Published in final edited form as:

Innov High Educ. 2019 April ; 44(2): 119–131. doi:10.1007/s10755-018-9452-0.

The Research, Advising, and Mentoring Professional: A Unique Approach to Supporting Underrepresented Students in Biomedical Research

Lori Gildehaus, Paul Cotter, Sharon Buck, Marsha Sousa, Karsten Hueffer, Arleigh Reynolds

Abstract

As a pilot intervention strategy to support undergraduate students, especially rural and Alaska Native students who are pursuing biomedical science research and career trajectories, we have developed a unique, mid-level Research, Advising, and Mentoring Professional (RAMP) position. In this article we outline the reasons for creating this position, RAMP qualifications, training, duties, and differences between RAMP and other positions typically found in higher education. Additionally, we discuss the evolution of the position and why it may be of interest to other institutions as they address similar issues involving students from underrepresented groups. Preliminary survey and focus group data from students mentored directly by RAMPs indicated that the holistic advising approach of RAMPs has had a positive impact on student experiences by supporting persistence in degree programs and providing psychosocial support of both personal and professional development.

Keywords

underrepresented students; mentoring; Alaska Native; biomedical research; student support

American Indian/Alaska Native (AI/AN) students face some of the largest health disparities in the United States; and, together with others from rural areas across the country, they are underrepresented in the biomedical research workforce. At our institution the enrollment rate of Alaska Native undergraduate students has increased from 16% in 2013 to 27% in 2017, but they made up only 9.7% of graduating students in 2017. Disparities in college retention rates between Alaska Native/rural Alaskan and non-Native/non-rural students (United States Department of Education, 2014) indicate a clear need to develop intervention strategies to support these students in their personal and professional endeavors because of the importance of their potential contributions.

In our Biomedical Learning and Student Training program (BLaST), which is funded by the National Institutes of Health (NIH), we strive to engage undergraduate students from diverse groups, especially AI/AN and rural backgrounds, in biomedical research within a culturally relevant context. The goal of BLaST is to increase the diversity of students in the biomedical

workforce through enhanced undergraduate training and mentoring in biomedical research, increased integration of research and teaching, and enhanced integration of rural campuses into a cohesive biomedical learning community in Alaska. During the past four years, 2015–2018, BLaST has supported nearly 250 undergraduate students through research experiences and assistantships. Fifty-one students (BLaST “Scholars”) received full scholarships that include comprehensive mentoring support, research experiences, and advising and tutoring services.

Underrepresented students, a group that includes AI/AN and rural students based on NIH criteria, (U.S. Department of Health and Human Services, 2018) face many social and academic challenges when they enter college (Engle & Tinto, 2008; Hurtado & Guillermo-Wann, 2013; Wright, 1991). Some of these challenges, such as transitioning to a university climate and managing cultural differences, can be especially pronounced in students from rural and Indigenous communities (Guillory & Wolverton, 2008; Wright, 1991). Common barriers to engagement and persistence include feelings of isolation and inadequacy (Guillory & Wolverton, 2008), balancing academic and personal commitments, and lack of financial support (Carter, 2006; Laden, 2004). Students may need assistance in order to navigate and overcome these struggles; and they require positive, self-affirming experiences in order to support resilience, persistence, and degree completion (Toven-Lindsey, Lewis-Fitzgerald, Barber, & Hasson, 2015).

Having a mentor facilitate connections and provide comprehensive guidance contributes to student engagement, and it may be especially important for underrepresented students (Wallace, Abel, & Ropers-Huilman, 2000). However, students can sometimes feel that faculty members are unapproachable or inaccessible (Gardner, Forrester, Jeffery, Ferzli, & Shea, 2015); and they may be uncomfortable asking for assistance (Schwartz, Kanchewa, Rhodes, Cutler, & Cunningham, 2016). Often, regrettably, those students who need the most support do not actively seek it (Alexitch, 2002).

