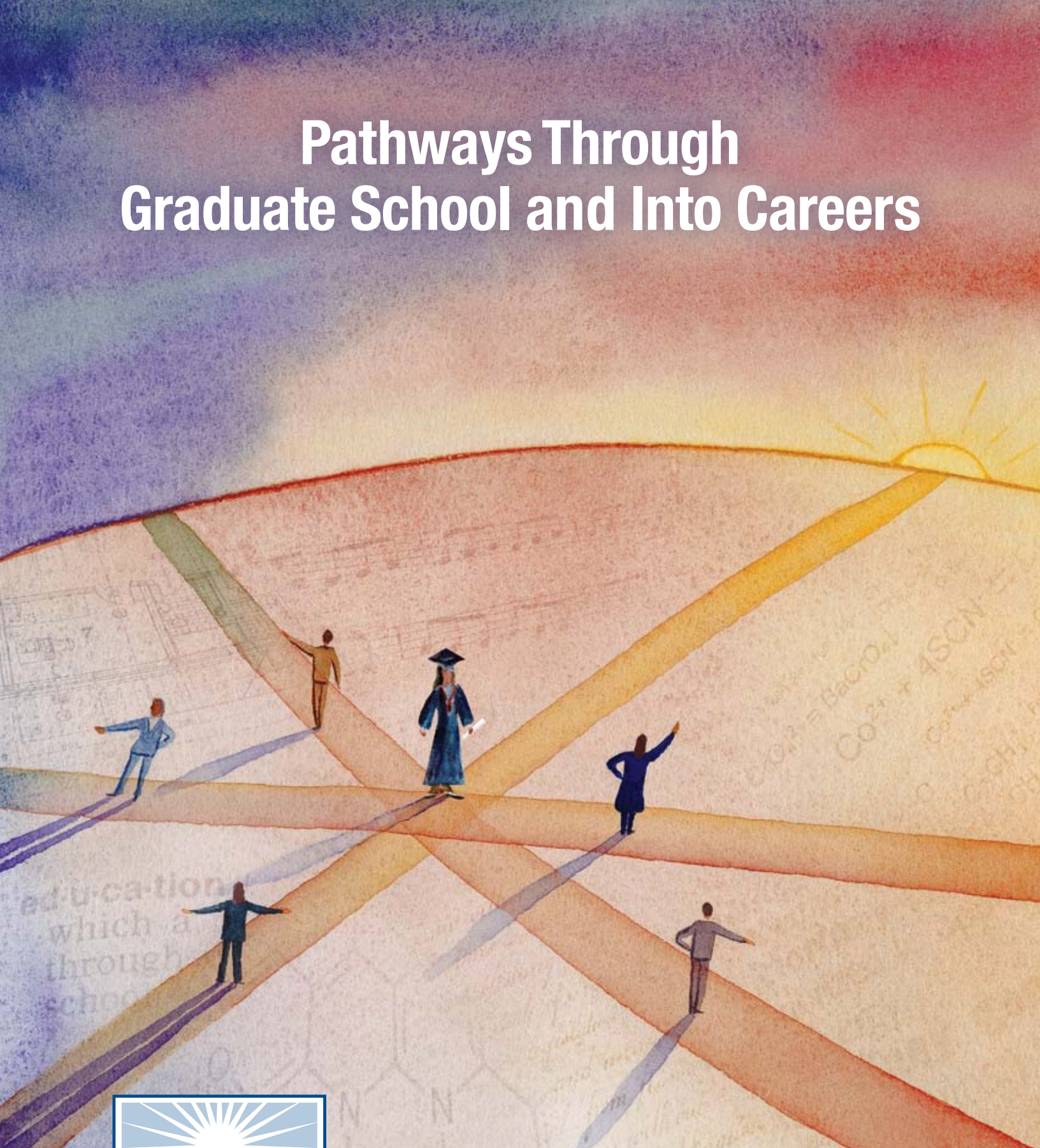


Pathways Through Graduate School and Into Careers



The illustration depicts a central figure in a blue graduation gown and cap standing at the intersection of four wide, colored paths (green, yellow, orange, and red) that radiate from a central point towards a rising sun on the right. The sun is a bright yellow circle with rays, set against a background of soft, blended colors (purple, blue, and orange). The paths are overlaid on a light-colored background that contains faint, stylized text and chemical structures. The text includes "ed-u-ca-tion", "which a", "through", "school", and "CO₂ + H₂O". The chemical structures include a hexagonal ring with "N" atoms and a complex molecule with "O", "N", and "H" atoms. Other figures are walking on the paths: a person in a blue suit on the green path, a person in a brown suit on the yellow path, a person in a blue suit on the orange path, and a person in a grey suit on the red path. The central figure is holding a rolled-up diploma. The overall style is artistic and symbolic, representing the journey from education to career.



