

Evaluation of the Impact of Bass Connections on Faculty Research, Pedagogy and Relationships

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BASS
CONNECTIONS

Executive Summary

Bass Connections began in 2013-2014. In the first seven years of the program, more than 3,500 students, faculty, staff and postdocs have participated in the program through 349 interdisciplinary research teams.

While faculty, staff, students and external partners all play important roles in shaping the success of teams, and by extension the program, Bass Connections would not be possible without the creativity, intellectual vision, commitment to student mentoring and collaborative spirit of the faculty leaders. Faculty leaders propose research projects, establish external partnerships, select and mentor student team members and provide the intellectual direction for the projects.

Given the important role of faculty in the program, in the summer and fall of 2019, Bass Connections conducted a survey to assess the impact of participation on faculty research, pedagogy and relationships over time. Ninety-seven faculty members responded to the survey (47% response rate). Key findings include:

Pedagogy & Student Relationships

- 67% of respondents agreed that Bass Connections made them a better teacher, with written responses indicating that Bass Connections helped faculty expand their understanding of students, project management and leadership.
- 75% of participants agreed that participating in Bass Connections improved their ability to organize and lead student teams.
- 72% of respondents reported that participating in Bass Connections increased their willingness to engage undergraduate students in their research, while 18% of faculty were either neutral or discouraged from further engaging with undergraduate students. Written responses indicate that some of the faculty found it difficult to work with undergraduate students, depending on their commitment levels and their knowledge of the topic.
- 82% of the respondents indicated that they are still in contact with students who participated on their team, and faculty listed several alumni with whom that they still maintain communication.
- 80% of respondents also agreed that the structure of Bass Connections helps faculty and students develop deeper and more lasting relationships than those that typically develop in the classroom.

Research

- Faculty reported that Bass Connections teams played an important role in securing 40 grants totaling \$19.8 M, resulting in a 521% return on investment on the funding provided to responding teams.
- Other faculty also reported that Bass Connections teams played a minor role in securing additional grants and that Bass Connections teams often play an important role in executing on existing grants.
- Half of the respondents reported at least one publication resulting from their team, with many noting multiple publications.
- Nearly two-thirds of respondents agreed that their Bass Connections experience increased their willingness to engage in collaborative research projects and in interdisciplinary research projects.

External Partnerships & Public Impact

- 55% of respondents agreed that Bass Connections helped them develop or strengthen relationships with an external partner.
- 58% of respondents agreed that Bass Connections helped them connect their research to the external community.
- Faculty reported a wide-range of public impacts resulting from their Bass Connections teams from new services to apps to developing the next generation of leaders.

Faculty Reflections

In written responses, faculty reflected on how Bass Connections has benefited their research, with themes including the opportunity to engage students, apply research within the community, collaborate with faculty across disciplines, and explore new intellectual directions. Common difficulties cited by faculty included budget and time constraints and varying student commitment levels. In final reflections, faculty offered suggestions for improving Bass Connections, such as offering teaching credit, helping equip students to contribute more quickly and creating more uniform expectations for students participating in Bass Connections. Several respondents expressed their support of the program and the ways their participation has positively influenced their approach to research and teaching.

Faculty offered insight on the ways Bass Connections has benefited their research, with reoccurring themes in responses including student engagement, community, collaboration, and intellectual freedom.

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Background and Methodology

As a multi-faceted program that includes faculty, postdocs, graduate and undergraduate students working together on applied research challenges, assessing impact is also multi-faceted and includes understanding how the program shapes the trajectories of students, the effect of applied research on external communities and the impact on faculty development and research outputs.

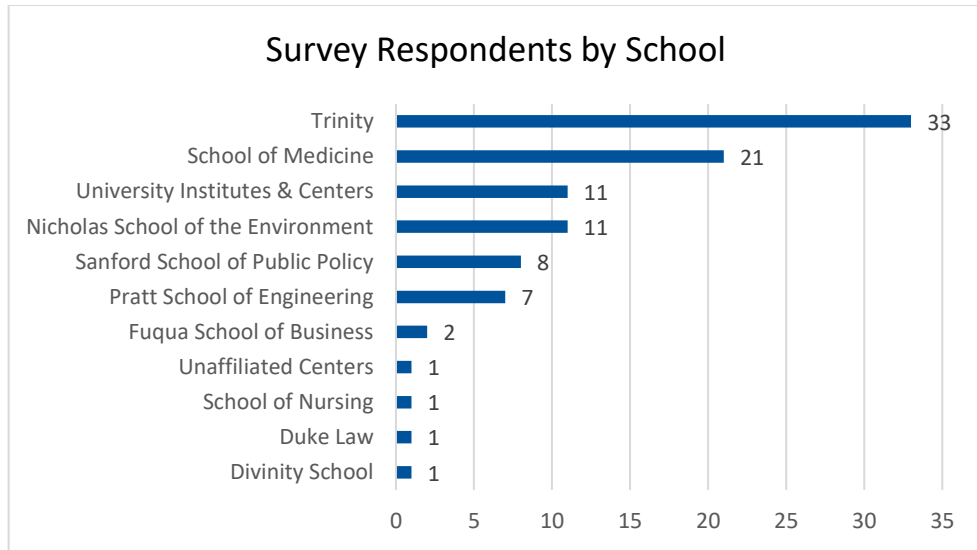
This faculty survey was the first survey administered to faculty to assess the long-term impact of the program on faculty pedagogy and research. This effort was preceded by our annual program survey, which is focused on understanding how teams are operating, identifying common challenges and best practices, and assessing short-term impact on the growth and research interests of faculty and students. Specific to faculty, these prior evaluation efforts have found that faculty participate in the program for a range of reasons including: to mentor students in a different way, to be part of a multidisciplinary team, to be part of something innovative and to advance existing or new research. Likewise, faculty have reported that the experience benefits them in a range of ways with teaching and mentoring at the top, followed closely by research.