Mentors often lack formal mentor training, and academic advisors may not be familiar with fields of study and related careers, student backgrounds, and mentorship. While caseloads vary between institutions and depend on the size of the student body and students’ needs, full-time academic advisors can advise up to 300 students per academic year (Carlstrom, 2013). Further, advisors’ high caseloads may prevent frequent contact with students and may limit time for cultural training and the holistic mentorship some students need.

Student engagement in research promotes student self-confidence and self-efficacy (Lopatto, 2008), and participation in research positively influences student decisions to pursue STEM degrees and increases motivation to enroll in graduate programs in STEM fields (Carpi, Ronan, Falconer, & Lents, 2017; Villarejo, Barlow, Kogan, Veazey, & Sweeney, 2008). However, many of our students arrive on campus with no research experience, are unfamiliar with campus life and the academic rigors of college, and are unaware of opportunities for assistance or professional and academic growth. They are typically uncertain about how to get involved in scientific research and are apprehensive about taking initial steps toward a research career.

BLaST has successfully used One Health (<https://www.cdc.gov/onehealth/index.html>), the concept that human, animal, and environmental health are so closely linked that none can be healthy unless all are healthy, as a valuable tool to engage students in biomedical research and prepare them for their chosen career paths (Cotter et al., 2018; Taylor et al., 2017). Recently, a One Health initiative was adopted at our institution to increase understanding about human life and well-being in the North. One Health resonates with our Alaska Native and rural students because these groups typically have close ties to the land and animals they depend upon for food, clothing, shelter, and cultural traditions. Ongoing work suggests One Health may be especially important for improving the recruitment and persistence of students from these groups (Cotter et al., 2018). The One Health concept provides a pathway for mentors to engage students in meaningful research projects that are relevant to them and their communities. To augment efforts to engage students through One Health, we have developed a new position, the Research, Advising, and Mentoring Professional (RAMP). RAMPs focus on enhancing the research and learning experiences of students from underrepresented groups in order to promote student persistence and success.

RAMPs: Description and Evaluation

Rationale for RAMPs

We (i.e., BLaST principal investigators and collaborating faculty) have observed that technicians, graduate students, and research professionals perform much of the mentoring in many laboratories with successful undergraduate research programs, an observation consistent with those of Thiry and Laursen (2011) and Wood (2003). We hypothesized that if these persons were motivated to be trained as mentors and were able to provide additional logistical, academic, and psychosocial support, they would fill a unique and formerly unrecognized role in the support of undergraduate research. Further, they would hold a central role in developing a culture of mentorship at our institution by coordinating mentoring efforts and providing a holistic approach to student support.

As a result of our observations and experiences, the BLaST administrative team developed and are currently piloting this novel, mid-level professional position. RAMPs focus on easing the transition of underrepresented students into university life, and they promote academic persistence and career success through comprehensive, holistic advising and mentoring. We define “mentoring” as intentional, comprehensive guidance of undergraduate students’ academic, research and professional growth, as well as social and emotional support, whereas “advising” focuses on providing advice regarding course selection, career options, and university resources. RAMP duties include and expand the usual understanding of mentoring and advising duties in higher education in that the aims of this program are holistic. The intent is to establish supportive relationships with students through understanding their backgrounds, interests, and goals. We believe that this approach will likely benefit AI/AN and other underrepresented students.

In this article we compare the duties of RAMPs with those of traditional mentoring and advising positions at colleges and universities. Further, we present data from students who have worked with RAMPs in order to evaluate our assertion that the comprehensive mentoring approach by RAMPs positively impacts undergraduate student academic,

research, and social experiences in college; provides support for students from underrepresented backgrounds to identify and pursue their interests; and represents a unique resource for students.

