

THE AMERICAN PHYSICAL SOCIETY BRIDGE PROGRAM



BRIDGE PROGRAM KEY COMPONENTS

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Admissions Practices

Every physics graduate program must decide which applicants to let in and which to turn down. Unfortunately, the traditional admissions criteria that many departments use can unintentionally select against women and underrepresented minorities.

The good news is that it's possible to select, in an unbiased way, students who will succeed and become productive scientists. To do so, faculty in charge of graduate physics admissions may need to rethink how these important decisions are made in their departments. Attributes such as a student's ability to persevere when faced with adversity and a student's ability to accurately self-assess strengths and weaknesses are important to success in a graduate physics program and should be considered alongside knowledge of physics and mathematics in admissions decisions.

Standardized measures such as the GRE do not attempt to measure these "non-cognitive" skills; moreover, evidence shows that the GRE and other standardized tests do not provide unbiased measures of student knowledge. And knowledge of physics is not synonymous with an ability to learn or to excel in research.

To help physics faculty efficiently evaluate applications and select students who can be successful and thrive, we present here some techniques used at APS Bridge Programs, whose retention rates are higher than the national average for physics graduate programs.

Effective Practices:

- *Develop processes that will allow the admissions committee to build internal consistency.*
 - Begin by having every committee member review a few common applications. Then meet to discuss and understand each other's viewpoints. This allows committee members to decide on common admissions goals and measures.
 - Prepare a rubric ahead of time for evaluating applicants, so that all evaluators rate applicants similarly.
 - Allow sufficient time in the admissions timeline for multiple reviews of applications. This can help build departmental confidence in the selection process and catalyze new ideas for evaluating applicants.
 - Create a written admissions policy, and make sure it is known to all committee members. Transparency promotes consistency and equitable treatment of applicants.
- *Ensure that your admissions process does not rely too heavily on GRE scores.*

- Remove GRE scores during the initial review of applications, to avoid anchoring bias. Anchoring bias is the tendency to place too much weight on an initial piece of information (the anchor) when making subsequent decisions. A solution is to remove this information from the initial review and make it available only after short lists have been constructed.
- Do not use GRE scores to eliminate any students from consideration.
 - Using a cutoff is [specifically discouraged](#) by the Educational Testing Service (ETS), the designer of this test.
 - GRE cutoff scores can cause admissions committees to overlook many qualified applicants.
- Consider dropping the GRE as a requirement for application to your program.
 - The APS Bridge Program has conducted interviews with many students who did not take the GRE. Reasons that these students cited for not taking the test include the cost of taking the test and sending scores to graduate programs, lack of time to study because of work obligations, and fear of poor performance due to insufficient undergraduate coursework. These students do not consider graduate schools that require the GRE. As a result, those schools receive fewer applicants, especially of lower socioeconomic status.
 - Students also indicated that listing the GRE as “optional” is a sub-optimal solution, because this is often interpreted as, “We don’t require the GRE, but we won’t consider those who don’t provide this information.”
- If you decide to use GRE scores, read the [ETS’s guidelines](#) to ensure that you and other committee members understand how scores are designed to be used.
- Review literature on the limits of the GRE’s predictive power:
 - [Willingham, 1976](#)
 - [Miller and Stassun, 2014](#)
 - [Moneta-Koehler et al., 2017](#)
 - [Scherr et al., 2017](#)
- *Screen applications using methods that go beyond traditional metrics.*
 - Use evaluative measures that consider non-cognitive aspects of applicant quality.
 - Non-cognitive skills are non-academic attributes that are essential for student success. They can include perseverance in the face of adversity, accurate self-assessment of strengths and weaknesses, possession of long-range goals, creativity in problem solving, time management skills, and leadership abilities.