In addition, we have regularly collected short-term output information from teams. These short-term outputs have demonstrated that teams produce a wide range of deliverables, many of which contribute to a faculty member's larger body of research. A [sampling of these outputs](#) can be found on the Bass Connections website.

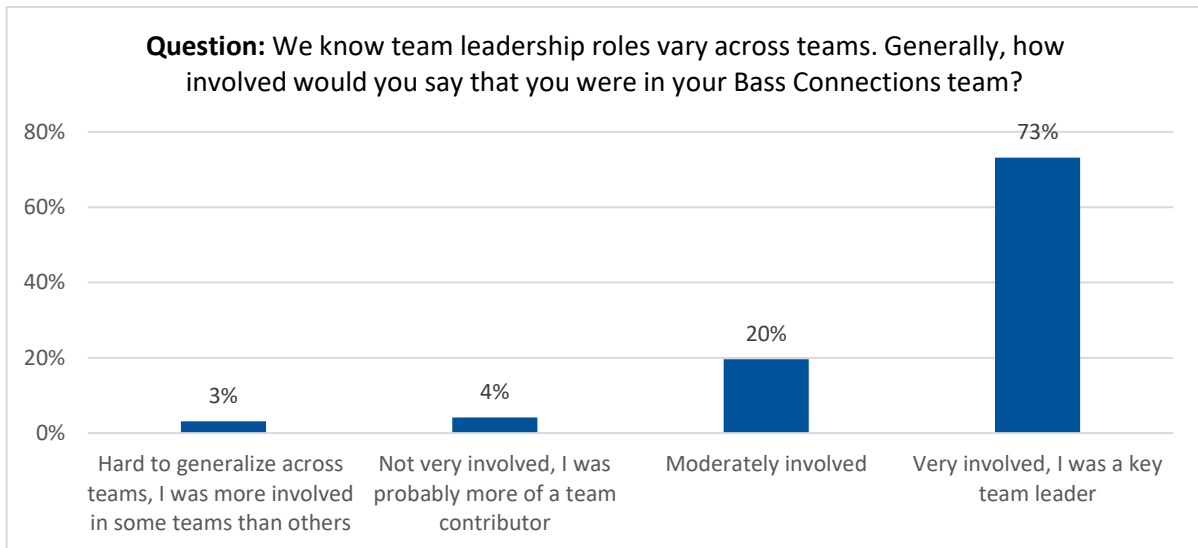
The long-term faculty impact survey sought to understand the impact of participating in the program on faculty research, pedagogy and networks *over time*. Faculty responded to a range of quantitative and qualitative questions that addressed the impact of Bass Connections on pedagogy, research, leadership, engagement and collaboration.

The survey was distributed to all active faculty listed as a team leader on at least one year-long project team during the first five years of the program (from 2013-14 through 2017-18). The survey was administered from June through October 2019.

Of the 207 active faculty members surveyed, 47% (n=97) responded. Importantly, these faculty are not a uniform group. Some faculty only participated in Bass Connections for one year, while others participated in the program for all of the five years included in the survey. These faculty also include faculty at all levels of their career, faculty from across all of Duke's schools, and faculty of varying ranks (tenure-track, clinical, teaching faculty). The chart below shows the number of respondents per school. These numbers roughly correspond with the overall engagement of faculty by school in the program.