RAMP Position Development

BLaST principal investigators designed the RAMP position as a full-time, salaried, non-faculty university staff position funded through the NIH-funded BLaST program. Faculty members developed the concept and the position description as they pursued NIH support to improve the engagement in biomedical research of underrepresented groups on our campus. As the RAMP concept was a novel approach, the proposal to NIH included a formative evaluation of the RAMP strategy to inform further position development and implementation. We hired six, full-time RAMPs from within and outside the university, five at our institution and one at a partner campus. RAMPs report to BLaST principal investigators. Recognizing the diverse needs of our students, we sought to hire a cohort of professionals with diverse expertise in science, biomedical research, and science education. Position requirements include an advanced degree (M.S. or Ph.D.) in science or education, publication-quality research experience, and training and/or interest in mentoring undergraduate students, especially those from underrepresented backgrounds. The intent was to provide a suite of support and technical services not typically found in any one job description within a university setting, including training in research techniques, academic and career advising, mentor-mentee pairing, and teaching and tutoring. Further, RAMPs would be recognized as professionals, with salary and responsibilities commensurate with their education and professional experience.

Pilot Program Evaluation

As part of our evaluation, in December 2017 we invited 27 current new (first academic term) and veteran (second term or later) BLaST undergraduate Scholars (students receiving BLaST scholarships - “students” in this article) to voluntarily complete an online survey. The academic status of these students ranged from the first year of college to the last year. The survey focused on the impact of RAMPs on students’ academic, research, and college experiences and their attitudes towards and use patterns of the BLaST Student Engagement Center. This center provides a dedicated space for students to study, gather, and interact; and the RAMP offices are located there. We received 15 complete responses (56% response rate; seven new students; eight veteran students). Eight (53%) respondents were from rural backgrounds as defined by U.S. Department of Education criteria (Geverdt, 2015) and modified for Alaska by Cotter et al. (2018). Our Institutional Review Board had waived the review requirements for all BLaST program evaluation survey instruments, including the survey summarized in this article.

In the academic years 2016/2017 and 2017/2018, RAMPs logged the frequency and duration of meetings (not including informal and/or impromptu meetings) with each student, and categorized the time they spent with students in the capacities of mentor, advisor, or research guide. Because student research projects differed in techniques used, complexity, and need for RAMP assistance, we do not report the time spent working with students in a research capacity.

Following the surveys, we convened two focus groups (10 and 14 students, respectively) of first-term and veteran students participating in BLaST courses in December 2017 in order to gain narrative insight on student perceptions of the RAMP program and the impact of BLaST on their college experience and aspirations. To minimize bias, focus groups were led by an independent evaluator and were not attended by BLaST personnel. We informed students that participation was voluntary and that all data would be de-identified prior to any publication. Focus groups provided a means to clarify survey data and identify any misalignment with patterns observed in survey responses (Rogers & Goodrick, 2012). We recorded focus group interviews for later transcription, reference, and accuracy. Student feedback was also used to inform RAMP duties and responsibilities, which has contributed to the evolution of the RAMP position.

Findings

Through formative evaluation efforts, RAMP responsibilities have expanded beyond their original intent (Table 1). Our RAMPs have diverse skill sets and specialties – chemistry, wildlife biology, environmental science, genetics, and education – to meet student and program needs. RAMPs continue their professional development in research content areas, mentorship, and cultural/diversity awareness; deliver workshops for faculty and graduate students on mentoring best practices; match students and faculty for research projects; and present at science and education/mentorship conferences. They work with greater autonomy and with more decision-making authority than originally proposed. RAMPs have developed a *RAMP Training Handbook* (Kallas et al., 2018) and a *BLaST Mentoring Handbook* (Kallas et al., 2017) for local use and to guide implementation of similar positions at institutions serving students with comparable demographic profiles. RAMPs integrate efforts of university and non-university personnel and resources to implement best practices for student success and to promote institution-level change in standards of mentorship and student support.

