

# Developing a New Partnership between Universities focused on Supporting Minority Graduate Students in Engineering

Authors:

**Jacqueline E. McDermott**, Associate Director of Graduate Diversity and Inclusion Purdue University College of Engineering Dean's Office of Graduate Education; **Shernita Lee**, Assistant Dean & Director of the Office of Recruitment, Diversity, and Inclusion, Virginia Tech Graduate School; **Nina Parshall**, Director of Graduate Recruitment and Support at The Ohio State University College of Engineering; **Stephen M. McBride**, Assistant Director of Graduate Student Success, Purdue University College of Engineering Dean's Office of Graduate Education; & **Elizabeth A. Karr**, Associate Dean, Graduate College, University of Oklahoma

## Abstract

In Spring 2022, the National Academy of Engineering (NAE) hosted a multi-day virtual workshop on *Connecting Efforts to Support Minorities in Engineering Education*, which brought together stakeholders in higher education with the goal of increasing communication and building new approaches to increase the diversity in engineering education from K-12 to faculty development. NAE promoted collaboration and funded mini-grants at the workshop's commencement. As a result of the NAE workshop and mini-grant, we defined that while programs exist at the undergraduate level to support minority students, there are far too few programs that support graduate students.

Here, we describe the development of a new partnership through the NAE mini-grant called "*GradThriving*": *Building a bigger network to support current minority graduate students*. The purpose of GradThriving was to identify challenges that current minority engineering graduate students face, and then share helpful success resources through the creation of a new website ([www.GradSchoolThriving.com](http://www.GradSchoolThriving.com)). This website is important to demystify resources and empower graduate students to take control of their own thriving process during their graduate studies.

This paper will discuss the formation of this new partnership and will share helpful structures, resources, and logistics in launching this project. We will share any challenges, successes, and strategies in the collaborative process as well as future directions of this work. Overall, we identified seven areas that current graduate students may struggle with and developed resources to provide transparency for student success. Our current graduate students at four different institutions weighed in on the helpfulness of these resources through focus groups representative of our diversity student body. In the future, this collaboration seeks to populate additional resources for current and future graduate students as well as develop academic and mentoring focused resources for current staff and faculty to better support their current underrepresented graduate students in engineering and related disciplines.

## Background - Partnership and Project Goals

The ultimate goals of the GradThriving partnership is to 1) Empower underrepresented minority (URM) graduate students to demystify some of the challenges they may face in graduate

school, and 2) Provide URM graduate students with practical and beneficial resources that will help them to succeed in their graduate program and advocate for themselves. Therefore, the first action that was taken through the mini-grant was to develop a GradThriving website that shares information, allowing current graduate students to thrive.

The long-term goal of this partnership is to develop a unified support network for Minority Graduate Students in Engineering, across institutions and ultimately across the country. Many more retention and student success resources exist at the Undergraduate level compared to the Graduate level - specifically through advisors, minority engineering programs, tutoring resource centers, student organizations, etc..., and therefore more attention is needed to develop comprehensive resources at the graduate level to better support historically URM graduate students. Further, many higher education professionals have a singular focus on recruitment, rather than retention and student success of current URM graduate students. It has been shown that graduate student academic success increases when students have a strong sense of belonging (O'Meara et al, 2017; Strayhorn et al., 2018), and therefore additional efforts must be focused on demystifying graduate education and supporting and retaining current minority graduate students.

All University partners recognized that each student's graduate school journey is individualized and unique: no two experiences look the same. These experiences will vary from university to university as well as based on the degree type, but there are some similarities that can be outlined through the GradThriving website. A GradThriving partner goal is that each prospective graduate student finds their best program fit prior to enrollment, and that current students are given the tools to truly thrive in their graduate programs until successful degree conferral. GradThriving should benefit all graduate students (prospective, current, and senior graduate students ready to transition to their next step) since the resources needed will vary by stage. Anticipation of those needs in an organized manner through GradThriving equips students for long term success and gives them the tools to conquer any obstacle that comes their way.

## Methods of developing a partnership

### *Identifying Partners for the Mini-Grant*

After the final NAE workshop, but before the mini-grant application deadline, one of the authors reached out to all speakers and workshop attendees with an interest in graduate student related efforts. The workshop had many attendees passionate about minority students at various time points in their educational journeys (pre-college, graduate, faculty, etc...). While it was helpful to share information and learn what was happening in each space, it is equally as important to not be afraid to reach out and find people passionate about similar topics: our passion is for current graduate students.