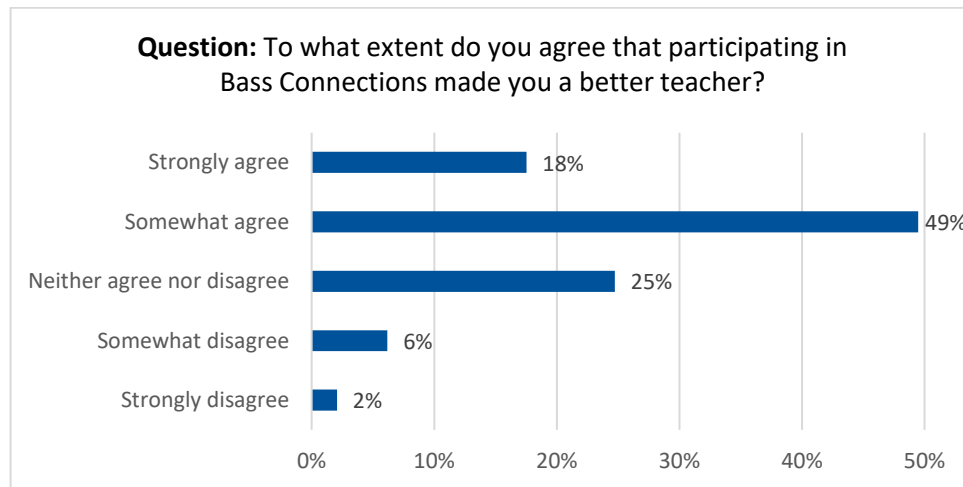


Recognizing that not all team leaders are equally involved on teams, we asked respondents to state their level of engagement. A vast majority (73%) of respondents reported that they played a key role in their project team, while a small number reported that they were only minimally involved. When considering the results in this report, it is important to note that a few respondents may not have been deeply engaged in their projects.



Impact on Pedagogy

Over half of the 98 respondents agreed that participating in Bass Connections improved their teaching, while a quarter neither agreed nor disagreed. Less than 10% disagreed.

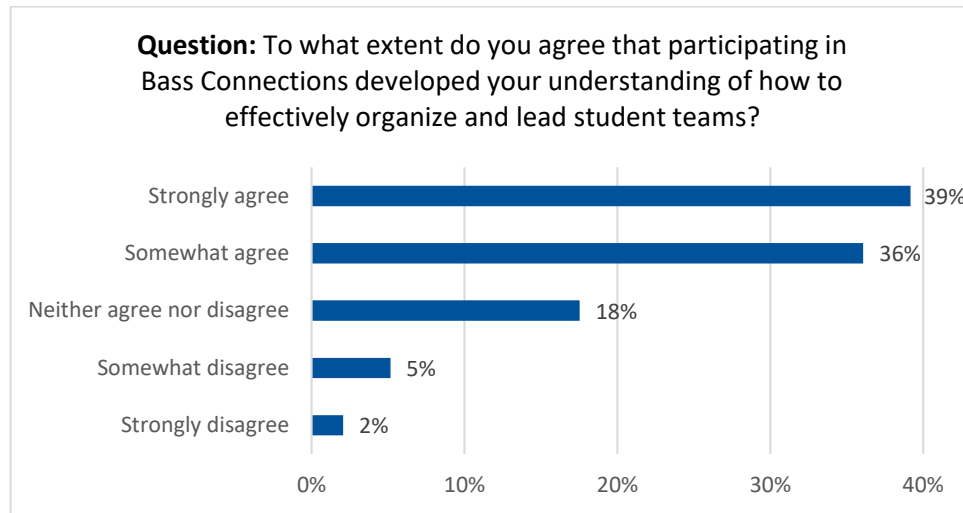


When asked how “the experience of leading a Bass Connections team influenced their approach to teaching their other courses,” faculty offered a range of responses:

- Yes, I gained experience understanding the benefits and limitations of long-term group project work.
- Yes, by expanding my appreciation for the utility and effectiveness of team-based learning.
- This team is the only one I’ve led with both undergrads and graduate students. It was a highly effective team and it increases my confidence of assembling a future team. I learned how to parse out the work with differing levels of capacity and experience. I also learned how difficult it is to schedule a Bass project when highly motivated students are engaged and are over-committed to many projects. I learned some of the tricks of the trade to schedule and organize the team.
- I now trust even entering undergrads to be able to learn how to do original research, so I introduce lab-like elements to classes in a way that I didn't before.
- In a minor way; I added lecture material based on the research we did via the Bass project.
- Working closely with a small group of students allowed me to better understand their struggles with some methodological approaches and theories. I had to come up with better ways to explain difficult concepts and as a result I think I was able to improve my teaching of other courses.
- Yes, I use examples from the interviews my Bass team conducted when I guest lecture on conducting interviews.