All respondents indicated that the RAMPs had at least a slightly positive impact on their BLaST experience and rated their experiences either good (33%) or very good (67%). This finding was supported by focus group comments. Eighty percent of respondents reported meeting with their RAMP at least four times during the fall 2017 academic term (Figure 1), and 87% indicated they would like to meet with their RAMP with the same frequency as they do currently. All respondents reported interacting with RAMPs other than their own at least occasionally, and 60% of all students (75% of veteran students) reported interacting with RAMPs other than their own on a regular basis.

RAMPs were assigned an average of seven students and met with them an average of 13 times per academic year (median = 12, range = 4 – 29) for a total average duration of 11.7 hours (median = 11 hrs; range = 3.5 – 26 hrs). These data are consistent with the 80% of students who reported meeting with their RAMP more than four times per semester. Additionally, students often participate in summer research sites off campus, and RAMPs maintain contact with them electronically throughout the summer regardless of their location.

Overall, the respondents agreed or strongly agreed that their RAMPs were interested in their personalities, interests, and goals and that they were helpful in identifying research opportunities for them (Figure 2). Students relied on RAMPs when seeking guidance on academic and research issues. Students also commented on the provision of guidance in emotional and psychosocial aspects of their lives, and focus group data revealed variation among students in their interest and comfort in seeking emotional/psychosocial support. As a group, students were somewhat less likely to discuss private matters or personal difficulties with their RAMP than they were to discuss issues related to academic, research, and career decisions (Figure 3).

All respondents reported visiting the BLaST Student Engagement Center at least 2–3 times per month: 80% reported visiting at least once per week, and 40% reported visiting two or more times per week. The most common reasons for visiting included to study with or to seek help from RAMPs, to socialize with other students, and to study independently (Figure 4). All respondents anticipated future visitation with the same (60%) or higher (40%) frequency.

Discussion

The RAMP represents a novel, mid-level teaching and research professional position designed to enhance student success. RAMPs provide a unique combination of advising and mentoring for academic, research, and career goals, as well as psychosocial support to help underrepresented students overcome hurdles in their chosen pathways. By building relationships, developing a community within BLaST, and facilitating connections between undergraduate students and faculty members and/or graduate student researchers, RAMPs help reduce barriers known to impede success of underrepresented students (Toven-Lindsey et al., 2015; Wallace et al., 2000).

Academic Advising

“They are mentors. Not only in research, but in academics as well.” BLaST students rely on RAMPs when seeking guidance on academic issues. The student-specific focus RAMPs provide is reflected in the variation in frequency and duration of RAMP-student meetings; students requiring more guidance met with their RAMPs more frequently, and nearly all students agreed that the amount of time with their RAMP was sufficient. The understanding of student interests, academic goals, and intended career trajectory helps RAMPs inform students of relevant academic and employment opportunities within and outside the university.

Research Mentoring

Effective mentoring is important to undergraduate students participating in research (Thiry & Laursen, 2011), and students understand the importance of mentors and teachers on their research experiences (Henne et al., 2008). BLaST students identified RAMPs as critical in finding research projects relevant to their life experiences and academic and career pathways, connecting them to research mentors, and managing mentor-mentee relationships when needed. A BLaST student referring to the impact of RAMPs on student researchers

commented, “If BLaST’s goal is to get them excited about research and teach them how to do it, I think they have definitely succeeded.”

RAMPs also provide formal guidance in research by integrating classroom learning and student research experiences. Faculty members recognized the utility of an introduction to research curriculum for students to enroll in prior to, and during, their research experiences. In collaboration with the faculty, RAMPs developed and continue to deliver a four-course series, which are each two-credit and regularly offered in the fall and spring semesters, for new student researchers. This series is designed to introduce fundamental scientific concepts and research methodologies and to integrate academic and research experiences. In this capacity RAMPs facilitate the transition from classroom learning to research endeavors. This critical function promotes successful research experiences and provides faculty members and graduate students with new undergraduate students who are familiar with research methodologies and understand basic principles and ethics of scientific research.

