A Guide to the Methodology of the National Research Council Assessment of the Doctorate Programs

Jeremiah P. Ostriker, Paul W. Holland, Charlotte V. Kuh, and James A. Voytuk, editors; Committee to Assess Research- Doctorate Programs; National Research Council

ISBN: 0-309-13956-2, 202 pages, 8.5 x 11, (2009)

A Guide to the Methodology of the National Research Council Assessment of Doctorate Programs

Jeremiah P. Ostriker, Paul W. Holland, Charlotte V. Kuh, and James A. Voytuk, editors

Committee to Assess Research-Doctorate Programs

Board on Higher Education and Workforce
Policy and Global Affairs

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
www.nap.edu

PREPUBLICATION COPY—UNEDITED PROOFS

THE NATIONAL ACADEMIES PRESS 500 Fifth Street, N.W. Washington, DC 20001

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This project was supported by the Andrew W. Mellon Foundation, the Alfred P. Sloan Foundation, the U.S. Department of Energy (Grant DE-FG02-07ER35880), the National Institutes of Health (Grant N01-OD-4-2139, TO#170), the National Science Foundation (Grant OIA-0540823), the National Research Council, and contributions from 222 U.S. universities.

Additional copies of this report are available from The National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area); Internet, http://www.nap.edu.

Suggested citation: National Research Council. 2009. Assessment of Research Doctoral Programs in the United States. Washington, DC: The National Academies Press.

Printed in the United States of America.

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Charles M. Vest is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. Charles M. Vest are chair and vice chair, respectively, of the National Research Council.

www.national-academies.org

PREPUBLICATION COPY—UNEDITED PROOFS

Committee to Assess Research-Doctorate Programs

Jeremiah P. Ostriker, Ph.D. (*Chair*), Professor of Astronomy, Department of Astrophysical Sciences, and Provost *Emeritus*, Princeton University
Virginia S. Hinshaw, Ph.D. (*Vice Chair*), Chancellor, University of Hawai‘i at Mānoa
Elton D. Aberle, Ph.D., Dean and Director Emeritus, College of Agricultural and Life Sciences, University of Wisconsin
Norman M. Bradburn, Ph.D., Tiffany and Margaret Blake Distinguished Service Professor and Provost *Emeritus*, University of Chicago, Senior Fellow, National Opinion Research Center
John Brauman, Ph.D., J.G. Jackson-C.J. Jackson Professor of Chemistry, Emeritus, Department of Chemistry, Stanford University
Jonathan R. Cole, Ph.D., John Mitchell Mason Professor of the University, and Provost *Emeritus*, Columbia University
Paul W. Holland, Ph.D., Frederic M. Lord Chair in Measurement and Statistics (retired), Educational Testing Service
Eric Kaler, Ph.D., Provost and Senior Vice President, Stony Brook University
Earl Lewis, Ph.D., Provost and Executive Vice President for Academic Affairs, Emory University
Joan Lorden, Ph.D., Provost and Vice Chancellor for Academic Affairs, University of North Carolina at Charlotte
Carol Lynch, Ph.D., Dean of the Graduate School *Emerita*, University of Colorado Boulder and Director of Professional Master's Programs, Council of Graduate Schools
Robert M. Nerem, Ph.D., Parker H. Petit Professor and Director, Institute for Bioengineering and Bioscience, Georgia Institute of Technology
Suzanne Ortega, Ph.D., Provost, University of New Mexico
Robert Spinrad, Retired Vice President, Technology Strategy, Xerox Corporation (resigned November 2007)
Catharine R. Stimpson, Dean and University Professor, Graduate School of Arts and Science, New York University
Richard Wheeler, Vice Provost, University of Illinois at Urbana-Champaign

Staff

Charlotte Kuh, Ph.D., Study Director, Board on Higher Education and Workforce, and Deputy Executive Director, Division on Policy and Global Affairs
Peter Henderson, Ph.D., Director, Board on Higher Education and Workforce
James Voytuk, Ph.D., Senior Program Officer, Board on Higher Education and Workforce
John Sislin, Ph.D., Program Officer, Board on Higher Education and Workforce
Kara Murphy, Research Associate, Board on Higher Education and Workforce
Sabrina Hall, Program Associate, Board on Higher Education and Workforce
Rae Allen, Administrative Assistant, Board on Higher Education and Workforce

Data Panel for the Assessment of Research-Doctorate Programs

Norman M. Bradburn, Ph.D., *(Chair),* Tiffany and Margaret Black Distinguished Service Professor and Provost *Emeritus*, University of Chicago
Richard Attiyeh, Ph.D., Vice Chancellor for Research, Dean of Graduate Studies, and Professor of Economics *Emeritus,* University of California, San Diego
Scott Bass, Ph.D., Provost, The American University
Julie Carpenter-Hubin, M.A., Director of Institutional Research and Planning, The Ohio State University
Janet L. Greger, Ph.D., Vice Provost for Strategic Planning, University of Connecticut *(retired)*
Dianne Horgan, Ph.D., Associate Dean of the Graduate School, University of Arizona
Marsha Kelman, M.B.A., Associate Vice President, Policy and Analysis, Office of the President, University of California
Karen Klomparens, Ph.D., Dean of the Graduate School, Michigan State University
Bernard F. Lentz, Ph.D., Vice Provost for Institutional Research, Drexel University
Harvey Waterman, Ph.D., Associate Dean for Academic Affairs, Graduate School-New Brunswick, Rutgers, The State University of New Jersey
Ami Zusman, Ph.D., Coordinator, Graduate Education Planning & Analysis, Office of the President, University of California *(retired)*

PREFACE AND ACKNOWLEDGMENTS

This methodology guide is being released in advance of the Assessment of Research Doctorate Programs to educate those who will be using the assessment in the details of its construction. Although it builds on earlier NRC assessments, the methodology of assessment has been significantly altered and the range of data used in constructing rankings has been considerably expanded. At the urging of members of the graduate community, the Committee to Assess Research Doctorate Programs has produced this guide because the methodology is statistically complex and it is important to know what to look for when the range of rankings for each program is released.

A data-based study as large as the one described in this methodology guide would be impossible without the time, care, and assistance of hundreds of people in universities who gathered and checked data for each of their programs to assist with the Assessment of Research Doctorate Programs. We will not name all these people, but the committee is extraordinarily grateful to them. The questionnaires were developed with the assistance of the committee's Data Panel, chaired by Norman Bradburn, whose membership appears following the list of the committee. We are also grateful to the staff of Mathematica Policy Research, our data contractor, which not only collected the data, but helped us with questionnaire wording, sampling plans, and model implementation. Geraldine Mooney and David Edson were the able leaders of a large MPR team.

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Academies' Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible, and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the process.

We wish to thank the following individuals for their review of this report: John Bailar, University of Chicago; John Burris, Burroughs Wellcome Fund; Michael Brick, Westat, Inc.; Joseph Cerny, University of California, Berkeley; Karen DePauw, Virginia Polytechnic Institute; Robeson Taj Frazier, University of California, Berkeley; Andrew Gelman, Columbia University; Claudia Goldin, Harvard University; Valen Johnson, M.D. Anderson Cancer Center; Sheryl Lightfoot, University of Minnesota; Daniel Mote, University of Maryland; Risa Palm, State University of New York; William Press, University of Texas; Raul Ramos, University of

Houston; Stephen Stigler, University of Chicago; Dawn Terkla, Tufts University; Andrew Wachtel, Northwestern University; George Walker, Florida International University; John Wiley, University of Wisconsin; and Lilian Wu, International Business Machines Corporation.

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by Stephen Fienberg, Carnegie Mellon University and Lyle Jones, University of North Carolina, Chapel Hill. Appointed by the National Academies, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Finally, we wish to thank our funders, the National Science Foundation (OIA-0540823), the National Institutes of Health (N01-OD-4-2139, TO#170), the U.S. Department of Energy (DE-FG02-07ER35880), the Alfred P. Sloan Foundation (2004-3-20), the Andrew W. Mellon Foundation, and the President's Committee of the National Research Council; and the 220 universities that participated and contributed financial support to the assessment.

Contents

1

Introduction

The Assessment of Research Doctorate Programs conducted by the National Research Council (NRC) provides data that allow comparisons to be made among similar doctoral programs around the United States, with the goal of informing efforts to improve current practices in doctoral education. The assessment, which covers doctoral programs in 61 fields at 222 institutions, offers accessible data about program characteristics that will be of interest to policymakers, researchers, university administrators, and faculty, as well as to students who are considering doctoral study. Furthermore, the assessment analyzes and combines these data to create ranges of rankings that allow the comparison of different doctoral programs within a field.

PURPOSE OF THE METHODOLOGY GUIDE

This methodology guide is intended mainly for one specific audience: those people in universities who will be asked to explain the results of the NRC Assessment to their presidents and provosts. This intended audience consists primarily of faculty, many of whom are serving as graduate deans and graduate program directors, as well as institutional researchers. Other potential audiences include those people who will be asked to explain the use of the study to the public, as well as those students who are considering doctoral study. Participants at the 2007 Annual Meeting of the Council of Graduate Schools requested that the NRC provide this guide in advance of the release of the assessment so that these various users may prepare for it. The assessment itself will be a separate document: a brief report on doctoral education in U.S. universities accompanied by online spreadsheets that will contain data, dimensional measures, and ranges of rankings for programs on a field-by-field, program-by-program basis.

This methodology guide is organized into the following chapters:

- **A brief description of the data—**This section lays out how the study was designed and how the data were collected. In particular, it covers the recruitment of the participating institutions, the questionnaires, how the taxonomy of fields was determined, the determinants of program inclusion, the reasons for dropping some programs and some fields, how a sample

survey of faculty was used in obtaining ratings[1], and how the faculty questionnaire was used to determine direct measures of quality.

- **How ratings in three dimensions are calculated—**In addition to the overall measure provided by the assessment for each program at each institution, dimensional measures were constructed in three areas: research activity, student support and outcomes, and student and faculty diversity. These measures take into account only the variables relevant to each area.
- **Calculating the overall rating of a program—**This section covers the sources of variability in ratings, direct measurement of quality as perceived by faculty, regression-based measures of the importance of measured variables to program quality, combined direct and regression-based measures, and how ratings are calculated and converted to a range of rankings. The calculation includes all the variables (20 for non-humanities fields, 19 for the humanities).
- **An example—**The calculation of the range of rankings for a program in economics is presented and explained.

This guide also presents technical information about the current study. Appendix A describes the statistical techniques used to obtain the ratings and ranges of rankings and is intended for those interested in the statistical basis of the summary measure. Appendix B contains a link to the questionnaires used to obtain the data about the universities, programs, faculty, and students. Appendix C is a list of the number of programs in each field included in the assessment. Appendix D contains a web link to a list of all the programs and their institutions by field. A detailed description of the 20 variables used in the calculations of the overall range of rankings is provided in Appendix E. Appendix F provides the weights for broad fields for each of the dimensional measures and the variables used in determining them. Appendix G shows the range of rankings for the dimensional measures for 117 (anonymous) programs in economics as an example. Appendix H shows the average number of ratings obtained per program in the sample survey.

DATA FOR A DYNAMIC DISCUSSION

The assessment has collected a great deal of data from doctoral programs across the United States, and it has statistically summarized these data along a variety of dimensions. The data that were assembled with great effort by U.S. research universities and their faculty, combined with the analytical talent of the many experts with whom we have consulted, have

[1] We use the term rating to mean a number on a scale from 1 to 6 that indicates the perceived quality of a program, or the statistically estimated perceived quality. Ratings from many raters were aggregated for programs as described in this guide and were thus arranged in order, from highest to lowest, to yield a program ranking. A rating is a score. A ranking is calculated from an ordered list of ratings. In our study, we calculate multiple ratings for each program, and from the multiple ratings, obtain ranges of rankings for each program.

enabled us to produce a study with procedures designed to provide a richer array of results from those of previous NRC efforts and from those of commercial vendors

This study and its methodology, however, are merely the beginning of an informed discussion, not the last word. Users of the assessment and its methodology should understand that it was not the intent of the assessment committee to produce the final verdict (as of 2006) on the characteristics and quality of doctoral programs. Rather, we intend to present data that are relevant to the assessment of doctoral programs and to make them available to others. Users will want to bring to these data their own knowledge of programs and to compare the assessment that the NRC has produced with that knowledge. This should be a dynamic process that leads to further discussion and insights.

We seek to make users aware of the strengths and limitations of the data and believe in the importance of this dynamic process. We have operated under the assumption that outstanding programs have certain measurable characteristics in common. For example, one can see evidence of a vibrant scholarly community by looking at measures of the number of faculty who produce scholarship and whose scholarship is recognized through citations, awards given by scholarly societies, and the percent of the faculty who receive grants. Nonetheless, the question of assessing how well a program accomplishes the dual objectives of conducting research and educating students to become scholars, researchers, and educators is a complex one.

The quality of doctoral programs is a multidimensional concept, and assessing that quality requires highlighting some of the more significant factors underlying it. This study has attempted to collect data that will capture this multidimensionality and to design measures that will best reflect it. Among the dimensions that we have sought to measure are: (1) the research activity of program faculty; (2) student support and outcomes; (3) diversity of the academic environment; and, taking these measures into account, (4) a summary measure that provides a range of rankings of the estimated overall quality of programs, which includes all these separate dimensions, included with differing weights, and which is based on recent quantitative measurements. Each of these four measures necessarily collapses interesting and informative measures of doctoral programs. We hope that users of the study will want to mine the data that underlie each metric, to examine additional information collected in the course of the study, and then construct their own comparisons. This will be possible by using the online spreadsheets that will accompany the final report.

In this undertaking, we were necessarily limited to examining what is countable[2]. Many will argue that program quality goes well beyond what can be measured: the existence of a scholarly community, the creative blending of interdisciplinary perspectives, or the excitement generated by the exploration of new paradigms. We agree. We also understand that some of these important qualitative dimensions will elude even the most carefully conceived quantitative measures. In order to capture as fully as possible those subjective dimensions that correlate with excellence in doctoral education, however, we surveyed a sample of program faculty about the

[2] "Perceived quality," a notion that underlies the rating part of the study, is measurable, but not countable. Most of the other variables in the study, such as numbers of faculty, students, citations, or publications are countable.

perceived quality of a sample of programs in their individual fields and then used standard statistical techniques to find the measurable characteristics that best correlated with these subjective estimates of program quality. We balanced this by asking faculty members in each field for their explicit views of the characteristics that are most important in facilitating a strong Ph.D. program. We then made a blend of these two estimators—the "regression-based" views of faculty as expressed through their ratings of sample programs, and their "direct" views as obtained through explicit identification of important program characteristics—to give us the quantitative tool that most robustly measured overall program quality.

2

The Data and How They Were Obtained

The long history of the NRC Assessment of Research Doctorate Programs in the United States—this is the third in a series of such assessments since 1982—will not be recounted in detail here. Rather, we will offer a shortened history that begins with the decision of the National Research Council to undertake another study following the assessment published in 1995. The first step in the process of developing this new assessment was the publication of *Assessing Research Doctoral Programs: A Methodology Study* ("the Methodology Study"), which was completed in 2003 and provided a roadmap for the large-scale study. At this point, universities still had to be recruited to join in the study, the final taxonomy of disciplines had to be settled, and the questionnaires had to be finalized and administered.

RECRUITING UNIVERSITIES

In November 2006 the chairman of the National Research Council, Ralph Cicerone, notified presidents and chancellors of U.S. universities offering doctoral degrees of the NRC's intention to conduct a new assessment of doctoral programs. The universities were asked to contribute funding to the project, with the amount determined by a sliding scale that reflected the number of doctoral degrees in selected fields granted in 2003-2004 according to the National Science Foundation's Survey of Doctoral Recipients.[3] Two hundred twenty-two universities chose to participate.[4] Most of the data collection was carried out in late fall 2006 and spring 2007. Data were checked through fall 2007 via correspondence with many institutions. Data collection was completed in the spring of 2008. At this point the study had collected data for more than 5,000 programs in 61 fields in the physical sciences and mathematics, agricultural and

[3] A contribution was not required for participation, but almost all of the participating universities did contribute funds.

[4] The institutions that chose not to participate generally had very few doctoral programs and often were undergoing administrative reorganization. Although the NRC followed up with institutions that did not respond, a handful of institutions that had been invited were excluded because of non-response.

life sciences, health sciences, engineering, social sciences, and arts and humanities.[5] Unless otherwise stated, the data reported in this study are for the 2005-2006 academic year. The universities and their programs are listed on the Web site whose URL is given in Appendix D.

THE TAXONOMY

At the same time as the universities were being recruited, we consulted widely in order to settle on a taxonomy of disciplines.[6] To assist us in this task, we examined the taxonomy of fields used by the National Science Foundation (NSF) in its Doctorate Records File,[7] reviewed the classification of instructional programs (CIPS) of the U.S. Department of Education, and consulted with a number of scholarly societies. These societies were especially helpful when it came to the life sciences, because the taxonomy used in the 1995 NRC study for that area had become outdated. In particular, interdisciplinary study in the life sciences had grown considerably since 1995. This is reflected in the current study by the addition of an interdisciplinary field, "Biology/Integrated Biology/Integrated Biomedical Sciences," which includes 120 programs. Most of the other changes from the 1995 NRC study served to expand the disciplines that were included. For example, programs in agricultural fields, public health, nursing, public administration, and communication were added. We decided not to include doctoral programs in schools of education, because in many cases, research and practice-oriented doctoral programs could not be separated. A separate study of these programs is now beginning under the auspices of the American Education Research Association.

The criteria for inclusion of a field or a discipline in the study were that it had produced at least 500 Ph.D.'s in the five years prior to 2004-2005, and that there were programs in the field in at least 25 universities.[8] The criterion for inclusion of a program was that it had produced at least five Ph.D.'s in the five years prior to 2005-2006.[9] Given these criteria, each university chose which of their programs to include. The disciplines and programs covered by the study are listed in Appendixes C and D.

---

[5] Data were collected for 67 fields in all, but 6 of these were emerging fields with too few programs to rate. Only partial data were collected for 5 of these fields. The other field that was not rated was Languages, Societies, and Cultures, which is discussed below.

[6] A provisional taxonomy had been suggested in *Assessing Research-Doctorate Programs: A Methodology Study.* This was revisited by a panel of the current Committee.

[7] The Doctorate Records File, administered by the National Science Foundation (NSF), is a joint data gathering activity of NSF, the U.S. Department of Agriculture, U.S. Department of Education, U.S. Department of Energy, the National Institutes of Health, and the National Endowment for the Humanities

[8] The fields of German and classics were included, although they did not meet these criteria, because they had been included in earlier NRC assessments. In 2006, they not only were included for historical reasons, but they qualified on the basis of the number of programs in the field.

[9] The dates for the test of field inclusion differ from those for program inclusion because of the lag in NSF data on Ph.D. production by field. Program data, which were obtained from the universities, were more current.

QUESTIONNAIRE CONSTRUCTION AND DATA COLLECTION

During the winter of 2005-2006, a panel consisting of graduate deans and institutional researchers met to review the questionnaires that had been developed for the methodology study and to suggest additional and alternative questions. Once the draft questionnaires had been posted on the project Web site, many suggestions were also received from the universities. The questionnaires were finalized in November 2006 and a link to them appears in Appendix B. The administration of the questionnaires involved the following steps:

- **Questionnaire design—**Five questionnaires were designed:
    1) an **institutional questionnaire**, which contained questions about institution-wide practices and asked for a list of doctoral programs at the institution.
    2) a **program questionnaire**, which was sent to each doctoral program in most cases[10]. In addition to questions about students, faculty, and characteristics of the program, programs were asked to provide lists of their doctoral faculty, and for five fields, their advanced doctoral students (see below)
    3) the **faculty questionnaire,** which asked individual faculty members about their educational and work history, grants, publications, what characteristics they felt were important to the quality of a doctoral program, and whether they would be willing to answer a survey asking them to provide ratings for programs in their field.
    4) the **student questionnaire**, sent to advanced students in English, chemical engineering, economics, physics, and neuroscience, which asked about student educational background, research experiences while in the program, program practices that they had experienced, and post-graduation plans.
    5) the **rating questionnaire**, which was sent to a stratified sample of those who had answered on the faculty questionnaire that they were willing to provide ratings of programs in their field.

    The operation of administering all these questionnaires was conducted by our contractor, Mathematica Policy Research, in close collaboration with NRC staff. All questionnaires were submitted and approved by the Institutional Review Board (IRB) of the National Research Council and most institutions also received approval from their own IRBs.

- **Data Collection—**Each of the participating universities was asked to name an institutional coordinator (IC) who would be responsible for collection of data from the university. On the institutional questionnaire, the IC provided the names of the programs at that university that met the NRC criterion for inclusion. Each of these programs was then sent the program questionnaire through the IC. Some universities had a well-developed

[10] Some large institutions with well-equipped institutional research offices answered those program questions they could centrally and then sent the remaining questions to the doctoral programs to answer.

centralized data-collection capability and provided much of the data centrally. Others did not and gave the program questionnaires to each of their programs to complete. Each program was asked for a list of faculty members who were involved in doctoral education according to the NRC definition of a program that was given on the institutional and program questionnaires. On the program questionnaire, we asked respondents to divide their program faculty into three groups: (1) core faculty, who either were actively supervising doctoral dissertations or serving on an admissions or curriculum committee for the doctoral program; (2) new faculty, who were tenured, or tenure-track faculty, who had been hired in the previous three years and were expected to become core faculty; and (3) associated faculty, who were not core faculty in the program, but were working in the program supervising dissertations and were regular faculty members at the institution. The faculty questionnaire was then sent to core and new faculty in each program and included a section (Section G) asking what aspects of doctoral programs the faculty member thought were important to quality.

Faculty in programs in five fields (physics, English, chemical engineering, economics, and neuroscience) were asked to provide lists of enrolled students who had been admitted to candidacy. These students were then each sent a copy of the student questionnaire. All questionnaires were delivered and answered online. Selected results of the student survey will be provided in the final report, but are not discussed in this guide. As part of the faculty questionnaire, faculty members were asked if they would be willing to complete a rating survey. Those who indicated they were willing were put into a pool that was used to obtain the stratified sample of raters for the rating survey. Although response rates varied by field, there were no detectable characteristics of non-respondents that would suggest response bias.

• **Sampling for the rating survey—**Programs and raters within a field were classified according to the size of the program (measured by faculty size) and the program's geographic region. Raters were also classified by faculty rank. In the fields with a large number of programs, 50 programs were sampled at random from a stratified classification. In fields with a smaller number of programs, 30 programs were chosen in a similar manner. A sample of raters in each field was chosen so that the sample duplicated the distribution by program size, faculty rank, and geographic region for all programs in the field. Each rater was given a set of 15 programs to rate on a six-point scale, for which 1 was "not adequate for doctoral education" and 6 was "distinguished." The questionnaire also asked the rater's familiarity with each program and provided information about the program and a reference to the program Web site. On average, programs received ratings from about 58 percent of the selected raters who had been given data about them. Non-respondents were replaced by other raters from the same stratum until almost every program had been rated by 50 raters[11]. Most programs in the rating sample received at least 40 ratings.[12] The numbers of raters for programs in each rated field are shown in Appendix H[13].

[11] The average number of raters taken over all programs was 44. See Appendix H.

[12] Since the committee did not know in advance how many programs there would be in each discipline, special treatment was given during the regression calculations to programs in disciplines with fewer than 35 programs.

• **Method of collecting publications, citations, and awards—**With the exception of fields in the humanities, publications and citations were collected through the Institute for Scientific Information (ISI), now a part of Thomson Scientific, and matched to faculty lists for fields in the sciences (including the social sciences). To assist in matching publications to faculty, faculty were asked for a list of ZIP codes that had appeared on their publications. These were used to match publications to faculty who had moved and to distinguish faculty with the same name and field. Although faculty were also asked about their publications in Section D of the faculty questionnaire, these lists were used only to check the completeness of the ISI data. The citation count is for the years 2000-2006 and relates to papers published between 1981 and 2006. In the case of the humanities, for which we do not have a comprehensive bibliographic source, we analyzed faculty members' curriculum vitae, which were submitted along with the faculty questionnaire or the list they provided in answer to the questionnaire. We then counted books and publications going back to 1996 and recorded these counts, giving books a weight of 5 and articles a weight of 1. Finally, lists of honors and awards were collected from 224 scholarly societies for all fields and differentiated between "highly prestigious" awards, which received a weight of 5, and other awards, which received a weight of 1.