- Probe letters of reference for evaluations of non-academic performance. These indicators can help evaluate applicants' potential for success in the laboratory and the classroom.
 - Review applications for trends rather than averages.
 - Search multiple components of each application for evidence of improvement over time. This can often provide information about a student's non-cognitive skills, which are critical for future scientists and should play a prominent role in admissions decisions.
 - When reviewing a transcript or GRE record, look for evidence that the student's grades or scores improved over time.
 - Examine letters of recommendation and personal statements for examples of dedication to improvement in the applicant's professional life.
 - Look for events in a student's life that might have dealt temporary setbacks and evidence that the student overcame these obstacles.
- *Incorporate video interviews into the selection process.*
 - Keep logistics in mind:
 - Use free video conferencing software such as Skype or Google Hangouts.
 - Allot 20 to 30 minutes per applicant.
 - Ensure that at least two admissions committee members are present for each interview. These faculty should compare their evaluations before presenting recommendations to the full committee.
 - Limit interviews to a "short list" of candidates, to reduce the load on admissions committee members' time. APS Bridge Program sites typically interview about two students for every available position.
 - Use interviews to probe non-cognitive skills.
 - Evaluation of non-cognitive skills allows for a broader understanding of an applicant's path toward graduate education, including hurdles the student may have encountered. Suggested questions include:
 - If you find that you are unable to solve a problem on the first few tries, what do you do?
 - Tell me about a problem that you are really proud to have solved, and explain how you solved it.
- *Make offers to students to fill specific departmental or research area needs.*
 - Mentoring students requires a sizable investment of departmental resources and time. If a student arrives only to find that they will not be able to pursue research in their field of interest, you risk losing that student.

- Students who are engaged with their research area early in their graduate studies and who are made to feel like valued members of the department are more likely to be retained.
- *Regularly discuss your department's overall admissions strategy.*
 - Have regular conversations among faculty about your department's admissions goals and how your strategies for evaluating applicants help meet those goals. This helps generate buy-in to the broader mission of educating students.
 - Questions to discuss might include:
 - Can your admissions process identify talented individuals who can succeed with the support you can offer?
 - What does it mean to be talented?
 - How are GRE scores, undergraduate GPA, and other measures used in admissions?
 - Are faculty aware of issues associated with these measures that might bias selection?
 - Can you accept students who are not yet ready for all of your graduate-level courses and must take a few undergraduate courses first?
 - How will you accommodate these students?
 - Are your admissions efforts linked to induction and matriculation programs that can integrate students into your program?

References:

[Willingham, W. 1976. Validity and the Graduate Record Examinations Program. ETS GRE Board Report.](#)

[Miller, C. and Stassun, K. 2014. A Test that Fails. Nature, 510, pp 303-304.](#)

[Moneta-Koehler L., Brown A.M., Petrie K.A., Evans B.J., and Chalkley R. 2017. The Limitations of the GRE in Predicting Success in Biomedical Graduate School. PLoS ONE, 12\(1\)](#)

[Scherr, R., Plisch, M., Gray, K., Potvin, G., and Hodapp, T. 2017. Fixed and growth mindsets in physics graduate admissions. PR-PER, 13 \(020133\).](#)

Building a Physics Graduate Student Association (from the Faculty Perspective)

Physics graduate students, like any group of professionals, need community. While this community may evolve spontaneously, a formal Physics Graduate Student Association (PGSA) can help ensure that it will be there when students need it.

Students engaged in formal associations often feel empowered to better support their peers and advocate for themselves. These organizations can also facilitate good communication between graduate students and faculty. They typically require few departmental resources to develop and sustain.

Below, we describe strategies for building and supporting a PGSA within your department.

Effective Practices:

- *Encourage a revolving chair-line structure to help sustain a PGSA.*
 - We recommend a “past chair, chair, chair-elect” structure, with positions rotating each year.
 - This organizational structure allows students to mentor and share their experience with past, present, and future chairs, while ensuring continuity of the organization when students graduate. This helps build leadership within the student body and avoids the risk of the organization floundering if a single charismatic individual leaves.
 - The rotating chair structure also keeps students from burning out or otherwise being negatively impacted by PGSA workload.
 - Each position should have specific responsibilities. Faculty can suggest responsibilities for each role, but PGSA members should make final decisions.
 - Examples of responsibilities might include nominating the slate for the next chair-elect (past chair); responding to faculty queries (chair); and organizing outreach events (chair-elect). This structure helps distribute organizational responsibility based on experience and operational knowledge.
- *Engage the PGSA in departmental activities.*
 - Engage PGSA leadership in leading orientation activities for new students. These activities might include:
 - Tours of campus with a special focus on resources for academic and medical assistance.
 - Tours of the surrounding community, including grocery stores, cultural centers, and neighborhoods.
 - Introducing new students to the departmental handbook and other key documents, as well as the “unwritten” expectations of the department.

