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Council of Graduate Schools

Statement on Proposed Principles for Federal Support of Graduate and Postdoctoral Education and Training in Science and Engineering
January 18, 2006

The Council of Graduate Schools (CGS) appreciates the opportunity to comment on the Office of Science and Technology Policy's (OSTP) Proposed Principles for Federal Support of Graduate and Postdoctoral Education and Training in Science and Engineering. CGS is an organization of over 450 institutions of higher education engaged in graduate education, research and the preparation of candidates for advanced degrees. Our member institutions award approximately 90% of the doctoral degrees and over 75% of the master's degrees in the U.S.

The proposed principles are extremely timely and relevant for several reasons. The United States has achieved unparalleled success as a nation in large part due to our scientific and technological superiority for the past 50 years. Our prosperity as a nation has been fueled by technological innovation enabled by a policy environment conducive to economic growth, a diverse population of ready talent, and a higher education system that is unequaled in terms of quality and expertise. Maintaining U.S. competitiveness in the 21st century global economy is a major issue facing our nation as other countries are developing policies and strategies to enhance their higher education systems, and research and development enterprises.

A major part of the responsibility for preparing the highly skilled 21st century workforce will rest on our nation's universities and their graduate programs. The vitality of our nation's higher education system is directly related to the quality of its graduate programs and the ability to recruit and support the best graduate students. It is for this reason that we strongly support the proposed principles and their implementation.

These principles are an important first step in acknowledging the extraordinarily important federal role and responsibility of supporting graduate education as an essential component of a national strategy to maintain and enhance U.S. competitiveness. We note that the proposed principles for federal support of graduate and postdoctoral education and training are specifically directed toward the fields of science and engineering. While acknowledging the critical importance of these fields, we strongly advocate a strengthened federal role in supporting graduate education across all fields and disciplines as part of a larger national strategy to maintain and enhance U.S. competitiveness and national security.

Comments on each of the six proposed principles and selected recommendations follow.

1. Federal Support of Graduate and Postdoctoral Education and Training is a Critical Investment in the Future

The importance of federal support for graduate education in science and engineering has been noted in several recent reports, papers and news articles including *Rising Above the Gathering Storm* from the National Academies and *NDEA 21: A Renewed Commitment to Graduate Education* by CGS (attached). Providing encouragement and opportunity for students with aptitude and desire to pursue advanced degrees in science and engineering and increasing participation of under-represented groups is critical to our long term economic success. The U.S must increase development of its domestic talent pool by encouraging and supporting U.S. students to pursue graduate degrees in these critical fields particularly as other nations have strategically increased their recruitment of international students who have traditionally come to the U.S. for graduate study. The resulting **public benefit** to our nation from such investments in U.S. graduate education must be recognized if the benefit is to be sustained.

The original National Defense Education Act (NDEA), enacted in 1958, produced a generation of researchers and scholars whose discoveries and inventions have fueled our economy for the past 50 years. This law is a prime example of how support for graduate education benefits the nation. It is time to make a similar investment in the next generation of researchers and scholars to create the reservoir of talent needed to carry us forward into the 21st century.

2. The Federal Investment Portfolio Must Broadly Support Science and Engineering Disciplines

CGS agrees that broad support for science and engineering disciplines and the understandings that arise from research in multiple disciplines are the foundation upon which future advances in knowledge will be built and upon which national security depends. Many U.S. graduate education programs emphasize collaboration across disciplines in recognition of the way in which new knowledge and discoveries are often created in an interdisciplinary context.

Recommendation: While the proposed principles are focused on science and engineering, CGS notes the importance of the social sciences and humanities and the need for enhanced federal support in these areas as well. In the post 9/11 world, it is imperative that we expand our understanding of the culture, politics, and language of many parts of the globe.

The need for increased capacity in critical, less commonly taught languages to communicate effectively in an increasingly global world is just one example of the important contributions of the humanities. Likewise, the social sciences increasingly contribute a global cultural and political perspective that is equally critical.

3. Graduate Students and Postdoctoral Scholars Must Receive Quality Education and Training

Graduate education is the jewel in the crown of the U.S. higher education system and the quality of U.S. graduate education is recognized around the globe. CGS has a long history of working collaboratively with the graduate education community to maintain and enhance the high standards of excellence for which U.S. graduate education is known, and to address outstanding issues in graduate education. Descriptions of several CGS projects related to quality follow:

The CGS Ph.D. Completion Project is a three-year grant-funded project that is addressing the issues surrounding Ph.D. completion and attrition. Doctoral education in the U.S. is the cornerstone of innovation in science and engineering and the continued strength of doctoral education is essential to national prosperity. Yet, approximately 40% percent of students who enter doctoral programs in research fields in the U.S. leave graduate study before completing their degrees.

The Completion project was initiated to address completion and attrition issues by creating intervention strategies and pilot projects and evaluating the impact of these projects on doctoral completion rates and attrition patterns. Through the project, six institutional and program characteristics have emerged as key factors influencing student outcomes that can ultimately affect the likelihood that a particular student will complete a Ph.D. program. These characteristics include: selection, mentoring, financial support, program environment, research mode of the field and processes and procedures. Through the project institutions are highlighting "best practices" in national and institution-wide discussions on Ph.D. completion. Currently, 46 institutions of higher education are participating in the project.