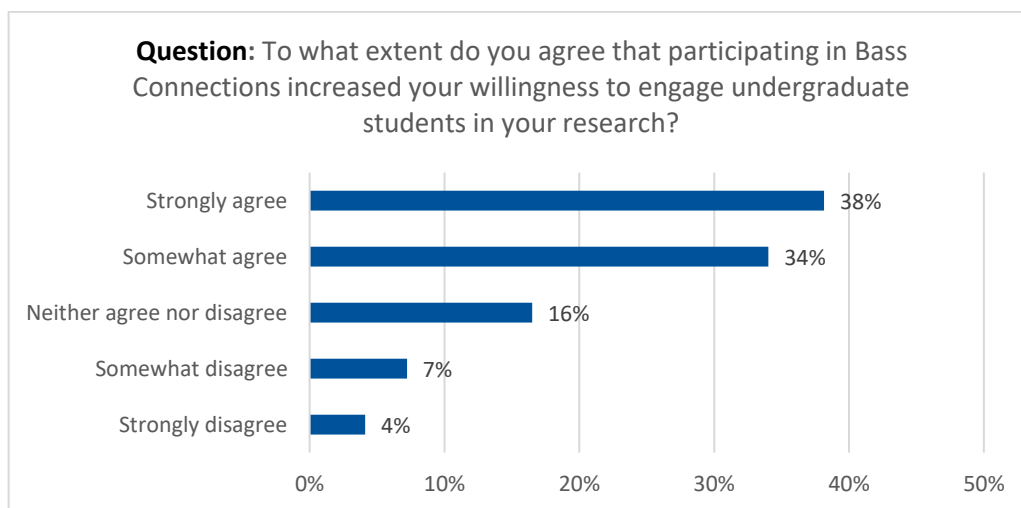
Ability to Lead Student Teams

Of 98 respondents, 75% agreed that participating in Bass Connections improved their understanding of how to effectively organize and lead student teams, while 18% neither agreed nor disagreed.



Inclinations Toward Engaging Undergraduates in Research

The majority of respondents reported that participating in Bass Connections increased their willingness to engage undergraduate students in their research. Yet, 16% of faculty were neutral, while 11% disagreed that the experience increased their willingness to engage undergraduate students in their research. It is possible that some faculty with lower levels of agreement responded as such because they were already very willing to engage undergraduate students in research. However, some of the comments indicate that some faculty found undergraduate students to be difficult to work with, depending on their commitment levels and their knowledge base in the topic.

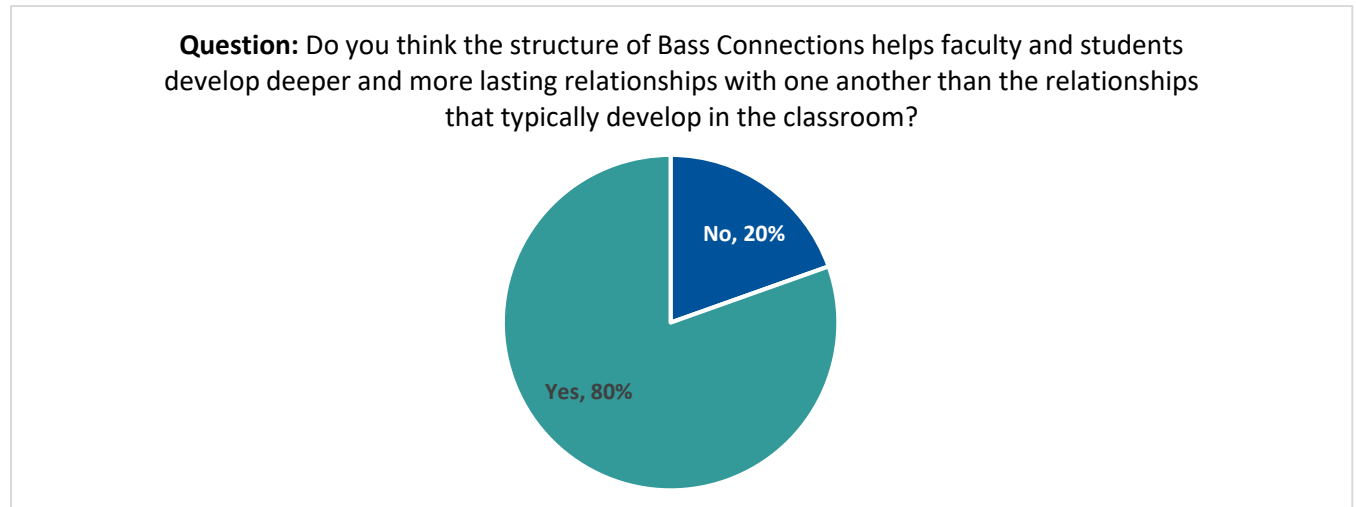


Faculty-Student Relationships

When asked whether they were “still in contact with students who participated on their project team” **82% of respondents said yes**, while 18% said no. Faculty also provided a list of students whom they are still in contact with, as well as examples of students who pursued post-graduate careers related to the

work of their team. We will use this information to track alumni impact in the future.

We further asked whether faculty feel that the Bass Connections model enables stronger faculty-student relationships and found that many faculty believe that it does.



Impact on Research

We asked faculty to note any grants or publications relating to their teams, as well as to comment on any specific impacts from their team on the overall direction of their research. The results, detailed below, show that the impact of Bass Connections on faculty research is wide-ranging. While not all research is intended to lead to grants and publications, by these traditional metrics, it appears that the program has resulted in numerous successful grant applications and publications.

Grants

In an effort to streamline and standardize reporting of grants linked to a faculty member's Bass Connections project team, for each faculty member, we collected grant data from the Office of Research Support from 2013 through to the end of 2018. We then piped this data into the survey, providing each respondent with a customized survey. For each grant assigned to them, respondents were asked to select from the following responses: *Not related to Bass team; Bass team played an important role in getting this grant; Bass team played an important role in executing on this grant; Bass team had a minor role in this grant.*

This approach does have some limitations as the Office of Research Support's (ORS) grant data is incomplete in some instances. In particular, grants are only tracked by the PI and do not include data about co-PIs. Grant data for SOM faculty is not included in ORS reporting unless the faculty member also holds a university-side appointment. As such, we also asked faculty to write in any grants not captured through the ORS data.

