

1.2 Summary of findings

Key findings are listed below for project components and achievement of project goals. A complete description of key findings and recommendations can be found in Section 4 of this report.

Project components

Survey results are reported for 2015-16 for which the GAANN student survey was conducted. The figure below displays the summary of survey results, in which department respondents rated all elements quite positively.

Figure 1. Project components and their perceived usefulness

| Component | Percent of students that found component most useful ² | Summary of Suggestions |
|-----------------------------------|---|--|
| Teaching training sessions | 76% | Formalize supplementary faculty teaching training to supplement TAPDP training; communicate training requirements and resources to graduate students. |
| Supervised teaching experience | 83% | Continue encouraging faculty to provide high quality support to students in development of teaching skills. |
| Supervised teaching support | 84% | Continue encouraging faculty to support students with feedback and guidance in teaching skills; map out teaching components and expectations for students and faculty. |
| Advising and mentoring by faculty | 100% | Continue encouraging strong intradepartmental cohesion via workshops, seminars, and other formal and informal opportunities for interaction. |
| Research experience | 92% | Students particularly enjoyed supported, independent research experiences that allowed them to perform experiments and explore areas of interest to them. |
| Core courses (n=31) | 68% | Better communicate the relevance of courses to student research interests; make course offerings known in advance and advising available to help students plan course selections |
| Lecture courses (n=23) | 65% | |
| Seminars (n=41) | 76% | |
| Elective courses (n=16) | 69% | |

² Most useful is defined as students that selected the two highest options on each scale. The highest options were *somewhat* or *very useful* for teaching training, supervised teaching experience, teaching support, advising and mentoring, and research experience. The two highest options for Courses and seminars were *fairly* or *very useful*.

Project goals

The evaluator compared results for the current 2015-16 year to prior GAANN funding and to baseline years (2014-2015). The components in Figure 2 for which all goal requirements have been met are highlighted in blue. The program is meeting its goals to *increase the number of female and URM students* and *increase the quality of students entering the program*, but there is still room for improvement. **The number of students from underrepresented minority (URM) backgrounds increased by three since 2014-15**, but URM students currently compose less than a quarter of the department, and both females and URMs are better represented in the non-GAANN population compared to the GAANN population. Students in 2015-16 entered with similar undergraduate GPAs and slightly better GRE scores than students in the baseline year. The mean time to advance has not changed since the baseline year, and the mean time to complete a degree has decreased by one term. No baseline currently exists for Goal 4, but feedback suggests that students are well-prepared in terms of departmental support and research productivity.

Figure 2. Current graduate student overview

| GAANN Goal | | Baseline 2014-15 | 2015-16 |
|---|--|---|------------------------|
| | | Total or Avg | Total or Avg |
| Goal 1 – Diversity: Increase the number of students from traditionally underrepresented groups. | URM: African American, Hispanic, Native American, Pacific Islander | 11 | 14 |
| | Female | 33 | 34 |
| Goal 2 – Student Quality: Increase the quality of students admitted. | GPA | 3.48 | 3.48 |
| | GRE Verbal | 567 | 573 |
| | GRE Quant. | 709 | 711 |
| Goal 3 – Graduation: Facilitate students' advancement to candidacy and conferral. | Number of terms to advance | 10 | 10 |
| | Number of terms to confer | 20 | 19 |
| | | Percentage good or excellent preparation | |
| Goal 4 – Career Preparedness: Produce trainees prepared to enter careers in teaching and research. | Teaching training and experience | 63% | |
| | Scientific knowledge | 89% | |
| | Background literature | 78% | |
| | Relevant research experience | 83% | |
| | Necessary practical skills | 82% | |
| | Knowledge about pursuing career | 57% | |
| | | | Average (Range) |
| | Peer-reviewed articles published | 1.32 (0-6) | |
| | Grants funded | 1.75 (0-18) | |
| | External research presentations | 3.56 (0-17) | |

Summary of recommendations

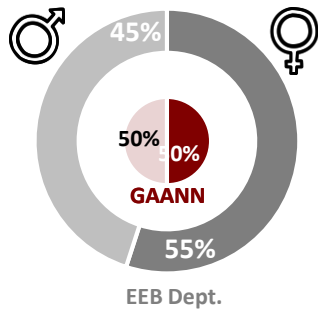
Program components are keeping pace with certain targets for the GAANN goals, but evaluators urge program personnel to take the following measures to address gaps:

- Recruit URMs in a more targeted way to satisfy **Goal 1** mandates
- Continue high standards of recruitment to go on achieving **Goal 2**
- Continue providing a supportive environment to achieve **Goal 3**
- Finally, provide professional development opportunities to satisfy all **Goal 4** objective.

