Texas 4000 riders and riders-in-training get to interact with cancer researchers. This allows the BME CUREs students to speak directly to potential donors about specific cancer-related research projects. As the UT Austin BME Department is an annual recipient of Texas 4000 funds this is very relevant. On the other side, the cancer researchers get to see the challenge of development fund raising and that research is not without cost. They also get the experience to communicate their research to a non-technical audience in an accessible way.

One purpose of the leadership training that the Texas 4000 students undergo is to enable them to give polished yet sincere pitches to potential donors. The skill of rapid communication or “pitching” an idea or opportunity is one that we often neglect in teaching scientific communication. The interaction with Texas 4000 students was intended to serve as a model for the BME CUREs REU participants to emulate and practice their own communication skills.

The partnership with the Texas 4000 was designed to be a highlight of the BME CUREs REU program. The goal is that the BME CUREs students will increase their understanding of the important roles of advocacy and philanthropy in advancing cancer research and keep the ultimate goal of improving health in mind. Likewise, the goal for the Texas 4000 students is to increase their understanding of how researchers are trained and what the everyday experiences of research are like.

Procedures for interaction between the BME CUREs REU Site and Texas 4000

Coordinated timing of 10-week commitments

The 10-week BME CUREs REU summer research experience is scheduled to directly overlap with the Texas 4000 10-week charity bicycle ride. On the first day of the ride in June, the Texas 4000 staff, local city partners, riders, family, friends and other campus supporters attend an on-campus kick-off event. This is a momentous send off for the cyclists on their journey that starts in the heart of the university campus. The BME CUREs REU participants arrive on campus the day before. The morning of the ride kick-off, the REU students attend a BME CUREs kick-off meeting, program orientation, and campus tour finishing at the Texas 4000 kick-off event. They have the opportunity to meet the riders and watch them leave on their bicycles. Finally, the day the riders arrive at their destination 10 weeks later in August, the BME CUREs REU participants also have a closing event.

BME CUREs REU seminar with riders-in-training and videoconference with current riders

Over the 10-week period, the BME CUREs REU participants meet in weekly seminars. Future riders in leadership-training visit the seminar at least once over the summer to talk about the pillars of Texas 4000 and their involvement in the fight against cancer, and hear from the REU participants about their cancer-related research efforts. In addition, the BME CUREs REU participants had an opportunity over the summer to participate in a videoconference with the current riders near the middle of the 10-week journey. Through these activities, both student groups got to hear from the other about their experiences in the fight against cancer that summer. However, the logistics of coordinating a videoconference with a group of students on a cross-country bicycle ride were very challenging. Consequently, future offerings of the BME CUREs

REU Site will instead put more emphasis on synchronous interactions with the riders-in-training but asynchronous interactions, such as via social media, with current riders.

BME CUREs REU seminar preparing handwritten notes for current Texas 4000 riders

The BME CUREs REU participants spent one of their weekly seminars writing cards to the Texas 4000 riders on one route; they went through the list of names and photos of the riders and chose their “pen pals” to which they handmade written notes and cards. The program sent all the cards together in a package ahead of the riders, so they would receive them when they stopped for lodging.

Social media interactions between BME CUREs REU participants and current Texas 4000 riders

The Texas 4000 students on the bike ride post photos and notes to the Texas 4000’s website through a social media aggregator. Similarly, the BME CUREs REU participants post to the REU program’s website through a blog with photos and commentary. Blog post content varies from reflections on research and the impact of cancer, to letters to the Texas 4000 student riders, to fun photos from local social trips. The program shares this blog and relevant postings with the Texas 4000 throughout the 10 weeks.

Adoption of Texas 4000 community-building methods by the REU Site

The BME CUREs REU Site has adopted novel community-building methods of the Texas 4000. The Texas 4000 students’ begin each of their activities with “rider dedications,” in which the riders share brief accounts of to whom they dedicate their current efforts in the Texas 4000. In analogy, the BME CUREs REU Site begins each weekly seminar with “research dedications” in which program faculty, staff, and trainees share brief accounts of who they dedicate their research efforts to this week. These dedications cover a wide range of the influences on the REU participants’ lives, including loved ones who have been lost to cancer, friends who are currently undergoing cancer treatment, family members supporting them in their education, research mentors guiding them in their projects, and fellow participants who encourage them.

Assessment plan and preliminary results

Evaluation of the BME CUREs REU Site is focusing on determining the extent to which the Site is implemented as proposed and achieves its goals, including participants’ development of science communication skills and a sense of belonging as a researcher and faculty and graduate students’ development as mentors. The interaction with the Texas 4000 which is the focus of this “work in progress” report was intended to help students develop a sense of belonging, especially among students who are from backgrounds under-represented in STEM who tend to place higher value on research that has personal meaning.

BME CUREs REU participants are being surveyed using established valid and reliable measures to identify any changes in students’ professional identity, research self-efficacy, intentions to pursue graduate education and careers in biomedical engineering, and thinking and working like a scientist/engineer. Participants are also being surveyed to determine the extent to which participation influences their sense of belonging as a researcher and development of communication skills.

Since this REU Site began in 2015, pre- and post-program interviews and surveys of BME CUREs REU participants have been conducted for only one cohort at this time. However, the

preliminary results are encouraging in that they suggest that the BME CUREs REU participants experienced increases in scientific self-efficacy, the extent to which they identify as scientists, and alignment of their personal values and science values. The BME CUREs REU participants reported that the Texas 4000 connection was unique and fun, and suggested that there be increased involvement with the Texas 4000 in future years.

Summary and conclusion

We hope that this “work in progress” description of the BME CUREs REU Site’s partnership with Texas 4000 will provide inspiration for other undergraduate research program directors to explore novel ways to incorporate exposure to advocacy and philanthropy into the undergraduate research experience. However, this is a new REU Site (started 2015), so the evaluation process is on-going and we cannot provide a full picture of the outcomes of the partnership at this time.