Emails were sent out asking whether potential partners would be willing to join a one hour Zoom virtual meeting to connect and discuss potential options for collaboration for the mini-grant. In addition to attendees of the NAE workshop, some current partners were looped in by colleagues who attended the workshop - further broadening our network. At the mini-grant planning Zoom

meeting, we discussed proposal ideas and established expectations. The attendees shared information about their role and responsibilities along with their priority topics related to graduate education. The benefit of such discussion demonstrated the vast number of themes that impact graduate students. However, we were able to condense the ideas and decided to examine retention strategies in more depth.

At least one person at this initial mini-grant planning meeting declined to participate in the mini-grant submission. Possible reasons to decline included a lack of interest, lack of time, and/or not a good fit with the overall proposal goals. To ensure a successful team dynamic, it is important that all partners are in alignment with the goals of the group and are excited about the common vision as well as have the flexibility and resources to prioritize this project among other administrative and academic responsibilities.

### ***Mini-Grant Partner Backgrounds***

The final mini-grant GradThriving proposal was submitted by four universities: Purdue University (College of Engineering Dean's Office of Graduate Education), Virginia Tech (Graduate School), the University of Oklahoma (Graduate College), and the Ohio State University (College of Engineering). No partnerships existed like this in the graduate student success space between the four universities prior to the NAE conference.

Across the four institutions, occupations range from administrators (Director level positions) to Assistant and Associate Deans. While our universities are all primarily white institutions (PWIs) and large R1 universities, the team has connections to Historically Black Colleges and Universities (HBCUs), Minority Serving Institutions (MSIs), Tribal Colleges and Universities (TCUs), minority focused clubs and offices, and federally funded programs such as the National Science Foundation Louis Stokes Alliance for Minority Participation (LSAMP), Alliance for Graduate Education and the Professoriate (AGEP), The National GEM Consortium, Initiative to Maximize Student Development (IMSD), National Name Exchange (NNE) and Bridge the Doctorate that aim to increase URM representation in the professoriate.

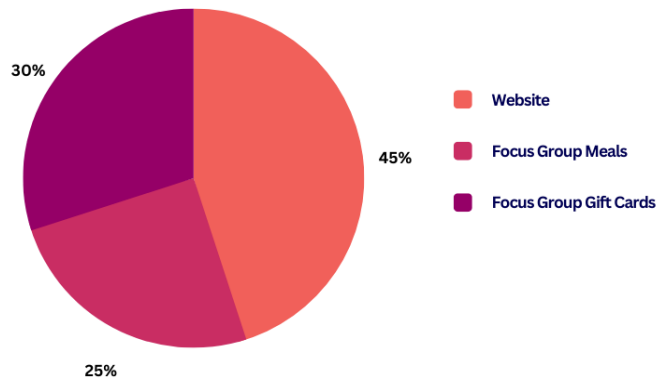
### ***Budget***

Obtaining the mini-grant money was a welcomed incentive to kick-start a new collaboration and partnership. However, the grant period was quite short, 2-3 months during the summer, and therefore the project needed a feasible implementation in this timeframe. We proposed an initial budget, and after mini-grant selection NAE communicated an increase in the requested budget

amount. A re-justification was submitted, resulting in the final budget breakdown (Fig. 1).

A little less than half of the proposed budget (45%) was allocated to website development. The website itself is hosted through a partner institution: we used these budgeted funds to purchase a web domain ([gradschoolthriving.com](http://gradschoolthriving.com)) and move forward with website creation with a web developer. The remaining money was budgeted to hold focus groups at our four institutions, in order to get graduate students' initial feedback on the website content. We held focus groups and provided meals to graduate students (25% of budget)

and we also provided a \$50 Amazon gift card per focus group for five participants (30% of budget). The food ordering process and gift card distribution were managed by Purdue University. Each partner was provided identical steps to follow to ensure timeliness in fulfilling the food order as well as designating the gift card to the correct email address.



**Figure 1.** Budget breakdown for mini-grant actions. Percentage of funds used in three categories: meal cards, gift cards, and website development.

A lesson learned from building a website was that the cost of the web developer was more than we initially budgeted (\$1500). To make up for the gap, Purdue University College of Engineering matched the NAE funds we received for the web developer in order to finish development of the GradThriving website. Allotting contingency funds in the future would be helpful to address these unexpected costs.

### ***Resources and Technology***

Zoom was the primary video conferencing platform that was used through this partnership. We scheduled multiple summer meetings in July by using the <https://whenisgood.net> online scheduling platform. Once all partners filled out their information, one team member took the lead in sending out a Calendar Invite for that day/time. Calendar invites included any agenda items, as well as a Zoom link for the meeting. For later meetings, we determined a suitable time for the next meeting at the end of each meeting period. This saved some time in the scheduling of future meetings.