• **Key variables—**Twenty-one key variables[14] were identified by the committee for inclusion in the rating process; these are described in Appendix E. One other variable that the committee wished to include—the number of student publications and presentations—was excluded because of lack of data. Most of these variables are expressed as *per capita* or "intensive" variables; that is, we divided the measure of interest (e.g., publications, citations) by the "allocated" faculty in the program, or, in the case of citations, we divided citations by the number of publications for each faculty member. This allocation was designed to assure that no more than 100 per cent of a faculty member was assigned to all programs taken together. The use of these key variables is described in Chapter 3.[15]

These were combined with another field that had similar "direct" weights in order to obtain the regression-derived ratings.[13] Languages, Societies, and Cultures was a special case that was not rated when it became clear to the committee that the programs included in the "field" were too heterogeneous for ratings to be obtained that were comparable across the field and that no subfield had more than 20 programs. Respondents included programs in Italian, romance languages, Russian studies, Middle Eastern studies, African studies, and a number of other fields. Full data about these programs will be published in the database accompanying the final report.

[14] There were only 19 for the humanities fields, since citation data were unavailable.

[15] The justification of each of the variables will be discussed in the final report. Two variables, however—one controversial and one novel—should be mentioned at this point. There is a large literature about the use of citations as a measure of excellence. A citation measure for an individual faculty member may be manipulated by self-citation. Flawed results may be highly cited but not indicative of quality. We grant the validity of these objections, but remind the reader that we are aggregating citations across the publications of all the faculty members in a program. Considering aggregated data, within a field, subdisciplines can have varying patterns of productivity and the numbers of citation an article may receive are not independent of the size of the subdiscipline, so that the value of the measure for a program will depend on its specialty composition, not the quality of the program. The final report will have a short discussion of these pitfalls. We use the variable here, in intensive form, because other things equal, we believe that a program whose faculty are more cited and that has a greater number of citations per publication will be a higher-quality program. The novel variable is interdisciplinarity. It, too, will be discussed at

- **Final data review**—Once all the data had been collected, they were reviewed by NRC staff for completeness and consistency. The institutional coordinators were asked to revise anomalous data and populate missing cells. If, after this request, the programs were still unable to provide missing data, two procedures were followed: If data on two or fewer measures were missing, the cells were populated with the mean value for programs that had provided data.[16] If data for three or more measures were missing, the program was dropped and the institutional coordinator was informed. If the data were then provided, the program was reinstated. Program names and assignment to a field were also reviewed by staff, and the institutional coordinator was consulted if anomalies were found and his or her recommendation was followed.

---

greater length in the final report. We measure interdisciplinarity by the percent of program faculty who are serving on dissertation committees from outside the program (associated faculty). This is an imperfect measure, since it will depend on institutional practices; e.g., how broad doctoral programs are. We felt, however, that some measure, however imperfect, would be informative. It rarely shows up as an important variable in determining program ratings.

[16] These values will be identified in the data tables that accompany the final report. Eight hundred fifty-four programs out of 4,915 total had at least one missing value. Programs were dropped if they did not submit a faculty list, so there were no missing values for the publications, citations, or awards measures.

3

Ratings in Specific Dimensions: The Dimensional Measures

The dimensional measures are provided to assure that measures of a broad range of characteristics of doctoral programs are available. They are divided into three categories: (1) research activity, (2) student support and outcomes, and (3) diversity of the academic environment. Each of the dimensional measures begins with the measures relating to one dimension of doctoral program performance, applies the weights from the faculty survey about what program characteristics contribute to quality, and then constructs a range[17] of rankings for each program based on this dimension of the data, taking into account variability in the data and in the choice of raters. They are dimensional in the sense that they provide more focused measures than the overall range of rankings, but they are central to the calculation of this range.

Some specifics about the calculation of these measures follow.

• **How the weights are obtained—**As part of the NRC faculty questionnaire, we asked faculty to indicate the relative importance of different characteristics of doctoral programs; this was done through the multipart question that makes up Section G of the faculty questionnaire (see Appendix B). Faculty were questioned about faculty quality, student characteristics, and program characteristics. First they were asked to indicate up to four characteristics in each category that they thought were important to program quality. Each characteristic that was listed received an initial score of 1. These preferences were then narrowed by asking the faculty members to identify a maximum of **two** characteristics in each category that they thought were most important. These characteristics each received a score of 2. A final question asked faculty members to indicate the relative importance of each category by assigning category weights whose values summed to 100. For each individual faculty member, the weight for a variable was calculated as the sum of the "votes" that it received times the importance assigned to the category that contained it. The weight for a variable in a discipline was the average weight taken across all faculty members in it. We

[17] When we use the term "range," we are referring to the inter-quartile range. This is the range that contains half of the observations or estimates of the quantity of interest.

took into account variability in raters' opinions and uncertainties due to missing data and the fact that some measures were sampled at one point in time.[18] Approximately 86 percent of the faculty responded. Their responses permitted calculation of the set of "direct" weights. Although there was some variation in the faculty responses, they were generally in agreement that publications and citations were the most important factors in program quality. Every variable, however, received some weight[19]. These weights were used to construct the dimensional measures. The average weights for programs in each broad field are shown in Appendix F, and an example of ranges of rankings for programs in economics is shown in Appendix G.

• **Research activity—**This dimensional measure relates to various ways to gauge the contribution of research: publications, citations (except for the humanities), the percent of the faculty holding research grants, and recognition of scholarship as evidenced by honors and awards. Specifically, the components of the research activity dimensional measure are: average publications per allocated faculty member,[20] average citations per publication, percent of core and new doctoral faculty respondents holding grants, and awards per allocated faculty member. Publishing patterns and the availability of research funding and awards for scholarship vary by field, but the weight placed on publications per faculty member is remarkably consistent—about 30 percent—across fields. Research activity is the dimensional measure that most closely tracks the overall measure of program quality, because in all fields, both the direct measure—based on abstract faculty preferences—and the regression-based measure put high weight on these measures.

• **Student support and outcomes—**This measure combines data on the percent of students fully funded in the first year, the percent of students completing their degrees in a given time period, time to degree, placement in academic positions (including academic postdoctoral positions), and whether a program collects data about the employment outcomes for its students. We found that faculty typically placed a larger weight on student support and completion rates than on median time to degree, academic placement, or whether a program

[18]There is some uncertainty in the values of the program variable values themselves. Some of the 20 program variables used to calculate the ratings also vary or have an error associated with their values due to year-to-year fluctuations. Data for five of the variables (publications per faculty, citations per publications, GRE scores, Ph.D. completion, and number of Ph.D.'s) were collected over time, and averages over a number of years were used as the values of these program variables. If a different time period had been used, the values would have been different. To express this type of uncertainty, a *relative error term,* e_{jk}, was associated with each variable value. For details, see Appendix A.

[19] All "direct" weights are used in the calculation of the Dimensional Measures. This differs from the case of the Overall Rating of Program Quality, in which some coefficients might be set to zero if the result of combining the direct and the regression-based weights was not statistically significantly different from zero.

[20] Because many faculty members supervise dissertations in more than one program, faculty members were allocated across these programs so that the total, taken across all programs, equaled one or less (in the case in which the faculty member was in a professional school).

follows the employment outcomes of it students.[21] There is surprising uniformity across broad fields on the weights, which are shown in Appendix F.

• **Diversity of the academic environment**—The diversity measures did not appear as major factors in determining the overall perceived quality of programs. Taken separately, there are definite patterns for variables that faculty thought were more important, and these vary by field. The measures that are included in this dimensional measure are: the percent of faculty and percent of students who are from underrepresented minority groups, the percent of faculty and the percent of students who are female, and the percent of students who are international (that is, in the United States on a temporary visa). In terms of field differences, most fields place the highest weight on the percentage of students from underrepresented minority groups. In the health sciences, social sciences, and humanities, relatively high weights are also placed on the percentage of faculty who are underrepresented minorities. The percentage of international students was not highly weighted, except for the physical sciences. These weights, by broad field, are shown in Appendix F.

What is interesting about the dimensional ratings is that, with the exception of the research activity measure, they produce program rankings that are quite different from the overall ratings. This can be seen in the table in Appendix G. Excellence in doctoral programs is not uni-dimensional. Some students may prefer a program where they can be assured of steady funding and a short time to degree, even if it is not a program that is perceived as stellar in terms of the productivity of its faculty. Similarly, a program that is more diverse may be preferable to many students, although diversity bears only a tenuous relation with the usual measures of scholarly productivity. Users of the assessment should be aware of these different dimensions, because each presents the characteristics of an individual doctoral program from a different perspective.

[21] Ideally, we would have used a measure such as employment in one's field 5 years after receipt of Ph.D., but many programs did not collect such data. The committee hoped that including this measure would encourage more programs to pay attention to post-degree outcomes for their graduates

4

The Overall Rating of Program Quality

The dimensional measures provide a summary of program performance along individual dimensions that are of importance in doctoral education. The overall rating combines the variables that make up the dimensional measures into a single measure. In addition to reflecting the faculty preferences in each field as derived from the faculty questionnaire, it includes the results of the importance measures derived from the rating survey. This section describes in non-technical terms how the overall rating of a program is calculated. Readers who wish more technical detail are referred to Appendix A.

THE OVERARCHING IDEA

There is a great deal of uncertainty in the ratings of the quality of programs. Uncertainty can come from a variety of sources. For example, although many academics may think that they can identify the top five or ten programs in their field, this certainty about perceived quality decreases as more and more programs are included. Furthermore, one program may be strong in one area while a second program's strengths may lie in a different area. Faculty asked to rate programs may differ in their views about the importance of these strengths, and the programs may differ in various characteristics, many of which may be considered important to the perceived quality of a doctoral program.

Describing this uncertainty was a key task of the predecessor committee that produced *Assessing Research-Doctorate Programs: A Methodology Study*.[22] This committee examined the methodology of the 1995 study and recommended that the next study rely more explicitly on

[22] National Research Council., *Assessing Research-Doctorate Programs: A Methodology Study*. Washington, D.C. 2003.

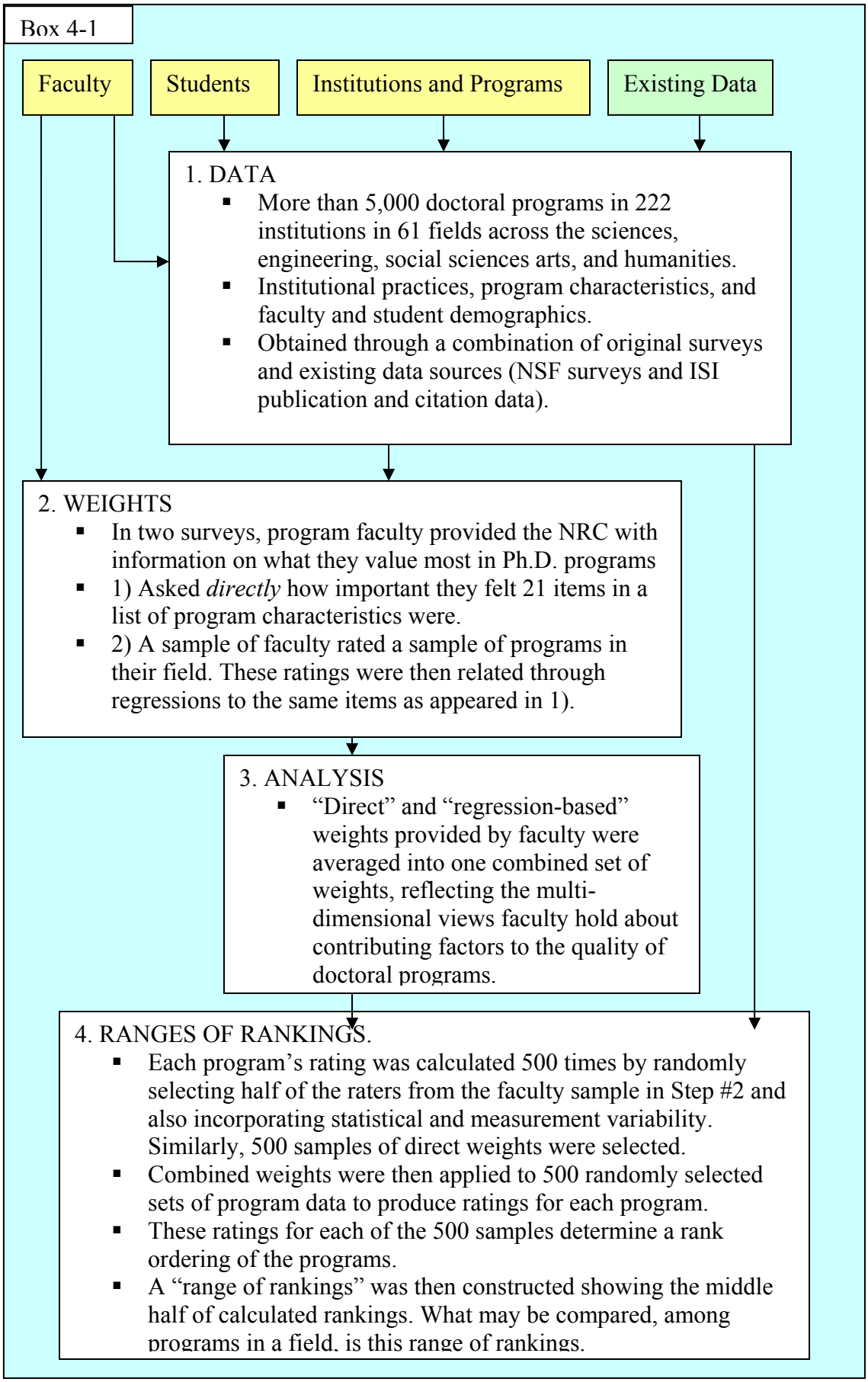
program data. It also contained two key recommendations as to how the methodology of obtaining reputation measures should be revised:

> "The next study should have sufficient resources to collect and analyze auxiliary information from peer raters and the programs being rated to give meaning and context to the rating ranges that are obtained for the programs…." (p. 5)
>
> and
>
> "Re-sampling methods should be applied to ratings to give ranges of rankings for each program that reflect the variability of ratings by peer raters. The panel investigated two related methods, one based on Bootstrap re-sampling and another closely related method based on Random Halves, and found that either method would be appropriate." (p. 5)

The dimensional ratings, described in the previous section, fulfill the first recommendation. This section describes how the second recommendation was followed and combined with the first to obtain an overall rating for each program within a field.

THE OVERALL APPROACH

A schematic description of the overall approach appears in Box 4-1 and is described in the text:



Faculty were surveyed to get their views on the importance of different characteristics of programs as measures of quality. Ratings were based on faculty members' views of how those measures related to program quality, as discussed in the chapter on dimensional measures. The views were related to program quality using two distinct methods: (1) directly, through answers to questions on the faculty survey; and (2) regression-based, obtained by asking faculty raters to provide program ratings for a sample of programs in a field and then relating these ratings, through a regression model that corrected for correlation among the characteristics, to data on the program characteristics. The two methods approach the ratings from different perspectives. The direct approach is a "bottom-up" approach that builds up the ratings from the importance that faculty members gave to specific program characteristics independent of reference to any actual program. The regression-based method is a "top-down" approach that starts with ratings of actual programs and uses statistical techniques to infer the weights given by the raters to specific program characteristics. The direct approach is idealized. It asks about the characteristics that faculty feel contribute to quality of doctoral programs without reference to any particular program. The second approach presented the respondent with 15 programs in his or her field and asked for ratings of program quality[23], but the responders were not explicitly queried about the basis of their ratings.

Because it turned out that these different approaches gave results that were similar in magnitude[24] but not strongly correlated[25], the two views of the importance of program characteristics were combined[26] to obtain an overall view (or combined weight) for each measured program characteristic. The sum of these weighted characteristics yielded a rating for each program. As is explained below, each rating is recalculated 500 times using different samples of raters. The program ratings obtained from all these calculations can then be arranged

[23] The question given raters about program quality was:

On a scale from 1 to 6, where 1 equals not adequate for doctoral education and 6 equals a distinguished program, how would you rate this program?

Not Adequate For Doctoral Education	Marginal	Adequate	Good	Strong	Distinguished	Don't Know Well Enough
1	**2**	**3**	**4**	**5**	**6**	**9**

[24] In the case of the resulting direct and regression based weights.

[25] For any given measure, the results from the two methods are not highly correlated with one another, permitting us to assume that the results from the two approaches are statistically independent.

[26] If there were no uncertainty, the weights would simply be averaged. Because there is uncertainty, the optimal combined weight is not so simple. but takes into account the variances of the separate coefficients. See equations (19) and (20) in Appendix A and the related discussion.

in rank order and, in conjunction with all the ratings from all the other programs in the field, used to determine a range of possible rankings.

Because of the various sources of uncertainty, which are discussed at greater length in Appendix A, each ranking is expressed as a range of values. These ranges were obtained by taking into account the different sources of uncertainty in these ratings (statistical variability from the estimation, program data variability, and variability among raters). The measure of uncertainty is expressed by reporting the end points of the inter-quartile range of rankings for each program; that is, the range that contains the middle half of a large number of ratings calculations that take uncertainty into account.[27] An example of the derivation of rankings for a program is given in the Chapter 5.

In summary, we obtain a range of rankings for each program in a given field by first obtaining two sets of weights through two different methods, direct and regression-based. We then standardize all the measures to put them on the same scale and obtain ratings by multiplying the value of the standardized measure by the weights. We obtain both the direct weights and coefficients from regressions through calculations carried out 500 times, each time with a different set of faculty, to generate a distribution of ratings that reflects their uncertainties. We obtain the range of rankings for each program by trimming the bottom quarter and the top quarter of the 500 rankings to obtain the inter-quartile range. This method of calculating ratings and rankings takes into account variability in rater assessment of what contributes to program quality within a field, variability in values of the measures for a particular program, and the range of error in the statistical estimation. It is important that these techniques give us a range of rankings for most programs. We do not know the exact ranking for each program, and to try to obtain one—by averaging, for example—could be misleading, because we have not imposed any particular distribution on the range of rankings.[28] The database that presents the range of rankings for each program will list the programs alphabetically and give the range for each program. Users are encouraged to look at groups of programs that are in the same range as their own programs, as well as programs whose ranges are above or below, in trying to answer the question, "Where do we stand?"

The next section provides an example of how the ranges of rankings were calculated for a particular program.

[27] The inter-quartile range eliminates the top and bottom 125 ratings calculated from 500 regressions and 500 samples of direct weights from faculty. It is a range that contains half of all the rankings for a program.
[28] For example, most of the rank ordered ratings could be at the top of the range.

5

An Example

Shortly before the assessment is released, each institutional coordinator will receive three tables for each program that was ranked. These will reflect the following: (1) the values that they submitted or were calculated from their data for each of the 20 variables with their corresponding standardized values, and (2) a pair of combined coefficients (plus and minus one standard deviation from the average value) used in weighting the variables (see Table 5-1); and (3) the standardized program values and the actual combined coefficients that were used to calculate the rating corresponding to each endpoint of the inter-quartile range of rankings for that program, as well as the program ranking corresponding to those ratings (see Tables 5-2a and 5-2b). Examples of these tables for an economics program are presented and discussed below.

Table 5-1 shows the values submitted by an unidentified program in economics and the range of combined coefficients for the entire field. Columns 1 and 2 name and label the variables. Column 3 gives the program value for each of the 20 variables used in the overall rating (see Appendix E for a description of these variables). Column 4 presents the standardized value of each variable in column 3; scores are standardized across all programs in the field, using a mean of 0 and variance of 1. Thus, the relative strengths and weaknesses of a program (in terms of these 20 variables) can be seen by comparing the standardized values in column 4. Columns 5 and 6 give the pairs of combined coefficients (weights) assigned to each variable used in rating all economics programs.[29] Each coefficient is a combination of both the direct and regression-based weights, the derivation of which is described in detail in Appendix A. In economics, variables V1, V2, and V14 (publications per allocated faculty, cites per publication and average number of Ph.D.'s) were assigned the largest weights.

Although it would be relatively easy to calculate a single rating for the program using the data in Table 5-1, the result could be misleading, because it would not reflect the variability (i.e., uncertainty) in each of the program measures or the variability in the estimation of the weights. The process for taking into account these sources of variability is described in detail in Appendix A.

[29] Five hundred regressions are run using half of the raters each time and 500 draws are made from randomly selected halves of the pool of direct ratings in order to construct the combined coefficients. The values presented show the range encompassed by plus or minus one standard deviation for each coefficient. See Appendix A for details.

TABLE 5-1 Data and Coefficient Table for a Program in Economics

Standardized Program Values and Range of Combined Coefficients
Institution Name: xxx
Program Name: yyy

Column 1	Column 2	Column 3	Column 4	Column 5		Column 6
				Combined Coefficients**		
Description	**Variable**	**Program Value***	**Program Value Standardized***	**Minus 1 SD**		**Plus 1 SD**
Publications per Allocated Faculty	V1	1.074	2.180	0.118	to	0.132
Cites per Publication	V2	1.171	-0.234	0.276	to	0.307
Percent of Faculty with Grants	V3	25.50%	-0.583	0.084	to	0.091
Percent Faculty Interdisciplinary	V4	5.90%	-0.641	n.s.#		n.s.#
Percent Non-Asian Minority Faculty	V5	7.70%	0.547	n.s.#		n.s.#
Percent Female Faculty	V6	12.50%	-0.440	n.s.#		n.s.#
Awards per allocated faculty	V7	0	-0.546	0.043	to	0.060
Average GRE-Q	V8	746	-0.165	0.092	to	0.096
Percent 1st yr. students w/ full support	V9	100.00%	0.980	0.036	to	0.056
Percent 1st yr students with portable fellowships	V10	0.00%	-0.544	0.021	to	0.033
Percent Non-Asian Minority Students	V11	10.00%	0.069	n.s.#		n.s.#
Percent Female Students	V12	44.40%	0.678	-0.038	to	-0.030
Percent International Students	V13	53.30%	-0.509	n.s.#		n.s.#
Average PhDs 2002 to 2006	V14	5.4	-0.355	0.120	to	0.144
Percent Completing within 6 years	V15	27.60%	-0.638	n.s.#		n.s.#
Time to Degree Full and Part Time	V16	5.67	0.232	-0.028	to	-0.017
Percent students in Academic Positions	V17	11.10%	-1.405	0.049	to	0.065
Student Work Space	V18	1	1	n.s.#		n.s.#
Health Insurance	V19	1	1	n.s.#		n.s.#
Number of student activities offered	V20	17	0.439	0.026	to	0.037

**Col 3 is based on data submitted by the program or calculated from these data.*

+ Col 4 is standardized across all program values in the field, with mean of 0 and variance of 1.

*** Col 5 is Minus 1 Standard Deviation from the Mean for the combined coefficients for the field as a whole*

*** Col 6 is Plus 1 Standard Deviation from the Mean for the combined coefficients for the field as a whole*

 # n.s. in a cell means the coefficient was not significantly different from 0 at the p=.05 level.

Tables 5-2a and 5-2b show the calculations of the first and third quartile rankings, respectively, for a particular program.[30] First, a randomly sampled set of regression coefficients and direct weights is used to obtain a set of 20 combined weights (column 5). These weights are multiplied by a sampled set of standardized program values (column 4) to generate a program rating (sum of column 6). This process is repeated another 499 times, generating 500 ratings for each of the 117 economics programs. Each of these 500 ratings for the program is *ranked* by comparing it with the ratings for the other 116 economics programs, based on the same selection of weights. The 500 rankings for the program are then ordered from best to worst, with the 125th being the Quartile 3 ranking (45) and the 375th being the Quartile 1 ranking (56). These values determine the inter-quartile range of rankings for the program. Half of the 500 randomly generated rankings for the program fall within this range[31]. The ratings that produced these first and third quartile rankings are -0.054 and 0.085, as shown in Tables 5-2a and 5-2b.[32]

[30] The first quartile ranking is the highest value of the lowest quarter of rankings. The third quartile ranking is the highest value of the third quarter of rankings.

[31] Use of the inter-quartile range means that we "throw away" half of the possible rankings for the program. The tails of the distribution can be very long, however, and the inter-quartile range is useful in making meaningful comparisons, while illustrating the point that any point estimate of a ranking is inexact.

[32] We do not show the 117 x 500 matrix of all the ordered ratings for all the economics programs, although it will be available when the final report is released. However, the ranking is obtained from that table.