See Section 4 for a comprehensive list of recommendations based on evaluation findings.

Goal 1 – Increase the number of students from traditionally underrepresented groups

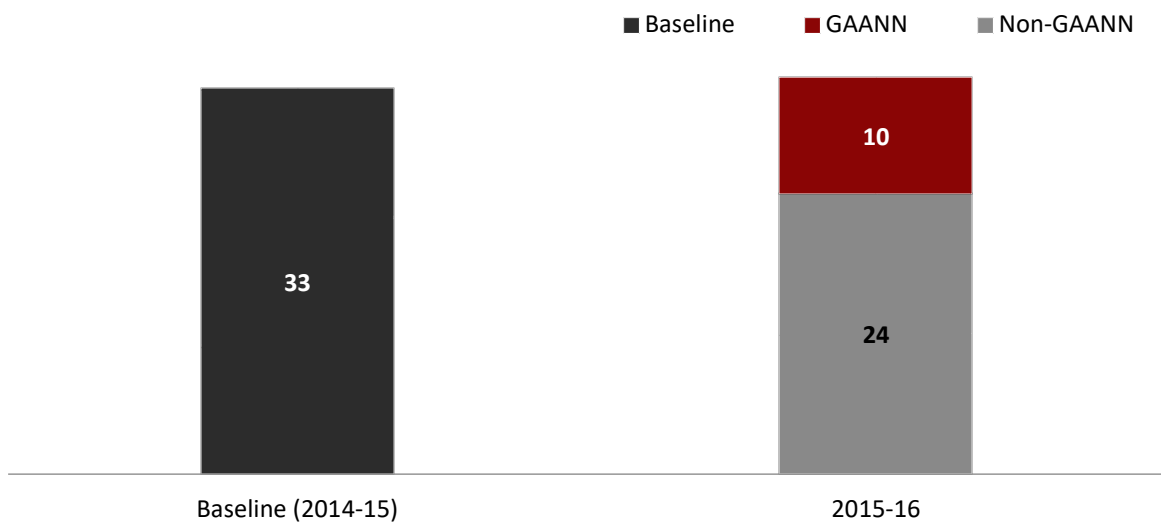
The USDE GAANN program has funded twenty current doctoral students in the Department of Ecology and Evolutionary Biology. All current GAANN fellowships were awarded to advanced students who were enrolled prior to 2015-16.



The pie chart compares the proportion of female doctoral students in the department, in grey, to the proportion of female students among currently enrolled GAANN fellows, in red. In 2015-16 female doctoral students represented more than half of the department (34 of 63). Half of the current GAANN fellows (50%) in the department are female students.

Additionally, Figure 16 shows that the total number of female students in the doctoral program has increased by one since 2014-15, despite one fewer doctoral student total.

Figure 16. Female GAANN compared to non-GAANN doctoral students



As shown in Figure 17, the number of underrepresented minority⁵ (URM) doctoral students enrolled in the doctoral program has increased by three since the baseline year. Of the twenty currently enrolled GAANN fellows, three are URM students: two identify as Hispanic, and one identifies as African American.