COMMISSION ON
PATHWAYS
THROUGH GRADUATE SCHOOL
AND INTO **CAREERS**

Executive Summary

Pathways Through Graduate School and Into Careers

Graduate education in the United States plays a critical role in the success of the U.S. workforce and economy, attracting and producing influential researchers, innovators, and leaders. U.S. graduate schools are the environments in which students acquire the knowledge and skills necessary to compete in the global economy and solve problems of national and global scope. The link between graduate education and American prosperity has never been stronger than it is today. But little is known at the granular level about what our graduates do, how their work life progresses, and how well the preparation they receive equips them for the careers they pursue.

To ensure that a diverse, talented workforce supports the future success of the U.S. economy and society, we must understand current pathways through graduate school into careers as well as emerging employment trends and opportunities.

The Commission on Pathways Through Graduate School and Into Careers explored these pathways by examining the views of groups that directly observe and experience this journey — students, universities, and employers. The perspectives of these groups offer an unprecedented opportunity to better understand what these stakeholders seek, where they find success, and where their needs and goals remain unmet.

Graduate Education and the Workforce

Why are advanced degrees needed? Between 2010 and 2020, about 2.6 million new and replacement jobs are expected to require an advanced degree, with a projected increase of about 22% for jobs requiring a master's degree and about 20% for jobs requiring a doctorate or professional degree. Advanced education levels continue to be associated with lower unemployment rates and higher salaries. Understanding available career options and the impact on employability may encourage more students to consider graduate education.

What influences career pathways? The path from graduate study to career is influenced by a number of external forces including parents, peers, faculty, and graduate programs. The formation of career aspirations is a lifelong process that begins as early as middle and high school, and perhaps even as early as elementary school. Although students ultimately are responsible for their careers, universities, industry, and policymakers must also play a role in making career pathways transparent.

Where do graduate degree holders work? Among new doctorate recipients, about one-half find initial employment in business, government, or nonprofit jobs. Individuals earning doctorates in engineering are most likely to go into business/industry, while those earning doctorates in humanities are most likely to enter academia. Overall, more than one-half of all doctoral degree holders in science, engineering, or health fields work outside of the academy. But sufficient data regarding the industry sectors where master's degree recipients are employed was lacking.

What do employers expect of graduate degree holders? Employees face increasingly complex demands as part of their job. In addition to requisite content knowledge, critical skills such as professionalism and work ethic, oral and written communication, collaboration and teamwork, and critical thinking and problem-solving are consistently defined as important to job success.

To better understand employer expectations of graduate degree holders, we gathered data directly from employers, conducting a series of interviews with leaders from a broad range of organizations and companies. We found that:

- Employers indicated that graduate degree holders bring value to their organizations. These employees have the advanced knowledge that allows them to quickly engage in their work. However, employers also felt that some graduate degree holders lack certain other skills necessary for success on the job, such as skills related to working in a team environment, creating and delivering presentations, and project management.
- Employers expressed a strong interest in participating in the education and training of students and future employees, and most employers offered a variety of work experiences for students. Many employers have ongoing relationships with universities, graduate programs, or faculty, often focused on recruitment, but other relationships to encourage interaction with faculty and graduate students exist as well.
- Employers advocated stronger ties between graduate school experiences and workforce needs. They believed that graduate programs need a multidisciplinary focus, that graduate students need to understand how knowledge in one area can be applied to solve problems in another, and that graduate students need to learn to be innovative and entrepreneurial.

What is the role of government? Government plays a critical role in supporting graduate education. Broadening participation in graduate education by individuals from all demographic and socioeconomic groups remains a national priority as does the need to make graduate education a viable option for a growing number of U.S. citizens. Some activity has occurred along three fronts:

- **Access to graduate education.** Despite an average annual increase of about 3% in overall graduate enrollment and a 4% average annual increase for all minority groups over the past decade, most students receiving a bachelor's degree do not continue with their education, and the representation of minority students in graduate education remains low. Some initiatives, such as the Ronald E. McNair Postbaccalaureate Achievement Program, exist at the federal level to increase access to graduate education, but other initiatives are needed.
- **Support during graduate education.** Federal grant aid to students has increased since the late 1990s, but the cumulative student loan debt burden for graduate students has increased substantially. The America COMPETES Reauthorization Act of 2010 authorized increases to the budget at the National Science Foundation in support of graduate education. More financial support is needed, however, to motivate students to enroll in and complete a graduate program.
- **Access to careers in government.** Federal and state governments are large employers of individuals with graduate degrees. Several initiatives at the federal level are underway to create opportunities for graduate students to gain experience working in the government sector and to examine future workforce needs in critical fields.