Table 5-2a Sample First Quartile Ranking Calculation

Institution Name: xxx

Program Name: yyy

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
Description	**Variable**	**Program Value***	**Standardized Program Value with Variation+**	**Combined Coefficient@**	**Product Col 4 x Col 5**
Publications per Allocated Faculty	V1	1.074	1.784	0.130	0.231
Cites per Publication	V2	1.171	-0.269	0.294	-0.079
Percent of Faculty with Grants	V3	25.5%	-0.596	0.085	-0.051
Percent Faculty Interdisciplinary	V4	5.9%	-0.581	n.s.#	n.c.#
Percent Non-Asian Minority Faculty	V5	7.7%	0.444	n.s.#	n.c.#
Percent Female Faculty	V6	12.5%	-0.511	n.s.#	n.c.#
Awards per allocated faculty	V7	0	-0.290	0.038	-0.011
Average GRE-Q	V8	746	-0.286	0.091	-0.026
Percent 1st yr. students w/ full support	V9	100%	1.432	0.044	0.064
Percent 1st yr students with portable fellowships	V10	0.0%	-0.489	0.023	-0.011
Percent Non-Asian Minority Students	V11	10.0%	0.062	n.s.#	n.c.#
Percent Female Students	V12	44.4%	0.561	-0.029	-0.016
Percent International Students	V13	53.3%	-0.018	n.s.#	n.c.#
Average PhDs 2002 to 2006	V14	5.4	-0.379	0.152	-0.058
Percent Completing within 6 years	V15	27.6%	-0.574	n.s.#	n.c.#
Time to Degree Full and Part Time	V16	5.67	0.017	-0.026	0.000
Percent students in Academic Positions	V17	11.1%	-1.365	0.063	-0.086
Student Work Space	V18	1	1.000	n.s.#	n.c.#
Health Insurance	V19	1	1.000	n.s.#	n.c.#
Number of student activities offered	V20	17	-0.427	0.025	-0.011
Average Rating (total of column 6)					-0.054
Program Ranking for this rating = 56					

**Col 3 is based on data submitted by the program or calculated from these data.*

+Col 4 is standardized value for the set of perturbed program values that produced the 1st quartile ranking. Standardized values have a mean of 0 and variance of 1.

@ Col 5 is the combined direct and regression-based weights for each variable (see Appendix A).

 # n.s. in a cell means the coefficient was not significantly different from 0 at the p=.05 level.

 # n.c. means the product was not calculated for these coefficients because the coefficient was not significant at the p=.05 level.

Table 5-2b Sample Third Quartile Ranking Calculation

Institution Name: xxx

Program Name: yyy

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
Description	**Variable**	**Program Value***	**Standardized Program Value with Variation+**	**Combined Coefficient@**	**Product Col 4 x Col 5**
Publications per Allocated Faculty	V1	1.074	2.765	0.134	0.371
Cites per Publication	V2	1.171	-0.246	0.267	-0.066
Percent of Faculty with Grants	V3	25.5%	-0.709	0.073	-0.051
Percent Faculty Interdisciplinary	V4	5.9%	-0.669	n.s.#	n.c.#
Percent Non-Asian Minority Faculty	V5	7.7%	0.515	n.s.#	n.c.#
Percent Female Faculty	V6	12.5%	-0.314	n.s.#	n.c.#
Awards per allocated faculty	V7	0	-0.439	0.050	-0.022
Average GRE-Q	V8	746	-0.305	0.089	-0.027
Percent 1st yr. students w/ full support	V9	100%	0.385	0.054	0.021
Percent 1st yr students with portable fellowships	V10	0.0%	-0.585	0.031	-0.018
Percent Non-Asian Minority Students	V11	10.0%	0.226	n.s.#	n.c.#
Percent Female Students	V12	44.4%	0.083	-0.043	-0.004
Percent International Students	V13	53.3%	-0.190	n.s.#	n.c.#
Average PhDs 2002 to 2006	V14	5.4	-0.196	0.121	-0.024
Percent Completing within 6 years	V15	27.6%	-0.725	n.s.#	n.c.#
Time to Degree Full and Part Time	V16	5.67	-0.439	-0.031	0.014
Percent students in Academic Positions	V17	11.1%	-1.293	0.083	-0.108
Student Work Space	V18	1	1.000	n.s.#	n.c.#
Health Insurance	V19	1	1.000	n.s.#	n.c.#
Number of student activities offered	V20	17	-0.058	0.024	-0.001
Average Rating (total of column 6)					0.085
Program Ranking for this rating = 45					

**Col 3 is based on data submitted by the program or calculated from these data.*

+Col 4 is standardized value for the set of perturbed program values that produced the 3rd quartile ranking.

Standardized values have a mean of 0 and variance of 1.

@ Col 5 is the combined direct and regression-based weights for each variable (see Appendix A).

 # n.s. in a cell means the coefficient was not significantly different from 0 at the p=.05 level.

 # n.c. means the product was not calculated for these coefficients because the coefficient was not significant at the p=.05 level.

In interpreting the range of rankings a program received, the first thing to note is which variables have the highest coefficients. These variables can be determined by examining the combined coefficients and identifying the largest ones. In the case of economics, the important variables are citations per publication, publications per allocated faculty, average Ph.D.'s in 2002-2006, and average GRE-Q, each of which has a combined coefficient value of 0.089 or greater. The rest of the variables are less heavily weighted, and a number of the variables don't enter into the determination of the overall rating at all because their coefficients were not statistically different from 0[33]. The program values in column 3 of Table 1 can be contrasted with the values taken across all the values in the field, shown in Table 5-3. The importance of correcting for collinearity [34] is evident from the correlation matrix that follows the variable listing for each field, and is shown in Table 5-4. Citations per publication, for example, have a correlation .7 with awards, and .5 with GRE-Q, with average Ph.D.'s and with percent completing within six years. This interdependence is corrected for by the principal components adjustment described in Appendix A.

[33]The procedure for setting nonsignificant coefficients to 0 is discussed in Appendix A.
[34] That is, high degrees of correlation among some of the independent variables.

TABLE 5-3 Descriptive Statistics for the Variables used in the Ratings: All Economics Programs

	Minimum	1st Quartile	3rd Quartile	Maximum	Standard Deviation
Publications per Allocated Faculty	0.049	0.369	0.655	1.357	0.246
Cites per Publication	0.153	0.684	1.771	5.485	1.002
Percent of Faculty with Grants	0.0%	24.0%	50.0%	100.0%	19.9%
Percent Faculty Interdisciplinary	0.0%	2.1%	26.9%	68.4%	16.3%
Percent Non-Asian Minority Faculty	0.0%	0.0%	7.7%	25.0%	5.3%
Percent Female Faculty	0.0%	10.5%	21.1%	66.7%	9.9%
Awards per allocated faculty	0.000	0.000	0.462	5.131	0.890
Average GRE-Q	353	740	790	800	55
Percent 1st yr. students w/ full support	0.0%	50.0%	100.0%	100.0%	29.2%
Percent 1st yr students with portable fellowships	0.0%	0.0%	9.1%	66.7%	14.2%
Percent Non-Asian Minority Students	0.0%	0.0%	14.3%	50.0%	9.8%
Percent Female Students	0.0%	28.6%	42.9%	76.9%	12.0%
Percent International Students	0.0%	52.4%	76.3%	98.2%	19.6%
Average Ph.D.s 2002 to 2006	1.00	3.20	9.80	26.40	5.73
Percent Completing within 6 years	0.0%	28.3%	51.0%	91.7%	19.1%
Time to Degree Full and Part Time	3.00	5.00	6.00	8.00	0.80
Percent students in Academic Positions	4.2%	17.6%	39.6%	56.5%	12.5%
Student Work Space	-1	-1	1	1	0.985
Health Insurance	-1	1	1	1	0.672
Number of student activities offered	4	15	18	18	2.161

Table 5-4 Correlations Matrix-Economics

	Highest Quartile Research Rating	Lowest Quartile Research Rating	Highest Quartile Student Support Rating	Lowest Quartile Student Support Rating	Highest Quartile Diversity Rating	Lowest Quartile Diversity Rating	Highest Quartile Overall Rating	Lowest Quartile Overall Rating
3rd Quartile Research Rating	1.00							
1st Quartile Research Rating	1.00	1.00						
3rd Quartile Student Support Rating	0.39	0.39	1.00					
1st Quartile Student Support Rating	0.38	0.38	1.00	1.00				
3rd Quartile Diversity Rating	-0.24	-0.25	-0.24	-0.23	1.00			
1st Quartile Diversity Rating	-0.25	-0.25	-0.24	-0.24	1.00	1.00		
3rd Quartile Overall Rating	0.95	0.94	0.45	0.44	-0.23	-0.24	1.00	
1st Quartile Overall Rating	0.95	0.95	0.44	0.43	-0.23	-0.23	1.00	1.00
Publications per Allocated Faculty	0.78	0.79	0.32	0.31	-0.23	-0.24	0.64	0.64
Cites per Publication	0.86	0.84	0.33	0.32	-0.16	-0.17	0.90	0.90
Percent of Faculty with Grants	0.55	0.56	0.09	0.08	-0.12	-0.12	0.51	0.52
Percent Faculty Interdisciplinary	0.05	0.05	0.14	0.14	-0.12	-0.13	0.10	0.11
Percent Non-Asian Minority Faculty	0.03	0.03	0.10	0.10	0.39	0.37	0.00	0.00
Percent Female Faculty	-0.19	-0.20	-0.26	-0.26	0.45	0.45	-0.21	-0.21
Awards per allocated faculty	0.77	0.76	0.41	0.40	-0.21	-0.22	0.77	0.77
Average GRE-Q	0.52	0.51	0.23	0.22	-0.08	-0.08	0.66	0.65
Percent 1st yr. students w/ full support	0.21	0.21	0.58	0.58	0.00	-0.01	0.24	0.24
Percent 1st yr students with portable fellowships	0.34	0.34	0.21	0.22	-0.13	-0.12	0.37	0.37
Percent Non-Asian Minority Students	-0.12	-0.12	0.02	0.02	0.49	0.47	-0.13	-0.13
Percent Female Students	-0.29	-0.28	-0.33	-0.33	0.40	0.41	-0.35	-0.34
Percent International Students	-0.10	-0.10	-0.14	-0.14	0.67	0.69	-0.03	-0.03
Average Ph.D.s 2002 to 2006	0.58	0.57	0.04	0.03	-0.11	-0.11	0.70	0.70
Percent Completing within 6 years	0.50	0.50	0.57	0.56	-0.32	-0.32	0.54	0.54
Time to Degree Full and Part Time	-0.14	-0.16	-0.36	-0.34	-0.07	-0.07	-0.10	-0.10
Percent students in Academic Positions	0.20	0.20	0.71	0.73	-0.20	-0.20	0.27	0.27

Student Work Space	0.13	0.15	0.28	0.28	-0.11	-0.11	0.12	0.12
Health Insurance	0.23	0.23	0.19	0.17	-0.11	-0.12	0.25	0.25
Number of student activities offered	0.05	0.04	0.01	0.01	0.04	0.03	0.16	0.15

Correlations- Economics cont'd (2)	Publications per Allocated Faculty	Cites per Publication	Percent of Faculty with Grants	Percent Faculty Interdisciplinary	Percent Non-Asian Minority Faculty	Percent Female Faculty	Awards per allocated faculty	Average GRE-Q	Percent 1st yr. students w/ full support	Percent 1st yr students with portable fellowships
3rd Quartile Research Rating										
1st Quartile Research Rating										
3rd Quartile Student Support Rating										
1st Quartile Student Support Rating										
3rd Quartile Diversity Rating										
1st Quartile Diversity Rating										
3rd Quartile Overall Rating										
1st Quartile Overall Rating										
Publications per Allocated Faculty	1.00									
Cites per Publication	0.40	1.00								
Percent of Faculty with Grants	0.36	0.37	1.00							
Percent Faculty Interdisciplinary	-0.08	0.08	0.04	1.00						
Percent Non-Asian Minority Faculty	0.06	-0.02	0.12	-0.02	1.00					
Percent Female Faculty	-0.29	-0.06	0.01	-0.08	0.10	1.00				
Awards per allocated faculty	0.42	0.70	0.28	0.20	-0.03	-0.21	1.00			
Average GRE-Q	0.37	0.52	0.16	0.10	-0.19	-0.26	0.38	1.00		
Percent 1st yr. students w/ full support	0.20	0.16	0.06	0.08	0.17	-0.17	0.20	0.23	1.00	
Percent 1st yr students with portable fellowships	0.13	0.36	0.14	0.05	-0.14	-0.19	0.43	0.14	0.12	1.00
Percent Non-Asian Minority Students	-0.09	-0.11	-0.18	0.01	0.42	0.07	0.01	-0.21	-0.01	0.04
Percent Female Students	-0.24	-0.22	-0.06	0.00	0.05	0.18	-0.30	-0.15	-0.04	-0.08

Percent International Students	-0.09	-0.06	-0.10	-0.14	-0.10	0.06	-0.09	0.25	0.02	-0.03
Average Ph.D.s 2002 to 2006	0.33	0.53	0.38	0.11	-0.04	-0.08	0.55	0.44	-0.07	0.20
Percent Completing within 6 years	0.31	0.52	0.09	0.10	-0.17	-0.13	0.52	0.34	0.24	0.28
Time to Degree Full and Part Time	-0.19	-0.09	-0.06	0.06	-0.12	-0.03	-0.06	0.04	-0.05	-0.03
Percent students in Academic Positions	0.15	0.15	0.03	0.14	0.13	-0.27	0.28	0.10	0.11	0.11
Student Work Space	0.17	0.12	0.12	-0.02	0.04	-0.13	-0.06	0.12	0.23	0.06
Health Insurance	0.19	0.21	0.13	0.03	0.10	-0.12	0.12	0.22	0.17	-0.21
Number of student activities offered	-0.07	0.12	0.12	0.12	0.15	-0.04	0.00	0.13	-0.05	-0.08

Correlations- Economics cont'd (3)	Percent Non-Asian Minority Students	Percent Female Students	Percent International Students	Average Ph.D.s 2002 to 2006	Percent Completing within 6 years	Time to Degree Full and Part Time	Percent students in Academic Positions	Student Work Space	Health Insurance	Number of student activities offered
3rd Quartile Research Rating										
1st Quartile Research Rating										
3rd Quartile Student Support Rating										
1st Quartile Student Support Rating										
3rd Quartile Diversity Rating										
1st Quartile Diversity Rating										
3rd Quartile Overall Rating										
1st Quartile Overall Rating										
Publications per Allocated Faculty										
Cites per Publication										
Percent of Faculty with Grants										
Percent Faculty Interdisciplinary										
Percent Non-Asian Minority Faculty										
Percent Female Faculty										
Awards per allocated faculty										
Average GRE-Q										
Percent 1st yr. students w/ full support										
Percent 1st yr students with portable fellowships										
Percent Non-Asian Minority Students	1.00									
Percent Female Students	0.05	1.00								
Percent International Students	-0.04	0.05	1.00							
Average Ph.D.s 2002 to 2006	-0.10	-0.27	0.06	1.00						
Percent Completing within 6 years	-0.13	-0.36	-0.13	0.28	1.00					
Time to Degree Full and Part Time	-0.08	0.01	-0.01	0.10	-0.33	1.00				
Percent students in Academic Positions	0.11	-0.25	-0.18	0.03	0.22	-0.03	1.00			

Student Work Space	-0.04	-0.04	-0.08	-0.15	0.26	-0.26	0.09	1.00		
Health Insurance	-0.17	-0.11	-0.01	0.16	0.06	0.01	0.10	-0.05	1.00	
Number of student activities offered	0.02	-0.11	0.05	0.16	-0.02	0.09	0.10	-0.05	0.19	1.00

The overall range of rankings should be looked at in the context of the dimensional measures for economics shown in Appendix G. Typically, programs that score well on the overall rankings will also do well on the research activity ranking, because the two have a number of highly weighted components in common. It is also worthwhile to look at the student support and outcomes ranking and the diversity ranking, because these may be of importance to students in selecting a program. The economics program's overall measure—it is program number 62 in the table in Appendix G—places it between the 45th and 56th of the 117 programs. Looking at the dimensional rankings, its research activity is highly ranked—between the 21st and 31st—primarily because of a relatively high rate of publications per allocated faculty member. It does less well in terms of student support and outcomes, where it ranks between the 74th and 87th. Nor does it perform especially well on the diversity dimensional measure—its rank is between the 64th and 77th. The dimensional measures, then, indicate the specific areas in which programs are performing well or poorly, as separate from the overall range of rankings.

The example is intended to explain to the reader how ratings are calculated, and how a range of rankings is constructed. Shortly before the study results are released, each institutional coordinator will receive tables similar to the tables above, showing the program data, the range of coefficients for each variable, the calculation of the first and third quartile rating, and the corresponding ranking for each rated program at the institution. The user should be aware, however, that he or she cannot duplicate all 500 samples of combined coefficients. After the report is released, software will be provided that will permit simulations of ratings with user-supplied weights and alternative data values. Because the ratings depend on program data and weights, both of which have uncertainties associated with them, the ranking resulting from a simulation can only be approximate. The committee would advise that the calculations are more useful in a qualitative sense. That is, for the numerous programs that fall in the middle range of rankings, it doesn't make sense to focus on an exact range. It does make sense to identify the variables that are important to the ranking of each program and, where possible, improve them[35].

[35] An example would be working to shorten time to degree.

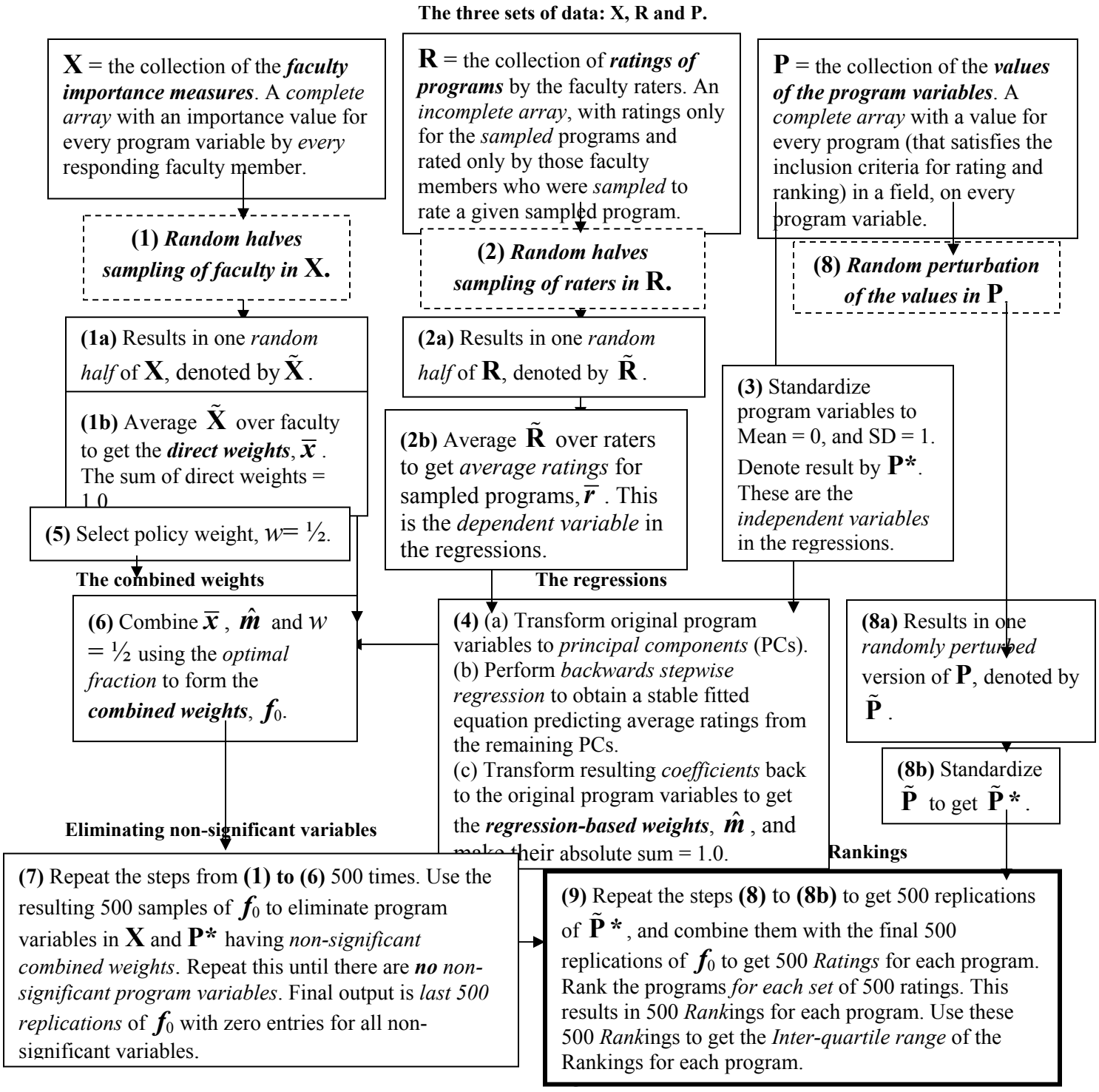
APPENDIX A

A Technical Discussion of the Process of Rating and Ranking Programs in a Field.

This appendix explains in detail how the various parts of the rating and ranking process for graduate programs fit together and how the process is carried out. Figure A-1 provides a graphical overview of the entire process and forms the basis for this appendix. We address each of the boxes in Figure A-1 separately, starting at the top and generally working downward and to the right. The topics in this appendix include:

- a summary of the sources of data used in the rating and ranking process,
- the direct weights, the regression-based weights, the methods used to calculate the regression-based weights,
- the simulation of the uncertainty in the weights by random-halves sampling,
- the construction of the combined weights using an optimal fraction to combine the simulated values of the direct and regression-based weights,
- the elimination of variables with nonsignificant combined weights,
- the simulation of the uncertainty in the values of the program variables,
- the combination of the simulated combined weights for the significant program variables with the simulated standardized values of the program variables to obtain simulated rankings, and
- the resulting inter-quartile ranges of rankings that are the primary rating and ranking quantities we report.

Figure A-1 A graphical summary of the NRC's approach to rating and thereby ranking graduate programs.



THE THREE DATA SETS

The empirical basis of the NRC ratings and rankings are the three data sets indicated in the three unlabeled boxes at the top of Figure A-1. The first, denoted by **X**, is the collection of faculty *importance measures* that were derived from data that were collected in the faculty questionnaire. The data in **X** are used to derive the *direct weights* discussed more extensively below. The second, denoted by **R**, is the collection of *ratings of programs by faculty raters*. These ratings were made separately from the faculty questionnaire and involved only a sample of programs from each field and only a sample of faculty raters from that field. This sample of faculty ratings plays a crucial role in the derivation of the *regression-based weights*, discussed more extensively below. The third data set, denoted by **P**, is the collection of the values of the 20 *program variables* that were collected from various sources for each program. The data in **P** are used in the final ratings and rankings of the programs and are discussed in greater detail below. More details about these three data sets are also available in Section 2 of this report.

BOX (1b): THE DIRECT WEIGHTS FROM THE FACULTY QUESTIONNAIRE[36]

We turn first to the *direct weights* in box (1b) in Figure A-1, leaving boxes (1) and (1a) to our later discussion of how we simulated the uncertainty in these data.

The faculty questionnaire asks each graduate-program faculty respondent to indicate how important each of 21 characteristics is to the quality of a program in his or her field of study.[37] This information is then used to derive the *direct weights* for each surveyed faculty member, as described below.

The original 21 program characteristics listed on the faculty questionnaire are shown in Table A-1, and they were divided into three categories—faculty, student, and program characteristics. Of the original 21, there are 20 for which adequate data were deemed to be available to use in the rating process, and these 20 data values for each program became the 20 *program variables* used in this study to which we repeatedly refer.

Faculty respondents were first asked to indicate up to four characteristics in each category that they thought were "most important" to program quality. Each characteristic that was listed received an initial score of 1 for that faculty respondent. These preferences were then narrowed by asking the faculty members to further identify a maximum of *two* characteristics in each category that they thought were the most important. Each of these selected characteristics received an additional point, resulting in a score of 2. Given this approach, at most, 12 of the program characteristics can have a non-zero value for any given faculty member; and of these 12, 6, at most, will have a score of 2, and the rest will have a score of 1. At least 8 program characteristics will have a score of 0 for each faculty respondent, more than 8 would be zero if the respondent selected less than 4 as the "important" or 2 as the "most important" characteristics. A final question asked faculty respondents to indicate the *relative importance* of

[36] The importance of program attributes to program quality is surveyed in Section G of the faculty questionnaire.
[37] The number of student publications and presentations was not used because consistent data on it were unavailable. The direct and regression-based weights were calculated without it.

each of the three categories by assigning them values that summed to 100 over the three categories.[38] For each faculty respondent, his or her *importance measure* for each program characteristic was calculated as the product of the score that it received times the relative importance value assigned to its category. Finally, the 20 importance measures for each faculty respondent were transformed by dividing each one by the sum of his or her importance measures across the 20 program variables.

[38] The faculty task can be thought of as asking faculty how many percentage points should be assigned to each category. The sum of the percentage point weights adds up to 100.