Figure 17. Total number of students URM GAANN and non-GAANN students

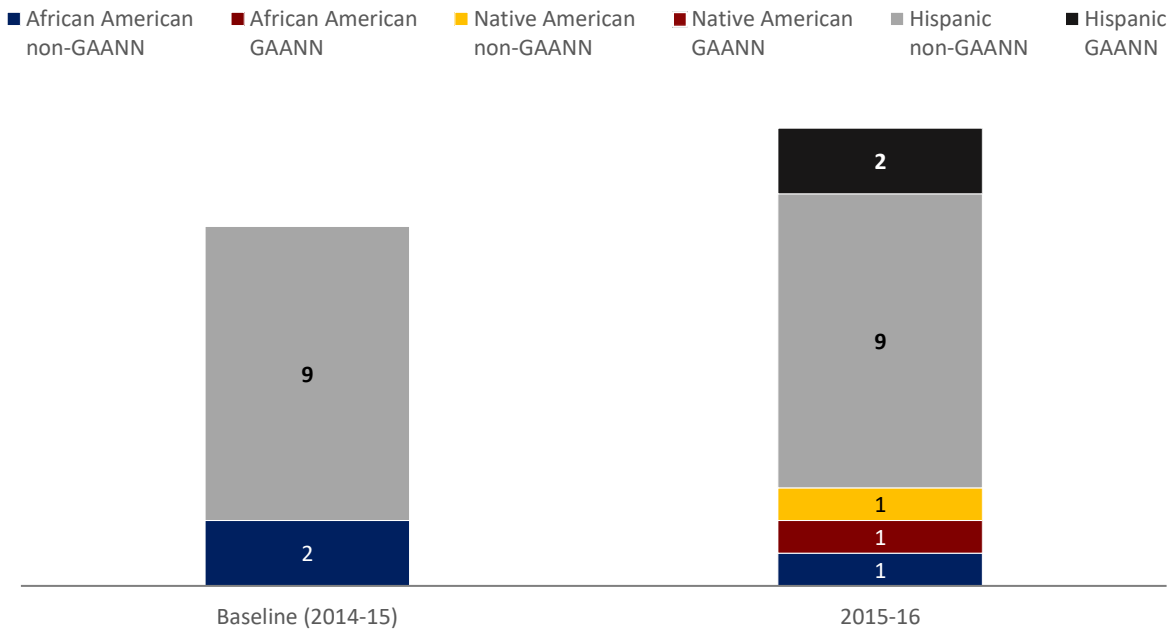


Figure 18 shows URM student enrollment by GAANN funding status as a proportion of all doctoral students. Students from URM groups comprised 18% of doctoral students registered in the baseline year. This increased to 24% in 2015-16 in accordance with program goals. However, only 15% of GAANN fellowships have been allocated to URM students in 2015-16.

Figure 18. Proportion of URM GAANN and non-GAANN students by year

| Funding status of URM students | Baseline 2014-15 | 2015-16 |
|--------------------------------|------------------|------------|
| Non-GAANN | | 26% |
| GAANN | 18% | 15% |
| Proportion URM students | | 24% |

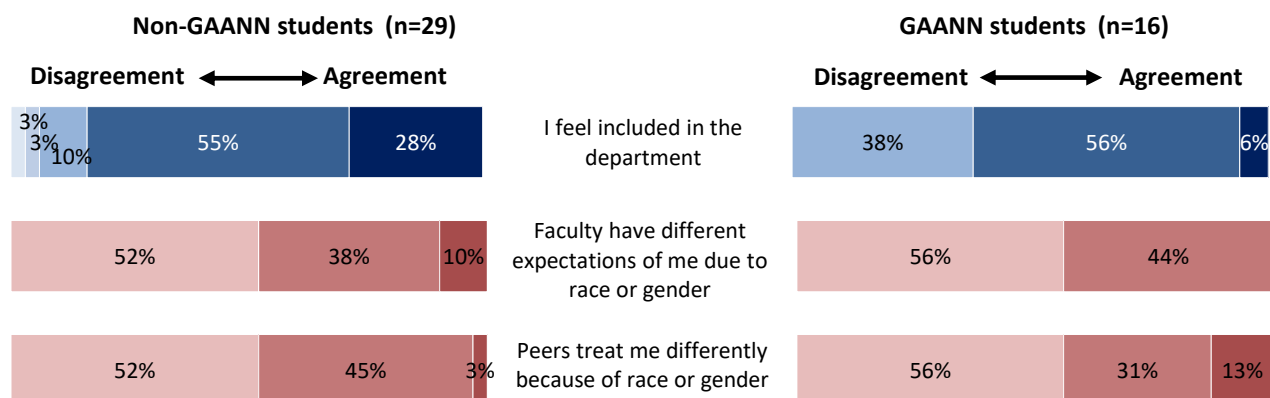
These findings suggest that although the department has increased proportions of female and URM students within the department, there is still room for improvement in recruitment of URM students. The department has the opportunity to use GAANN fellowships in future years to better support and increase recruitment of URM students into the doctoral program.

⁵ African American, Native American, Pacific Islander, Hispanic

Inclusivity in Department of Ecology and Evolutionary Biology

Students reflected on their sense of comfort and inclusion in the department, a potential factor in URM retention and performance in the department⁶. Most students (62% GAANN and 83% non-GAANN) *agreed* or *strongly agreed* with the statement *I feel included in the department*. The majority of students *strongly disagreed* with the statement *faculty have different expectations of me due to my race or gender* and *peers treat me differently because of my race or gender*. In Figure 19, darker hues indicate stronger agreement.