Career Goals and Opportunities

RAMPs help students explore and understand career options. They discuss how students can continue their education; and they assist with applying for professional and graduate programs, internships, and employment opportunities. Utilizing Individual Development Plans, RAMPs focus on the requirements and skills students need for their specific career paths and disseminate resources and opportunities accordingly. With RAMP assistance, students explore their research interests and develop a greater awareness of available avenues of career opportunities. A BLaST student described the role of RAMPs in this process, “My RAMP has...gone out of her way to look at specific medical schools that are maybe diversity-based, or they’re neurology-based, which is my main focus, and she’s looked for those for me to apply to.”

Psychosocial Support

Psychosocial support is an important way in which RAMPs foster the overall well-being and success of our students. It is also how they differ most from conventional mentors and advisors. RAMPs provide emotional and empathetic support and demonstrate a genuine desire to understand student challenges, fears, and insecurities as they navigate the university system and degree process. Inherent in the ability to provide psychosocial support is the development of both a professional and personal relationship that is based on trust, understanding, and mutual respect. RAMP psychosocial support is highlighted by this student, “They really care about what you want to do, and they want to give you as many opportunities as they can. And they check on you emotionally and mentally....It’s like more of an informative parent more than anything.” BLaST students view RAMPs as a collective body of mentoring professionals who care about their well-being, and they reported seeking guidance from multiple RAMPs during the course of an academic term.

Paramount to developing a successful psychosocial support network is a sense of community. RAMPs recognize that community is fundamentally important to rural and Alaska Native students (Sharma, Lopez, Mekiana, Ctibor, & Church, 2013); and we know that students have better emotional health when they are involved in organizations that

promote community and foster a sense of belonging (O’Keeffe, 2013). Our findings suggest that the Student Engagement Center also contributes to a sense of community. These factors may result in increased retention rates and greater rates of degree completion (Guillory & Wolverton, 2008).

RAMPs as Mid-level Professionals

RAMP skillsets include those associated with multiple positions, including faculty and academic advisors, among others (Table 1). As implemented at our institution, RAMPs are mid-level education and research professionals; their experience, training, and duties distinguish them from research technicians and other staff. RAMP responsibilities extend beyond expectations for entry-level positions. They have decision-making authority regarding daily tasks and involvement in larger projects; they develop and participate in professional networks; they perform duties with minimal oversight; participate in professional development activities; they are self-directed; and they have responsibilities commensurate with a professional-level salary. The professional expectations and range of duties did not fit existing position descriptions at our institution. We anticipate that adopting a RAMP model at other institutions may require modifications to existing administrative structures in order to accommodate the broad scope of RAMP functions.

Application of the RAMP Model

We have developed the RAMP position within the context of BLaST, a program dedicated to enhance opportunities to engage Alaska Native and rural students in biomedical research. We have refined the position to reflect stakeholder (student, research mentor, administration) feedback, and it has evolved into a unique professional position.

We are currently collaborating with tribal college partners to implement a RAMP model on their campuses and to further identify cost-effective, impactful measures to promote holistic mentorship for their students. Tribal colleges in the U.S. have access to funding opportunities targeting Indigenous populations, and their size and mission may allow administrative flexibility to incorporate holistic mentoring practices based on our RAMP model. Such flexibility may include a graduated RAMP model, whereby mentored students assume comprehensive mentoring duties at their institutions to mentor and guide less experienced students; or faculty members could receive additional training in comprehensive mentorship and further serve their students (and institutions) in that capacity; or positions could be created and funded at these institutions that incorporate comprehensive mentoring, along with other institution-specific responsibilities. Institutionalizing expertise in comprehensive mentoring may be a cost-effective approach to increasing underrepresented student representation in biomedical research and science training at tribal colleges and other small institutions. Modifying existing position descriptions to include a comprehensive mentorship role and/or to alter existing academic organizational structures with the addition of mentoring professionals could help meet the institution’s mission.