Faculty characteristics

i. Number of publications per faculty member

ii. Number of citations per publication (for non-humanities fields)

iii. Percent of faculty holding grants

iv. Involvement in interdisciplinary work

v. Racial/ethnic diversity of program faculty

vi. Gender diversity of program faculty

vii. Reception by peers of a faculty member's work as measured by honors and awards

Student characteristics

i. Median GRE scores of entering students

ii. Percentage of students receiving full financial support

iii. Percentage of students with portable fellowships

iv. Number of student publications and presentations (not used)

v. Racial/ethnic diversity of the student population

vi. Gender diversity of the student population

vii. A high percentage of international students

Program characteristics

i. Average number of Ph.D.'s granted in last five years

ii. Percentage of entering students who complete a doctoral degree in a given time (6 years for non-humanities, 8 years for humanities).

iii. Time to degree

iv. Placement of students after graduation (percent in either positions or postdoctoral fellowships in academia)

v. Percentage of students with individual work space

vi. Percentage of health insurance premiums covered by institution or program

vii. Number of student support activities provided by the institution or program

We will use the following notation consistently: *i* for a *faculty respondent*, *j* for a *program* in a field, and *k* for one of the 20 *program variables*. Thus, x_{ik} denotes the measure of importance placed on program variable *k* by faculty respondent *i*. The values, x_{ik}, are non-negative and, over *k*, sum to 1.0 for each faculty respondent *i*. The *importance measure vector* for faculty respondent *i* is the collection of these 20 values,

$$\boldsymbol{x}_i = (x_{i1}, x_{i2}, \ldots, x_{i20}). \quad (1)$$

The entries in these $\boldsymbol{x}$-vectors are non-negative and sum to 1.00. Denote the vector of *average importance weights*, averaged across the entire set of faculty respondents in a field, by

$$\bar{\boldsymbol{x}} = (\bar{x}_1, \bar{x}_2, \ldots, \bar{x}_{20}). \quad (2)$$

The mean value, $\bar{x}_k$, is the average weight of the importance given to the k^{th} program variable by all the surveyed faculty respondents in the field. The averages, $\{\bar{x}_k\}$, are the *direct weights* of the faculty respondents because they directly give the average relative importance of each program variable, as indicated by the faculty questionnaire responses in the field of study. Thus, the final 20 importance measures of the program characteristics for each faculty respondent are non-negative and sum to 1.0.

BOXES (2b), (3) AND (4): THE REGRESSION-BASED WEIGHTS

We next consider the processes in boxes (2b), (3) and (4) in Figure A-1 that lead to the *regression-based weights*. Again, we leave boxes (2) and (2a) to our later discussion of how we simulated the uncertainty in these data.

The regression-based weights represent our attempt to ascertain how much weight is implicitly given to each program variable by faculty members when they rate programs by using their own *perceived* quality of the programs they are rating. We used linear regression to predict average faculty ratings from the 20 program variables and interpreted the resulting regression coefficients as indicating the *implicit importance* of each program variable for faculty ratings. This is different from the direct weights that were just described. We have broken down the process of obtaining the regression-based weights into the three parts indicated by boxes (2b), (3) and (4) which we now discuss in turn.

Box (2b): The average ratings for the sampled programs.

The ratings data in R of Figure A-1 are the ratings given by the sampled faculty members to the sample of programs that they were requested to rate. A randomly selected faculty member, *i*, rates a randomly selected program, *j*, on a scale of 1 to 6 in terms of his or her *perception* of its

quality. Denote this rating by r_{ij}. The matrix sampling plan used was designed so that a sample of up to 50 of the programs in a field was rated by a sample of the graduate faculty members in that same field. Each rater rated about 15 programs, and none rated his or her own program. On average, each rated program was rated by about 44 faculty raters. The rater sample was stratified to ensure proportionality by geographic region, program size (measured by number of faculty), and academic rank. The program sample was stratified to ensure proportionality by geographic region and program size.

R is the array of all the values of r_{ij}. Note that R is an *incomplete array* because many faculty members who responded to the questionnaire did *not* rate programs and many programs in a field were *not* rated, except for the small fields. Box (2b) indicates that we compute the average of these ratings for program j, and denote this average rating by $\bar{r}_j$. Because each program's average rating is determined by a different random sample of graduate faculty raters, it is highly unlikely that any two programs will be evaluated by exactly the same set of raters. Denote the *vector* of the average ratings for the sampled programs in a field by $\bar{\boldsymbol{r}}$.

The values of the average ratings in $\bar{\boldsymbol{r}}$ are the *dependent variable* in the regression analyses used to form the regression-based weights.

Box (3): The program variables and standardizing

Denote the value of program variable k for program j by p_{jk}, and define the vector of all program variables for program j by

$$\boldsymbol{p}_j = (p_{j1}, p_{j2}, \ldots, p_{j20}), \qquad (3)$$

and the array with rows given by $\boldsymbol{p}_j$ by P. A cursory examination of the program characteristics listed in Table A-1 shows that they are on *different scales*. For example, the number of publications per faculty member (numbers in the fives and tens), the median GRE scores of entering students (numbers in the hundreds), and the percentage of entering students who complete a doctoral degree in 10 years or less (fractions) are reported in values that are of very different *orders of magnitude*. If these values are left as they are, the size of any regression coefficient based on them will be influenced by *both* the importance of that program variable for predicting the average ratings (which is what we are interested in), as well as the scale of that variable (which is arbitrary and does not interest us). The program variables with *large values*, such as the median GRE scores, will have very small coefficients to reflect the change in scale in going from GRE scores (in the hundreds) to ratings (in the 1 to 6 range). Conversely, program variables with *small values*, such as proportions, will have larger regression coefficients to reflect the change in scale in going from numbers less than 1 to ratings (in the 1 to 6 range).

To avoid the ambiguity between the influence of the scale and the real predictive importance of a variable, we needed to modify the values of the different program variables so they have *similar scales*. This would ensure that program variables with the same influence on the prediction of faculty ratings would have similar regression-coefficient values. Our solution is the very common one of *standardizing* the p_{jk}-values by subtracting their mean across the

programs in a field and dividing by the corresponding standard deviation. This will result in program variables that have the same mean (0.0) and standard deviation (1.0) across the programs in the field. In this way, no program variable will have substantially larger or smaller values than any other program variable across the programs in a field. For the regressions of box (4), the standardization was done only over the programs that were sampled for rating.

We denote the values of the standardized program variables with an asterisk (p_{jk}* and **P***). Two program variables (Student Work Space and Health Insurance) were coded as 1 (present) or -1 (absent). We felt that there was no need for additional standardization of these two program variables and they were not standardized to have mean 0 and variance 1.

The standardized program variables for the sampled and rated programs served as the *predictor or independent variables* in the regressions that lead to the regression-based weights.

Box (4): The regressions and the regression-based weights

The statistical problem addressed in box (4) is to use $\bar{\boldsymbol{r}}$ and **P*** as the *dependent* and *independent* variables, respectively, in a linear regression, to obtain the vector of regression-based weights, $\hat{\boldsymbol{m}}$, using least squares. It should be noted that only the data in **P*** for the *sampled* programs are used. The data for the non-sampled programs in **P*** are not used in this step of the process.

Two immediate problems arise. These are: (1) the number of observations (i.e., the number of sampled programs in a field) is 50 or less, while the number of independent variables (i.e., the program variables in **P***) is 20, and (2) a number of the program variables are correlated with each other across the programs in a field.. This is less than an ideal situation for obtaining *stable* regression coefficients. There are too few observations to hope for stable estimates of the coefficients for 20 variables. The fact that these variables are also correlated does not help matters either. If we had ignored these two problems, least-squares regression methods would have tended to assign coefficients rather arbitrarily to one particular variable or to other variables that are correlated with it, and how this worked out would depend on which programs were included in the sample of rated programs. The resulting unstable regression coefficients would have been unusable for our purposes.

For example, as expected, when we fit a linear model that included all 20 of the program variables, we found that for a number of the variables, the coefficients and their signs did not make intuitive sense. However, we found, as expected, that they made more sense when we used various step-wise selection methods for reducing the number of variables used as predictors. With only 50 cases, we had to expect that we could not use all 20 variables in the prediction equations without adjustments.

After examining a variety of approaches, we settled on using a backwards, step-wise selection method applied to the 20 *principal component* (PC) variables formed from the 20 program variables (rather than using the original 20 program variables). The regression coefficients obtained for the remaining PC variables were then transformed back to scale of the original 20 program variables, with the result that all 20 program variables now had non-zero

coefficients, but these coefficients were subject to several linear constraints implied by the deleted PC variables.

The principal component variables are linear combinations of the original 20 program variables that have two properties: (1) they are uncorrelated in the sample, and (2) they can give exactly the same predictions as do the original variables—that is, every prediction equation that is possible with the original variables is also possible to form using the PC variables, using different regression coefficients. The PC variables are usually ordered by their variances from largest to smallest, but this plays no role here. There are as many PC variables as there are original variables—in our case, 20.

If we denote the array of original 20 standardized variables for the sample of rated programs as **P***, then the corresponding array of the 20 PC variables, **C**, is given by the matrix multiplication, **C** = **P***__V__, where **V** is the 20 by 20 orthogonal matrix specified by, among other things, the *singular value decomposition* of **P***. After the regression coefficients are estimated using the PC variables, we get back to the coefficients for the original standardized variables in **P*** by transforming the vector of regression coefficients by the transformation, **V**.

Our step-wise use of the PC variables proceeded as follows. We begin with a least-squares prediction equation, predicting $\bar{r}$ from **C**, that includes all of the PC variables. Then a series of analyses is performed, with one PC variable at a time being left out of the prediction equation; the PC variable that has the least impact on the fit of the predicted ratings (as measured by its t-statistic) is removed. This process is repeated, removing one PC variable each time, until the remaining PC variables each add statistically significant improvements to the fit of the predictions of the ratings (at the 0.05 level). The result is a set of regression coefficients, the *PC coefficients*, $\hat{\gamma}$, which predict the sample of program ratings from a subset of the PC variables, i.e.,

$$\hat{\bar{r}} = \mathbf{C}\,\hat{\gamma}\,. \qquad (4)$$

In Equation 4, the caret denotes estimation. Moreover, for the PC variables that have been eliminated during the backwards selection process, the corresponding PC-coefficients, $\hat{\gamma}_k$, are zero. These zeros mean that we are setting the *coefficients* of certain *linear combinations of the original variables* to zero rather than setting the coefficients for some of the original program variables to zero. This was regarded as a virtue, because we did not *necessarily* eliminate any of the original program variables from the prediction equation used to find the regression-based weights. By proceeding this way, we are not forced to give a zero weight to one of two collinear variables in the step-wise procedure. Instead, both collinear variables will typically load onto the same principal components and get some weight when the matrix **V** is applied to the PC coefficients to obtain the coefficients for the original program variables, i.e.,

$$\hat{\boldsymbol{m}} = \mathbf{V}\,\hat{\gamma}\,. \qquad (5)$$

In the same way, the matrix of estimated variances and covariances of $\hat{\boldsymbol{\gamma}}$, obtained from the least-squares output, may be transformed to the corresponding matrix for $\hat{\boldsymbol{m}}$. The variances from this matrix are used later in box (6) in the computation of the "optimal fraction" for combining the direct and regression-based weights.

The regression coefficient for the k^{th} program variable, denoted by $\hat{m}_k$, is the *regression-based weight* for program characteristic *k* as a predictor of the average ratings of the programs by the faculty raters, and $\hat{\boldsymbol{m}} = (\hat{m}_1, \hat{m}_2, ..., \hat{m}_{20})$.

The predicted perceived quality rating for a sampled program can be expected to *differ* somewhat from the actual average rating for that program. For example, for the two fields studied in *Assessing Research Doctorate Programs: A Methodology Study*, the root-mean-square deviation between the predictions and the average ratings was 0.42 on a 1-to-6 rating scale for both mathematics and English. In addition, the (adjusted) R^2 of the regressions of average ratings on measured program characteristics was 0.82 for mathematics and 0.80 for economics. These values indicate that the predictions account for about 80 percent of the variability in average ratings. We regarded this as satisfactory levels of agreement between predicted and actual to use these methods in this study.

These results show that the *predicted* perceived quality ratings agree fairly well with the *actual* ratings. However, these results do not indicate how well a prediction equation that was based on a *sample of programs* will reproduce the predictions of the equation for the *whole population of programs* in a field. The data for mathematics, reported in *Assessing Research Doctorate Programs: A Methodology Study*, indicate that using 49 programs did a reasonably good job of reproducing the predictions based on the whole field of 147 physics programs.[39] Thus, we decided that in developing the regression-based ratings, we would use a sample of 50 programs from a field if it had more than 50 programs and use almost all of the programs in fields with 50 or fewer programs. When there were fewer than 30 programs in a field, it was combined with a larger discipline with similar direct weights for the purposes of estimating the regression-based weights.[40] In one case, computer engineering, there were fewer than 25

[39] See Appendix G of *Assessing Research Doctorate Programs: A Methodology Study,* National Research Council (2003)

[40] The fields for which this was done were:

Small Field	Surrogate Field
Aerospace engineering	Mechanical engineering
Agricultural economics	Economics
American studies	English literature
Astrophysics and astronomy	Physics
Entomology	Plant science
Forestry	Plant science
Food science	Plant science
Engineering science and mechanics	Mechanical engineering
Theatre and performance	English literature

programs, and this field was combined with the field of electrical and computer engineering to estimate the regression-based coefficients.[41]

There is one final alteration in the values of $\hat{\boldsymbol{m}}$ that needs to be mentioned. The direct weights, $\{\overline{x}_k\}$, have absolute values that sum to 1.0. This is not necessarily true of the regression coefficients, $\{\hat{m}_k\}$. The scale of m_k depends on both the scale of p_{jk} and the scale of the average ratings, $\{\overline{r}_j\}$.We decided, because our intent was to *combine* these two sources of the importance of the various program variables, that they needed to be on similar scales. We decided to force them *both* to sum to 1.0 in absolute value[42]. This allows the direct and regression-based weights to have negative values where they arise, typically in the regression-based weights, without requiring anything complicated to deal with this. Using the sum of absolute values allows the sign of the regression-based weights to be determined by the data rather than by an a priori hypothesis. Thus, we divided each regression coefficient, $\hat{m}_k$, by the sum of the absolute values of all the regression coefficients. In this way, both the direct and regression-based weights are fractional values, mostly positive but some negative, whose absolute sums equal 1.0. The estimated standard deviations of the $\{\hat{m}_k\}$, obtained in standard ways from the regression output, were also divided by this sum to make them the correct size for use in the process of combining the direct and regression-based weights, discussed below.

BOXES (5) AND (6): THE COMBINED WEIGHTS

To motivate our method of combining of the direct and regression-based weights, we start by describing the direct and regression-based *ratings*. Remembering that the standardized values of the program variables for program *j* are denoted by p_{jk}*, the *direct rating* for program *j*, using the average direct weight vector, $\overline{\boldsymbol{x}}$, is X_j, is given by

$$X_j = \sum_{k=1}^{20} \overline{x}_k p_{jk}^{*}. \qquad (6)$$

The *regression-based rating* for program *j*, using the regression-based weight vector, $\hat{\boldsymbol{m}}$, is M_j, is given by

$$M_j = \sum_{k=1}^{20} \hat{m}_k p_{jk}^{*}. \qquad (7)$$

[41]The committee had not anticipated this when it developed the taxonomy, or the field would not have been included as a separate field.

[42] We use the absolute value here because, for time to degree, a higher value should receive a negative weight.

Note that the regression-based rating is a linear transformation of the predicted ratings used to obtain the regression-based weights, because the constant term of the regression is deleted, and the weights have been scaled by a common value so that their absolute sum is 1.0. The procedure for computing regression-based ratings can be used for any program, sampled or not, in the given field. Simply use M_j *as* defined in Equation 7 above, where $\{p_{jk}^*\}$ comes from the data for program *j* and the $\{\hat{m}_k\}$ are the regression-based weights based on the sample of programs and raters.[43]

We combined the direct ratings with the regression-based ratings as follows. Let *w* denote a *policy weight* and form the following *combination* of the direct and regression-based ratings:

$$R_j = wM_j + (1 - w)X_j. \tag{8}$$

The *policy weight*, *w*, is chosen in box (5) of Figure A-1, and is the amount the regression-based ratings are allowed to influence the combined rating, R_j. When $w = 0$, the regression-based rating has *no* influence on the R_j. When $w = 1$, the R_js are *totally* based upon the regression-based ratings. Any *compromise value* of *w* is somewhere between 0 and 1.

We did not actually form both the direct and regression-based ratings in our work. Instead, we exploited the simple linear form of these given by:

$$R_j = w\sum_{k=1}^{20}\hat{m}_k p_{jk}^* + (1-w)\sum_{k=1}^{20}\bar{x}_k p_{jk}^* = \sum_{k=1}^{20}\bar{f}_k p_{jk}^* \tag{9}$$

where the combined weight, $\bar{f}_k$, is given by

$$\bar{f}_k = w\hat{m}_k + (1-w)\bar{x}_k. \tag{10}$$

The representation of the combined rating given in Equations 9 and 10 is a linear combination of the program variables that uses the *combined weights*, $\{\bar{f}_k\}$ defined in Equation 10. The combined weight $\bar{f}_k$ is applied to the k^{th} standardized program characteristic, p_{jk}^* for each *k*, and then all 20 of these weighted values are summed to obtain the final combined rating for program *j*.

However, because both $\hat{m}_k$ and $\bar{x}_k$ are subject to uncertainty, we made one additional adjustment to Equation 10 that is described below, following the discussion of how we simulated the uncertainty in both the direct weights and in the average ratings used to form the regression-based weights.

[43] We have throughout estimated linear regressions. Is this assumption justified? We can only say that, empirically, we tried alternative specifications that included quadratic terms for the most important variables (publications and citations) and did not find an improved fit.

BOXES (1), (1a), (2) AND (2a): SIMULATING THE UNCERTAINTY IN THE DIRECT AND REGRESSION-BASED WEIGHTS

The direct weight vector, $\bar{\boldsymbol{x}}$, is subject to uncertainty; that is, a different set of respondent faculty would have led to different values in $\bar{\boldsymbol{x}}$. Disagreement among the graduate faculty on the relative importance of the 20 program variables is the source of the uncertainty of the direct weights. The average ratings of the sampled faculty in $\bar{\boldsymbol{r}}$ are also subject to uncertainty; a different sample of raters or programs would have produced different values in $\bar{\boldsymbol{r}}$. One way to reflect this uncertainty is to use the sampling distributions of $\bar{\boldsymbol{x}}$ and $\bar{\boldsymbol{r}}$. There are various ways that these sampling distributions may be realized. We chose an empirical approach that made no assumptions about the shapes of the various distributions involved, but this allowed us to use computer-intensive methods to let the sampling variability of both $\bar{\boldsymbol{x}}$ and $\bar{\boldsymbol{r}}$ influence the final ratings and rankings. We examined two empirical approaches, Efron's *bootstrap* and a *random-halves* (RH) procedure suggested by the committee chairman. We found that both gave very similar final results in terms of the final ranges of rankings and ratings. The bootstrap requires taking a sample of *N* with replacement from the relevant empirical distribution. The RH procedure requires taking a sample of *N*/2 without replacement from the same empirical distribution. We chose to use the RH procedure because it cut the sampling computations in half, is fairly easy to explain, and as far as we could tell, gave essentially the same results as the bootstrap for ranking and rating.

Boxes (1) and (2): The random halves procedure

The RH procedure for both $\bar{\boldsymbol{x}}$ and $\bar{\boldsymbol{r}}$ are nearly the same, and with the same justifications. **X** is a complete array whose rows denote the *N* faculty respondents, while **R** is an incomplete array whose rows denote the *n* sampled faculty raters for a field. In the case of **X**, the RH procedure requires a random sample of size *N*/2 of the *faculty respondents*. In the case of **R**, the RH procedure requires a random sample of size *n*/2 of the *faculty raters*. Repeated draws from these random half samples are then used to simulate the uncertainty in $\bar{\boldsymbol{x}}$ and $\bar{\boldsymbol{r}}$, respectively.

Alert readers may worry that these half samples will exhibit *too much* variability in the resulting averages; after all, a half sample has only half the number of cases as a full sample—and the bootstrap always takes a full sample of *N* or *n*. The explanation of why a half sample without replacement has essentially the same variability as a full sample with replacement is most easily seen by considering the variance of the mean of a sample without replacement from a finite population. It is well known from sampling theory that the variance of the mean from a sample of size *N*/2, from a population of size *N* is, essentially,

$$\mathrm{Var}(\bar{x}_k) = \frac{\sigma^2_{x_k}}{\left(\frac{N}{2}\right)}\left(1-\frac{N}{2}/N\right) = \frac{\sigma^2_{x_k}}{N}. \qquad (11)$$

That is, because of the "finite sampling correction," the variance from a random half sample without replacement is exactly the same as the variance of a random sample of twice the

size with replacement (there is a small "N versus $N-1$" effect that Formula 11 ignores). This is why the bootstrap and the RH methods give such similar results in our application to the uncertainty of the direct weights. There are other reasons to expect the RH method to produce a useful simulation of the uncertainty of averages.[44]

The same reasoning applies to the RH sampling of the faculty raters in **R** to simulate the uncertainty in the average ratings, $\bar{\boldsymbol{r}}$, used to obtain the regression-based weights. The procedure was to sample a random half of all raters for programs in a field and compute the average rating for each program from that half sample.

The regression-based weights are subject to uncertainty from *two* sources. The first is the uncertainty arising from sampling the faculty raters and, as indicated above, the RH sampling directly addresses this source. The second is from using average ratings from a sample of programs rather than all the programs to develop the regression equation from which the regression-based weights are derived. In the discussion of box (4), above, we gave our reasoning for believing the sample of 50 programs is adequate, and how we pool the data from other related fields when the number of programs in a field is smaller than 50. In addition, while the use of ratings for a sample of programs has the practical value of reducing the workload of the faculty raters, our *implicit* use of the predicted average ratings, $\{M_j\}$, from Equation 7 above, rather than actual average ratings, $\{\bar{r}_j\}$, also reduces some of the uncertainty due to the sampling of the programs to be rated. For these two reasons, we believe that this second source of uncertainty is not as important as that simulated by the RH procedure for the uncertainty in the average ratings, and consequently, for the regression-based weights, $\hat{\boldsymbol{m}}$.

We always drew the RH samples 500 times, and those for $\bar{\boldsymbol{x}}$ were statistically independent of those for $\bar{\boldsymbol{r}}$. This gives us 500 replications of the direct weights and 500 replications of the regression-based weights that we then combined into 500 replications of the combined weights, which we describe next.

Box (6): Using the optimal fraction to combine the direct and regression-based weights.

In deriving the ranges of ratings that reflect the uncertainty in $\hat{m}_k$ and $\bar{x}_k$, simulated values, m_k, and x_k, are drawn from the sampling distributions of $\hat{m}_k$, and $\bar{x}_k$, respectively, using independent RH samples from the appropriate parts of **R** and **X**. These two simulated values are to be combined to form a simulated value, f_k, for $\bar{f}_k$ in Equation 10. However, the simple weighted average in Equation 10 only reflects the effect of the policy weighting, w, and ignores the fact that both m_k, and x_k are independent random draws from distributions, rather than fixed

[44] The random-halves procedure has a place in the statistical literature, but with other names. It is an example of the "deleted-d" jackknife as described in Efron and Tibshirani, (1993) *An Introduction to the Bootstrap.* New York: Chapman and Hall. p. 149, with d = n/2. It is described by Kirk Wolter in a private communication as an example of the "balanced repeated replication" or "balanced half samples," and described in Wolter, K. M. (2007) *Introduction to Variance Estimation*., 2nd ed. New York: Springer-Verlag.

values. We want to combine m_k, and x_k in such a way as to bring the simulated value, f_k, as close as possible to $\bar{f}_k$ on average, and in a way that will also reflect the policy weight, w, appropriately. This section outlines our approach to choosing the *optimal fraction* to apply to m_k to achieve this. The optimal fraction is the amount of weight applied to m_k that minimizes the mean-square error of f_k, treating $\bar{f}_k$ as a target parameter to be estimated.