This proposed principle notes that "***federal agencies should encourage the earliest possible completion of graduate and postdoctoral education and training."***

Recommendation: Based on knowledge gained by CGS through the Ph.D. Completion Project, we suggest revising the above language as follows: "***consistent with best practices in the various fields of study, federal agencies should encourage the earliest possible completion of graduate and postdoctoral education and training.***

In 1993, the **Preparing Future Faculty** (PFF) project was initiated by CGS and the Association of American Colleges and Universities. This is one of several key projects underway to provide long-term support of graduate programs to better prepare the next generation of faculty who will teach undergraduate students and the future K-12 teachers of our nation. The PFF asserts that graduate students preparing for faculty careers should begin learning about the expectations for faculty – in research, teaching, and service at different types of institutions of higher education. PFF programs are offered in a variety of disciplines from science and mathematics to humanities and social sciences to help prepare students for faculty positions through a variety of activities including mentoring programs and seminars and workshops. These programs also emphasize the

importance of diversity by supporting activities that have an impact on retention, graduation and teaching for inclusiveness.

Professional Science Masters (PSM) Degree represents a growing initiative to better prepare master's graduates with the skills needed in non-academic employment sectors. These degrees have been initiated at many universities to respond to local and regional workforce needs in business, government and non-profit sectors and provide an alternative to the doctorate for those preparing for careers outside of academe. The PSM began in 1997 with a series of grants from the Sloan Foundation to selected research universities. In 2001, a Sloan grant to CGS extended the PSM initiative to Master's focused institutions which award 40% of science/math master's degrees and whose faculty are heavily invested in master's education. A similar project focused on master's degrees award by social sciences and humanities departments was awarded to CGS by the Ford Foundation to fund Professional Masters programs in humanities in social sciences. There are currently 101 PSM programs at 51 CGS member universities established with prior support from CGS and the Sloan Foundation.

4. Federal Contributions Toward Graduate and Postdoctoral Education and Training are Provided in Partnership with Academic and other Non-Federal Institutions.

The concept and practice of the partnership between the federal government, academic and other non-federal institutions in support of graduate education is critical to our long-term success as a nation and to our national security. CGS wholeheartedly supports the partnership and agrees that federal agencies should consider the impact on and consult with its partners when designing and conducting fellowship and traineeship programs. CGS recently participated in the NIH Town Hall meeting to discuss proposed changes in funding for the National Research Service Awards. These awards are critical to supporting future scientists and researchers and the town hall meeting format might serve as one model for consulting with the graduate education community.

"Federal agencies should have, and be able to articulate, a rational basis for the level of the Federal program's contribution toward the education and training of the fellows or trainees." The concept of a *rational basis* seems too vague - especially as it relates to compensation for indirect costs or tuition remission.

Recommendations:

- We recommend additional consultation to determine what constitutes a "rational basis" for the federal contribution toward the education and training of fellows and trainees.
- The partnership between the federal government, academic, and non-federal institutions would be strengthened through the creation of an ongoing mechanism and process for regular communication between those involved in graduate education in science and engineering. We urge OSTP to consider creating a standing committee consisting of representatives from each of the three above mentioned sectors that would meet periodically to discuss graduate education issues of interest.

5. Graduate Students and Postdoctoral Scholars Should Be Adequately Supported to Encourage Their Pursuit of Science and Engineering Careers

CGS agrees that levels of support provided by agencies should be reasonable and commensurate with the level of education and experience of the recipient. The question of "adequate" support deserves further exploration. Support for graduate education in science and engineering is a pressing national priority that requires further emphasis in order to continue our leadership role and compete effectively in the global economy. Other nations are increasing their investments in science and engineering. Here in the U.S., for example, the level of support provided by the National Science Foundation (NSF) for the educational allowance of graduate students, e.g. tuition, fees, and health care, is significantly below actual costs; the level has been $10,500 since 1998. In order to attract more students, and particularly students from under-represented groups to pursue graduate education in science and engineering, increased support is necessary in the years ahead. CGS urges that this support be made a priority for OSTP and other policy making bodies.

6. Federal Agencies Should Collaborate in Areas of Common Interest

Recommendation: In addition to collaborating in areas of common interest, CGS urges that federal agencies also share information about best practices in the area of support for graduate education. While collaboration between federal agencies is important, collaboration with key non-profit groups possessing knowledge and expertise in effective practices would likely be of great benefit to the federal agencies supporting graduate students in math and science. The Council of Graduate Schools would welcome the opportunity to engage in an appropriate form of collaboration with key federal agencies.

The final comments and recommendations address the proposed process for interagency coordination and the background information presented at the beginning of the proposed principles document.

Proposed Process for Interagency Coordination

We support the concept of establishing a standing working group to promote implementation of the principles. Implementation of the principles is key in terms of having any impact on the quality of graduate education in science and engineering and in terms of attracting more students to these fields.

Recommendation: CGS urges the adoption of a broader framework for implementation that would allow for regular input and consultation with non-federal organizations representing key constituencies involved in graduate education. Such an expanded framework would allow for input from those closest to graduate education and would result in better policy and implementation in the future. Such an expanded framework would benefit both federal agencies and universities.

Background Information:

In footnote 1, various categories are defined. One paragraph is -

"Research assistants or associates refer to graduate students or postdoctoral scholars funded through Federal research grants or contracts. The assistants or associates are not selected by the Federal agency, and the host institution determines their level of support. The principal purpose of their employment is the conduct of research, and any limitations imposed by their citizenship status are determined by the policies of the host institution."

In the strictest sense this is true, but Federal "imperatives" - export control, immigration, etc. - impose significant constraints on universities.

Recommendation: revise last phrase to read "***any limitations imposed by their citizenship status are determined by the host institution, which must comply with Federal laws and regulations.***

Summary:

CGS strongly supports the proposed principles and their implementation. We offer our organization and the expertise of our members to achieve the goal of improving federal support for graduate education in science and engineering. Thank you for the opportunity to comment on the proposed principles.