Continued stakeholder input, and incorporation of robust evaluation, as the RAMP model expands to other underrepresented student-serving institutions, will provide a more comprehensive view of the exportability of the RAMP model to other institutions. Further,

expansion to other institutions will provide a larger and more diverse sample of stakeholder feedback and may allow more rigorous assessment of RAMP efficacy in promoting persistence and graduation rates of underrepresented students in the biomedical sciences.

Conclusion

We have developed a novel, mid-level, professional position requiring scientific expertise, an interest in academic advising, and formal training in comprehensive mentorship in order to promote student academic and career success, persistence, and degree completion. Our focus is upon rural and Alaska Native students. We believe the RAMP position is a unique and successful way to engage and support underrepresented students; and we suggest that it may be applicable to fields other than biomedical sciences. By combining academic advising and research mentoring into a single professional position that seeks to understand students' needs and goals in a holistic manner, we suggest that RAMPs can reduce barriers that often keep students from underrepresented groups from achieving their academic and career goals.

Acknowledgement

The research reported in this publication was supported by the National Institute of General Medical Sciences of the National Institutes of Health under Award Numbers UL1GM118991, TL4GM118992, or RL5GM118990. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Biographies

Lori Gildehaus has a B.S. in Biology from the University of Missouri-Columbia and an M.S. in Wildlife Biology from the University of Alaska Fairbanks. She is the Lead RAMP for the NIH BUILD funded BLaST grant program. lagildehaus@alaska.edu.

Paul Cotter has a doctorate from Idaho State University and is principal of EvaluLogic, which is a company focused on science education and biomedical training of underserved populations, community wellness initiatives, and drug/suicide/domestic violence prevention programs. paul@evalulogic.com.

Sharon Buck received her Master's Degree in Biology from the University of Alaska Fairbanks and is Technical Associate with EvaluLogic. She specializes in data management, analysis, and presentation and report and survey development. sdbucks@gmail.com.

Marsha Sousa earned a B.S. in Biological Sciences and a Ph.D. in Physiology and Biophysics from Colorado State University. She is the Co-Director of the Student training core for the BLaST program. Her special interests are reproductive physiology, equitable access to education, and providing authentic research experiences to undergraduate students. mcsousa@alaska.edu.

Arleigh Reynolds has a B.S. in Biology, a D.V.M. and a Ph.D. in nutrition from Cornell University; and he is a full professor in the Department of Veterinary Medicine at the University of Alaska Fairbanks. He is the Director of One Health for the University and one of two PIs for the NIH BUILD funded BLaST grant program. ajreynolds@alaska.edu.

Karsten Hueffer received his veterinary degree in 1999 from the School of Veterinary Medicine in Hannover, Germany, and the Ph.D. from Cornell University. Following post-doctoral training at Yale Medical School, he joined the faculty at the University of Alaska Fairbanks and currently serves as the Associate Dean for Veterinary Medicine and one of two PIs on the NIH funded BLaST grant. His research interests focus on infectious diseases, with special emphasis on zoonotic diseases in the North. In addition he works on effective mentoring of students in research. khueffer@alaska.edu.