Across all responses, faculty reported:

- 40 grants totaling \$19.8 M in which a Bass Connections team **played an important role in getting the grant.** The size of these grants ranged from \$5,000 to \$2.7 M.
- 32 grants totaling \$22.6 M in which the Bass Connections team **played a minor role in getting the grant.**

- 12 instances in which the Bass Connections team played an **important role in executing on a grant**.

Respondents were also asked to list any **grants under review** that are related to the work of their Bass Connections team – 12 additional grants were reported including grants to the NSF, NIMH, NEH and NIH.

Return on Investment as a Measure of Impact

In its first five years, Bass Connections awarded approximately \$4.7 M to teams – the 97 individuals who responded to the survey represent \$3.8 M of that funding. Considering only those grants which faculty said their Bass Connections team played an important role in securing, the **return on financial investment is 521%**.

There are a few caveats to this data including the possibility that those projects also received other sources of supplemental internal support not linked to Bass Connections; the fact that our investment does not account for faculty time, which certainly has a cost and that, as with all investments of time, there is always an opportunity cost. Finally, it is not apparent if we can assume that this finding is representative of the non-respondent pool. For example, one could argue that individuals with large “returns” on their experience might be the most likely to respond to the survey. However, we think this is unlikely to be true given the large number of individuals who reported no grants or publications, and the number of respondents who completed the survey even though they note that they were not heavily involved in the project.

Publications

We asked respondents to complete an open-ended question noting any publications related to their team, including “journal articles, books/book chapters, policy papers, etc.” We received a list of publications including:

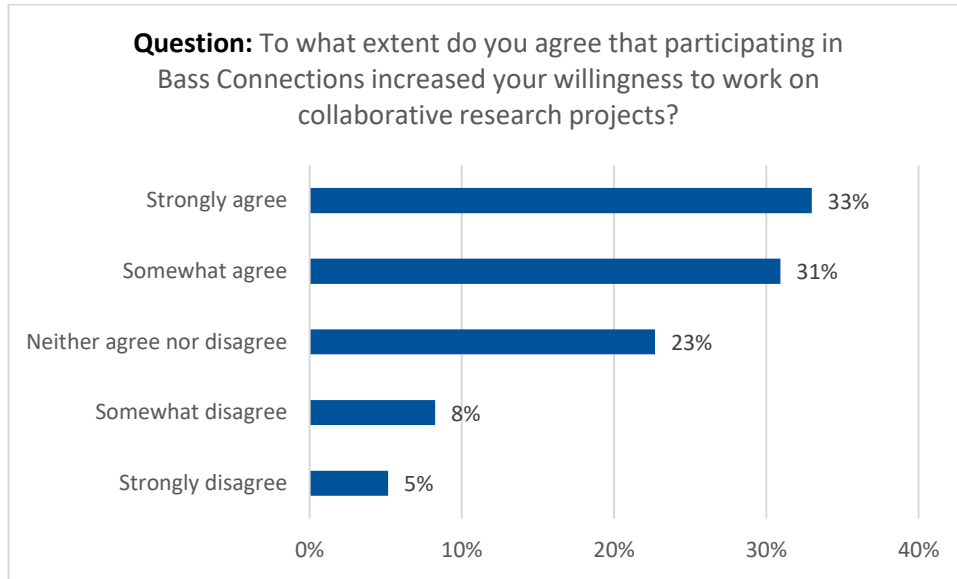
- 49 respondents noted at least one publication, with many noting multiple publications (50%)
- 31 blank responses (32%) *[it is unclear whether one should interpret the lack of a response as a “no” or whether the faculty simply didn’t take the time to complete this item]*
- 17 “No” responses (18%)

We further asked faculty to report on any publications still in draft form or under review:

- 36 respondents noted in-progress publications (38%)
- 54 blank responses (55%) *[again, it is unclear how to interpret this lack of a response]*
- 7 “No” responses (7%)