Communication was completed primarily through email. It was important that all information was on the same email chain or thread in order to easily go back and review action items. Key tasks were often highlighted to draw the attention of the responsible partner. In order to organize and compile website content, the team used GoogleDrive to share and review documents. A helpful note about working across universities was that each partner university uses different technological systems (OneDrive, SharePoint, Microsoft Teams, Google, etc...) and it can be difficult connecting with higher education professionals across these different university

platforms (i.e. trouble adding external members, hurdles to access platforms, assigning roles, etc...). GoogleDrive worked best as a collaborative platform for all partners.

Successful collaborations take a village, and partners should look for dedicated personnel support and resources at your institution and/or department. In addition to the grant partners, the current collaboration had additional support through communication units, graduate assistants (GAs), undergraduate student workers and more. These additional institutional resources have been helpful in creating and sustaining the website development and social media presence.

### ***Structure and Roles***

With six contributors spread over four institutions, the team needed to have clear leadership. Once established, that individual coordinated meetings and activities and followed up with summaries and action items. For website development, each institutional group had at least one website subpage for which they developed primary content as shown in Figure 2. The institutional groups selected their subpage of interest based off of their areas of expertise. After initial content was included in the draft documents, the other partners reviewed the content to share thoughts and suggest changes. The final name and content of the subpages evolved after considering subject redundancy, best alignment area, and reflecting on students' logic. In addition, each institution held focus groups and collected feedback from stakeholders. Beyond these tasks, there were other smaller tasks throughout the project necessary to move the project forward.

As in most projects, there was not an equal contribution from everyone working in these areas, although an important aspect of our team dynamic was that every team member left each meeting with an action item, however big or small. After the meeting, follow-up emails were sent with action items to ensure that everyone was clear on their expectations and actions moving forward. By the next meeting, these tasks were followed up with their deliverables, continuing the discussion of next steps.

### ***Timeline and Process of Developing Website***

For this partnership, the team met every two to three weeks starting in the summer. We first started by compiling topics that we see students struggle with at our own institutions. After compiling these topics of challenges, we divided them among the group and used GoogleDrive Excel and Word documents to collaboratively work on compiling resources pertaining to each

## The Seven Subpage Categories



**Figure 2.** GradThriving website subpage categories.

topic.

After adding resources to a Google Word document, one team member took the bullet pointed information and finessed resource to be put onto the website. We worked closely with the Purdue University Communication team, who liaised with a web developer to bring together a neutrally branded website about graduate student thriving. The development of the website structure itself took about 2 months. While the website was being developed, we purchased the GoogleDomain and the team simultaneously drafted website content.

Once website content was developed, the next step was to get feedback from graduate students at our own institutions. Each university selected 5 graduate students and had their own small group listening session. Sessions provided a meal to students and ranged from 1-1.5 hours long. Sessions also provided a \$50 gift card for students who shared feedback. We found that an hour wasn't nearly enough time to review all of the content on the 7 website subpages with our graduate students, but many students also shared feedback and additional resources via email.

We collected as much feedback, questions, concerns, and suggestions as possible from our graduate students and implemented it on the website. Mini-grant partners then combined this information in a GoogleSheet organized by feedback for each subpage in a different tab.

This system worked really well; however, one challenge with collecting such large amounts of feedback was the question of how to make this feedback actionable. Website feedback fell into 3 different categories:

1. Easy updates (wording suggestions, moving topics around on the webpage, etc...)
2. Medium updates (new topic suggestions – need to draft up wording and find best place to put on the website)
3. Updates that need more time/resources (image modification, addition of new images, website structural updates, etc...)

Student feedback was generally very helpful, and there was little that we would not likely implement either in this version of the website (or future versions). Within the time frame of the mini-grant, we were able to complete all easy updates, and this was noted on our feedback GoogleSheet. All other updates were noted in the GoogleSheet and triaged for a secondary round of edits in spring 2023.

One student shared, *“A lot of people you will meet in graduate school generally want to see you succeed and do well in your career and life. I was so surprised in the best possible way that professors, colleagues, cohorts and friends are genuinely there to help and guide you. The thing is, you have to ask and let people know your thoughts and plans; if you never ask for help or guidance, they’ll never know”*. GradThriving wants to empower students and the reach with this website allows that support to extend beyond our units and institutions.