References

- Alexitch LR (2002). The role of help-seeking attitudes and tendencies in students' preferences for academic advising. *Journal of College Student Development*, 43, 5–19.
- Carlstrom A (Ed.) (2013). *NACADA National Survey of Academic Advising* (Monograph No. 25). Manhattan, KS: National Academic Advising Association.
- Carter DF (2006). Key issues in persistence of underrepresented minority students. *New Directions for Institutional Research*, 130, 33–46. doi:10.1002/ir
- Carpi A, Ronan DM, Falconer HM, & Lents NH (2017). Cultivating minority scientists: Undergraduate research increases self-efficacy and career ambitions for underrepresented students in STEM. *Journal of Research in Science Teaching*, 54, 169–194. doi:10.1002/tea.21341
- Cotter P, Reynolds A, Taylor BE, Buck S, Sheikhattari P, & Hueffer K (2018). Mentored research experiences in One Health: Increasing science identity and self-efficacy among undergraduate students from rural backgrounds. Manuscript submitted for publication.
- Engle J, & Tinto V (2008). Moving beyond access: College success for low-income, first generation students. (ERIC Document Reproduction Service No. 504 448)
- Gardner GE, Forrester JH, Jeffery PS, Ferzli M, & Shea D (2015). Authentic science research opportunities: How do undergraduate students begin integration into a science community of practice? *Journal of Science College Teaching*, 44, 61–65.
- Geverdt D (2015). Education Demographic and Geographic Estimates program (EDGE): Locale boundaries user's manual (NCES 2016–012). Washington, DC: U. S. Department of Education, National Center for Education Statistics Retrieved from https://nces.ed.gov/programs/edge/docs/NCES_LOCALE_USERSMANUAL_2016012.pdf
- Guillory RM, & Wolverton M (2008). It's about family: Native American student persistence in higher education. *The Journal of Higher Education*, 79, 58–87.
- Henne W, Henne R, McMahon W, Yee SH, Brasel T, & Mehdiabadi NJ (2008). Alumni perspectives on undergraduate research In Taraban R & Blanton RL (Eds.), *Creating effective undergraduate research programs in science: The transformation from student to scientist* (pp. 215–232). New York, NY: Teachers College Press.
- Hurtado S, and Guillermo-Wann C (2013). *Diverse learning environments: Assessing and creating conditions for student success—Final report to the Ford Foundation*. Los Angeles, CA: Higher Education Research Institute, University of California, Los Angeles.
- Kallas A, Gildehaus L, DeRuyter T, Sousa M, Reynolds A, & Hueffer K (2018). BLaST RAMP Training Handbook. Retrieved from <http://alaska.edu/blast/one-health-blast-resource/RAMP-Handbook-FINAL-5.17.18-website.pdf>
- Kallas A, Gildehaus L, DeRuyter T, Vertigan T, Sousa M, Reynolds A, & Hueffer K (2017). BLaST Mentoring Handbook. Retrieved from <http://alaska.edu/files/blast/imgs/mentoring-handbook-final-8.31.17-smaller.pdf>
- Laden BV (2004). Serving emerging majority students. *New Directions for Community Colleges*, 127, 5–19.
- Lopatto D (2008). Exploring the benefits of undergraduate research: The SURE survey In Taraban R & Blanton RL (Eds.), *Creating effective undergraduate research programs in science: The transformation from student to scientist* (pp. 112–131). New York, NY: Teachers College Press. doi:10.1187/cbe.04-07-0045