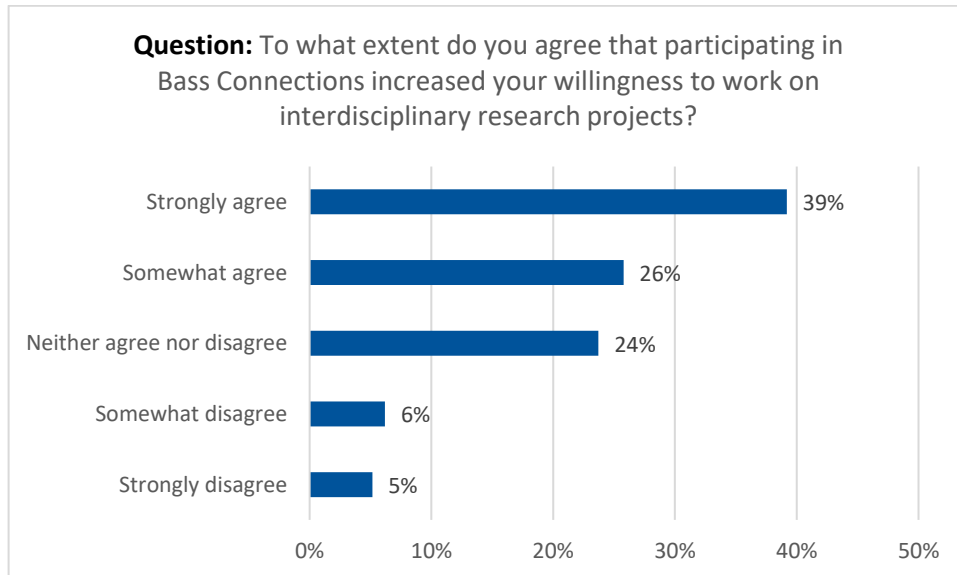
Interest in Further Collaborative Research

Sixty-four percent of respondents agreed their Bass Connections experience increased their willingness to engage in collaborative research projects, with one-third strongly agreeing.



Interest in Further Interdisciplinary Research

Similarly, 65% respondents agreed that participating in Bass Connections increased their willingness to engage in interdisciplinary research projects, with just 11% disagreeing.



Research Benefits

In open-ended comments faculty noted a range of ways in which Bass Connections did, or did not, benefit their research. Select comments have been grouped by common themes below.

Student Engagement

- Our students were instrumental in helping our Center with its research in the community. The NIH was very impressed with what our Bass Connections team contributed (and this was noted in their annual scientific advisory committee report).
- Not directly (my research is largely bench-based). But made me aware of potential to engage undergrad group projects in meaningful research.
- It convinced me that teams of undergraduates can be highly effective contributors to certain kinds of research projects. It introduced me to colleagues at Duke that have become valuable connections.
- It was about the students not about my research.
- All gained real world experience and a few have said that this experience led directly to job opportunities after graduation.
- The Bass experience encouraged us to think about our work as an ongoing research project, rather than as something that was tied to a specific course. We have been able to think about our work on our projects as an activity into which students can dip in and out, while still retaining the integrity of the ongoing work. Our Bass projects are in turn embedded in our existing research labs. We think of the Bass projects as facilitating student engagement with faculty research in the art and humanities, especially.
- We integrated students into multiple projects in meaningful roles, including fieldwork internationally and data analysis, so it helped a great deal.
- Biggest impact was understanding the mechanics of leading a student-centric research team; the Lives of Things project resulted in an exhibition at the Nasher that was on display for several years.
- My undergraduate researchers learned how to design research, collect and analyze data and write a research report and present a poster about their findings.

Community and Collaboration

- I was introduced to a colleague in another country. This led to my being able to have a PhD student choose our program over another. She conducted her research in that country and this was a very beneficial relationship and possible because of Bass.
- By providing a connection with outside stakeholders and their perspective.
- Served as formative research for future projects; created new links with external partners and Duke-based colleagues.
- Having these amazing undergraduate students be so thoroughly involved made it possible for us to extend our research into the community, while at the same time providing a unique experience for the students themselves.
- First, the diversity of the team across multiple dimensions was an invaluable asset to the research as well as the mentoring of students. Second, established relationships and/or collaborations among some team members (including our global partners) minimized the time and effort to build trust and cultivate a strong team. The project in turn strengthened longstanding relationships and fostered new

partnerships and projects among faculty from various disciplines in different parts of the world. New research and training opportunities also emerged for students. Third, the project reinforced the importance of flexible planning in the effective and successful execution of a global health project such as ours.

- The work my CSbyUs team accomplished has allowed me to form research-practitioner collaborations with the North Carolina Department of Public Instruction and Durham Public Schools; it also plays a significant role in a grant proposal I just submitted to NSF.

Research Design and Execution

- The Bass Connections program and “team” have been an incredible benefit to our research. This opportunity and the team we’ve been able to bring together each year has been the cornerstone of this specific project and ultimately has and is providing continuing proof-of-concept, preliminary/pilot through mature findings, support toward building community partnerships and bringing together numerous perspectives within our undergraduate team members based on their varied fields of study that are ultimately supporting the growth of the project and growth of individual undergraduate researchers in their personal academic journeys.
- In multiple ways - generating and refining the research question, enabling collaborative data collection and analysis, recruiting and motivating local partners, and by helping keep up momentum and motivation.
- Having a team helped expand my ability to collect and evaluate information. A robust student perspective also greatly enriched our research design and final product.
- The teams provided crucial preliminary data for grants, while also conducting research that led directly to new findings (publications) and helped establish our credibility in the region.
- The seed money that Bass Connections provided was critical to getting our interdisciplinary project off of the ground. Also, the structure provided allowed me to involve undergraduates in a way that would not have been possible without Bass Connections.
- Having a Bass Connections team created accountability and structure for my research, since it’s not a core part of my job. Students provided critical help with data collection and entry and contributed insights on design and data analysis decisions.