- A meet-and-greet social to introduce new students to faculty in the department.
 - Picking up incoming students from the airport and possibly offering them a place to sleep the first few nights they are on campus.
- Encourage PGSAs to organize peer mentoring programs and [mentor training](#) for students.
- Include a PGSA representative on departmental committees as appropriate, so that faculty can better understand the impacts of departmental policies on graduate students.
- *Consider asking the PGSA to organize or help with outreach activities to introduce physics to the larger community surrounding your university.*
 - Students can serve as excellent recruiters for your undergraduate program, and often find fulfillment as role models in their communities.
 - Encourage the PGSA to host a Physics Career Day to engage and inform community members about careers in physics.
 - Encourage graduate students to participate in institutional science outreach activities. Students could visit local schools or community centers to give physics or career talks, or organize physics demonstrations or other activities for local high school or middle school students.

For more tips about implementing PGSAs within your department, please see the [Integration Into Community Section](#) of the APS Bridge Program Student Induction Manual.

Mentoring and Advising

Students in successful bridge programs have multiple mentors, including research advisors, academic advisors, and peer mentors. Building trust in each of these mentoring relationships helps students be more forthcoming about struggles that may impact their work, and allows students and mentors to work together to identify and prepare for career opportunities.

In addition to individual mentor–mentee relationships, “constellation mentoring” can help students succeed. Constellation mentoring involves multiple people (a constellation) collectively mentoring an individual student. Selection of mentors can be tailored to a student’s unique needs. A student may need a mentor to:

- Help them integrate into the graduate program and the physics community;
- Teach them what it means to be a research physicist and a scholar;
- Help them quickly and confidentially address academic and practical issues such as housing and funding;
- Identify strengths and weaknesses;
- Guide them as they select courses and develop and complete their academic plans;
- Identify and access health care resources.

Establishing a network of mentors and maintaining a regular meeting schedule keeps students on track and provides troubleshooting if problems arise. Here, we describe some effective practices for building productive mentor–mentee relationships.

Effective Practices

- *Mentors should build trusting and productive relationships with mentees.*
 - Meet regularly (every two to three weeks is recommended, at least initially) to build comfort and trust. A strong relationship between mentee and mentor will help when personal situations or problems arise. Some students may be most comfortable meeting in an informal, neutral location of their choice, such as a local coffee shop.
 - Actively solicit information from students about their future goals and about challenges they are facing.
- *Build faculty’s mentor awareness and skills by offering mentor training. Senior students may benefit from formalized mentor training as well. The Physics Research Mentor Training Seminar can be found on the APS [website](#).*
- *Establish regular meetings for faculty to discuss individual student progress and strategies for support.*
 - Schedule regular meetings for all faculty who interact with students, including those who meet students in the classroom, as research advisors, for professional

development, etc. This is especially critical when students are beginning their studies.

- These meetings provide opportunities for community-wide tracking of individual student progress.
- They can also provide early opportunities to identify and resolve potential issues students may be having with coursework, mismatches in research mentorship, and other problems.
- Establish regular meetings with research mentors to discuss students' research progress and any anticipated issues that individual students may face.
- Establish frequent meetings with faculty academic mentors to discuss students' academic progress, upcoming exams, participation in group work sessions, etc. During the first semester, these meetings should occur within the first two weeks. They can taper off if the student is demonstrating success.
- *Build multiple mentors into each student's mentoring plan.*
 - Identify multiple people within the department who are willing to mentor each student. This often includes administrative staff who know how to navigate the university bureaucracy.
 - Encourage peer-mentor relationships, including spontaneous ones that may occur outside the department. Physics Graduate Student Associations (PGSAs) are also well positioned to organize productive peer-mentoring relationships among students. For more information about building a PGSA, please see [Building A Physics Graduate Student Association](#).
 - Develop communication channels among these mentors (while respecting students' privacy) to ensure that mentors will be able to rapidly identify and respond to crises that may arise.
- *Foster a mix of formal and informal mentoring relationships within the department.*
 - Encourage informal mentoring relationships in addition to a student's formal research and academic mentors.
 - Informal mentorship can help address a student's unique needs. Students are often more comfortable sharing their personal challenges in low-stress environments.
 - Faculty may host informal meetings by inviting students to impromptu social events such as coffee breaks or lunch.
 - Create formal and informal opportunities for peer mentoring, particularly for senior graduate students to mentor junior students.
 - Pair senior graduate students with junior students within a formal or informal peer-mentorship program.