Figure 19. Students' feelings of inclusion in department

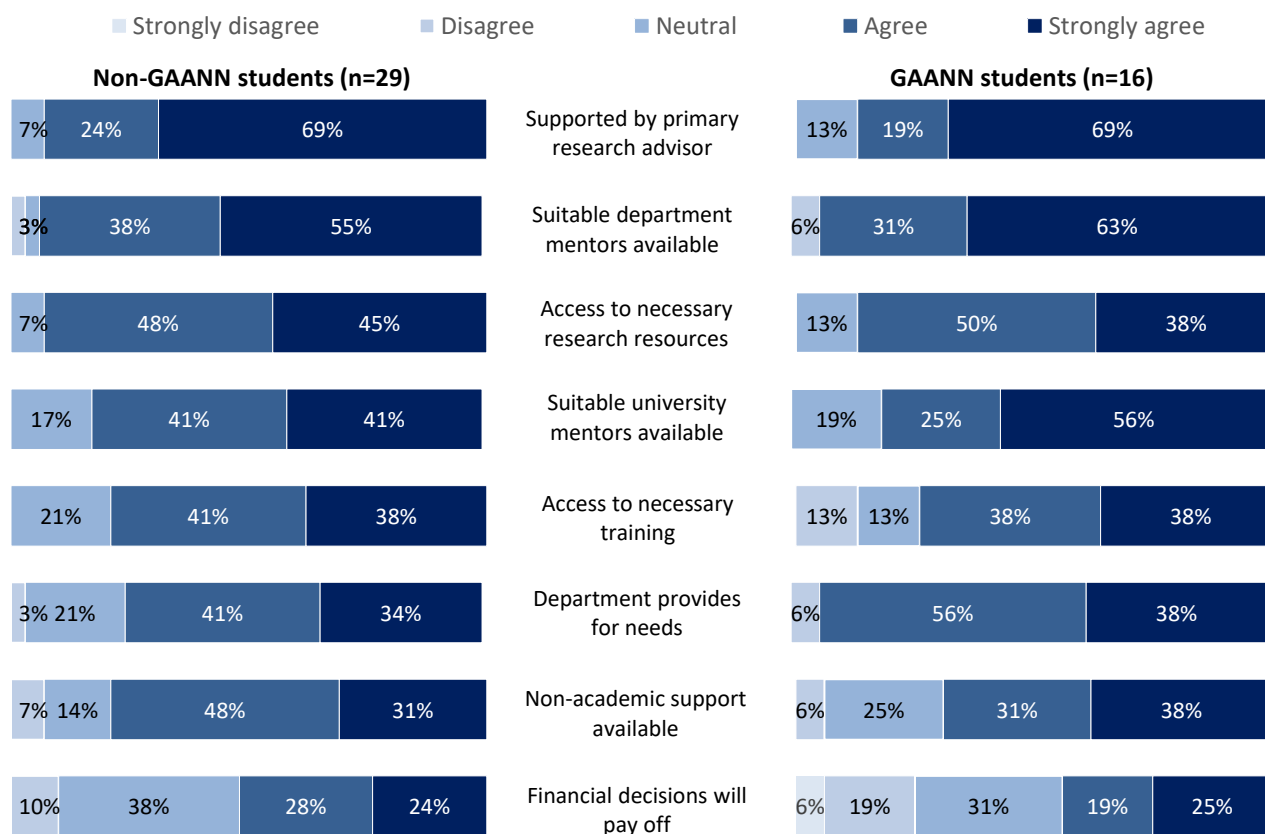


⁶ See Chang, et al. 2014. *What matters in College for Retaining Aspiring Scientists and Engineers from Underrepresented Racial Groups*. Journal of Research in Science Teaching, 51(5), pp. 555-580.

To better understand the barriers students face in advancing in or completing their doctoral degrees, students were asked about departmental support and satisfaction with the graduate experience, including financial hardships and utility of student investments.

Figure 23 describes the support that graduate students might need to advance and successfully complete their degrees. Overall, non-GAANN and GAANN respondents expressed similar opinions about the extent to which the department and UCI supports graduate student needs. Most students *strongly agreed* that they were *supported by their primary advisor* and that there were *suitable department mentors available*. Responses indicate that students are well-supported within the department. Students feel least confident that *financial decisions during their graduate careers will pay off*, and findings suggest that improvements in the department should revolve around academic and non-academic opportunities for professional development.

Figure 23. Departmental support and preparation for careers



Goal 4 – Produce trainees that are prepared to enter careers in teaching and research

To assess preparation of graduate students for entry into careers in the Department of Ecology and Evolutionary Biology, evaluators assessed GAANN and non-GAANN preparedness to enter a career, program support for career preparation, and student accomplishments.

Career interest

Figure 24 compares current GAANN and non-GAANN student primary career interests to their initial career goals. There was minimal change between non-GAANN students’ initial and current primary career goals, but GAANN students expressed some changes in their career interests. About 30% fewer GAANN students selected *teaching/research at a 4-year institution* as a primary career goal, while interest in *research in industry* has increased by 25%.