Intellectual Freedom and Exploration

- Allowed me to investigate areas of interest that I would not have otherwise had the resources to explore.
- It supported the creation of what turned out to be a very interesting and impactful collaboration. We are mostly an experimental lab; working with a human population led us to ask different questions than we otherwise would have and increased the impact of our work.
- Bass Connections allowed me to explore new research ideas that with time have become an important part of my intellectual agenda. I started with a question and learned with and from other faculty and students. Being a faculty leader of a Bass Project also forced me to learn how to organize a multi-disciplinary team.
- It has indirectly affected my research through increased understanding of the potential of renewables.
- Bass Connections teams often helped to pilot new research ideas, and coupled with Data+ projects, produced datasets that formed the basis for much of our research that wouldn’t be otherwise

possible. Bass Connections projects also provide some funding to push forward this researcher and enable projects that wouldn't otherwise be possible. Lastly, leading a Bass Connections team pushed me as a researcher to think deeper about a subject and have conversations with my students about a topic, which often generates ideas or inspires questions that lead to new threads of research.

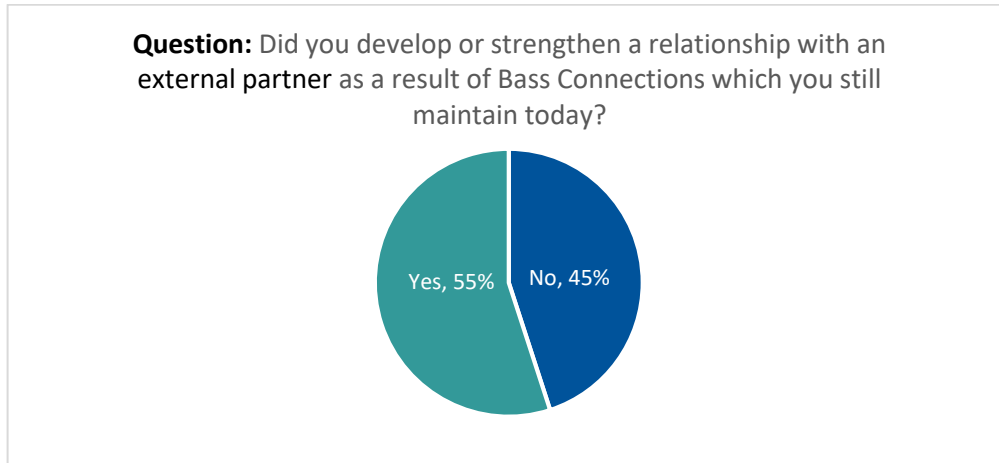
- It was not so much my research that benefited. It was the scope of scholarly interests that was most impacted by participation as a team leader in Bass Connections. My team was intentionally exploring the multiple meanings of "grace" for the perspectives of the natural sciences, including neuroscience and biomechanics, and the humanities, including dance, visual art, philosophy, literature and religion. This intersectionality has led to my subsequent engagement with the Health Humanities Lab at Duke and with the International Consortium for Medical Humanities, where I have made presentations at the last two international meetings.

Difficulties

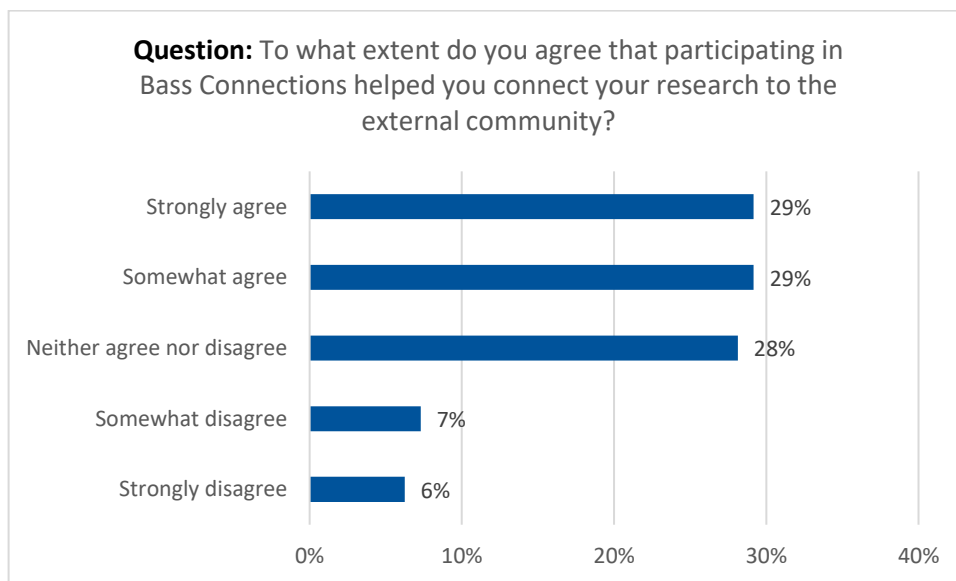
- Initially, we explored new questions that we were not able to previously pursue. However, this flexibility was only available for the first 2-3 years when project budgets were larger. Now, with \$15K-\$25K budgets for international projects, we are severely limited in what we can do, especially since travel requires 75-90% of the budget.
- It did lead to one publication. It did not spur any additional research publications, however.
- It didn't really. We never got much off the ground. It was difficult to organize between SoM and Arts and Science faculty. Program does not incentivize SoM faculty to participate. I participated once and probably won't again.
- Once they were fully trained, the students made significant contributions to my research. But training them adequately took time and resources.
- It did not [contribute to my research]. If the students had spent time on it, it would have. But all had added Bass Connections as a half credit and they did VERY little work.
- I taught it the first time, when resources were limited, students were taking it as a lark. Several other instructors I have talked to had the same problem with lack of student engagement. The students we recruited were really interested in the topic, and the content we were trying to develop was solely student generated (high school curriculum based on the brain) - but their commitment was quite poor.