- O’Keeffe P (2013). A sense of belonging: Improving student retention. *College Student Journal*, 47, 605–613.
- Rogers PJ, & Goodrick D (2012). Qualitative data analysis In Newcomer K, Hatry HP, & Holey JS (Eds.), *Handbook of practical program evaluation*, (pp. 429–53). San Francisco, CA: John Wiley and Sons.
- Schwartz SEO, Kanchewa SS, Rhodes JE, Cutler E, & Cunningham JL (2016). “I didn’t know you could just ask:” Empowering underrepresented college-bound students to recruit academic and career mentors. *Children and Youth Services Review*, 64, 51–59.
- Sharma DKB, Lopez EDS, Mekiana D, Ctibor A, & Church C (2013). “What makes life good?” Developing a culturally grounded quality of life measure for Alaska Native college students. *International Journal of Circumpolar Health*, 72, 1–7. doi:10.3402/ijch.v72i0.21180
- Taylor BE, Reynolds AJ, Etz KE, MacCalla NMG, Cotter PA, DeRuyter TL, & Hueffer K (2017). BuILDing BLaST: Promoting rural students’ biomedical careers using a culturally responsive One Health approach. *BMC Proceedings*, 11, 79–89. doi:10.1186/s12919-017-0092-7
- Thiry H, & Laursen SL (2011). The role of student-advisor interactions in apprenticing undergraduate researchers into a scientific community of practice. *Journal of Science Education and Technology*, 20, 771–784. doi:10.1007/s10956-010-9271-2
- Toven-Lindsey B, Levis-Fitzgerald M, Barber PH, & Hasson T (2015). Increasing persistence in undergraduate science majors: A model of institutional support of underrepresented students. *CBE-Life Sciences Education*, 14, 1–12. doi:10.1187/cbe.14-05-0082.
- U.S. Department of Education, National Center for Education Statistics (2014). Integrated Postsecondary Education Data System (IPEDS), Fall 2001 and Spring 2007 through Spring 2013, Graduation Rates (NCES 2017–094). Retrieved from <https://nces.ed.gov/programs/digest/d16/>
- U.S. Department of Health and Human Services, National Institutes of Health (2018). Notice of NIH’s interest in diversity. (NIH Publication No. NOT-OD-18–210). Retrieved from <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-18-210.html>
- Villarejo M, Barlow AEL, Kogan D, Veazey BD, & Sweeney JK (2008). Encouraging minority undergraduates to choose science careers: Career paths survey results. *CBE-Life Sciences Education*, 7, 394–409. doi:10.1187/cbe.08-04-0018 [PubMed: 19047426]
- Wallace D, Abel R, & Ropers-Huilman B (2000). Clearing a path for success: Deconstructing borders through undergraduate mentoring. *The Review of Higher Education*, 24, 87–102. doi:10.1353/rhe.2000.0026
- Wood WB (2003). Inquiry-based undergraduate teaching in the life sciences at large research universities: A perspective on the Boyer Commission Report. *Cell Biology Education*, 2, 112–116. doi:10.1187/cbe.03-02-0004 [PubMed: 12888846]
- Wright B (1991). American Indian and Alaska Native higher education: Toward a new century of academic achievement and cultural integrity. (ERIC Document Reproduction Service No. 343 771)

Figure 1.

Meeting Frequency between RAMPs and Their Students

Note: The survey question is included as the chart heading. This figure shows aggregate data for new and veteran BLaST students (n=15).

Figure 2.

Student Responses Regarding Their Experiences with their RAMPS

Note: The survey question is included as the chart heading. This data reflects responses from new and veteran BLaST students.

Figure 3.
Student Responses Regarding Psychosocial Factors

Note: The survey question is included as the chart heading. Psychosocial factors included academic, coursework, research, and personal experiences. Responses were on a Likert-style scale of 1 (very unlikely) to 6 (very likely). This data reflects responses from new and veteran BLaST students.

Figure 4.

Student-reported Reasons for Visiting the BLaST Student Engagement Center.

Note: The survey question is included as the chart heading. This data reflects responses from new and veteran BLaST students.

Table 1.

RAMPS: Responsibilities Compared to Other Traditional Academic Positions

	RAMP	Faculty	Graduate Students	Academic Advisors	Traditional Lab Technician
Proposal/scientific writing	X	X	X		
Scientific publications	X	X	X		
Experimental/project design	X	X	X		X
Laboratory/research techniques	X		X		X
Data analysis	X	X	X		X
Formal responsible conduct of research and ethics training	X				
Oral and written presentations	X	X			X
Academic advising	X	X		X	
Development of IDP to identify and align interests, activities and career goals	X				
Exploration and increased awareness of career options	X	X		X	
Comprehensive, holistic mentoring	X				
Psychosocial support	X	X		X	
Work/life balance	X			X	
Teaching	X	X	X		
Tutoring	X		X	X	
Formal training in mentoring URM's	X				
Curriculum development to support research/academic development of students	X	X			