Figure 24. Student primary career interests since start of program

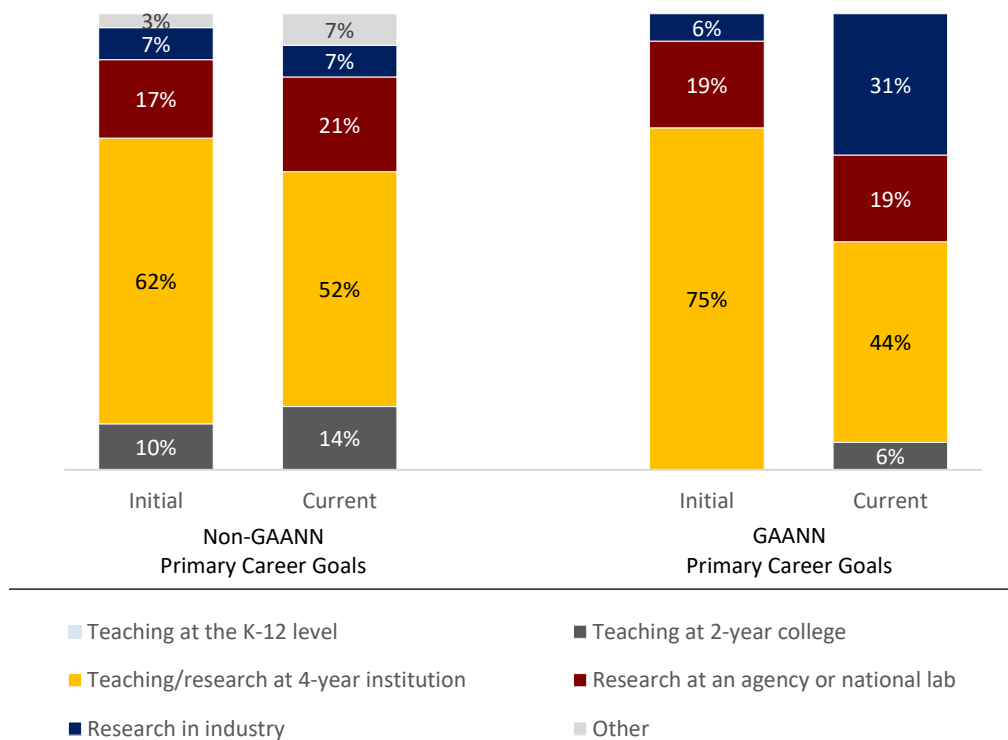
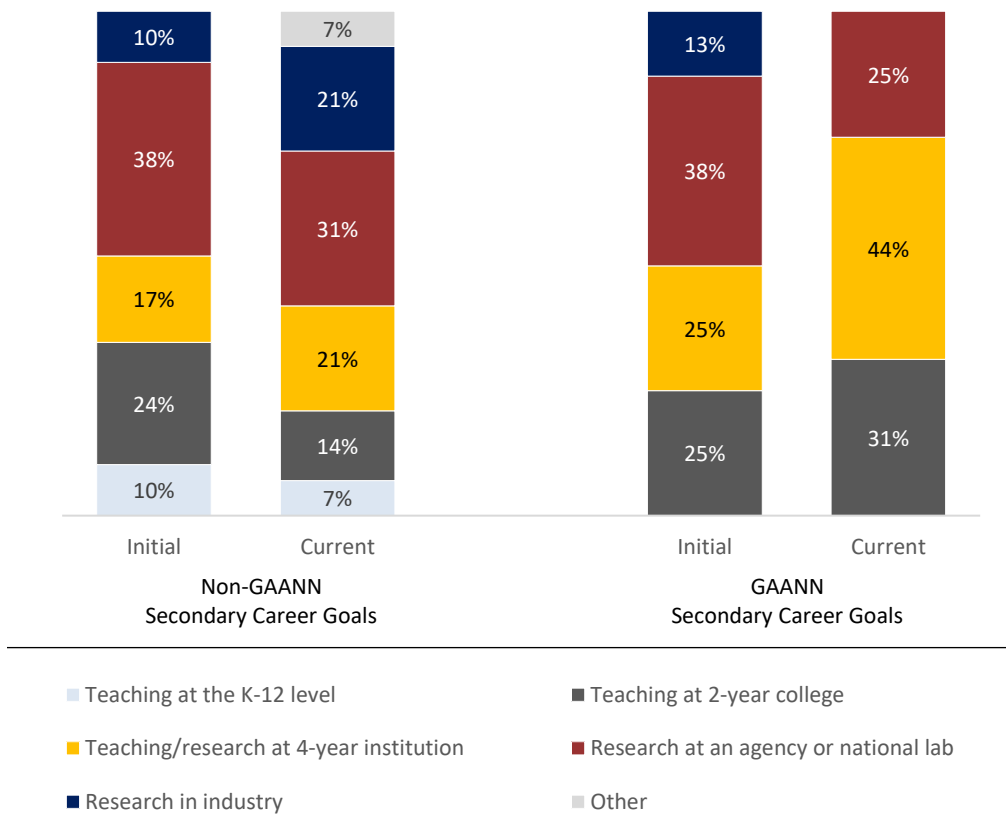