Knowledge of Career Pathways

What do graduate students know about careers? The relationship between educational and occupational aspirations is complex. Students who expect more prestigious jobs are more likely to attain higher levels of education. Likewise, the jobs students aspire to shape their educational plans. But data also show that there is a gap between educational plans and career knowledge. In order to more fully understand students' knowledge of career opportunities, we surveyed individuals who took the *GRE*® General Test between 2002 and 2011. We found that:

Prior to graduate school:

- Students perceived value in obtaining an advanced degree. They believed that it gave them better career opportunities and increased their income potential.
- The perceived value of graduate education is tied, nevertheless, to limited information about viable careers. Few students reported they had received sufficient information regarding career options prior to entering graduate school.
- When asked who they consulted about career options, students indicated that informal sources, such as friends, family, or coworkers, were the most common. Sources that might have provided better information on career opportunities, such as employers and career counselors, were used far less often.

During graduate school:

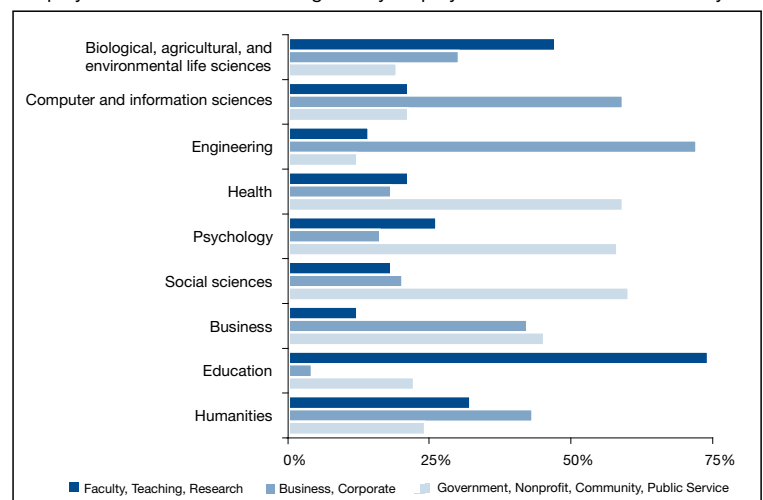
- Responses to our survey confirmed the importance of faculty in student career development, with most students indicating that a faculty member or advisor primarily provided career advice, far more than any other group of influencers.

- Careers encouraged by faculty appeared to be closely aligned with the career interests of students. Teaching/faculty and research positions were the two most-endorsed careers by both students and faculty. Positions in industry, government, and nonprofit organizations were of interest to some students, but were endorsed less frequently by faculty.
- Few students discussed career options with a career counseling or placement office while in graduate school.

Following graduate school:

- Individuals with master's and doctoral degrees work in a broad range of important occupations in every occupational sector: in academia, industry, government, and nonprofit organizations.
- Master's degree holders, even more so than doctoral recipients, work in a variety of settings. About one-third of individuals with master's degrees work in business and private corporations and slightly less than one-fourth work in teaching or faculty positions. Those with master's degrees also work in other sectors, such as nonprofit, community/public service, government, and research organizations.

Employed holders of master's degrees by employment sector and field of study.



What is the perspective of graduate deans? Universities play a critical role in helping students find pathways through graduate school and into careers. In order to better understand graduate deans' perspectives and to document the resources currently provided by graduate schools, we conducted a survey of CGS member graduate deans. We discovered:

- Graduate deans' perceptions confirmed that students are not very knowledgeable about career options prior to entering, during, and in some cases, even upon completion of their graduate education.
- Providing career guidance to graduate students is often not a high priority. This does not mean that deans do not believe that it is important, but given the list of other priorities and lack of resources, it does not rise to the top.
- One important step in developing and improving graduate programs is to provide better tracking of recent graduates to inform faculty and students about the various career pathways taken by graduates.

Moving Forward

There are two central components of a larger national strategy to enhance U.S. innovation and competitiveness. The first is to prepare more graduate students for the full spectrum of careers inside and outside the academy across all occupational sectors. The second is to clarify and strengthen career pathways. To do so, changes in the university, industry, and government arenas are called for.

Universities

Universities, graduate leaders, and faculty are on the front line of preparing the workforce of the future. Priority actions include:

- **Make connections with students.** Establish programs aimed at understanding the connection between graduate education and career paths. Build relationships between K–12, community colleges, four-year colleges, and graduate education systems so that students understand routes of progression. Provide career counseling for graduate students and provide them with professional skills development, resources, and guidance in preparing for a variety of career pathways.
- **Track career outcomes and job placement information for graduate students.** University leaders, including graduate deans, need to work at all levels to establish specific responsibility for collecting and using data on career outcomes for each graduate by program. Graduate faculty need to be provided with this information so that they understand, value, and communicate to students about the full spectrum of career pathways.
- **Connect graduate students with graduate alumni.** Successful alumni can provide inspiration, guidance, and advice to graduate students as well as information about successful careers in nonacademic sectors.
- **Broaden the focus of graduate education to include development of professional skills.** Graduate education leaders should work across campus to broaden the development of professional skills by graduate students. Create advisory committees of employers to provide input in designing or modifying existing graduate education so that students develop the skills needed for success in a career.

