EVALUATING THE
2015 SUMMER GENOMICS RESEARCH EXPERIENCE
FOR UNDERGRADUATES/
GEOBIOLOGY AND GENOMICS UNDERGRADUATE RESEARCH
EXPERIENCE (SGREU/GGURE) PROGRAM
OF THE
USC CENTER OF EXCELLENCE IN GENOMIC SCIENCE
AND THE
USC CENTER FOR DARK ENERGY BIOSPHERE INVESTIGATIONS

Executive Summary and
Complete Questionnaire Responses

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INTRODUCTION

As part of its Center of Excellence in Genomic Science (CEGS) and Center for Dark Energy Biosphere Investigations (C-DEBI), USC offers a research program for undergraduates designed to encourage underrepresented minorities to pursue training in genomics, the life sciences, and environmental science. The summer program is called Summer Genomics Research Experience for Undergraduates/Geobiology and Genomics Undergraduate Research Experience (SGREU/SGURE). During the summer of 2015, 14 students worked in laboratories under the supervision of faculty mentors and also attended a weekly journal club/research seminar. All but one of the 14 summer students were continuing their research from the 2014-2015 academic year.

Methodology

During the third week of August (as the summer program was ending), 13 of 14 students completed an online questionnaire (response rate = 93%). Students were informed the study was conducted by an independent researcher and that their responses would be anonymous. Questionnaire completion took fifteen minutes on average.

Participant Demographics

Participant demographics were as follows:

<table>
<thead>
<tr>
<th>Gender</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>African American</td>
</tr>
<tr>
<td>Male</td>
<td>Alaskan Native</td>
</tr>
<tr>
<td>(Rising)</td>
<td>Asian*</td>
</tr>
<tr>
<td>Junior</td>
<td>Hispanic</td>
</tr>
<tr>
<td>Senior</td>
<td>Native Hawaiian/Pacific Islander*</td>
</tr>
<tr>
<td>Progressive Master’s</td>
<td>White*</td>
</tr>
</tbody>
</table>

*Students could choose more than one ethnicity; those choosing Native American or White are multiracial.

This document contains a summary of the results. Complete questionnaire responses are provided in Appendix A. All comments were transferred directly from the online survey, and may have been lightly edited for spelling and punctuation.
SUMMARY OF FINDINGS

1. As we saw in the program’s previous years, the summer program provides value to students by giving them the ability to spend a great deal of time in the lab. Compared with the school-year program, the summer program allowed them to work on more in-depth projects, as well as earn more money.

2. The summer’s journal club and seminar series were especially popular with the students. They appreciated the in-depth information and the opportunity to connect with their peers.

   ▪ Many students would like to continue the journal club/seminar series during the school year, and once a month seems to be the ideal academic-year frequency.

3. For many of the students, program participation made them more likely to include research in their career goals. All had an interesting and enjoyable research experience.

4. Students would have liked more public health or biomedical speakers for the journal club, not surprising given that many of them intend to pursue a career in the medical field.
STUDENT PERCEPTIONS OF PROGRAM STRENGTHS

As in previous years, students especially enjoyed the journal club and seminar series. It exposed students to more depth of content and provided a venue for interacting with other students.

→ “The best part is the seminars because we are able to share our research and also are informed on cutting edge research.”

→ “Eating lunch and getting updates on my peer’s research projects.”

→ “Hearing new speakers each week. I learned a lot about subjects I never would have explored on my own and discovered they were very interesting.”

→ “The weekly discussions. Having a chance to meet with like-minded peers and get answers to different curiosities I have about the world of science.”

→ “The journal readings were the best part because of how informative the speakers were, and how much knowledge I gained.”

→ “I enjoyed listening to the professors present their research. This allowed me to gain knowledge about different types of scientific research.”

→ “Getting to meet Dr. Nealson and hear about the research he does.”

→ “The best part of the summer was the weekly meetings with Dr. Finkel. I enjoyed the opportunity to hear from different researchers and the projects that they were working on. It was a small welcoming environment that allowed us to ask questions and get feedback.”

Students appreciated the summer luxury of plenty of lab time—the chance to really “dig in” to a research project and earn more money than during the school year.