Figure 25 compares current GAANN and non-GAANN student secondary career interests to their initial career goals. Similar to primary career interests, non-GAANN students did not indicate many changes in their secondary career interests, though two students developed interest in applied fields. GAANN students grew more interested by 19% in *teaching/researching in 4-year institution* as a secondary career, and showed less interest in *research in industry* and *research at an agency or national lab*, resulting in a reversal of the trends for primary career interests. Future evaluations may investigate mechanisms for the processes by which secondary and tertiary goals rise in students' estimation, and *vice versa*.

Figure 25. Student secondary career interests since start of program

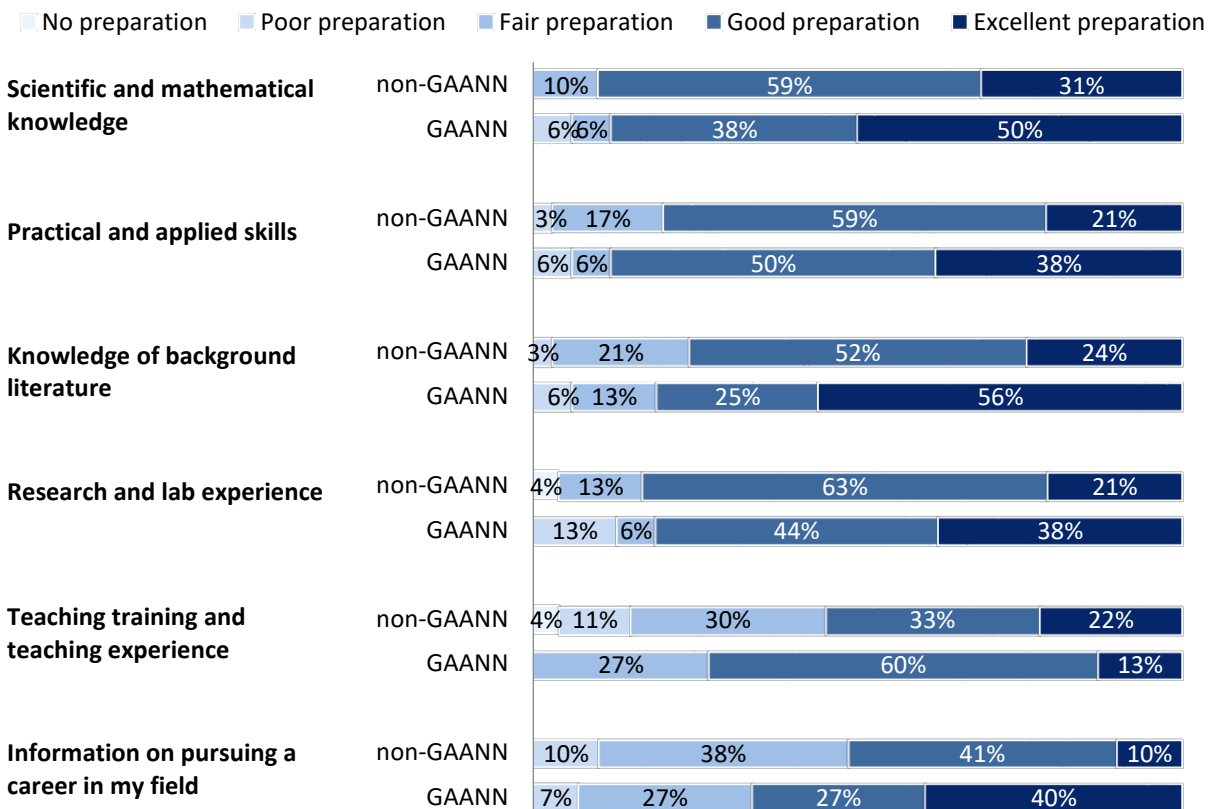


Student skills preparation to enter a career in areas of national need

Doctoral students (n=45) rated six statements related to their preparedness to enter a scientific career on a scale from 1 to 5; 1 = *no preparation*, 5 = *excellent*. Sixteen of these doctoral students were GAANN fellows. The students who selected “Not sure yet” in response to preparedness statements were excluded from analysis.