First, consider a general weighting, $f_k(u)$, that uses a fraction, u. This weighting has the form

$$f_k(u) = um_k + (1 - u)x_k. \tag{12}$$

By construction of the RH procedure, the mean of the distribution of m_k is $\hat{m}_k$ (the regression coefficients that are obtained when the data from all n faculty raters are used). Similarly, the mean of the distribution of x_k is $\bar{x}_k$, the mean importance value that is obtained when the data from all N faculty respondents are averaged. We may regard $f_k(u)$ as an estimator of ϕ_k, given by

$$\phi_k = w\,\hat{m}_k + (1 - w)\,\bar{x}_k. \tag{13}$$

The problem then is to find the value of u that will minimize the mean-square error (MSE) of $f_k(u)$ given by

$$\text{MSE}(u) = \text{E}(f_k(u) - \phi_k)^2, \tag{14}$$

where, in Equation 14, the notation, $\text{E}(f_k(u) - \phi_k)^2$ denotes the *expectation* or *average* taken over the independent RH distributions of $\hat{m}_k$ and $\bar{x}_k$. The MSE is a measure of the combined uncertainty in $f_k(u)$.

The MSE in (14) can be written as

$$\begin{aligned}\text{MSE}(u) &= \text{E}(um_k + (1 - u)x_k - w\,\hat{m}_k - (1 - w)\,\bar{x}_k)^2 \\ &= \text{E}(u(m_k - \hat{m}_k) + (1 - u)(x_k - \bar{x}_k) + (u - w)\,\hat{m}_k + (w - u)\,\bar{x}_k)^2 \\ &= \text{E}(u(m_k - \hat{m}_k) + (1 - u)(x_k - \bar{x}_k) + (u - w)(\hat{m}_k - \bar{x}_k))^2. \end{aligned} \tag{15}$$

The point of re-expressing Equation 14 as Equation 15 is that now when the squaring is carried out, all of the terms except the squared ones have zero expected values and can be ignored. If we denote the variance of the sampling distribution of $\hat{m}_k$ by $\sigma^2(\hat{m}_k)$ and the variance of $\bar{x}_k$ by $\sigma^2(\bar{x}_k)$, then Equation 15 becomes

$$\text{MSE}(u) = u^2\sigma^2(\hat{m}_k) + (1 - u)^2\sigma^2(\bar{x}_k) + (u - w)^2(\hat{m}_k - \bar{x}_k)^2. \tag{16}$$

It is now a straightforward task to differentiate Equation 16 in u, set the result to zero, and solve for the optimal u-value, u_{0k}, which we call the *optimal fraction*. This calculation results in

$$u_{0k} = \frac{\sigma^2(\bar{x}_k) + w(\hat{m}_k - \bar{x}_k)^2}{\sigma^2(\bar{x}_k) + \sigma^2(\hat{m}_k) + (\hat{m}_k - \bar{x}_k)^2}. \quad (17)$$

The optimal fraction in Equation 17 has some useful and intuitive properties. It takes on the value w when there is no uncertainty about the direct and regression-based weights. Moreover, w has no influence on the optimal fraction when $\hat{m}_k$ and $\bar{x}_k$ are equal. In that case, the direct weights and regression-based weights on the k^{th} program characteristic are the same, and the optimal fraction combines the two simulated values in a way that is inversely proportional to their variances, so that the value with less variation gets more weight. Note also, that the value in Equation17 is the same for all of the RH simulated values of m_k and x_k.

The two variances in Equation 17, $\sigma^2(\bar{x}_k)$ and $\sigma^2(\hat{m}_k)$, may be found in standard ways. The value of $\sigma^2(\bar{x}_k)$ is given by

$$\sigma^2(\bar{x}_k) = \sigma^2(x_k)/N_F, \quad (18)$$

where N_F denotes the number of faculty in the field who supply direct weight data, and $\sigma^2(x_k)$ denotes the variance of the individual direct weights given to the k^{th} program variable by these faculty respondents. The value of $\sigma^2(\hat{m}_k)$ is obtained from the regression output that produces $\hat{m}_k$ when the data from all faculty raters in a field are used. Its square root, $\sigma(\hat{m}_k)$, is the standard error of the regression coefficient, $\hat{m}_k$. Finally, because we rescaled the $\hat{m}_k$ so that their absolute sum was 1.0, the same divisor must be applied to $\sigma(\hat{m}_k)$ to put it on the corresponding scale.

If we now replace the u in Equation 12 with u_{0k} given in Equation 17, we then obtain the combined weight that optimally combines the two simulated values of the weights, m_k, and x_k, into the combined rating, given by

$$R_{0j} = \sum_{k=1}^{20} f_{0k} p^*_{kj} \quad (19)$$

where

$$f_{0k} = u_{0k} m_k + (1 - u_{0k}) x_k, \quad (20)$$

and u_{0k} is given by Equation 17. The vector of optimally combined weights is denoted by $\boldsymbol{f}_0$[45].

[45] The weights f_{0k} differ little from the weights that would be obtained from equation (10) with w = ½ in fields with a large number of programs. For example, the program described in Chapter 5 in economics is one of 117 programs, and the root mean square difference between the optimal weights calculated from Equation 20 and those from Equation 10 with w = ½ over the 500 iterations is 0.00468. The average absolute difference in rankings for the 117

The values of R_{0j} from Equations 19 and 20 are used as the 500 simulated values of the combined ratings for the purposes of determining the ranking interval ranges for each program that is discussed below.

In performing the RH sampling to mimic the uncertainty in the direct and regression-based weights, it should be emphasized that the random half samples from **X** and **R** were statistically independent. This is our justification for assuming that the random draws, m_k, and x_k, are statistically independent in the calculation of the optimal fraction, u_{0k}.[46]

As a final point, we did realize that the approach to calculating the optimal fraction described above did not take into account any correlation between the direct and regression-based weights for *different* program variables. We did examine a method that did, but it simply produced a matrix version of Equation 17 that reduced to the procedure we used when the program variables were uncorrelated, but was otherwise difficult to implement with the resources available to us.

BOX (7): ELIMINATING NON-SIGNIFICANT PROGRAM VARIABLES.

After we have obtained the 500 simulated values of the combined weights by applying Equations 17 and 20 to the 500 simulated values for the direct and regression-based weights, we were in a position to examine the distributions of these 500 values of the combined weights for each program variable. The distributions of the combined weights for some of the program variables did not contain zero and were not even near zero. However, other program variables had combined weight distributions that did contain zero. If zero is inside the middle 95 percent of this distribution, we declare the combined weight for that program variable to be *non-significant* for the rating and ranking process (in analogy with the usual way that distributions of parameters are tested for statistical significance). If the combined weight for a program variable is not significantly different from zero, the variable for that coefficient is dropped from further computations. This elimination of program variables required us to recalculate everything above box (7) in Figure A-1. The eliminated program variables are ignored in calculating the direct and regression-based weights for the other variables. New RH samples are drawn, the direct weights are retransformed so that the absolute sum of the remaining direct weights was 1.0, the regressions are re-run using the reduced set of program variables as predictors, and new optimal fractions are computed to combine the direct and regression-based weights. Finally, the 500 simulated combined coefficients are again tested for statistical significance from zero. This

---

programs in economics between those for the optimal weights and those with w = ½ is 3.972 and 3.979 for the 1st and 3rd quartile ratings, respectively. The average difference in the lengths of the ranking range over the 117 programs was 6.047 for optimal weighting and 6.032 for the w = ½ weighting. These differences may be greater if the field is composed of a small number of programs with fewer responses by the faculty for the importance weights and a larger variance on those weights, such as applied mathematics with 33 programs.

[46] The fact that the raters for each field were a subset of those who answered the faculty questionnaire may confuse some into thinking that our independence assumption may not be justified. This is an unfortunate misunderstanding of the simulation of uncertainty in the rating and ranking process. It is the statistical independence of the two RH sampling processes that matters, nothing else.

process is repeated until a final set of combined weights, each of which is significantly different from zero, is obtained. Only after this testing and retesting process is performed are the final sets of 500 combined coefficients ready for use in the computation of the intervals of rankings that are discussed in box (9) of Figure A-1. The values for the combined weights that correspond to the eliminated variables are set to 0.0 in each of the final 500 simulated values of $\boldsymbol{f}_0$. These 500 vectors of combined weights are used in the production of the ratings that are used to produce the final intervals of rankings for each program, as discussed later.

Empirically, the examination of three fields suggests that this process has two useful effects. First, the middle of the inter-quartile ranges of rankings of programs is changed very little, so that the ranges before eliminating nonsignificant program variables and those after this elimination are centered in nearly the same places[47]. Second, the widths of these inter-quartile ranges are slightly reduced or are unchanged. These are the effects that we would expect from eliminating variables that are having only a noisy effect on the ranking and rating process, and for this reason, we have continued to include box (7) in our rating and ranking process. Nonetheless, the inter-quartile intervals do shift more markedly than the medians, when estimated coefficients are set to zero—largely for those departments near the middle of the rankings. This is because quartile estimates are more variable than median estimates. There are even rare instances in which the intervals calculated both ways do not overlap.

BOX (8), (8a) AND (8b): INCORPORATING UNCERTAINTY INTO THE PROGRAM VARIABLES

In addition to the uncertainty in the direct and regression-based weights discussed above, there is also some uncertainty in the values of the program variables themselves. Some of the 20 program variables used to calculate the ratings also vary or have an error associated with their values due to year-to-year fluctuations. Data for five of the variables (publications per faculty, citations per publications, GRE scores, Ph.D. completion, and number of Ph.D.'s) were collected over time, and averages over a number of years were used as the values of these program variables. If a different time period had been used, the values would have been different. To express this type of uncertainty, a *relative error factor,* e_{jk}, was associated with each program variable value, p_{jk}. The relative error factor was calculated by dividing the standard deviation over the series by the square root of the number of observations in the series, and then dividing that number by the value of the variable p_{kj}. For example, the publications per faculty variable is the average number of allocated publications per allocated faculty over 7 years, and a standard error value was calculated for this variable as SD/√7. This standard error was then divided by the value of the publications per faculty variable to get the relative error factor for this program variable.

[47] Examination of the effect of this procedure gave correlations between the median rankings with and without the elimination of nonsignificant variables of .99.

For the other 15 program variables that are used in the ratings, no data on variability were directly obtained during the study, and we assigned a relative error of 0, 0.1 or 0.2 to these variables. The relative error for the variables Student Workspace and Health Insurance were given an error of 0, because they were thought to have little or no temporal fluctuation over the interval considered; and for Percent of Faculty Holding Grants, the error assigned was 0.2, because an examination of data from the *National Science Foundation Survey of Research Expenditure* indicated this to be an appropriate estimate. The remaining 12 program variables were assigned a relative error of 0.1. Each program had its own relative error factor for each program variable, e_{jk}.

Just as we had simulated values from the sampling distributions of $\bar{\boldsymbol{x}}$ and $\bar{\boldsymbol{r}}$ via RH sampling, we also wanted to reflect the uncertainty in the values of the program variables themselves rather than using the fixed values, $\{p_{kj}\}$, in computing program ratings. We did this in the following way. The value, p_{kj}, was *perturbed* by drawing randomly from the Gaussian distribution, $N(p_{kj}, (e_k p_{kj})^2)$.This distribution has a mean equal to the variable value p_{kj} and a standard deviation equal to the relative error, e_k, times the variable value, p_{kj}. Thus, the entire array **P** is randomly perturbed to a new array, $\tilde{\mathbf{P}}$. This perturbing process is repeated 500 times, and each one is standardized to have mean 0.0 and standard deviation 1.0 for each of the 20 program variables to produce 500 standardized arrays, $\tilde{\mathbf{P}}^*$.

BOX (9): THE INTER-QUARTILE RANGES OF RANKINGS

In box (9) we have already calculated 500 replications of the combined weights after eliminating the nonsignificant program variables for the given field [from box (7)] and from 500 replications of the steps in boxes (8), (8a) and (8b), we have 500 replications of the standardized perturbed version of **P** that contains the program variable data for all of the programs to be rated in the field. Now we use Equations 17, 19,and 20 to combine the replications of the combined weights with the replications of the standardized perturbed program variables to obtain 500 replications of the combined rating R_j for each program, j. Denote the k^{th} replication of R_j by $R_j^{(k)}$. To obtain the k^{th} replication of the *rankings* of the programs, sort the values of $R_j^{(k)}$ over j from high to low and assign the rank of 1 to the program with the highest rating in this set. In case of tied ratings, we use the standard procedure in which the ranks are averaged for the tied cases, and the common rank given to the tied programs is the average of the ranks that would have been given to the tied set of programs. For each of the replications of the ratings, there is a corresponding replication of the rankings of the programs, resulting in 500 replications of the ranking of each program.

Instead of reporting a single ranking of the programs in a field, we report the inter-quartile range of the rankings for each program. This is an interval starting with the rank that was at the 25th percentile (also called the first quartile) in the distribution of the 500 replications of the ranks for the given program, and ending at the 75th percentile (the third quartile) of this

distribution. The interpretation of the inter-quartile range is that it is *the middle of the distribution of rankings* and reflects the uncertainty in the direct and regression-based weights and in the program data values, twenty-five percent of a program's rankings in our process are less than this interval and 25 percent are higher. The interval itself represents what we would expect the typical rankings for that program to be, given the uncertainty in the process and the ratings of the other programs in the field.[48]

[48] The choice of an inter-quartile range, rather than some other range (eliminating the top and bottom quintile, for example) is arbitrary. IQRs are standard in the statistical literature. Broader ranges would result in greater overlap. The point of introducing uncertainty in our calculations is that we do not know the "true" ranking of a program. The purpose of presenting an IQR is to provide a range in which a program's ranking is likely to fall.

APPENDIX B

Questionnaires

National Research Council
Assessment of Research Doctorate Programs
2006

Institutional Questionnaire

Every ten or so years, the National Research Council conducts a study of national importance regarding the quality and characteristics of doctoral programs in the United States. This comparative assessment is designed to assist prospective doctoral students with selecting programs that best fit their interests and to permit programs to benchmark themselves against similar programs.
The 2006 Assessment of Research Doctorate Programs collects data about the doctoral programs in over 60 areas of study in American universities. This Institutional Questionnaire is designed to collect data about institution-wide policies and practices.

A. Health Benefits and Services

A1. Is university-supported health care insurance part of the financial support provided to enrolled doctoral students?

☐ Yes
☐ No *If no, skip to question A3*

A2. Does the university-supported health insurance for doctoral students cover mental health services?

☐ Yes
☐ No

NOTE: For questions that follow about postdoctoral scholars, please use this definition of a postdoctoral scholar developed by the Association of American Universities:

- The appointee was recently awarded a Ph.D. or equivalent doctorate (e.g., Sc.D., M.D.) in an appropriate field; and
- the appointment is temporary; and
- the appointment involves substantially full-time research or scholarship; and
- the appointment is viewed as preparatory for a full-time academic and/or research career; and
- the appointment is not part of a clinical training program; and
- the appointee works under the supervision of a senior scholar or a department in a university or similar research institution (e.g., national laboratory, NIH, etc.); and
- the appointee has the freedom, and is expected, to publish the results of his or her research or scholarship during the period of the appointment.

(See: http://www.aau.edu/reports/PostDocRpt.html. Accessed 6/27/06)

A3. Is university-supported health care insurance part of the financial support provided to postdoctoral scholars?

☐ Yes
☐ No *If no, skip to question B1*

A4. Does the university-supported health insurance for postdoctoral scholars cover mental health services?

☐ Yes
☐ No

B. Collective Bargaining

B1. Is there a collective bargaining agreement for <u>teaching assistants</u> on your campus?

☐ Yes
☐ No *If no, skip to question B2*

B1a. Does the collective bargaining agreement for teaching assistants cover:

☐ Some teaching assistants
☐ All teaching assistants

B2. Is there a collective bargaining agreement for <u>research assistants</u> on your campus?

☐ Yes
☐ No *If no, skip to Question C1*

B2a. Does the collective bargaining agreement for research assistants cover:

☐ Some research assistants
☐ All research assistants

C. New Ph.D. Programs

C1 . What <u>new</u> Ph.D. programs have been added to the university since 1995?

Please list all programs added since 1995, even if not included in this study

D . Research Location

D1. Please list all of the zip code(s) that your institution or faculty members use when submitting proposals to potential sponsors.

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐

[Note: The web version of the questionnaire will allow the respondent to add as many zip codes as needed.]

E. Academic Year

E1. How is an academic year defined at this institution?

☐ From July 1st to June 30th
☐ Other, please specify:_____

F. Doctoral Student Representation in 5 Selected Fields

This section collects outcomes by race/ethnicity on the full-time doctoral students who are U.S. citizens or permanent residents in each of five broad fields 1) Life Sciences, 2) Physical Sciences and Mathematics, 3) Engineering, 4) Social and Behavioral Sciences, and 5) Arts and Humanities.

- If the numbers in these tables are too small to release for reasons of confidentiality, please provide the raw data to the NRC and we will aggregate over cohorts so that the size of any cell is always greater than or equal to 5.

- For purposes of this question only, "Physical Sciences, Mathematics, and Engineering" in the taxonomy have been disaggregated into two separate broad fields: "Physical Sciences and Mathematics" and "Engineering."

- Do not include Emerging Fields unless they are also included as part of a program in an established field within the taxonomy

- Include doctoral students enrolled in your doctoral programs, whether or not they have been admitted to candidacy.

- Do not include doctoral students who have declared that they only intend to earn a master's degree.

- Doctoral students who "left the program" are those who are no longer enrolled at this time.

- Doctoral students who "stopped out" (left but later enrolled again) should not be counted as students who left if they are currently enrolled or completed the doctoral degree.

Native Americans/Alaska Natives in the Life Sciences

F1a. Please record the number of Native American/Alaskan Natives who entered the Life Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F1b. Of the Native American/Alaska Natives admitted to candidacy in the Life Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									

2005-2006									

Non-Hispanic Blacks in the Life Sciences

F2a. Please record the number of Non-Hispanic Blacks who entered the Life Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F2b. Of the Non-Hispanic Blacks admitted to candidacy in the Life Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									

2004-2005									
2005-2006									

Non-Hispanic Whites in the Life Sciences

F3a. Please record the number of Non-Hispanic Whites who entered the Life Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F3b. Of the Non-Hispanic Whites admitted to candidacy in the Life Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									

2003-2004									
2004-2005									
2005-2006									

Hispanics in the Life Sciences

F4a. Please record the number of Hispanics who entered the Life Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F4b. Of the Hispanics admitted to candidacy in the Life Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									

2002-2003									
2003-2004									
2004-2005									
2005-2006									

Asians and Pacific Islanders in the Life Sciences

F5a. Please record the number of Asians and Pacific Islanders who entered the Life Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F5b. Of the Asians and Pacific Islanders admitted to candidacy in the Life Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									

2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Native Americans/Alaska Natives in the Physical Sciences and Mathematics

F6a. Please record the number of Native Americans and Alaska Natives who entered the Physical Sciences and Mathematics programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F6b. Of the Native Americans and Alaskan Natives admitted to candidacy in the Physical Sciences and Mathematics, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									

2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Blacks in the Physical Sciences and Mathematics

F7a. Please record the number of Non-Hispanic Blacks who entered the Physical Sciences and Mathematics programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F7b. Of the Non-Hispanic Blacks admitted to candidacy in the Physical Sciences and Mathematics, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									

1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Whites in the Physical Sciences and Mathematics

F8a. Please record the number of Non-Hispanic Whites who entered the Physical Sciences and Mathematics programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F8b. Of the Non-Hispanic Whites admitted to candidacy in the Physical Sciences and Mathematics, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									

1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Hispanics in the Physical Sciences and Mathematics

F9a. Please record the number of Hispanics who entered the Physical Sciences and Mathematics programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	**Number of students who left the program without a master's or doctoral degree**	**Number of students who left the program after receiving a master's degree**	**Number of students admitted to doctoral candidacy**
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F9b. Of the Hispanics admitted to candidacy in the Physical Sciences and Mathematics, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	**4 years**	**5 years**	**6 years**	**7 years**	**8 years**	**9 years**	**10 years**	**Number still enrolled after 10 years**
1996-1997									

1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Asians and Pacific Islanders in the Physical Sciences and Mathematics

F10a. Please record the number of Asians and Pacific Islanders who entered the Physical Sciences and Mathematics programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F10b. Of the Asians and Pacific Islanders admitted to candidacy in the Physical Sciences and Mathematics, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years

1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Native Americans and Alaska Natives in Engineering

F11. Please record the number of Native Americans and Alaska Natives who entered the Engineering programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F11b. Of the Native Americans and Alaskan Natives admitted to candidacy in Engineering, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

									Number still

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Blacks in Engineering

F12a. Please record the number of Non-Hispanic Blacks who entered the Engineering programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F12b. Of the Non-Hispanic Blacks admitted to candidacy in Engineering, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Whites in Engineering

F13a. Please record the number of Non-Hispanic Whites who entered the Engineering programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				

2004-2005				
2005-2006				

F13b. Of the Non-Hispanic Whites admitted to candidacy in Engineering, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Hispanics in Engineering

F14a. Please record the number of Hispanics who entered the Engineering programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				

2003-2004				
2004-2005				
2005-2006				

F14b. Of the Hispanics admitted to candidacy in Engineering, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Asians and Pacific Islanders in Engineering

F15a. Please record the number of Asians and Pacific Islanders who entered the Engineering programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				

2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F15b. Of the Asians and Pacific Islanders admitted to candidacy in Engineering, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Native Americans/Alaska Natives in the Social Sciences

F16a. Please record the number of Native American/Alaska Natives who entered the Social Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				

1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F16b. Of the Native American/Alaskan Natives admitted to candidacy in the Social Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Blacks in the Social Sciences

F17a. Please record the number of Non-Hispanic Blacks who entered the Social Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				

1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F17b. Of the Non-Hispanic Blacks admitted to candidacy in the Social Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Whites in the Social Sciences

F18a. Please record the number of Non-Hispanic Whites who entered the Social Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter	Number of students who left the program without a master's or	Number of students who left the program after receiving a	Number of students admitted to doctoral

	zero	doctoral degree	master's degree	candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F18b. Of the Non-Hispanic Whites admitted to candidacy in the Social Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Hispanics in the Social Sciences

F19a. Please record the number of Hispanics who entered the Social Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral	Number of students who left the	Number of students who	Number of students

	students If none: enter zero	program without a master's or doctoral degree	left the program after receiving a master's degree	admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F19b. Of the Hispanics admitted to candidacy in the Social Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Asians and Pacific Islanders in the Social Sciences

F20a. Please record the number of Asians and Pacific Islanders who entered the Social Sciences programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F20b. Of the Asians and Pacific Islanders admitted to candidacy in the Social Sciences, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Native Americans/Alaska Natives in the Arts and Humanities

F21a. Please record the number of Native American/Alaska Natives who entered the Arts and Humanities programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F21b. Of the Native American/Alaskan Natives admitted to candidacy in the Arts and Humanities, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Blacks in the Arts and Humanities

F22a. Please record the number of Non-Hispanic Blacks who entered the Arts and Humanities programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F22b. Of the Non-Hispanic Blacks admitted to candidacy in the Arts and Humanities, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Non-Hispanic Whites in the Arts and Humanities

F23a. Please record the number of Non-Hispanic Whites who entered the Arts and Humanities programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F23b. Of the Non-Hispanic Whites admitted to candidacy in the Arts and Humanities, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

Hispanics in the Arts and Humanities

F24a. Please record the number of Hispanics who entered the Arts and Humanities programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F24b. Of the Hispanics admitted to candidacy in the Arts and Humanities, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									

2005-2006									

Asians and Pacific Islanders in the Arts and Humanities

F25a. Please record the number of Asians and Pacific Islanders who entered the Arts and Humanities programs included in this study between 1996 and 2005.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

F25b. Of the Asians and Pacific Islanders admitted to candidacy in the Arts and Humanities, record the number of students from each cohort listed below who completed degrees within the given number of years after enrolling.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Number still enrolled after 10 years
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									

2004-2005									
2005-2006									

National Research Council
2006 Assessment of Research Doctorate Programs

Program Questionnaire

Every ten or so years, the National Research Council conducts a study of national importance regarding the quality and characteristics of doctoral programs in the United States. This comparative assessment is designed to assist prospective doctoral students with selecting programs that best fit their interests and to permit programs to benchmark themselves against similar programs.

The 2006 Assessment of Research Doctorate Programs collects data about the doctoral programs in over 60 areas of study in American universities.

The information from your responses to this questionnaire will be compiled by Mathematica Policy Research and provided to the National Research Council for their analyses. The National Research Council staff who analyze the data will sign non-disclosure confidentiality agreements to protect the identity of individuals participating in this survey. Any information, including race/ethnicity and gender, that is not currently available to the public, will be treated as confidential and only reported in aggregated form so that it cannot be used to discern the identity of any survey participant in any report or presentation concerning the survey or in the public use file that will be made available to the public at the conclusion of this study.

Your institution has identified your program in:

____(Name of program that was identified by the institution)_____

as an area of doctoral study that corresponds to the following field in the NRC taxonomy:

____(Name of field in the NRC taxonomy)_____

1) Your program was selected because it satisfies at least three of the following four criteria for a doctoral program:

1. Enrolls doctoral students
2. Has a designated faculty
3. Develops a curriculum for doctoral study
4. Makes recommendations for the award of degrees.