→ “We had a high cap on the maximum amount of hours we could work.”

One student also mentioned the benefit of gaining insight into science careers.

→ “The best part of the program was being able to interact with PhD students and post docs. I was able to learn first hand what a career as a scientist might look like.”
STUDENT PERCEPTIONS OF PROGRAM WEAKNESSES

A few students struggled with the material for the seminar series.

→ “Some of the content from the guest lectures were difficult to understand.”

→ Deciphering the language in the research paper. It was difficult to get to the main idea on my own when I didn't understand so much of the information.”

Several students said the program had no weaknesses.

→ “There isn't a worst part.”

→ “I didn't find any of the parts of the program to be unsatisfactory.”

→ “Nothing was bad about it.”

One student bemoaned the potential decrease in funding for the program.

→ “I wouldn't say there's a worst part about the PROGRAM per say. I don't see a downside period. The program is uniquely accommodating in that it allows real life people (from minority backgrounds) with real life hindrances to pursue their interests in the field of science. What is disheartening is the instability of the program's funding. It suggests that, perhaps, someone somewhere doesn't see the worth of a group of empowered young scientists.”
The **summer research experience** received strong marks—almost all students rated it an 8 or higher on a 10-point scale, and 54% rated the research experience a perfect “10.” Students enjoyed their research projects and appreciated the benefits.

→ “I have learned and done so much in the lab I am currently in. I would have never had such an opportunity without this program.”

→ “I enjoyed working in my lab and learning about the different research projects that people were working on.”

→ “I love my PI and the weekly seminars we have. I'm also passionate about my global health research.”

Students worked an average of 26 hours per week in the lab over the summer. Most students (82%) felt their summer workload was “just right.”

→ Two students, with lighter workloads (7 and 13 hours, respectively), felt they would have liked to work more hours (12 and 20 hours, respectively).
### SUPERVISION AND FACE TIME

**Who is your primary research supervisor?**

<table>
<thead>
<tr>
<th>Supervisor</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Research Professor</td>
<td>33%</td>
</tr>
<tr>
<td>Postdoc</td>
<td>50%</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>8%</td>
</tr>
<tr>
<td>Other (&quot;project manager&quot;)</td>
<td>8%</td>
</tr>
</tbody>
</table>

**How often do you meet with your research professor to discuss your research?**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every day</td>
<td>8%</td>
</tr>
<tr>
<td>A few times a week</td>
<td>8%</td>
</tr>
<tr>
<td>Once a week</td>
<td>25%</td>
</tr>
<tr>
<td>Every few weeks</td>
<td>25%</td>
</tr>
<tr>
<td>Once a month</td>
<td>17%</td>
</tr>
<tr>
<td>Other (&quot;never,&quot; “I’ve never met with my research professor&quot;)</td>
<td>17%</td>
</tr>
</tbody>
</table>

**How often do you meet with your research supervisor to discuss your research? (if the supervisor is not the PI)**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every day</td>
<td>50%</td>
</tr>
<tr>
<td>A few times a week</td>
<td>17%</td>
</tr>
<tr>
<td>Once a week</td>
<td>33%</td>
</tr>
</tbody>
</table>

- For the most part, summer GREU students are well-supervised in their labs. Several meet with their PI at least once a week, and most meet with the professor at least once a month.

- For those not supervised by the professor, but by a postdoc or graduate student, all still meet with their research supervisor at least once a week, if not even more frequently.

- There are two students who never met with their research professor.
TRAINING: LAB MEETINGS

<table>
<thead>
<tr>
<th>Does your lab have a regularly scheduled group meeting during the summer?</th>
</tr>
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<tbody>
<tr>
<td>Yes (N=3)</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If your lab has a regular group meeting, how often do you attend?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every week</td>
</tr>
<tr>
<td>Every few weeks</td>
</tr>
<tr>
<td>Once a month</td>
</tr>
<tr>
<td>Other (&quot;missed it due to a summer class&quot;)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you present your work at the (summer lab) meeting?</th>
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<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

- Only a handful of the labs have a regularly scheduled group meeting over the summer.

- For students in those labs, all attended the summer group meeting, although an additional student said they missed the lab group meeting due to summer school.