Overall, we developed a website that our current graduate students said is very informative. It is meant to be a “one stop shop” for all graduate students, and we hope that it will be a helpful resource for both current and prospective minority students.

***Marketing Plan and Intentionality of Design***

Once the website was complete, a marketing plan was needed. One member of the team designed a flyer and email draft that could be used for distribution to announce the launch of GradThriving. The team discussed various approaches for spreading the word and detailed a plan for each partner to distribute to stakeholder groups. Further, each institution planned to share within their university network with their own graduate students, administrators, and faculty in engineering disciplines. This website resource also has the potential to be used for future orientations to graduate school as well.

Beyond universities GradThriving was distributed broadly to national student organizations and programs (Table 1) and a flyer with a QR code would be printed and distributed at conferences attended by the various team members.

Partners also received feedback from current graduate students about having a strong call to action in marketing email communications and on the website itself, as well as the importance of intentionality of design. This also permeated through our marketing plan, ensuring that language was accessible and approachable to both current and prospective Master’s and Doctoral students. An example of the intentional design for graduate students can be seen in the GradThriving logo, which initially was designed as a 4-sided mortarboard, an inherently undergraduate symbol. Here, the logo was updated to a gown with a hood and three bands on the gown’s bell sleeves, which is imagery specific to graduate students and also encourages students to strive for a doctoral degree. In addition to the GradThriving website, this logo will also be used on social media pages (Instagram, Twitter, LinkedIn, etc…) to help increase student engagement.

**Table 1.** List of External Student Organizations and Programs for Marketing

Society of Hispanic Professional Engineers (SHPE) Graduate Region Representatives
National Society of Black Engineers (NSBE) Region Representatives
American Indian Science and Engineering Society (AISES) Region Representatives
Sloan Indigenous Graduate Partnership (SIGP) Listserv and faculty contacts
Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS) Contacts/Representatives
Institutions with National Science Foundation Bridge to the Doctorate Cohorts
National Institutes of Health Post-Baccalaureate Research Education Program (NIH PREP)
National Institutes of Health Initiative for Maximizing Student Development (NIH IMSD)
Women in Engineering ProActive Network (WEPAN) Listserv
National Association of Multicultural Engineering Programs (NAMEPA) Listserv
GEM National Consortium

### *Cross University Collaboration: Administrative Logistics*

As this was a mini-grant, it was not feasible to provide subcontracts to multiple institutions. Therefore, the funds were distributed by NAE to one institution, Purdue University, who took the lead on the project. Partners were required to work creatively to ensure each partner institution had the funds/support to carry out their on-site tasks related to the project. To provide funding for the focus groups and gift cards at the partner institutions, administrative assistants at Purdue arranged for catering delivery to each institution on the day of their sessions. They were able to pay in advance for catering deliveries to other states and campuses. Additionally, they worked with the students participating in the focus groups to distribute electronic Amazon gift cards by email. While this structure worked well, it did require a few additional days of lead time than would normally be needed.

Another roadblock that delayed the receipt of mini-grant funds was that the lead PI is an administrator with a Ph.D. and not a faculty member. The NAE conference and mini-grant focused on connecting professionals in higher education from all levels (staff, faculty, etc...), but did not provide any guidance before mini-grant submission to talk with campus sponsored programs and/or pre-award services at home institutions. While this may seem trivial to faculty members, as more administrators become involved in partnerships the concept of navigating university systems to receive grants and effect change is an important concept to address. Therefore, there was some initial red tape to receive funds and begin work for the grant. It is highly likely that this process will vary by institution.

### Expected Outcomes

We expect that over time this student success resource will have an impact for graduate students across the country. The content will continue to evolve and be updated for relevance. It will bring a spotlight to student success among minority graduate students, and provide actionable resources.

In the future - beyond this mini-grant, partners plan to present the GradThriving resource at conferences, either for graduate students at a minority STEM focused conference and/or for administrators/advisors through NAGAP, NACADA, Virginia tech's HBCU/MSI Research Summit, etc.... This partnership also has the potential to develop into a larger network of administrators and professionals working to support minority engineering graduate students, and could lead to larger grant proposals from the mini-grant partner members and others.

### Conclusions and Future Directions

To measure success of the GradThriving website we will monitor website metrics by determining the amount of page clicks that are received within specific timeframes. For instance, we will evaluate the exposure received on the website one month, six months, and one year after completion. The website also has an anonymous feedback form for visitors to indicate their perceptions of how helpful the content is and their recommendations for improvements.