Employers

Employers in industry, the nonprofit sector, and government are in a position to signal the knowledge and skills necessary for success. It is in their interest to:

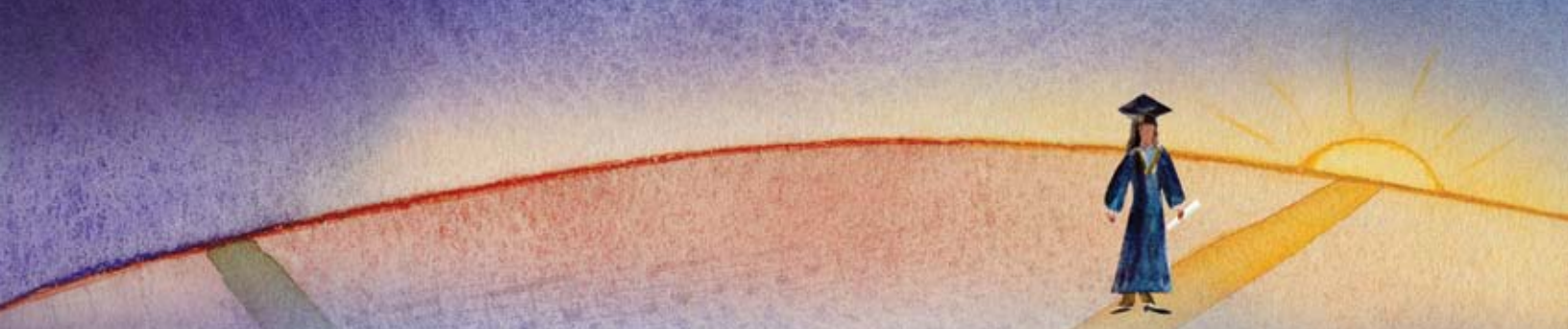
- **Enhance and expand collaborative relationships.** Employers should reach out to universities to further develop opportunities for graduate students, post-doctorates, and faculty.

- **Make strategic investments in graduate education programs.** Employers should consider enhanced investments in graduate education programs that align closely with their future workforce needs, such as endowing a graduate fellowship at a university.
- **Provide opportunities for graduate students and graduate faculty.** Offering students a chance to work in a nonacademic environment through internships and other research opportunities broadens students' views of career options. Providing opportunities for faculty members through sabbaticals or collaborative research will increase their awareness of career opportunities for their students.
- **Provide support for employees to pursue graduate studies while employed.** Employers should provide financial support and encouragement to their employees to pursue and complete graduate studies.

Policymakers

Other countries and regions of the world are investing in education, particularly graduate education, and the United States must also make support for graduate education a top priority through the following actions:

- **Establish a Professional Plus Program for graduate students on research assistantships.** Federal agencies should develop a Professional Plus Program that would provide an enhancement to any grant on which research assistantships are funded to support graduate schools or university offices in providing professional development programs for graduate students.
- **Increase federal government support for graduate education through the authorization and implementation of new initiatives.** Initiatives supporting doctoral and master's education are called for. An example would be a COMPETES doctoral traineeship program to support doctoral education in areas of national need.
- **Create an advisory commission of leaders in business and graduate education to support workforce priorities.** The Administration should convene a blue ribbon advisory commission of leaders in business and graduate education, led by appropriate officials of the executive branch of the federal government. The commission should develop strategies and plans for clarifying career pathways for graduate students in key areas of national priority.



Commission on Pathways Through Graduate School and Into Careers

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*The report was written by
Cathy Wendler, ETS; Brent Bridgeman, ETS;
Ross Markle, ETS; Fred Cline, ETS; Nathan Bell, CGS;
Patricia McAllister, CGS; and Julia Kent, CGS.*

The Commission on Pathways Through Graduate School and Into Careers — led by the Council of Graduate Schools (CGS) and Educational Testing Service (ETS) — spearheaded a research effort to address such issues as graduate student knowledge of career options, how students learn about occupational opportunities, the role of graduate programs and graduate faculty in informing and guiding students along the path to professional occupations, and career pathways that individuals with graduate degrees actually follow. Throughout this effort, the Commission helped identify the appropriate questions to ask, suggested possible data sources and experts to consult in this work, assisted in the preparation of the final report findings, and provided advice on policy recommendations. The ultimate goal of the 14-member Commission — composed of industry leaders, university presidents, graduate deans, and provosts — is to encourage a national conversation about why understanding the pathways through graduate school and into careers is vital to our nation's success in the 21st century.

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