- Senior graduate student peer mentors can provide invaluable resources and information for junior students. They can also help induct junior students into the departmental and laboratory cultures.
- Graduate student groups may be interested in organizing a peer mentorship program or in receiving mentor training.
- Place bridge students' desk space in between more senior graduate students' or PhD students' desks. If bridge students are seated close to non-bridge students, they are more likely to talk to each other and form study groups and informal peer-mentoring relationships.

Induction

Students beginning graduate studies face several significant transitions. In addition to adjusting to new academic challenges, they are often moving to a new location away from their homes or immediate family support networks, taking on new levels of financial independence and responsibility, and navigating new cultural surroundings.

Particularly if students are new to the area or inexperienced in living on their own, they can place their academic progress at risk by living in places where they have difficulty getting to and from campus or where they are taken advantage of by unscrupulous landlords; or by signing leases they cannot afford. Such uninformed personal decisions can have lasting effects on a student's ability to meet degree requirements and join study groups, and can cause unnecessary stress.

Helping students manage these transitions can be critical to their success. Having students arrive a few weeks before the beginning of the semester provides time to find optimal housing, receive an introduction to the local physics community, and orient to the graduate student culture. It also allows faculty to place students in appropriate courses.

Effective Practices

- *De-emphasize the differences between bridge program students and other graduate students.*
 - Make sure bridge program students feel supported and respected by all department members. This helps them feel more comfortable asking for help when needed.
 - Concerns about bridge program students receiving special treatment or being seen as "inferior" to traditional students can often be assuaged when bridge students perform well.
- *Strive to create a friendly and supportive environment for students.*
 - Faculty and staff should be available to discuss students' academic and personal issues. Emphasize that the department is invested in each student's success and will support the student in achieving their academic goals.
 - Host department-wide events such as mixers, graduate student socials, and monthly lunches. Design events to build community among students, faculty, and staff.
 - Hold an orientation program that includes ice-breakers, information sessions, a group picture, building tours, and introduction of research areas. Incorporate bridge program students into the departmental graduate student orientation.

- Introduce new students to faculty, staff, the physics graduate student association (if you have one), graduate student council leadership, research advisors, and bridge program and peer mentors.
- Encourage older graduate students to develop welcome and/or orientation activities and social events for new students.
- Encourage senior graduate students to consider creating a [mentoring program](#) or pairing with new students.
- Consider providing tutoring to get students on solid academic footing.
- Designate space in the department where students can build an academic and social community. This space could include student offices, rooms for tutoring, or rooms for student leader organizations.
- *Help new students identify appropriate housing, transportation, and banking options before they come to campus.*
 - Have current graduate students discuss safe and affordable housing, transportation, and banking options with incoming students.
 - Create a list of these options and a map that can be shared with incoming students both before they arrive on campus and during orientation.
 - Encourage current graduate students to reach out to incoming students before they arrive on campus and offer help finding appropriate housing options.
 - Ask current graduate students to consider hosting new graduate students for a few weeks during the summer or when they first arrive on campus.
 - New students gain a chance to learn about the area and time to find affordable housing before they start classes.
 - This arrangement can also create natural peer-mentoring relationships between junior and senior graduate students.
 - Advise incoming students to consult with a faculty mentor before making large financial decisions such as signing a lease or buying a car. This allows mentors to identify and discuss potential issues that may disrupt a student's studies.
- *Tailor your course sequence to promote community among students.*
 - If possible, have incoming students take at least one course together.
 - If graduate students are allowed to take only a certain number of undergraduate courses, create special-topics sections that are cross-listed with the undergraduate course needed. (For example, at the University of South

Florida, *Bridge to Quantum Mechanics* is a graduate course that is cross-listed with undergraduate *Quantum Mechanics*.)