In addition, the program must have awarded 5 Ph.D.s during the period 2001/2 to 2005/6.

a. I believe my program may be ineligible ☐ *(go to IN1)*

2) The following other program(s) at your institution will also be part of the study in the field of_(Name of field in the NRC taxonomy):

____(Name of program that was identified by the institution)_____
____(Name of program that was identified by the institution)_____ etc.

3) If other doctoral degree-granting programs in this field exist at your institution (see above), data and faculty lists for those programs will be provided to the NRC separately. *Consequently, please do not include faculty members in those programs here, unless they actively participate in your program.*

Part A. Program Fields and Research Specialties

In this section of the questionnaire, we collect information on the fields your program is associated with and the research specialties of your faculty.

***A0. Please enter the website address (URL) for this program. (e.g. www.myuniversity.edu/my program)**

_____

A1. Is this program interdisciplinary in nature, drawing significantly on knowledge and techniques in two or more fields?

☐ *Yes*
☐ *No*

If not an engineering field, skip to Part B

A2. Although students accepted into this program may specialize in areas within engineering, does this program confer. . .

☐ *A general (or nonspecific) doctoral degree in engineering*
☐ *A doctorate in a specific engineering field such as mechanical engineering or biomedical engineering*

Part B. Program Faculty

Some institutions may find submitting this information easier in a spreadsheet format. If you would prefer using the Excel spreadsheet available from Mathematica, click on "Will use spreadsheet" below. You will be skipped to the next section in the questionnaire. Please submit the spreadsheet to Mathematica at your earliest convenience.

- *SPREADSHEETS WILL NOT BE ACCEPTED AFTER CLOSE OF BUSINESS DECEMBER 15, 2006.*

☐ *Will use spreadsheet*
☐ *Continue to the faculty section of the web survey*

In this section, we ask you to provide information about your faculty in three categories—core, new, and associated.

B1. Core Faculty. Please complete the table below with the names of faculty members who:

1) have served as a chair or member of a program dissertation committee in the past 5 academic years (2001-2002 through 2005-2006), OR
2) are serving as a member of the graduate admissions or curriculum committee

The faculty member must be currently (2006-2007) and formally designated as faculty in the program, and not be an outside reader who reads the dissertation but does not contribute substantially to its development. Include emeritus faculty only if the faculty member has, within the past three years, either chaired a dissertation committee or been the primary instructor for a regular PhD course.

Information Collected	Answer Options
Name: *First : Middle Initial: *Last :	
Fields of Specialization: Primary : Secondary:	
Faculty Rank:	Professor Associate Professor Assistant Professor Emeritus Other, specify
Tenure status:	Tenured Nontenured, tenure-track Nontenured, non tenure-track
Highest degree:	Doctorate (e.g. PhD DSc EdD etc.) Other professional degree (e.g. JD LLB MD DDS DVM etc.) Master's degree (e.g. MS MA MBA) Other (specify)
Number of Dissertation Committees: *Chaired in this Program in the last five years (acted on as primary dissertation advisor) *Served on in this Program in the Last Five Years (include Committees Served on as a member or chair)	

Gender:	Male Female
Citizenship:	U.S. Citizen Permanent Resident Temporary Visa Holder Unknown
Race/Ethnicity:	White, Non-Hispanic Black, Non-Hispanic Hispanic Asian or Pacific Islander American Indian or Alaska Native Race/Ethnicity Unknown
University Address: *Line 1: Line 2: *City *State *Zip Code	
*Telephone	
*Email	

*=Required fields

B2. <u>New Faculty</u>. Please complete the table below with the names of faculty members not listed as core in the previous questions who:

1) do not meet the criteria for core faculty, but who have been hired in tenured or tenure-track positions within the past three academic years (2003-2004 through 2005-2006) AND

2) are currently employed at your university and are expected to become involved in doctoral education in your program.

Information Collected	Answer Options
Name: *First : Middle Initial: *Last :	
Fields of Specialization: Primary : Secondary:	
Faculty Rank:	Professor Associate Professor Assistant Professor Emeritus Other, specify
Tenure status:	Tenured Nontenured, tenure-track Nontenured, non tenure-track
Highest degree:	Doctorate (e.g. PhD DSc EdD etc.) Other professional degree (e.g. JD LLB MD DDS DVM etc.) Master's degree (e.g. MS MA MBA) Other (specify)
Gender:	Male Female
Citizenship:	U.S. Citizen Permanent Resident Temporary Visa Holder Unknown
Race/Ethnicity:	White, Non-Hispanic Black, Non-Hispanic Hispanic Asian or Pacific Islander American Indian or Alaska Native Race/Ethnicity Unknown

University Address: *Line 1: Line 2: *City *State *Zip Code	
*Telephone	
*Email	

*=Required fields

B3. <u>Associated Faculty</u>. Please complete the table below with the names of faculty members who:

1) have chaired or served on program dissertation committees in the past five years (2001 2002 through 2005-2006), AND

2) have a current (2006-2007) appointment at your institution, but who are not designated faculty in the program.

They should not be outside readers, or faculty currently employed at other universities, unless they are on leave from the faculty at your institution. Include emeritus faculty only if the faculty member has, within the past three years, either chaired a dissertation committee or been the primary instructor for a regular PhD course.

Information Collected	Answer Options
Name: *First : Middle Initial: *Last :	
Fields of Specialization: Primary : Secondary:	
Faculty Rank:	Professor Associate Professor Assistant Professor Emeritus Other, specify
Tenure status:	Tenured Nontenured, tenure-track Nontenured, non tenure-track
Highest degree:	Doctorate (e.g. PhD DSc EdD etc.) Other professional degree (e.g. JD LLB MD DDS DVM etc.) Master's degree (e.g. MS MA MBA) Other (specify)
Number of Dissertation Committees: *Chaired in this Program in the last five years (acted on as primary dissertation advisor) *Served on in this Program in the Last Five Years (include Committees Served on as a member or chair)	
Gender:	Male Female
Citizenship:	U.S. Citizen Permanent Resident

	Temporary Visa Holder Unknown
Race/Ethnicity:	White, Non-Hispanic Black, Non-Hispanic Hispanic Asian or Pacific Islander American Indian or Alaska Native Race/Ethnicity Unknown

*=Required fields

B5. The next question(s) collect aggregate information on faculty diversity. The total number of core and new faculty for this program was provided by this institution.

How many of the approximately *[number of faculty from spreadsheet]* **core and new faculty members in this program are . . .**

If none, enter as 0

☐ Male
☐ Female

B6. The next question(s) collect aggregate information on faculty diversity. The total number of core and new faculty for this program was provided by this institution.

How many of the approximately *[number of faculty from spreadsheet]* **core and new faculty members in this program are . . . .**

If none, enter zero

U.S. Citizens:	☐☐☐
Permanent Residents:	☐☐☐
Temporary Visa Holders:	☐☐☐
Citizenship Unknown:	☐☐☐

***B7. The next question(s) collect aggregate information on faculty diversity. The total number of core and new faculty for this program was provided by this institution.**

Of the core and new faculty members in the program who are <u>U.S. citizens or permanent residents</u>, how many are:

If none, enter zero

White, Non-Hispanic:	☐
Black, Non-Hispanic:	☐
Hispanic:	☐
Asian or Pacific Islander:	☐
American Indian or Alaska Native:	☐
Race/Ethnicity Unknown:	☐

[Program will check to make sure the total of responses to this question equals the numbers entered for U.S. citizens and permanent residents in B6.]

B8. Is the dissertation committee chair typically the primary advisor of doctoral students in your program?

☐ Yes
☐ No

Part C. Doctoral Program: Enrollment and Degree Completion

In this section, we ask for information about your program's doctoral students and degree recipients, including demographic information, enrollments, and degrees awarded.

***C1. For each academic year listed below, please indicate the number of doctoral degrees awarded in your program that year.**

	Number of Doctoral Degrees Awarded *If none: enter zero*
2001-2002	☐☐☐
2002-2003	☐☐☐
2003-2004	☐☐☐
2004-2005	☐☐☐
2005-2006	☐☐☐

***C2. Of the doctoral graduates who received doctoral degrees in the period 2003-2004 through 2005-2006, what was the <u>median time to degree?</u>**

- The median is the mid-point measured from the date of first enrollment in the program to date of graduation—50 percent took a shorter time to complete their degrees and 50 percent took longer
- When entering a number that includes a decimal, please type the decimal
- If this program enrolls MD/PhD students and the time to degree for these students can be calculated separately, do NOT include these students below. You will be asked about the MD/PhD students later.

	Median Number of Years
a. All full-time and part-time doctoral students	|__| . |__|
b. Doctoral students who were full-time during their entire time in the program	|__| . |__|

C3. For each academic year listed below, please indicate:

1) The number of doctoral students to whom your program offered admission AND
2) The number of doctoral students who then enrolled for the first time.

	Number Offered Admission *If none: enter zero*	**Number First-Time Enrolled** *If none: enter zero*
2001-2002	☐☐☐	☐☐☐
2002-2003	☐☐☐	☐☐☐
2003-2004	☐☐☐	☐☐☐
2004-2005	☐☐☐	☐☐☐
2005-2006	☐☐☐	☐☐☐

[The program will check that for each row, the number entered in col 1 must be larger that the number entered in col 2.]

C4. What is your program's policy regarding whether a master's degree in the field is required prior to admission to this program:

Mark one only

☐ It is required prior to admission

☐ It is expected that students will earn it as a stage in their doctoral program

☐ Neither of the above

C5. Of the *[program automatically calculates number from response to question C3]* **students who enrolled for the first-time in 2003-2004, 2004-2005, and 2005-2006, what number had a master's degree in the field of your program prior to enrollment?**

If not known: check this box: ☐ *and continue*

If none: enter zero
Number of students: ☐☐☐

[The program will check that the number entered must be equal to or smaller than the total number of students in col 2 for years 2003-2006 in C3.]

C6. Does your doctoral program have a continuous enrollment policy?

- ***Continuous Enrollment*** *means that a person is considered to be a doctoral student only if he or she is enrolled and pays tuition or a fee. Under this policy, a student who drops out must apply for reinstatement.*

☐ Yes
☐ No skip to C8

C7. To whom does this policy apply?

Mark one only

☐ All Students
☐ Students Admitted to Candidacy
☐ Other (Specify _____)

C8. How many doctoral students, whether or not they were yet admitted to candidacy, were enrolled in your program during fall of 2005?

Number of Doctoral
Students Enrolled Fall 2005: ☐☐☐

C9. Of the *[program automatically enters the number from C8]* **doctoral students enrolled in your program during the fall of 2005, how many were …**

If none: enter zero

Male: ☐☐☐
Female: ☐☐☐

[Program will check to make sure the total of responses to this question equal the numbers entered for total in C8.]

a. Of the *[program automatically enters the number from C8]* **doctoral students enrolled in your program during the fall of 2005, how many were enrolled. . .**

If none: enter zero

Full-Time: ☐☐☐
Part-time: ☐☐☐

[Program will check to make sure the total of responses to this question equal the numbers entered for total in C8]

b. Of the *[program automatically enters the number from C8]* **doctoral students enrolled in your program during the fall of 2005, how many were …**

If none: enter zero

U.S. Citizens: ☐☐☐
Permanent Residents: ☐☐☐
Temporary Visa Holders: ☐☐☐
Citizenship Unknown: ☐☐☐

[Program will check to make sure the total of responses to this question equal the numbers entered for total in C8.]

***c. Of the** *[program enters the number of US citizens and permanent residents from C9b]* **doctoral students who were U.S. citizens or permanent residents, how many were…**

If none: enter zero

White, Non-Hispanic: ☐☐☐
Black, Non-Hispanic: ☐☐☐
Hispanic: ☐☐☐
Asian or Pacific Islander: ☐☐☐
American Indian or Alaska Native: ☐☐☐
Race/ethnicity Unknown: ☐☐☐

[Program will check to make sure the total of responses to this question equal the numbers entered for U.S. citizens and permanent residents in C9b.]

C10. Does this program enroll dual professional degree/PhD students?

- Dual professional degree/PhD students include students such as MD/PhD, DVM/PhD or ThD/PhD students.

☐ Yes
☐ No

If no, skip to C12

a. How many dual professional degree /PhD students were enrolled in this program in Fall 2005?

Dual professional degree/PhD students include students such as MD/PhD, DVM/PhD or ThD/PhD students.

If none: enter zero

Number of **dual professional degree**/PhD Students |_____|

b. Does this program include <u>only</u> dual professional degree /PhD students?

Dual professional degree/PhD students include students such as MD/PhD, DVM/PhD or ThD/PhD students.

☐ Yes *(skip to C12)*
☐ No *(go to C10c)*

c. How will you be reporting the progress of the dual professional degree /PhD students enrolled in this program?

Dual professional degree/PhD students include students such as MD/PhD, DVM/PhD or ThD/PhD students.

☐ Can report separately on the dual professional degree/PhD students
☐ Cannot report separately on the dual professional degree/PhD students (*skip to C12)*

***C11. What was the median time to degree for students enrolled in the dual professional degree/PhD segment of this program who graduated in the period 2003-2004 through 2005-2006?**

Dual professional degree/PhD students include students such as MD/PhD, DVM/PhD or ThD/PhD students.

- *The median is the mid-point measured from the date of first enrollment in the program to date of graduation—50 percent took a shorter time to complete their degrees and 50 percent took longer*
- *When entering a number that includes a decimal, please type the decimal.*

	Median Number of Years
All full-time and part-time dual professional degree/PhD graduates	|__| . |__|
dual professional degree/PhD graduates who were full-time during their entire time in the program	|__| . |__|

C12. Please describe how your program defines a full-time doctoral student:

_____
_____
_____

C13. Does your program have formal requirements for being admitted to candidacy?

☐ Yes
☐ No skip to C15

C14. Please indicate the criteria your program uses to admit students to candidacy.

Mark all that apply

☐ Successful Completion of Required Coursework
☐ Successful Completion of Written Examination(s)
☐ Successful Completion of Oral Examination(s)
☐ Award of the Master's Degree
☐ Defense of a Dissertation Prospectus
☐ Other Specify:_____

C15. During the 10 years between 1996 and 2005, did your program distinguish between students seeking a master's and those seeking a doctorate?

Mark one only

☐ Yes, distinguished between seeking a master's and seeking a doctorate during that entire time period → skip to C16

☐ Began that period making the distinction but later changed

☐ Began that period making no distinction but later changed

☐ No, made no such distinction during that entire period → skip to C16

C15a. In what year did the policy change?

Year:☐☐☐☐

C16. The next series of questions collects information on how many of the full-time students in your program complete doctoral study by gender.

[*FILL if C10c = "can report separately*
Since you will be reporting them separately, please do NOT include the program's dual professional degree/PhD students in the numbers reported for questions C16a through C17b
[*FILL if C10c = "cannot report separately"*
Please include the program's dual professional degree/PhD students in the numbers reported for questions C16a through C17b

- To preserve confidentiality, if the numbers in cells equal less than 5, the NRC will aggregate over cohorts so that the size of any reported cell is always greater than or equal to 5
- Include doctoral students enrolled in your doctoral program, whether or not they have been admitted to candidacy
- Do not include students who only enroll with the intent of earning a master's degree and did not convert to doctoral students.
- Doctoral students who "left the program" are those who are no longer enrolled at this time.
- Doctoral students who "stopped out" (left but later enrolled again) should not be counted as students who left if they are currently enrolled or completed the doctoral degree
- Admitted to Candidacy may be defined in different ways. If your program defines and grants candidacy for a doctoral degree, please use the definition of admitted to candidacy your program uses. If it does not, please leave column 4 (Number of students admitted to doctoral candidacy) blank.
- Since you will be reporting them separately, please do NOT include the program's dual professional degree/PhD students in the numbers reported for questions C16a through C17b.

***C16a. Please complete the table for the male students in your program**

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

***C16b. Of the male students admitted to candidacy in your program, record the number who within the various time spans listed below completed <u>doctoral</u> degrees <u>within</u> the given number of years after enrolling.**

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years
1996-1997								
1997-1998								
1998-1999								
1999-2000								
2000-2001								
2001-2002								
2002-2003								
2003-2004								
2004-2005								
2005-2006								

***C17a. Please complete the table for the female students in your program**

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

***C17b. Of the female students admitted to candidacy in your program, record the number who within the various time spans listed below completed doctoral degrees within the given number of years after enrolling.**

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years
1996-1997								
1997-1998								
1998-1999								
1999-2000								
2000-2001								
2001-2002								
2002-2003								
2003-2004								
2004-2005								
2005-2006								

Ask C18a and C18b if C10c = can report separately

C18a. Please complete the table for the dual professional degree/PhD students in this program.

Dual professional degree/PhD students include students such as MD/PhD, DVM/PhD or ThD/PhD students.

	Number of entering doctoral students If none: enter zero	Number of students who left the program without a master's or doctoral degree	Number of students who left the program after receiving a master's degree	Number of students admitted to doctoral candidacy
1996-1997				
1997-1998				
1998-1999				
1999-2000				
2000-2001				
2001-2002				
2002-2003				
2003-2004				
2004-2005				
2005-2006				

***C18b. Of the dual professional degree/PhD students admitted to candidacy in your program, record the number who within the various time spans listed below completed doctoral degrees within the given number of years after enrolling.**

Dual professional degree/PhD students include students such as MD/PhD, DVM/PhD or ThD/PhD students.

	3 years or less	4 years	5 years	6 years	7 years	8 years	9 years	10 years	Delete col
1996-1997									
1997-1998									
1998-1999									
1999-2000									
2000-2001									
2001-2002									
2002-2003									
2003-2004									
2004-2005									
2005-2006									

C19. In order to analyze program interdisciplinarity through a review of dissertation key words, please enter the full names of every student who was awarded a doctoral degree in this program over the past three years (2003-04 through 2005-06) and the academic year in which that degree was awarded.

Enter each student's name and the academic year on each line

First Name **Middle** **Last Name** **Academic Year**

_____ _____

_____ _____

_____ _____

[allow 300]

Part D. Doctoral Program: Characteristics

In this section, we ask for information about the characteristics of your doctoral program.

D1. Did you require GREs from all students entering this doctoral program in 2005-2006?

Mark one only

☐ Yes, required for all (*skip to D4)*
☐ No, only required for some
☐ No, not required for any (*skip to D5)*

D2. Which of the following criteria are used to exempt students from the GRE requirement?

M*ark all that apply*

☐ Professional experience
☐ Master's degree
☐ Undergraduate degree from same institution
☐ Graduate degree from same institution
☐ High undergraduate GPA
☐ Publications or research experience
☐ Not required for international students
☐ Other exam (e.g., LSAT, GMAT) (Specify, _____)

D3. When applying for admission, do more than 50 percent of the entering students in your program provide GRE scores?

☐ Yes
☐ No *skip toD5*

D4. Among the doctoral students enrolling for the first time in the program, please enter, for each academic year:

1) The number who reported their scores
2) Their median Verbal GRE
3) Their median Quantitative GRE scores

	2003-04	**2004-05**	**2005-06**
1) Number of GRE test takers			
2) Median score, Verbal GRE			
3) Median score, Quantitative GRE			

[Program will check D4(1)to make sure the numbers are less than or equal to the numbers in C3, col b]

D5. Does your program require all (or most) doctoral students to serve as teaching assistants (TAs), as part of their doctoral experience?

☐ Yes
☐ No skip to question D7

D6. For how many terms are they required to TA?

If none: enter zero
Number of Terms Required: ☐☐

D7. Among doctoral students who teach in return for their stipend or salary…

a. In the fall of 2005, how many doctoral students in this program were assigned to <u>assist faculty</u> by teaching lab or recitation sections?

If none: enter zero
Number of Students: ☐☐☐

b. On average, <u>how many course sections</u> do doctoral students who assist faculty by teaching lab or recitation sections teach in a given term?

If none: enter zero
Number of Course Sections: ☐

c. In the fall of 2005, how many doctoral students were appointed with <u>sole responsibility</u> for instruction of one or more courses or course sections?

If none: enter zero
Number of Students
With Sole Responsibility: ☐☐☐

d. On average, <u>how many course sections</u> do those doctoral students with sole responsibility for instruction teach?

If none: enter zero
Number of Course Sections: ☐

e. On average, <u>how many students are enrolled</u> in classes taught by doctoral students with sole responsibility for their instruction?

If none: enter zero

Number of students enrolled: ☐☐☐

D8. Please indicate whether your institution and/or your program provides the following kinds of support for doctoral students or doctoral education.

	Institutional Support Only	Program Support Only	Both Institutional and Program Support	Neither Institutional nor Program Support
Orientation for new graduate students	☐	☐	☐	☐
International student orientation	☐	☐	☐	☐
Language screening/support prior to teaching	☐	☐	☐	☐
Instruction in writing (outside of program requirements)	☐	☐	☐	☐
Instruction in statistics (outside of program requirements)	☐	☐	☐	☐
Prizes/awards to doctoral students for teaching and/or research	☐	☐	☐	☐
Assistance/training in proposal preparation	☐	☐	☐	☐
On-campus, graduate student research conferences	☐	☐	☐	☐
Formal training in academic integrity/ethics	☐	☐	☐	☐
Active graduate student association	☐	☐	☐	☐
Staff assigned to the graduate student association	☐	☐	☐	☐
Financial support for the graduate student association	☐	☐	☐	☐
Posted academic grievance procedure	☐	☐	☐	☐
Dispute resolution procedure	☐	☐	☐	☐
Regular graduate program directors/coordinators meetings	☐	☐	☐	☐
Annual review of all enrolled doctoral students	☐	☐	☐	☐
Organized training to help students improve teaching skills	☐	☐	☐	☐
Travel support to attend professional meetings	☐	☐	☐	☐

D9. Does your program confer awards to honor faculty for mentoring or other activities that promote scholarship of doctoral students?

☐ Yes
☐ No

D10. Does your program collect data about employment outcomes for all of your doctoral graduates?

☐ Yes
☐ No skip to question D12

D11. Do you provide potential applicants with this information?

☐ Yes
☐ No

D12. Approximately what percentage of the doctoral students in your program have a workspace for their exclusive use? (For example: a carrel in the library, a desk in an office or other place where they can keep books, papers and materials)

If none: enter zero

Percentage with exclusive work space: ☐☐☐%

D13. Please list the interdisciplinary centers, programs, or clinics in which the greatest number of doctoral students from your program participate (conduct research, teach, or gain clinical experience). Please list no more then 10.

If none: check this box: ☐ *and continue*

NAMES OF INTERDISCIPLINARY CENTERS, PROGRAMS, OR CLINICS:

_____
_____
_____
_____

[allow 10]

D14. What other programs does your program collaborate with for organized training activities (e.g. training grants, certificate programs, joint degree programs)?

If none: check this box: ☐ *and continue*

NAMES OF OTHER PROGRAMS

_____

_____

_____

[allow 10]

Part E. Doctoral Program: Financial Support for Full -Time Students

In this section, we ask for information about the financial support your program provides to its full-time doctoral students.

E1. For the 2005-2006 academic year, what did your institution charge full-time first-year doctoral students in your program for tuition, mandatory fees, and health insurance premiums?

- *Enter dollar amounts without commas or dollar signs ($).*
- *Public Institutions: Please answer separately for in-state and out-of-state students*

	Public Institutions		**Private Institutions**
	In-state students	Out-of-state students	
Tuition and fees for full-time enrollment:	$_____	$_____	$_____
Health Insurance premiums:	$_____	$_____	$_____

E2. For the 2005-2006 academic year, not including summer 2006, what was the <u>modal amount of total financial support</u> your program provided to funded full-time first-year doctoral students?

- *Financial support is funding provided by your institution or program or by an external funding agency or organization. It does not include personal, spousal, or family support, wages from work unrelated to the program, or loans*
- *Enter dollar amounts without commas or dollar signs ($).*
- *Public Institutions: Please answer separately for in-state and out-of-state students.*

	Public Institutions		**Private Institutions**
	In-state students	Out-of-state students	
Modal Amount Of Total Support	$_____	$_____	$_____

E3. For the 2005-2006 academic year, not including summer 2006, what was the <u>modal amount of financial support</u> your program provided to funded full-time first-year doctoral students in these three categories?

- *Enter dollar amounts without commas or dollar signs ($).*
- *Public Institutions: Please answer separately for in-state and out-of-state students*

	Public Institutions		**Private Institutions**
	In-state students	Out-of-state students	
Tuition and fees for full-time enrollment:	$_____	$_____	$_____
Health Insurance premiums:	$_____	$_____	$_____
Academic year support (stipend/salary)	$_____	$_____	$_____

E4. What was the modal amount of summer 2006 support your program provided to funded full-time first-year doctoral students?