A majority of respondents rated their preparation *good* to *excellent* in all career skills (Figure 26). Students gave the highest ratings to *scientific and mathematical knowledge*, for which 88% of GAANN students and 90% of non-GAANN students received *good* or *excellent preparation*. However, a substantial proportion of respondents perceived that they had *fair preparation* or less in *teaching training and teaching experiences* and *information on pursuing a career in their field*, indicating two opportunities for improvement in the department, despite high ratings.

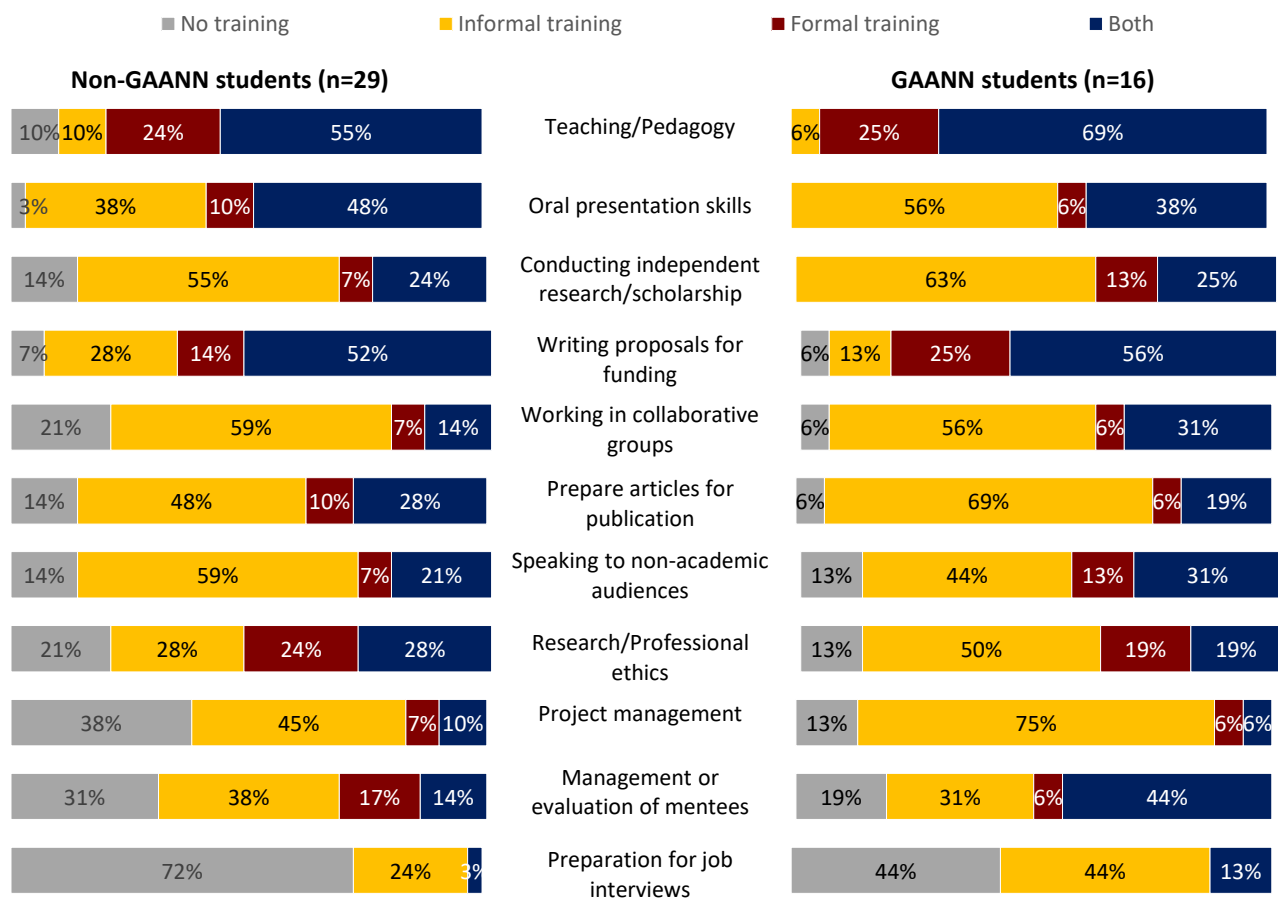
Figure 26. Preparedness in skills useful for entering a career in areas of national need



Career preparation

Doctoral students responded to survey questions about the type of career preparation they received in critical skills (Figure 27). The chart below presents the areas of career preparatory training received, sorted from most training of any kind to least training for GAANN students, 100% of whom responded that they had some form of training in *teaching/pedagogy*, *oral presentation skills*, and *conducting independent research*. In aggregate, respondents were most likely to have received formal training in *teaching/pedagogy*, *writing funding proposals*, and *oral presentation skills*. According to survey responses, students had the least preparation for *job interviews*. This was also an area for which the greatest difference between GAANN and non-GAANN student preparation existed, as 57% of GAANN respondents and 27% of non-GAANN respondents reported receiving some training. Another area of discrepancy was project management, for which 87% of GAANN and 62% of non-GAANN respondents said they had training.