- *Develop ways for new students to work collaboratively as they take core courses.*
 - Guided group-work sessions led by faculty or experienced TAs can encourage students to work collaboratively to gain a deeper understanding of the concepts learned in core courses.
 - Group activities may include solving a difficult problem or receiving additional instruction on complex concepts, and can complement core coursework.
 - These collaborative sessions can provide a non-threatening work environment for younger students, particularly for underrepresented minority students. Such opportunities often help students feel comfortable asking questions and become more engaged in class discussions.
 - Consider engaging a postdoctoral researcher or faculty member who is interested in developing and field-testing guided-group-work course material.
 - Identify academically strong, advanced graduate students who can lead the group-work sessions based on the developed and tested materials.
 - Advanced students leading the guided group-work will gain additional teaching experience.
 - Regular meetings can create stable peer-mentoring relationships between junior and more advanced physics students.

- *Use a pre-course assessment in addition to undergraduate grades to more accurately assign students to courses.*
 - Use a pre-course assessment or prepared list of questions to assess the students' incoming preparation and to begin conversations about student placement.
 - Ohio State University (OSU) physics faculty have developed a set of incoming graduate student assessments. For copies of the assessments, please contact Dr. Chris Porter at OSU.
 - Students should complete the pre-course assessment before selecting classes. Dr. Chris Porter has developed a set of notes that may be useful for faculty interested in how to administer the tests.
 - Have department staff (director of graduate studies, faculty, and instructors, as appropriate) administer, grade, and discuss assessment results with students.
 - Collaborate with students to develop a coursework plan that helps fill undergraduate gaps and facilitates a smooth transition to graduate coursework.
 - Students are often more receptive to recommendations for appropriate course selections when presented with assessment results.

- The focus of these conversations should be on meeting students needs and emphasizing collective support for and investment in the student's success. Students should not be made to feel patronized or judged for their scores on the assessment. Instead, students should feel empowered to make good course selections based on their current knowledge.

Research Engagement

Independent research is at the heart of a graduate student's education. A student's induction into the research culture is critical to their development as an independent scholar.

Faculty advisors should work closely with students to help them select viable research areas and supportive mentors. Faculty can introduce students to a research group in a number of ways. Students can attend group meetings; learn about the group's expectations in terms of hours, responsibilities, and group member roles; and become proficient in the research techniques that group members use.

Advisors should, however, avoid involving students in research before they are ready. Engagement with a research project takes a great deal of time and effort, particularly in the beginning stages. It can quickly become an overwhelming responsibility for a new student, who may not be aware of what it takes to succeed as a graduate student. Advisors should consider whether a student has made sufficient progress in core courses to add additional research obligations to their workload, or whether their focus should continue to be on coursework.

Effective Practices

- *Provide opportunities for students to understand the research that available groups do.*
 - Encourage or require students to attend a research seminar surveying the areas of expertise within the department.
 - Laboratory leaders or upper-level graduate students can give presentations on their current work and planned future projects.
 - New students learn about the work being done in a variety of labs, and can talk to potential advisors about the prospects of working together.
 - Engage current graduate students in opportunities to teach new students about the different research areas within your department.
 - Have upper-level graduate students organize lab tours during new student orientation.
 - Graduate student organizations can also help coordinate peer mentoring, matching individuals according to research interest.
 - Rotate students through research groups so they can explore available research opportunities without making a commitment.
 - Encourage first-year students to spend a few weeks in two or three different groups, learning about the research and the expectations of each group. This allows students to gain deeper knowledge about the work being done in a given research group and to determine whether the lab leader's mentoring style is a good fit.