If none: check this box ☐ and continue

- *Enter dollar amounts without commas or dollar signs ($).*
- *Public Institutions: Please answer separately for in-state and out-of-state students.*

	Public Institutions		Private Institutions
	In-state students	Out-of-state students	
Summer support:	$_____	$_____	$_____

E5. How many of the full-time first-year doctoral students (FFDs) who entered your program in the 2005-06 academic year had…..

	Number of Students *If none: enter zero*
Full financial support:	☐☐☐
Partial financial support:	☐☐☐
No financial support:	☐☐☐
Total number of FFD doctoral students:	☐☐☐

[Program will check that the first three numbers add to the last number]

E6. Does a majority of the full-time doctoral students in your program receive a typical pattern of financial support over their first five years?

☐ Yes
☐ No *skip to E8*

E7 Please indicate your program's typical five-year pattern of financial support by recording, for each funding mechanism listed, how many years of support a student would typically receive during his or her first five years of enrollment.

- *For the types of support that are not applicable, enter 0*
- *When entering a number that includes a decimal, please type in the decimal.*

	Typical Five-Year Pattern
Number of fellowship support years:	☐.☐
Number of traineeship support years:	☐.☐
Number of teaching assistantship years:	☐.☐
Number of research assistantship years:	☐.☐
Number of other assistantship years:	☐.☐
Number of years without support:	☐.☐

E8. Including all of the *[program automatically enters the number from C9a (full-time)]* **Fall term 2005 full-time doctoral students, record the number who received the various types of support indicated below:**

- ***Financial support*** *is funding provided by your institution or program or by an external funding agency or organization. It does not include personal, spouse, or family support, wages from work unrelated to the program, or loans*

Fall Term 2005 Doctoral Students by Year in Program

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	>6 Yr
Full support							
a) Externally funded fellowships only							
b) Externally funded traineeships only							
c) Institutional fellowships only							
d) Teaching assistantships only							
e) Research assistantships only							
f) Administration (other) assistantship only							
g) Combination of externally funded fellowship or traineeship (a or b) with internal support (c, d, e, and/or f)							
h) Combination of internal fellowship(s) with internal assistantships (d, e, and/or f)							
i) Combination of internal assistantships (d, e, and/or f)							
___ j) Other _____							
Funded with less than full support							
Unfunded							
TOTAL NUMBER OF STUDENTS							

E9. During the 2005-2006 academic year, did your program use externally-funded <u>training grants</u> to support doctoral students?

☐ Yes
☐ No

Part F. Postdoctoral Scholars

In this section, we ask for information about the postdoctoral scholars (postdocs) associated with your program

*Please use this **definition of a postdoctoral scholar** developed by the Association of American Universities:*

- *The appointee was recently awarded a Ph.D. or equivalent doctorate (e.g., Sc.D., M.D.) in an appropriate field; and*
- *the appointment is temporary; and*
- *the appointment involves substantially full-time research or scholarship; and*
- *the appointment is viewed as preparatory for a full-time academic and/or research career; and*

- *the appointment is not part of a clinical training program; and*
- *the appointee works under the supervision of a senior scholar or a department in a university or similar research institution (e.g., national laboratory, NIH, etc.); and*
- *the appointee has the freedom, and is expected, to publish the results of his or her research or scholarship during the period of the appointment.*

(See: http://www.aau.edu/reports/PostDocRpt.html. Accessed 6/27/06)

F1. During the 2005 Fall term, were any postdoctoral scholars, including those who are university employees or those on external or portable fellowships, working with core or new faculty in your program?

☐ Yes
☐ No *skip to exit screen*

F2. During the 2005 Fall term, how many postdoctoral scholars, including those who are university employees or those on external or portable fellowships, were working with core or new faculty in your program?

Number of Postdocs: ☐☐☐

a. Of the [program enters the number from F2] **postdoctoral scholars, how many were …**

Male: ☐☐☐
Female: ☐☐☐

[Should total to the number in F2]

b. Of the *[program enters the number from F2]* **postdoctoral scholars, how many were …**

If none: enter zero

U.S. Citizens: ☐☐☐
Permanent Residents: ☐☐☐
Temporary Visa Holders: ☐☐☐
Citizenship Unknown: ☐☐☐

[Should total to the number in F2]

c. Of the *[program enters the number of US citizens and permanent residents from F2b]* **postdoctoral students who were U.S. citizens or permanent residents, how many were…**

If none: enter zero

White, Non-Hispanic: ☐☐☐
Black, Non-Hispanic: ☐☐☐
Hispanic: ☐☐☐
Asian or Pacific Islander: ☐☐☐
American Indian or Alaska Native: ☐☐☐
Race/ethnicity Unknown: ☐☐☐

[Program will check to make sure the total of responses to this question equal the numbers entered for U.S. citizens and permanent residents in F2b]

F3. Among the *[program enters the number from F2]* **postdoctoral scholars associated with this program, which four countries of origin provide the largest percentage of postdoctoral scholars on temporary visas to the program and what percentage of all postdoctoral scholars in the program do citizens of these countries comprise?**

Country of Origin	Percentage of All Postdoctoral Scholars in the Program
_____	☐☐%
_____	☐☐%
_____	☐☐%
_____	☐☐%

F4. Of the *[program enters the number from F2]* **postdoctoral scholars associated with this program, how many had portable fellowships (i.e., fellowships awarded directly to postdoctoral scholars rather than through institutions and which can be used at an institution of the individual's choosing)?**

If none: enter zero

Please fill in number: ☐☐☐

Part IN: Possible Ineligible Program

IN1. Is this program ineligible because it:

Mark All That Apply

☐ a. Does NOT enroll doctoral students?
☐ b. Does NOT have designated faculty?
☐ c. Has NO developed curriculum for doctoral study?
☐ d. Makes NO recommendations for the award of degrees?
☐ e. Awarded fewer than 5 Ph.D.s between 2001/2 to 2005/6?

[If "e" is marked, go to exit screen.]
[If "e" is not marked and there is only one item marked in a-d, go to 2.]

IN2. According to the eligibility criteria for the 2006 NRC Assessment, your program is eligible and you may continue.

[Return to eligibility page of questionnaire.]

National Research Council
Assessment of Research Doctorate Programs
2006

Program Questionnaire for Emerging Fields

Every ten or so years, the National Research Council conducts a study of national importance regarding the quality and characteristics of doctoral programs in the United States. This comparative assessment is designed to assist prospective doctoral students with selecting programs that best fit their interests and to permit programs to benchmark themselves against similar programs.

The 2006 Assessment of Research Doctorate Programs collects data about the doctoral programs in over 60 areas of study in American universities.

Your institution has identified your program in:

____(Name of program that was identified by the institution)_____

as an area of doctoral study that corresponds to the following emerging field in the NRC taxonomy:

____(Name of field in the NRC taxonomy)_____

Your program was selected because it satisfies at least three of the following four criteria for a doctoral program:

1. Enrolls doctoral students
2. Has a designated faculty
3. Develops a curriculum for doctoral study
4. Makes recommendations for the award of degrees.

In addition, the program must have awarded 5 Ph.D.s during the period 2001/2 to 2005/6.

If more than one doctoral degree granting program in this field exists at your institution: data and faculty lists for those programs will be provided to the NRC separately.

The following other program(s) at your institution will also be part of the study in the field of (Name of field in the NRC taxonomy):

____(Name of program that was identified by the institution)_____
____(Name of program that was identified by the institution)_____ etc.

We are interested in the number of core, new, and associated faculty in your program.

Core Faculty are faculty members who:

1) have served as a chair or member of a program dissertation committee in the past 5 academic years (2001-2002 through 2005-2006), OR

2) are serving as a member of the graduate admissions or curriculum committee

The faculty member must be currently (2006-2007) and formally designated as faculty in the program, and not be an outside reader who reads the dissertation but does not contribute substantially to its development. Include emeritus faculty only if the faculty member has, within the past three years, either chaired a dissertation committee or been the primary instructor for a regular PhD course.

New Faculty are faculty members who:

1) do not meet the criteria for core faculty, but who have been hired in tenured or tenure-track positions within the past three academic years (2003-2004 through 2005-2006) AND

2) are currently employed at your university and are expected to become involved in doctoral education in your program

Associated Faculty are faculty members who:

1) have chaired or served on program dissertation committees in the past five years (2001 2002 through 2005-2006), AND

2) have a current (2006-2007) faculty appointment at your institution, but who are not designated faculty in the program.

They should not be outside readers, or faculty currently employed at other universities. Include emeritus faculty only if the faculty member has, within the past three years, either chaired a dissertation committee or been the primary instructor for a regular PhD course.

1. Based on the definitions above, please provide for this program…

The number of core faculty: ☐☐☐
The number of new faculty: ☐☐☐
The number of associated faculty: ☐☐☐

2. How many students were enrolled in doctoral study in this program during the 2005-2006 academic year?

Number of Students ☐☐☐

3. How many of this program's currently enrolled doctoral students were in the candidacy stage as of the 2005-2006 academic year?

Number of Students ☐☐☐

Welcome to the National Research Council's

2006 Assessment of Research Doctorate Programs
Faculty Questionnaire

Every ten or so years, the National Research Council conducts a study of national importance regarding the quality and characteristics of doctoral programs in the United States. The **2006 Assessment of Research Doctorate Programs** collects data on the doctoral programs and doctoral faculty in over 60 areas of study in American universities, along with some student data. This comparative assessment, the most comprehensive to date, is designed to assist prospective doctoral students with selecting programs that best fit their interests and to permit programs to benchmark themselves against similar programs.

Your participation is important. By completing this questionnaire, you are providing information that will: 1) help the NRC identify the characteristics of successful graduate programs, 2) enable the NRC with collecting data on grants, citations, and publications from other sources; and 3) permit a statistical description of the faculty in the graduate program(s) or programs with which you are affiliated. For further information about the assessment, see *www7.nationalacademies.org/resdoc/index.html*. This site also has a list of Frequently Asked Questions and contains an Email link to request answers to questions you might have concerning the study or the questionnaire.

All of the information you provide will be treated as confidential. The survey is being conducted by Mathematica Policy Research (MPR), an organization experienced in the conduct of confidential surveys. Your responses will be compiled by MPR and provided to the NRC for their analyses. Personally identifiable information, such as past employment and ZIP Codes, will be used to obtain data on publications, grants and awards and honors from other databases. The National Research Council staff who analyze the data will sign non-disclosure confidentiality agreements to protect the identity of individuals participating in the survey. The survey will be conducted using secure web-based survey technology and any information that could be used to identify or link responses to an individual respondent for any survey question will be maintained in storage that is secure. Any data, including race/ethnicity and gender, that is not currently available to the public will only be used in an aggregated form that cannot be used to discern the identity of any survey participant in any report or presentation concerning the survey or in the public use file that will be made available to the public at the conclusion of this study. The link between your name and the data you provide in this questionnaire will only be used to obtain publications and, awards and honors data from other databases and will be removed prior to the publication of the public use file.

Your participation is voluntary. Completing the questionnaire averages about 14 minutes, not counting the time required to list or upload publications, which will vary from person to person. You may refuse to answer any question or discontinue participation at any point. There is no personal risk to you in responding to this questionnaire. Your identity will be known to only the National Research Council and Mathematica Policy Research. No information concerning respondents will be given to your institution. If you have any questions about the study or this questionnaire, please email us at NRC-Assessment@mathematica-mpr.com. Faculty must submit their competed questionnaire by February 15, 2007 if they wish to be considered as a program rater for the Rating Survey that follows this spring. Otherwise, the end date is April 1, 2007.

Click here to indicate your informed consent to participate in this study ☐

A. Program Identification

You have been identified by your institution as a faculty member who participates in doctoral education in one or more graduate programs that fall under one or more fields in the NRC taxonomy. The names of these programs are listed below in questions A2i and A2. However, if you are involved in a doctoral program that is not on this list, it is not part of this study and should not be considered when responding to this questionnaire.

A1. In what year did you become a faculty member at this institution?

Year: ☐☐☐☐

a. Do you have emeritus status?

☐ Yes (*ask A1b)*
☐ No (skip to *A2)*

b. During the last 3 years have you been the primary instructor for a regular PhD course?

☐ Yes
☐ No

A2i. Using the drop down list of graduate programs at this institution that are eligible for this study, please select the doctoral program or programs in which you are involved. Do not include programs for which you serve/ have served as an "outside reader."

For each please enter the number of doctoral dissertation committees you have chaired (that is, been the principal advisor for) during your last 3 years at this institution.

Do Not include committee memberships in programs that are not part of the study.

Program Name (Drop down list of institution's participating program)	**Number of Committees Chaired** *If none, enter zero*
_____	_____

[If A1b = yes, skip to A4]
[If A1b = no and A2i (Number of committees chaired) is > zero, skip to A4]
[If A1b = no and A2i (Number of committees chaired) is < zero, go to exit screen]

A2. Using the drop down list, please select the doctoral program or programs in which you are involved. *Do not include* programs for which you serve/ have served as an "outside reader". For each please enter:

- *Column 1: The number of doctoral dissertation committees you have chaired (that is, been the principal advisor for) during your last 5 years at this institution*
- *Column 2: The total number of committees that you have **either served on or chaired during the period 2001-2006. Please include** committees on which you are **currently serving or chairing***

Program Name (Drop down list of institution's participating program)	Column 1 **Number of Committees Chaired** *If none, enter zero*	Column 2 **Number of Committees Served On or Chaired** *If none, enter zero*
_____	_____	_____

(If A1 = 2003 or later or A2 contains a number greater than zero, skip to A4, otherwise ask A3)

A3. Are you currently serving on doctoral admissions or curriculum committees in one or more of the programs you indicated? [LIST PROGRAM NAMES FROM A2]

☐ Yes
☐ No

(If A3 equals "Yes" go to A4, otherwise skip to the exit "thank you" screen)

A4. Please record your *primary* area of specialization. Then, using the drop down list, please select the field that comes closest to describing or including your primary area of specialization.

Primary Area of Specialization: _____

a. (Drop down Taxonomy list – including subfields)

A5. Please record any additional areas of specialization you currently have. Then, using the drop down list, please select the field that comes closest to describing or including that additional area of specialization.

IF NONE: CHECK THIS BOX: ☐ *(should not skip to C1 but continue to A6)*

a. Area of Specialization: _____

(Drop down list of Taxonomy fields and subfields

b. Area of Specialization: _____

(Drop down list of Taxonomy fields and subfields

c. Area of Specialization: _____

_(Drop down list of Taxonomy fields and subfields

d. Area of Specialization: _____

_(Drop down list of Taxonomy fields and subfields

e. Area of Specialization: _____

(Drop down list of Taxonomy fields and subfields

f. Area of Specialization: _____

(Drop down list of Taxonomy fields and subfields

A6. In your current position at this institution, on which <u>two</u> work activities listed below do you work the most hours, on average?

	Activity Worked <u>Most</u> Hours *Mark One Only*	**Activity Worked the <u>Second Most</u> Hours** *Mark One Only*
Research and development	☐	☐
Teaching	☐	☐
Management or Administration	☐	☐
Professional services to individuals	☐	☐
Other – Specify activity worked <u>most</u> hours:_____ _____	☐	☐
Other – Specify activity worked		

second most hours:___ ☐ ☐

B. Prior Experience

B1. What was your status immediately prior to your employment as a faculty member at your current institution?

Mark One Only

☐ Student
☐ Postdoc
☐ Faculty – Professor
☐ Faculty – Associate Professor
☐ Faculty – Assistant Professor
☐ Faculty – Emeritus Professor
☐ Other – Specify title:_____

B2. Please provide the name and location of your previous employer

Previous employer: _____
City:_____
State:_____Zip Code: _____
Country:_____

Ask B3 if B1 = any response except student

B3. Which of the following employment sectors best describes your last employer immediately before being hired by this institution?

Mark One Only

EDUCATION
- ☐ U.S. 4-year college or university other than medical school
- ☐ U.S. medical school (including university-affiliated hospital or medical center)
- ☐ U.S. university-affiliated research institute
- ☐ U.S. community college or technical institute
- ☐ U.S. preschool, elementary, middle, secondary school or school system
- ☐ Non-U.S. educational institution

GOVERNMENT (other than education institution)
- ☐ Foreign government
- ☐ U.S. federal government
- ☐ U.S. state government
- ☐ U.S. local government

PRIVATE SECTOR (other than education institution)
- ☐ Not-for-profit institution
- ☐ U. S. based industry or business (for profit)
- ☐ Non-U. S. based industry or business (for profit)

OTHER
- ☐ Self-employed
- ☐ Other:_____

B4. Thinking about the job you held immediately before being hired by your current

institution, on which <u>two</u> work activities listed below did you work the most hours?

	Activity Worked <u>Most</u> Hours	**Activity Worked the <u>Second Most</u> Hours**
	Mark One Only	*Mark One Only*
Research and development	☐	☐
Teaching	☐	☐
Management or Administration	☐	☐
Professional services to individuals	☐	☐
Other – Specify activity worked <u>most</u> hours:_____	☐	☐
Other – Specify activity worked <u>second most</u> hours:_____	☐	☐

C. Educational Background

C1. Please indicate all degrees earned beyond your bachelor's degree

Mark All That Apply

☐ Doctorate (e.g. PhD DSc EdD etc.)
☐ Other professional degree (e.g. JD LLB MD DDS DVM etc.)
☐ Master's degree (e.g. MS MA MBA MFA)
☐ Other – Specify degree:_____

C2. What institution conferred your Ph.D. or equivalent degree? If a U.S. institution, please use the dropdown list to select the school. If a foreign institution, please enter the name and address of that institution below

Drop down list
of U.S. Institutions

Foreign Institution (record below)

Institution Name: _____
City: _____
Country: _____

C3. Using the drop down list, please pick the field that comes closest to the field of your Ph.D. or equivalent degree.

_____[Drop down Taxonomy list—including subfields]_____

Other field – please specify: _____

C4. In what year was your Ph.D. or equivalent degree conferred?

Year: ☐☐☐☐

C5. Using the Association of American Universities (AAU) definition detailed below, have you ever held a postdoctoral position (postdoc)?

The AAU **definition of a postdoctoral scholar** states:

- The appointee was recently awarded a Ph.D. or equivalent doctorate (e.g., Sc.D., M.D.) in an appropriate field; and
- the appointment is temporary; and
- the appointment involves substantially full-time research or scholarship; and
- the appointment is viewed as preparatory for a full-time academic and/or research career; and
- the appointment is not part of a clinical training program; and
- the appointee works under the supervision of a senior scholar or a department in a university or similar research institution (e.g., national laboratory, NIH, etc.); and
- the appointee has the freedom, and is expected, to publish the results of his or her research or scholarship during the period of the appointment.

(See: http://www.aau.edu/reports/PostDocRpt.html.)

☐ Yes
☐ No *skip to D1*

C6. How many postdoctoral appointments have you held?

Number of Postdocs Held: ☐

C7. For each postdoc held, please enter the number of years that you held the postdoc and the sector in which you were working.

- *If you have held more than 4 postdoctoral appointments, please list the four most recent*

	Number of Years	Sector (drop down list from B3)
Most Recent		
Second Most Recent		
Third Most Recent		
Fourth Most Recent		

D. Scholarly Activity

The questions in this section will help us match productivity data such as publications, citations, research grants and other types of scholarly productivity with the faculty who participate in the graduate program There will be two primary sources of data. The first will be the data provided by the journals monitored by the Institute for Scientific Information (ISI). The list can be found at: http://scientific.thomson.com/mjl/. The second will be your answers to the questions below. In counting publications, in most cases, the NRC will limit itself to books, monographs, and articles and reviews in refereed journals. It is especially important that you list books, monographs, and articles in edited volumes and in specialist journals not covered by ISI so that we have a full picture of your scholarly productivity. In addition, if there are other kinds of scholarly production that you feel give a complete picture of your scholarship, please list them below in D5

D1. Under what names or variants of your name have you published books or articles in the past five years (e.g. Jane Doe, Jane H. Doe, J. H. Doe or other prior names)?

- *If you are in the Humanities, please include the names or variants of your name under which you have published books or articles in the past 10 years (1996-2006).*

_____

_____

_____

D2. Please list the Zip Codes that appeared on your publications as a reflection of your professional location between 2001 and 2006.

- *If you are in the Humanities, please list the zip codes that appeared on your publications in the past 10 years (1996-2006).*

Zip Code 1 _____

Zip Code 2 _____

Zip Code 3 _____

Zip Code 4 _____

Zip Code 5 _____

Zip Code 6 _____

Zip Code 7 _____

Zip Code 8 _____

D3. Please list the titles of books that you have authored, co-authored or edited from 2001 to 2006.

- *If you are in the Humanities, please list the titles of books you have authored, co-authored or edited in the past 10 years (1996-2006).*
- *If you have an electronic version of your CV, you may want to cut and paste the*

requested information

Books Authored or Co-authored
Book 1:_____
Book 2:_____
Book 3:_____
Book 4:_____
Book 5:_____

Books Edited
Book 1:_____
Book 2:_____
Book 3:_____
Book 4:_____
Book 5:_____

[allow up to Book 30]

D4. Please list any papers you authored or co-authored from 2001 to 2006.

- ***Faculty in the Arts and Humanities:*** *Since ISI coverage of publications in the Arts and Humanities is spotty, it is important that these faculty provide as complete a listing as possible of papers authored or co-authored in the* ***past 10 years (1996-2006)****. If you would like to browse the ISI website, here is the link:* http://scientific.thomson.com/mjl/
- ***Papers listed on your CV:*** *If you upload your CV, there is no need to reenter papers already listed there. You will have an opportunity to upload your CV when you reach the end of the questionnaire*
- ***Additional papers not included on your CV****. To include papers not on your CV, you can upload a list of these papers by using this link [LINK].*
- ***For journal articles****, please remember to add the volume number.*
- ***For articles in edited volumes.*** **Please enter these in D5.**

Authors	Title	Journal	Year of Publication
_____	_____	_____	☐☐☐☐
_____	_____	_____	☐☐☐☐
_____	_____	_____	☐☐☐☐
_____	_____	_____	☐☐☐☐
_____	_____	_____	☐☐☐☐

[allow up to 30 articles]

D5. Please list any other scholarly product (e.g. shows curated, databases assembled, etc.) from the period 2001 to 2006 not covered above.

- *If you are in the Humanities, please list any other scholarly product from the past 10 years (1996-2006) not covered above.*
- ***For All Faculty,*** *If you wish to list chapters contributed to edited volumes, please list them here showing chapter title and volume title. Alternatively, we can extract them from your CV, which you should attach.*

Authors	Title	Year
_____	_____	☐☐☐☐
_____	_____	☐☐☐☐
_____	_____	☐☐☐☐
_____	_____	☐☐☐☐
_____	_____	☐☐☐☐
_____	_____	☐☐☐☐

[allow up to 30 products]

D6. To what scholarly or professional societies do you belong?

- *If you have an electronic version of your CV, you may want to cut and paste the requested information.*

_____
_____
_____
_____
_____

[allow 8]

E. Research Activity

E1. Is any of your work currently supported by an extramural grant or contract?

☐ Yes
☐ No *skip to E4*

Ask E2 if E1 = yes

E2. How many extramural grants or contracts currently fund your work?

Number of Current Grants/Contracts: [___]

a. For how many of these extramural grants or contracts do you currently serve as:

	Number of Grants/Contracts *If None: Enter Zero*
1. The sole principal investigator	[ ]
2. A co-principal investigator	[ ]

E3. Currently, how many doctoral students are supported on your extramural funding (grants or contracts)?

If None: Enter Zero

Number of Supported
Doctoral Students: [__]___]

E4. Since July 1, 2001, have you either: 1) submitted a disclosure to your university's licensing or tech transfer office, 2) filed for a patent or 3) were named as an inventor on a licensed patent?

☐ Yes
☐ No *skip to E5*

Ask E4a if E4 = yes

E4a. Since July 1, 2001 . . .

If none, enter zero
Enter Number

1. How many disclosures have you submitted to your university's licensing or tech transfer office? _____
2. How many patents applications have you filed? _____
3. How many patents have been granted to you as an inventor? _____
4. Of the patents that have been granted to you as an inventor since July 1, 2001 (item 3 above), how many have resulted in commercialized products or processes or have been licensed? _____

[program will check that E4a3 > 0, if E4a3 >0 then E4a4 >0 and not less than E4a3]

E5. To what extent is your current research related to the field of your Ph.D. or equivalent degree?

☐ Closely related
☐ Somewhat related
☐ Not related

Ask E6 if C5 = yes

E6.To what extent is your current research related to your postdoc experience immediately prior to becoming a faculty member?