***If we were to start a new partnership again, we would change the following:***

The partners wish that we took more time to put an emphasis on building relationships and rapport as a group at the beginning of the partnership. With university partners in different states and spanning different time zones, it would have been helpful to spend more time getting to know each other better. The benefit of this is that we can learn from different perspectives at different institutions. Our initial virtual meetings were more focused on brainstorming website ideas rather than building our foundation, and we suggest that future partnerships should spend time at the beginning of their partnership getting to know everyone, learning from their perspectives, and reviewing best practices that could be used. This process would allow the team to broaden our own understanding to ensure efficiency in accomplishing shared goals.

A process is indeed an iterative cycle that constantly evolves. The process we used for this project is shown in Figure 3. The five components that resonated for the partnership were communication, organization, feedback, marketing, and technology. We were unable to equally focus on each component, but recognized the value and importance of each one. These components are co-dependent and involved several stakeholders.

## **GradThriving Process**



**Figure 3.** GradThriving components involved in project design and implementation.

***What can someone do: Challenges and Recommendations for the Future***

When we initially set out to pursue this project, we intended to collect feedback from students late in the summer term, and one challenge we faced was coordinating focus groups within the summer timeline of the project. Some graduate students complete internships, other work opportunities, and/or are away during the summer months – making the timing challenging to complete project goals. We received a small extension into the fall semester, which allowed us to hold focus groups when students were more easily available. We suggest that future collaborators should understand time constraints and coordinate work with students or faculty members during the fall or spring semesters to engage the largest number of participants as possible. Also, the relationships have to already be in place with the student population to quickly organize the focus groups and to ensure representation and participation from diverse and underrepresented populations.

One limitation of this project was related to the collaborators each representing large, Primarily White Institutions (PWIs). While there is value in learning from underrepresented students' perspectives at PWIs, we recognize that these experiences might vary from students completing graduate school at a Minority Serving Institution (MSI). In the future, we would like to work more with smaller institutions and Minority Serving Institutions (MSIs). As we continue to improve our GradThriving resources, we intend to build additional connections to incorporate more

perspectives and voices. We recommend that new projects bring together not only different institutions, but also people of different ranks and backgrounds to promote holistic partnerships.

There are also some administrative perspectives that future collaborators should consider. Applying for grants as an administrator can be challenging, as described earlier, and administrators do not typically have the same access to sponsored programs like faculty members do. A recommendation for new partnerships is that all members learn their internal university award processing systems and then reach out to appropriate offices while developing a new partnership. A similar challenge was the fact that we represent many different institutions. The monetary distribution process was not as efficient as we had hoped, as we had to work closely with the one collaborator's institution to distribute the funds to the rest of the group. Future collaborators should consider working with their sponsored programs offices to aid them throughout this process.

The final challenge and recommendation centers around the importance of shared leadership in a partnership. For example, with multi-faceted development of our web resources, it was important to share responsibilities and actions to ensure that the same people were not doing all of the work. Dividing these tasks, assigning each person an action item, and working on them independently allowed us to take ownership of various sections and benefit the larger team. We were also able to focus on the strengths that we brought to the group, allowing synergy and efficiency at our check-in meetings. Some recommendations for future partnerships are to 1) Play to your strengths when dividing and conquering, 2) Communicate action items clearly, and 3) Maintain shared leadership within group (with one person acting as point to make sure emails get sent, meetings get planned, agendas are set, etc...).

If you are looking to start a new partnership, then the most important or foundational aspect to the partnership must be shared vision and excitement over a common goal. This will keep all partners engaged and will move the partnership forward. Further, it has been shown that partnerships must set realistic expectations and goals, partnerships take time to develop and partnerships have the potential to produce more than one could achieve working alone (Wildridge et al., 2004). In summary, developing a new partnership can be incredibly beneficial, but partners must invest in the partnership itself.

### ***What is the future of GradThriving and where do we see this going?***

Beyond the mini-grant, our team has had intentional conversations regarding where we see this partnership going and the future of GradThriving. We have discussed additional collaborations for our institutions to engage in together with the goal of building a larger graduate community of underrepresented students. Collaborating in this way would allow us the chance to build upon what currently exists without recreating things that are currently working.

Currently, we plan to engage graduate-focused professionals at MSIs, including Historically Black Colleges and Universities (HBCUs), Minority Serving Institutions (MSIs), Hispanic-Serving Institutions (HSIs), and Tribal Colleges and Universities (TCUs). Our long-term goal for this

partnership is to connect and develop a more unified support network for Minority Graduate Engineering Students throughout the United States irrespective of the institution type.

### **Citations**

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