External Partnerships and Public Impact

When asked: “Did you develop or strengthen a relationship with an external partner as a result of Bass Connections which you still maintain today?” 55% of respondents said yes, while 45% said no.



The majority of faculty (58%) also agreed that Bass Connections helped them connect their research to the external community. About 41% were neutral or disagreed. These findings seem to correlate with the fact that about 20% to 30% of project teams in a given year do not have an external partner and external partnerships vary in depth.



When asked to provide written information about any **public impact** of their team’s work, 65 faculty responded. While five respondents simply stated “no,” others offered a range of interpretations of the public impact of their team, including the impact on the post-graduate career of the Bass Connections team members, to helping inform other researchers through the team’s research outputs, to public exhibits and websites, to training local community health workers to improve health care access in a rural village. A sampling of comments demonstrating the range of public impacts cited include:

- The public impact is through the spectacular students with whom we worked, and how they used this experience in their honors projects and post-graduate careers.
- Our students contributed to projects that led to new mental health interventions and assessment tools in low- and middle-income countries.
- Developed an mHealth app, called mVax, which is being used by the collaborating organization in Honduras to document pediatric vaccinations in clinic.
- We strengthened our partnerships with people living with sickle cell disease as well as the organizations that support them both in the US and our collaborative sites. The students also interacted directly with these individuals and organizations at all four study sites - Jamaica, Cameroon, South Africa, and US.
- New partnerships with Partnership for Healthy Durham and Lincoln Health Center in particular.
- Our team worked directly with middle and high school students in Durham teaching them computational thinking, design thinking, data science, and app development.
- Yes! Trained local clinical workers on the ground, enhanced health access for community members, helped local university partner engage in distance learning.

Final Reflections

We closed the survey by asking faculty to reflect on any ground not covered, including suggestions for improving the program going forward. A sampling of comments offered include:

- Definitely having participating faculty receive some teaching credit. While enjoyable, Bass Connections participation does not yield sufficient research output to justify the time spent. This makes sustained participation very difficult.
- Bass Connections needs the structure of a class (e.g., a syllabus, regular assignments at specified dates) with buy-in from all team leaders as to the value of the project. Students need to understand that Bass Connections is a class, and not treat their participation like an extra-curricular activity. Norms regarding the role of Bass Connections among the faculty and students may be difficult to change, but likely will lead to long term success of the program. Please note: my comments are based on my active participation in 2014-2015. I have not had active involvement since then, so the context of the program may have changed.
- Since we started Bass (2014), we saw a growing number of applicants (this year's over 20) and several students love our project so much that they don't care about academic credits. They just want to join us.
- I think the Bass program could perhaps take the risk of funding multi-year projects that allow taking new PhD students (offering funds for 2 years). I think teams of faculty members would be happy to engage in collaborative/interdisciplinary work if they can collectively get funding for a new PhD student that will help lead a Bass project and channel the work of UG students from different departments.
- I appreciate the many efforts being made to enhance the Bass Connections program. In particular, I like/appreciate the work this summer to develop program/faculty resources. Lower barriers: Continue to seek faculty feedback. Facilitate 'brain shares' among faculty and project teams concerning program strengths and new ways to think about/provide resources for community-based research.

- Provide more flexibility to meet the teaching/research interests of faculty rather than having to always fit the parameters of what BC defines as priorities.
- I really think that by having graduate students eligible to lead teams, you have nailed it on the head. Faculty really do need to carve out time for a team, so by having grad students lead with faculty support, it's a great formula. Only suggestion I would have is to make it easier for faculty to have Bass teams count towards teaching, I had to overload significantly to make it happen.
- Require all Bass students to attend a series of crash courses/workshops about the basic foundations of research and methods – get everyone up to speed somewhat; continue to offer workshops on various topics or specific methods/software to support the progress; help find and train project managers, especially for faculty who don't already have graduate students working on the project to fill that role.
- I am very grateful for the opportunity to have had two rounds of Bass Connections support. It allowed my colleagues and me to strengthen our collaborations, mentor and learn from some amazing students, and lay the foundation for future integrative, global, and transformative research on sickle cell disease.