Figure 27. Career preparatory training of GAANN and non-GAANN students



Graduate student accomplishments

To further assess students' preparedness to enter a career in a scientific field, students answered prompts about their engagement in essential academic experiences. Figure 28 shows non-GAANN and GAANN student participation in research activities according to targets set by program planners. Targets accomplished by at least 50% of students are highlighted in light blue, and targets accomplished by at least 75% are highlighted in dark blue. The percentage indicates the number of students who accomplished the given task at least once; the average and the range of each accomplishment are presented parenthetically.

Students were most successful in sharing their research through *research presentations* and *peer-reviewed publications*, including more than 41% of all students who have been first author of a *peer-reviewed journal article*. More than 44% of all students have received grant funding. Professors could continue encouraging research dissemination by facilitating connections between their students and scholars in their field of interest, inviting students to collaborate and co-author their publications-in-progress, and supporting students' writing for independent research.

Figure 28. Percentage of students completing activities at least once by year

| Accomplishment | Non-GAANN, n=29 % (Ave., range) | GAANN, n=16 % (Ave., range) |
|--|------------------------------------|--------------------------------|
| Outside research presentations | 86% (2.79, 0-11) | 94% (4.94, 0-17) |
| Internal research presentations | 76% (2.41, 0-10) | 94% (5.56, 0-20) |
| Peer-reviewed journal article | 58% (1.03, 0-5) | 80% (1.87, 0-6) |
| Peer-reviewed journal article – first author | 41% (0.44, 0-2) | 56% (1.33, 0-2) |
| Grant proposals funded | 48% (1.52, 0-10) | 44% (5.00, 0-18) |
| Other non-peer reviewed publications | 10% (0.14, 0-2) | 13% (3.00, 0-5) |
| Peer-reviewed conference proceedings | 28% (0.75, 0-5) | 31% (1.00, 0-8) |
| Book chapter | 7% (0.07, 0-1) | 13% (0.13, 0-2) |

Section 4. Key Findings and Recommendations

Overall, the Department of Ecology and Evolutionary Biology (EEB) is rising to each of the challenges addressed in the GAANN goals. EEB students are broadly supported by the department and they seem to feel included in a rich intellectual environment. Interventions to consider in the future may include broader diversification strategies for recruitment and professional development training for the job search process. Findings from components evaluated above are included in the below goal sections to which they most closely pertain.

Goal 1: Increase the number of doctoral students from traditionally underrepresented groups

URMs are not well-represented in the department and GAANN funding is not contributing as much to higher numbers of URMs in the department as it could. Females and URM students have lower rates of representation among GAANN scholars than in the department overall. Additionally, while females represent almost 60% of the departmental population, URM students represent less than a quarter. Students sensed little exclusionary culture within the department.

Allocate future GAANN funding to students from URM backgrounds who may not be able to pursue training in EEB at UCI otherwise. Use GAANN funding to actively recruit URM students, not simply to support URMs who have already been accepted to the program. Continue efforts to support female enrollment in the PhD program through the use GAANN funds.

Goal 2: Improve the quality of students accepted to the doctoral degree program

Compared with the baseline, the quality of 2015-16 students did not change significantly. GPAs remained consistent across cohorts and compared to baseline. On average, the quality of GAANN students, measured through GRE scores and mean undergraduate GPAs, is lower or equal to that of non-GAANN students.

Current levels of academic achievement were high to begin with among department students, and they can only be slightly improved overall. Re-think allocation of GAANN resources to prioritize recruiting high-performing URM and female students, as the awards were intended.

Goal 3: Decrease the mean time for graduate students to complete a doctoral degree

Departmental students felt as though they were getting ample quantities of high quality support in terms of mentorship, research, teaching, and coursework. Compared with baseline, the time to advancement has increased minimally and the time to completion of a doctoral degree remains unchanged, but these outcomes will become more meaningful as evaluated over time. Student feedback expressed satisfaction with access to necessary resources and training that may support advancement in the program.

Continue providing broad support and a stimulating intellectual environment.

Goal 4: Increase preparation of graduate students to enter careers in this designated area of national need

Students were extremely positive about their preparation to enter careers in Ecology and Evolutionary Biology in survey responses, and they also had high levels of research productivity. Of all the training types offered in the department, respondents indicated they received the least amount of training in information on pursuing a career.

Consider offering more guidance on professional development as students near graduation.