- Collaborate with nearby universities, when feasible, to create networking and research opportunities for students.
 - Organize a mini-conference at which students from neighboring institutions can share research progress and learn networking skills.
 - Students gain opportunities to give poster presentations of their work, tour laboratories, and meet with faculty members at other institutions. This can facilitate meaningful connections between students.
 - Encourage students from neighboring institutions to give a journal-club presentation or lunchtime seminar in your department, and vice versa.
 - Establish research collaborations with faculty at other institutions.
- If funding is available and new students are sufficiently prepared, engage them in research projects before their first semester begins.
 - Offer a summer internship for new students.
 - Recruit students to arrive early and work in a research group over the summer. This gives students a chance to immerse themselves in the research-group culture and begin familiarizing themselves with research techniques during the summer, freeing them up to focus on coursework and other obligations during the semester.
 - Research grants may allow funding for modest stipends and dorm housing for students. Departmental or institutional funds may also be available to support graduate students over the summer.
- *Introduce students to research group activities.*
 - Integrate students into the research group by having them attend weekly group meetings.
 - Have older students present their research at weekly or monthly group meetings to share their progress and to troubleshoot issues. Encourage new students to present at least once at these meetings.
 - Devote some meeting time to reading and discussion of relevant scholarly work, to help students learn about the current state of knowledge in their field.
 - Use each student's stated research interest to pair them with a research mentor before they arrive on campus and their time is occupied with coursework.
- *Monitor students' relationships with their research advisors and with other students.*
 - Assign a mentor who matches the student's research interests and who is willing to be attentive toward the student. Students who feel supported by their mentor are more likely to stay in the program.
 - Schedule regular meetings with each student's research mentor.

- Use these meetings to discuss the student's progress, identify potential issues impacting the student's performance, and strategize about supportive mechanisms to keep the student on track.
- For more tips about monitoring student performance, see [Student Progress Monitoring](#).
- Make sure students are assigned to a research project of appropriate scope.
 - Potential projects should be designed to be completed in a reasonable amount of time and at the graduate student level.
 - The scope and requirements of the research project should be clearly defined and communicated to the student before they commit to working on it.
- Make sure the student is able to balance the time needed for coursework with that needed for meaningful engagement in research. If the student is struggling in one or more courses, adjust expectations for research progress.

Student Professional Development Resources

Students often begin physics graduate programs with interests in a variety of career options. Here we describe practices that can help prepare students for different types of careers and outreach opportunities that can benefit both students and physics departments.

Effective Practices:

Preparing master's students for doctoral degree applications:

- *Develop a course to prepare students for the GRE Physics Subject Test.*
 - Preparatory courses should be led by a faculty member and should meet regularly—preferably once a week over several months. The course framework could consist of:
 - Problem sets focusing on specific topics such as classical mechanics or quantum mechanics and discussion of solutions during course meetings;
 - Explanation and practice of general test-taking strategies;
 - Practice examinations. Note that older exams, while offering good practice problems, contain older-style problems that can occasionally be solved using dimensional analysis rather than appropriate physical reasoning. The current exams do not use this type of problem. The ETS provides a free online [GRE Physics Test Practice Book](#).
 - Utilize preparatory books for the GRE Physics Subject Test.
 - One recommended text is [Conquering the Physics GRE](#), 3rd edition, by Yoni Khan and Adam Anderson, 2018.
 - Use online resources as a guide for a GRE preparatory course, or share them with students for additional practice. Resources include:
 - [APS Webinar: Acing the Physics GRE](#).
 - A free [GRE preparatory curriculum](#) developed by The Ohio State University's Society of Physics Students. The curriculum includes problem sets and sample examinations.
 - [Case Western Reserve University's free GRE preparatory flashcards](#) (available in mobile and web versions).
- *Offer professional development activities for students interested in academic positions.*
 - These activities might include workshops or trainings on:
 - Best practices for effective teaching;
 - The role of a postdoctoral associate in the laboratory, and how attaining such a position impacts your future career choices;
 - How students can maximize their chances of finding a career that is a good fit for their interests and skills;
 - Mentoring students as a faculty or postdoc;

- Organizing a research lab;
- Effective networking.

Preparing students for private-sector and government careers:

- *Offer a professional development course or seminar to introduce students to skills they will need in these kinds of careers.*
 - Seminar topics could include reading scientific literature, working in multidisciplinary research groups, grant writing, oral and written communications, and research ethics.
 - The [Phys21: Preparing Physics Students for 21st Century Careers report](#) lists a number of other professional development topics that are particularly useful for students interested in a variety of careers.
 - Leverage connections in the physics community to support students' development.
 - Ask industry contacts to lead workshops or seminars on developing specific skills, and to discuss with students their companies' work environments, expectations of employees, and typical career pathways.
 - Build relationships with local industry and government labs. This will help you remain up-to-date on skill sets that students need to be competitive for these kinds of positions.