- No student presented their work in a lab meeting this summer.
TRAINING: OPPORTUNITY FOR PUBLICATION

<table>
<thead>
<tr>
<th>Has anyone in your lab discussed with you the possibility of your lab work contributing to a poster or publication?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

- Two students have discussed the possibility of their work contributing to a poster or publication. Students are at various points in the publication process.
  
  → “I am still in the beginning stages of my project, but the goal is to have it as contributing information to the lab’s larger project.”

  → “I have spent almost five months analyzing the twitches of zebrafish, and the data that I analyzed will be included in the paper that my lab is writing. I will also be doing a few illustrations for the paper.”
The summer journal club/seminar series scored very well, with most students rating it an eight or higher on a 10-point scale; 54% rated it a perfect “10.”

Students appreciated the “engaging” and “helpful” seminars and discussions.

→ “The seminars were really interrelated and brought about a deeper understanding to what is happening across different research labs.”

→ “Dr. Finkel really made the journal club interesting and engaging. The speakers were all from different fields and their research was fascinating. I learned about things I would have never been exposed to without the seminars.”

→ “Before discussing some of the papers in the journal club, I had a hard time understanding them. The journal club was helpful because I was able to talk about the papers and share ideas with other students.”

→ “Each professor brought a lot of energy and was very informative about the topic at hand. The journal club series covered a variety of topics, which made it really well-rounded.”

The majority of students (69%) would like to continue the series during the academic year, with “once a month” being the ideal frequency.

When asked what type of speakers/topics they would like to see in the future, students requested a bit more variety or breadth, beyond the molecular biology field, and including public health, biomedical research, and food & diet.
OVERALL PROGRAM RATING

<table>
<thead>
<tr>
<th>Overall Summer Program</th>
<th>Mean (0-10)</th>
<th>% 8,9, or 10</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>9.5</td>
<td>92%</td>
</tr>
</tbody>
</table>

- As with last six years, students were very satisfied with the summer program overall. Most students rated the program an 8 or higher on a 10-point scale, and 62% rated it a perfect “10.”
  - “It's a great program and keeps us students busy for the summer. Learning is important year round and this program really does a great job of ensuring we learn in and out of the lab.”
  - “I enjoyed working in my lab and getting to know the other participants in the weekly meetings.”
  - “I've grown in my experience and have been challenged and look forward to continuing my research!”

- Many students felt the SGREU program had advantages over the school-year GREU. Advantages include more time to spend in the lab (and increased hours for increased pay), and the journal club allowed for more learning and interaction with the other students.
  - “I always enjoy the summers. The weekly seminars provide a consistency and connectedness that often go lacking during the academic year.”
  - “Getting to spend more time in the lab which I appreciated because I got to be more involved in the project.”
  - “I had much more time to learn and do experiments and I took advantage of that, which is a positive.”
  - “The frequency of our meetings increases in the summer. This is definitely a positive. It's both social and educational, and altogether enjoyable.”
The summer program encouraged several students to become more interested in pursuing advanced degrees with a research focus. Several medically-oriented students now want to include research as part of their career.

→ “I am seriously considering a career in research and academia.”

→ “Yes, I want to continue to be immersed into research.”

→ “I think I get more excited hearing about the work that great individuals do in the lab. I did once plan to pursue an M.D. but my goals have changed. Once I start working in a lab again, I'm sure I'll have my answer.”

For other students, the program helped them solidify other career goals.

→ “After speaking with post docs, I learned that many regretted their choice to become scientists. Many encouraged me to pursue medicine instead. I am still considering being a physician scientist; however, I feel most compelled to pursue medicine.”

→ “Before the program, I wanted to go to medical school, but now I want to become a dietitian. I am interested in how certain foods can affect our health. I want to help others learn to eat healthy.”
STUDENTS’ SUGGESTIONS FOR IMPROVING THE PROGRAM

- A few students had suggestions about journal club content or structure.
  
  → “Add student presentations.”

  → “Expanding the seminar series into a more hands-on series of experiments.”

  → “Having some meetings be during the evening.”

  → “Maybe the participants could be polled to figure out the best meeting day. Often I could not attend meetings because I had my research meetings at the same time.”

  → “Maybe not meeting as often.”