Student Progress Monitoring

Successful bridge programs carefully monitor students' progress to ensure that they make successful transitions into doctoral programs. Bridge program mentors should check on students' progress every one to two weeks during the start of the program, and implement early interventions if problems with coursework or other interactions arise.

New graduate students must learn to predict how much time, effort, and resources they will need to meet their programs' expectations. With practice and advice from mentors, students will learn to allocate their resources effectively and efficiently.

Effective Practices

- *Help students develop time-management and organizational skills.*
 - At the beginning of each semester, have faculty advisors and students complete time-management worksheets together.
 - Mentor–mentee pairs should review and refine this worksheet each semester, or more often if needed.
 - This exercise helps students identify areas where their time could be used more effectively and the environments in which they work most efficiently.
 - Encourage the [graduate student association](#) to host a seminar on time management. Often there are individuals on campus who can lead such workshops. Department faculty should be aware of these resources.
- *Confer regularly with instructors, tutors, guided group-work leaders, and department staff regarding students' academic progress.*
 - Get weekly updates from professors and students on student performance, especially during the first four to six weeks of the semester.
 - Instructors, group-work leaders, and tutors can also work together to identify the sources of any academic or personal problems students are having, and develop interventions that will reduce or resolve the problems before they become unmanageable.
 - If a student's self-appraisal of an issue does not match the instructor's, look more closely at this issue. It could indicate a more serious problem.
 - When asking instructors for updates, bear in mind that they may not realize that students are struggling.
 - Once a student issue is identified, designate at least one individual who will be responsible for monitoring progress on addressing the issue.
 - This individual will arrange group meetings, moderate discussions, and monitor follow-up.
 - This will help prevent the student from falling between the cracks.

- Intervene as quickly as possible when a problem is identified.
 - Interventions might include setting the student up with a tutor, having them drop or change the level of a course, and/or referring them to the campus learning center for additional resources.
 - Schedule a meeting with the student as soon as possible. Discuss options with the student. Emphasize that while the problem may be serious, the meeting does not necessarily reflect a perception that the student will not succeed, but rather that the student may need to take a different path to success.

Sustainability

Several bridge programs feature a focus on longevity and sustainability. A key element of sustainability involves building relationships with your university administration.

Effective Practices:

- *Build relationships with your institutional administration and the larger community surrounding your university.*
 - Identify and interact regularly with on- and off-campus offices and centers that support inclusion and diversity.
 - Inform staff at these offices about your department's activities and identify ways you can partner to further support students.
 - Learn about resources that institutional offices offer to support your department and your students.
 - Encourage students to take advantage of these opportunities and resources.
 - Invite university administrators to departmental discussions with students. This can inform administrators about your activities and raise their awareness of issues that your students face, as well as solutions you have developed.
 - Provide administrative contacts with regular updates about your program's successes and contributions to the institution's prestige. These can include increased visibility within the broader community, graduation of accomplished alumni, and raising of external funds. Leverage these updates in discussions with administrators about institutional resources that might be dedicated to supporting your department's diversity and inclusion goals.
 - Inform your university's development office about your department's activities, and ask how you can help them prepare information for prospective donors.
- *Leverage grant funding and faculty awards within your department to secure ongoing support for bridge students.*
 - Have faculty apply for [NSF CAREER](#) awards while referencing work with bridge students.
 - Faculty at current or former [Alliances for Graduate Education and the Professoriate](#) (AGEP)-funded institutions may also petition their NSF program officers to provide funding for bridge students to work in their labs.
 - Add requests for student support into broader-impacts statements of grant applications.

- *Consider how lessons applied to bridge students can be generalized to all graduate students.*
 - Evaluate whether practices and activities designed to support bridge students could benefit all graduate students in your department.
 - Document practices that have proven effective for all students and share them with other departments and institutions.