☐ Closely related
☐ Somewhat related
☐ Not related

F. Doctoral Students

F1. Please provide a list of doctoral students at your current institution for whom you served as primary dissertation adviser who have completed their studies and received their doctorate in the past five (5) years (2001-02 through 2005-06). For each doctorate holder, please indicate the year in which the degree was awarded and current position and employer, if known.

Name	Degree Year	Current Position	Current Employer	City	State	Country

[allow 40]

G. Program Quality

The charge to the Committee on an Assessment of Research-Doctorate Programs includes the design and calculation of program ratings that use collected data to quantitatively estimate program quality. The

committee will construct one set of ratings based on the perceptions of graduate faculty of the relative importance of program characteristics to the quality of doctoral programs. This section of the questionnaire asks you to describe the relative importance of program characteristics as determinants or indicators of program quality.

Specific Characteristics: Program Faculty Quality (Category I)

G1. In Column A, please select the characteristics in this category (up to FOUR) that you feel are the most important to program quality. In Column B, if you selected more than two characteristics, please select the TWO you feel are the most important.

CATEGORY I -- Program Faculty Quality	Column A Most Important Characteristics (*Mark Up to Four)*	Column B Two Most important Characteristics
a. Number of publications (books, articles, etc.) per faculty member	☐	☐
b. Number of citations per faculty member	☐	☐
c. Receipt of extramural grants for research	☐	☐
d. Involvement in interdisciplinary work	☐	☐
e. Racial/ethnic diversity of the program faculty	☐	☐
f. Gender diversity of the program faculty	☐	☐
g. Reception by peers of a faculty member's work as measured by honors and awards	☐	☐

Specific Characteristics: Student Characteristics (Category II)

G2. In Column A, please select the characteristics in this category (up to FOUR) that you feel are the most important to program quality. In Column B, if you selected more than two characteristics, please select the TWO you feel are the most important.

CATEGORY II -- Student Characteristics	Column A Most Important Characteristics (*Mark Up to Four)*	Column B Two Most important Characteristics
a. Median GRE scores of entering students	☐	☐
b. Percentage of students receiving full financial support	☐	☐
c. Percentage of students with portable fellowships	☐	☐
d. Number of student publications and presentations	☐	☐
e. Racial/ethnic diversity of the student population	☐	☐
f. Gender diversity of the student population	☐	☐
g. A high percentage of international students	☐	☐

Specific Characteristics: Program Characteristics (Category III)

G3. In Column A, please select the characteristics in this category (up to FOUR) that you feel are the most important to program quality. In Column B, if you selected more than two characteristics, please select the TWO you feel are the most important.

CATEGORY III -- Program Characteristics	**Column A** **Most Important Characteristics** (*Mark Up to Four)*	**Column B** **Two Most important Characteristics**
a. Average number of Ph.D.s granted over the last five years	☐	☐
b. Percentage of entering students who complete a doctoral degree	☐	☐
c. Time to degree	☐	☐
d. Placement of students after graduation	☐	☐
e. Percentage of students with individual work space	☐	☐
f. Percentage of health insurance premiums covered by the institution or program	☐	☐
g. Number of student support activities provided at either the institutional or program level (This variable will be a tally of whether the following services are provided to graduate students at either the institutional or program level: orientation for new students, prizes/awards to doctoral students for teaching and/or research, formal training in academic integrity/ethics, travel funds to attend professional meetings, grievance/dispute resolution procedures, annual review of all enrolled doctoral students, training to improve teaching skills, institutionally-supported graduate student association, information about employment outcomes of graduates and on-campus graduate student research conferences).	☐	☐

General Characteristics

G4. Please assign a score to each category with the total adding up to 100, where 0 indicates the category has no importance to your judgment of quality and 100 indicates it is the only category that is important.

Category	Score
Category 1: Program Faculty Quality Characteristics	
Category 2: Student Characteristics	

Category 3: Program Characteristics	
Total	**100**

H. Demographic Information

H1. In what year were you born?

Year of birth: ☐☐☐☐

H2. Are you:

☐ Male
☐ Female

H3. What is your citizenship status?

☐ U.S.
☐ Permanent Resident
☐ Temporary Visa Holder

H4. Are you Hispanic (or Latino).

☐ Yes
☐ No *skip to H6*

H5. Which of the following best describes your Hispanic origin or descent?

Mark one only

☐ Mexican or Chicano
☐ Puerto Rican
☐ Cuban
☐ Other Hispanic descent – specify_____

H6. What is your racial background

Mark all that apply

☐ American Indian or Alaska Native
☐ Native Hawaiian or other Pacific Islander
☐ Asian
☐ Black or African-American
☐ White

I1. To help us understand the characteristics of faculty in doctoral programs without asking additional questions, and to enable us to access data from national databases (e.g., on citation counts), please attach your current C.V. when you submit this questionnaire.

☐ C. V. attached

J1. Would you be willing to answer an additional questionnaire that would ask you to rate the overall quality of other doctoral programs in your field?

☐ Yes
☐ No

Ask J2 if J1 = yes

J2. Good contact information is needed for those selected. Please fill in your preferred contact information below.

ADDRESS: _____
_____
_____
_____

CITY: _____ STATE: _____ ZIP CODE: _____

J3. Please provide your preferred e-mail address where you can be reached if there are responses in your questionnaire that require clarification or if you prefer to be contacted about the program ratings by email.

Email address: _____

Thank you for your time.

Rationale for Questions on the Faculty Questionnaire

A. Program Identification—The questions in this section are designed to confirm data provided by the program about faculty who participate in doctoral education in the program and to determine if the faculty member meets the criteria that they have served on doctoral committees or are recent hires. These data will also be used to apportion faculty effort, for those who are associated with more than one program.

A1. This question will be useful in knowing that productivity information on publications, awards, and honors can be linked to the current institution.

A2. The faculty spreadsheets/program questionnaire asked for a list of faculty members that chaired or served on a doctoral committee in a field. The intent of this question is to determine if a faculty member actually served on a committee in the past five years and to determine the number of such committees. It is important to ask for committee service, since the number of committees will determine the faculty member's effort in the programs. This can be used to proportion the productivity measures related to publications, grants and awards. All of an institution's programs that are participating in the assessment will be on a drop down list. The faculty members will use this list to identify the programs with which he or she is involved and the number of committees.

A3. This question is asked because service of a doctoral admissions or curriculum committee is an alternate criterion for Core Program Faculty if they have no dissertation committee service in that program.

A4. The answer to this question will permit a description of research specializations of faculty.

A5. These questions will identify the primary or core faculty in a program and the subfields that are represented by the faculty members. It will allow individuals when using the data on programs to compare programs with like characteristics and will help prospective students match their interests to that of a program.

A6. This information will be compared with the information in B4 to see if the work activity of the faculty member has changed from their previous institution.

B. Prior Experience—This section asks for prior employment and primary and secondary employment activity in that employment. Such information is useful in describing the research-intensity of faculty and their previous research experience.

B1.-

B3. These questions ask for information about prior employment and will provide information about the origins of the program faculty. It will also be useful in the matching the faculty to productivity data, if they are recent hires at their current institution.

B4. This question will provide information on whether the work activity of the faculty member has changed.

C. Educational Background—This section asks about degrees, institutions, Ph.D. field as well as year Ph.D. conferred. Further, the questions ask about post doctoral appointment experience.

C1. While many of the faculty members will have the Ph.D. as their highest degree, it will be

important to know if the faculty have received other degrees. These data are not available from other data sources and are especially important in describing the background of faculty in the biomedical sciences.

C2. The doctoral origins of the faculty for a program will provide data on the career paths of graduates from different institutions and provide a count of the number of foreign degree holders on faculties at U.S. doctoral institutions. It provides information about the segmentation of the academic labor market and is an indirect outcomes measure for those doctorate-awarding origins of those who are academically employed.

C3. Field of Ph.D. or equivalent will provide information on whether the faculty member has changed research fields. It may also give a measure of interdisciplinarity.

C4. Year of Ph.D. or equivalent will allow for cohort analyses and in conjunction with the next question will provide information about the postdoctoral experience.

C5.-
C7. There is very little known about the postdoctoral experience and these questions will provide information on the career paths of individuals who have held postdocs in terms of the number and duration and how that has changed over time for doctoral faculty.

D. Scholarly Activity—The questions in this section of the questionnaire are designed to gather information that will be helpful in matching the faculty in a program to data from national databases of publications, citations and grants.

D1. The request for the names faculty use on their publications will help in the matching process by eliminating false matches and by finding publications written before a name change, for example the name used before marriage.

D2. In addition to using author names in the matching process, the ZIP Code for the location of the author will be used, since it is the only uniquely identifiable numeric piece of information that appears on a publication. Institutional names may be available, but they vary in form and it will be difficult to identify all forms that pertain to a particular institution. Also, if a faculty member moves from one institution to another, the ZIP Code of the prior institution will help in matching the earlier publications to the faculty member.

D3. There is no good data source for matching the faculty in a program to the books they have authored. Sources, such as the Library of Congress and Books in Print, do not carry geographic information about the author and matching on name alone will provide multiple matches. The titles of the books can then be used to eliminate false matches.

D4. ISI does not cover all possible journals. In particular, its coverage of highly specialized journals in the humanities may be very limited. A listing of these publications will be useful in obtaining more complete data on faculty productivity.

D5. This question is intended to obtain a list of non-journal and non-print scholarly contributions.

D6. This information will be an indicator of professional involvement and interdisciplinary activity.

E. Research Activity—This section asks about their current and recent research/scholarly activities.

E1. This question is important to the calculation of the percentage of faculty supported by outside grants.

E2. Since grant data from the federal agencies and other organizations will not be matched to program faculty, the information from this question will assist in providing a measure of research productivity

E3. These questions will provide added information about grant and contract support related to the support of graduate students.

E4. Patents, disclosures, and licenses in some fields are very important measures of research productivity, and there is no good source for this information at the program level.

E5-
E6. This question will provide additional information on trends in research and mobility across fields over a career.

F. Doctoral Students—Information from this question will be used to identify the career outcomes of doctoral students that completed the program. Knowing the career paths for graduates of the program is important since it helps in characterizing program goals. It will assist students who use the data from the study to select a degree program that meets their own career objectives.

G. Program Quality—This section collects data pertinent to the design and calculation of program ratings.

G1.-G3. These questions ask for those characteristics of doctoral programs that the faculty member considers important.

G4. This question will provide information about characteristics that faculty think are valuable in determining program quality. The varying weights that faculty put on these items will be used to calculate weights to be applied to observed data for the explicit ratings of programs.

H. Demographic Information—This section asks for basic demographic information about the faculty. This information is not available from any other source, except a population sample from the National Survey of Postsecondary Faculty, which is not available at the program level.

I. The C.V. for the faculty is requested to verify publication and career path data.

Welcome to the National Research Council's

2006 Assessment of Research Doctorate Programs
Admitted-to-Candidacy Doctoral Student Questionnaire

This questionnaire is part of the National Research Council's **2006 Assessment of Research Doctoral Programs**. The National Research Council (NRC) is the operating arm of the National Academy of Sciences, an institution that conducts studies on issues relevant to questions of importance to educational, scientific and technological policy. Its reports are highly respected and have important impact on national and institutional policymakers.

This is the first NRC assessment of doctoral programs in over ten years. The study is an effort to gather data about doctoral programs nationwide and provide data that will be helpful to students, faculty, administrators and those who make educational policy.

For the first time, the assessment is including a survey of doctoral students. By completing this questionnaire, you provide information that will: (1) bring a student perspective to the study; (2) permit a statistical description of the advanced doctoral students in your field, and (3) help the NRC identify the multiple dimensions of successful graduate programs.

Further information about the assessment may be found at www7.nationalacademies.org/resdoc/index.html. This site also has a list of Frequently Asked Questions and contains an Email link for submitting questions you might have about the study or the questionnaire.

As a graduate student, this is an important opportunity for you to be heard on issues related to graduate education, both in your program and in general. If you and your fellow students respond at a high rate, the results will provide important information about and to your program that will help facilitate change in graduate education at the program level.

Your responses to this online questionnaire will be entered directly into our database and treated as completely confidential by the NRC. Your individual answers will not be shared with faculty or administrators of your doctoral program. Any data, including race/ethnicity and gender, that is not currently available to the public will only be used in aggregated form that cannot be used to discern the identity of any survey participant in any report or presentation concerning the survey or in the public use file that will be made available to the public at the conclusion of this study. The link between your name and the data you provide will be removed prior to the publication of the public use file. In the case of questions with an open-ended response, comments will be reported only in an anonymous form that does not disclose the identity of the respondent.

Your participation is voluntary. You may refuse to answer any question or discontinue participation at any point. There is no personal risk to you in responding to this questionnaire since your identify will be known only to the National Research Council and Mathematica Policy Research. No information concerning respondents will be given to your institution. If you have any questions related to the study or this questionnaire, please send an email to **NRC-Assessment@mathematica-mpr.com**

Please click here to indicate your informed consent to participate in this study ☐

Part A. Education

The questions in this section are designed to collect information on your education and how you have been financially supported during your doctoral program.

A1. When did you first enroll in this doctoral program?

Month ☐☐ Year ☐☐☐☐

A2. When were you admitted to candidacy for the doctorate?

Month ☐☐ Year ☐☐☐☐

A2a. Please record your primary area of specialization. Then, using the drop down list, please select the field that comes closest to describing or including your primary area of specialization.

Primary Area of Specialization: _____

(Drop down Taxonomy list – including subfields)_____

A2b. Please record any additional areas of specialization you currently have. Then, using the drop down list, please select the field that comes closest to describing or including that additional area of specialization.

IF NONE: MARK THIS BOX: ☐

1. **Area of Specialization:** _____

(Drop down list of Taxonomy fields and subfields

2. **Area of Specialization:** _____

(Drop down list of Taxonomy fields and subfields

3. **Area of Specialization:** _____

(Drop down list of Taxonomy fields and subfields

A3. When do you expect to be awarded your doctorate?

Month ☐☐ Year ☐☐☐☐

A4. Before entering this doctorate program, had you already completed a master's degree in:

Mark Yes or No for Each

	Yes	No
a. Your current field?	☐	☐
b. Another field - specify: _____	☐	☐

A5. While studying for your doctorate, will you also receive any of the following as part of a joint, concurrent, or combined degree program:

Mark Yes or No for Each

	Yes	No
a. Professional doctorate (e.g., MD, DDS, OD, JD)?	☐	☐
b. Professional master's degree (e.g., MBA, MPA, MPH, PSM)?	☐	☐
c. Master's degree in your current doctoral program?	☐	☐
d. Master's degree in a different field?	☐	☐

Ask A6 if any "yes" responses to A4 or A5c or A5d

A6. Did you write a master's thesis?

☐ Yes
☐ No

A7. While studying for the doctorate, will you receive a <u>certificate</u> in another field or skill area?

☐ Yes
☐ No

A8. While in your program, how many <u>research presentations</u> (including poster presentations) have you made at:

	Number *If None: Enter Zero*
a. Research conferences on your campus (including other units of a multi-campus system)?	☐☐
b. At regional, national, or international meetings?	☐☐

A9. Have you received travel funds for research presentations at regional, national, or international meetings?

☐ Yes
☐ No *(skip to A11)*

Ask A10 if A9 = yes

A10. From which of the following sources have you received travel funds for research presentations?

IF NOT KNOWN: MARK THIS BOX: ☐

Mark up to three

☐ National Fellowship
☐ Traineeship
☐ Professional Society
☐ Graduate program
☐ University or school/college
☐ Extramural grant
☐ Other – Specify source:

_____

A11. How many research publications have you authored or coauthored before and during your doctoral studies (include pieces accepted for publication but not yet published)?

	Before Doctoral Studies	During Doctoral Studies
a. Refereed articles	☐☐	☐☐
b. Book chapters	☐☐	☐☐
c. Book reviews	☐☐	☐☐
d. Books or edited volumes	☐☐	☐☐
If None: Mark Here	☐	☐

A12. Which of the following have been your <u>largest</u> sources of financial support during your doctoral program?

Mark up to three sources

- ☐ National Fellowship/Scholarship
- ☐ Institutional Fellowship/Stipend
- ☐ Traineeship
- ☐ Teaching assistantship (TA)
- ☐ Research assistantship (RA)
- ☐ Other assistantship (e.g., general assistantship)
- ☐ Internship, clinical residency
- ☐ Personal earnings during graduate school (other than sources listed above)
- ☐ Loans (from any source)
- ☐ Personal savings
- ☐ Spouse's, partner's, or family earnings or savings
- ☐ Employer's reimbursement/assistance
- ☐ Foreign (non-U.S.)
- ☐ Other – Specify source:_____

Ask A13 if any of the first 7 categories in A12 are checked

A13. If you had a fellowship, scholarship, traineeship, or assistantship, with what degree of support did it provide you?

Mark one only

- ☐ Full
- ☐ Partial

Part B: Postgraduation Plans

The questions in this section are designed to collect information on your career plans and whether and how they have changed over time.

B1. When you entered your doctoral program, what were your primary and secondary career goals?

	Mark One in Each Column **Primary**	**Secondary**
a. Research and development	☐	☐
b. Teaching	☐	☐
c. Management or administration	☐	☐
d. Professional services to individuals	☐	☐
e. Other – Specify goal: _____	☐	☐
If No Secondary Career Goals: Mark this Box		☐

B2. <u>At this time</u>, what are your primary and secondary career goals?

	Mark One in Each Column **Primary**	**Secondary**
a. Research and development	☐	☐
b. Teaching	☐	☐
c. Management or administration	☐	☐
d. Professional services to individuals	☐	☐
e. Other - specify: _____	☐	☐
If No Secondary Career Goal: Mark this Box		☐

B3. Do you feel supported by your advisor in your current career goals?

☐ Yes
☐ No
☐ Not Certain

B4. When you entered your doctoral program, for what type of employer did you believe you would work when you graduated?

Mark one only

EDUCATION
- ☐ U.S. 4-year college or university other than medical school
- ☐ U.S. medical school (including university-affiliated hospital or medical center)
- ☐ U.S. university-affiliated research institute
- ☐ U.S. community college or technical institute
- ☐ U.S. preschool, elementary, middle, secondary school or school system
- ☐ Non-U.S. educational institution

GOVERNMENT (other than education institution)
- ☐ Foreign government
- ☐ U.S. federal government
- ☐ U.S. state government
- ☐ U.S. local government

PRIVATE SECTOR (other than education institution)
- ☐ Not-for-profit institution
- ☐ U. S. based industry or business (for profit)
- ☐ Non-U.S. based industry or business (for profit)

OTHER
- ☐ Self-employed
- ☐ Other – Specify sector:

_____

B5. <u>At this time</u>, for what type of employer do you expect to work when you graduate?

Mark one only

EDUCATION
- ☐ U.S. 4-year college or university other than medical school
- ☐ U.S. medical school (including university-affiliated hospital or medical center)
- ☐ U.S. university-affiliated research institute
- ☐ U.S. community college or technical institute
- ☐ U.S. preschool, elementary, middle, secondary school or school system
- ☐ Non-U.S. educational institution

GOVERNMENT (other than education institution)
- ☐ Foreign government
- ☐ U.S. federal government
- ☐ U.S. state government
- ☐ U.S. local government

PRIVATE SECTOR (other than education institution)
- ☐ Not-for-profit institution
- ☐ Industry or business (for profit)
- ☐ Non-U.S. based industry or business (for profit)

OTHER
- ☐ Self-employed
- ☐ Other – Specify sector:

_____

Part C: Program Characteristics

We are interested in the characteristics of your program and your perception of the program's quality.

C1. Did your institution or graduate program provide you with an orientation when you matriculated?

☐ Yes
☐ No

C2. When you entered your doctoral program, did the program provide you with written expectations (e.g., a handbook) about academic progress?

☐ Yes
☐ No

C3. During your doctoral program, have you or will you participate in formal *(e.g., school- or program-sponsored class or seminar)* or informal *(e.g., individual conversations with mentor)* instruction, practice or professional development training in:

	Mark one for each activity			
	Formal Only	**Informal Only**	**Both Formal and Informal**	**Neither**
a. Oral communication and presentation skills?	☐	☐	☐	☐
b. Speaking to nonacademic audiences?	☐	☐	☐	☐
c. Writing proposals for funding?	☐	☐	☐	☐
d. Preparing articles for publication?	☐	☐	☐	☐
e. Working in collaborative groups?	☐	☐	☐	☐
f. Conducting independent research/scholarship?	☐	☐	☐	☐
g. Project management?	☐	☐	☐	☐
h. Research/professional ethics?	☐	☐	☐	☐
i. Teaching/pedagogy?	☐	☐	☐	☐
j. Supervision and evaluation?	☐	☐	☐	☐
k. Preparation for job interviews?	☐	☐	☐	☐

C4. During your doctoral program have you, or do you, expect to:

Mark Yes or No for each

		Yes	No
a.	Mentor or tutor a high school student?	☐	☐
b.	Mentor or tutor an undergraduate student?	☐	☐
c.	Mentor or tutor a graduate student?	☐	☐
d.	Grade papers for undergraduate or graduate courses?	☐	☐
e.	Lead discussion sections of undergraduate or graduate courses?	☐	☐
f.	Lead laboratory sections of undergraduate or graduate courses?	☐	☐
g.	Guest lecture in undergraduate or graduate courses?	☐	☐
h.	Teach a course based on a previously set curriculum?	☐	☐
i.	Teach a course based on a curriculum you developed?	☐	☐

C5. Other than course grades, does your program provide <u>an annual or more frequent assessment</u> of your academic progress? (examples: a letter from the program, a meeting with your dissertation committee)

☐ Yes
☐ No *(skip to C7)*

Ask C6 if C5 = Yes

C6. Are these assessments helpful?

☐ Yes
☐ No

C7. Have you begun your doctoral dissertation research?

☐ Yes
☐ No *(skip to C10)*

Ask C8 if C7 = Yes

C8. Have you received <u>timely</u> feedback on this research?

☐ Yes
☐ No *(skip to C10)*

Ask C9 if C8 = Yes

C9. Has this feedback been helpful?

☐ Yes
☐ No

C10. Are there one or more faculty members at your institution whom you consider as mentors, either in your program or external to it?

- *A **mentor** is an individual from whom you seek advice about your education, career development or other matters of concern to you as a graduate student*

	Mark Yes or No for each	
	Yes	**No**
a. I have a mentor in my program.....	☐	☐
b. I have a mentor external to my program.....	☐	☐

C11. Do you have access to career advice?

☐ Yes
☐ No *(skip to C16)*

Ask C12 if C11 = Yes

C12. Have you taken advantage of the opportunity for career advice?

☐ Yes
☐ No *(skip to C16)*

Ask C13 and C14 if C12 = Yes

C13. Who has provided the advice?

Mark all that apply

☐ An individual who serves as both advisor and mentor
☐ Advisor
☐ Mentor
☐ Graduate program director/coordinator
☐ Program staff
☐ University-wide career office
☐ Other – Specify who advised you:

_____

C14. Does the advice cover a variety of employment sectors (e.g., employment outside of academic institutions)?

- ☐ Yes
- ☐ No
- ☐ Don't Know

C15. Which source of career advice did you find <u>most</u> helpful?

Mark one only

- ☐ An individual who serves as both advisor and mentor
- ☐ Advisor
- ☐ Mentor
- ☐ Graduate program director/coordinator
- ☐ Program staff
- ☐ University-wide career office
- ☐ Other – Specify most helpful source:

_____

C16. On a scale of 1 to 5 where 1 is distant and 5 is interactive, how would you characterize your overall relationship with:

Mark one for each category

	Highly Interactive, Supportive		**Neutral**		**Distant, Antagonistic or Hostile**
	5	**4**	**3**	**2**	**1**
a. your faculty advisor?	☐	☐	☐	☐	☐
b. the faculty in your program?.....	☐	☐	☐	☐	☐

C17. On a scale of 1 to 5, how supportive are students in your program of one another?

Mark one only

- ☐ 5 Very supportive
- ☐ 4
- ☐ 3 Somewhat supportive
- ☐ 2
- ☐ 1 Not supportive

C18. Does your program encourage students to interact with faculty outside of your program?

- ☐ Yes
- ☐ No

C19. Thinking about your doctoral program, how satisfied are you with the quality of the:

Mark one for each category

	Very Satisfied	Somewhat Satisfied	Not Satisfied
a. Teaching by the faculty?	☐	☐	☐
b. The dissertation supervision?	☐	☐	☐
c. Your research experience in the program?	☐	☐	☐
d. Your program's curriculum?	☐	☐	☐
e. The overall quality of the program?	☐	☐	☐

C20. How much do you feel you have benefited from the:

Mark one for each category

	A Lot	Some	Not At All
a. Intellectual environment of your program?	☐	☐	☐
b. Intellectual environment of your institution?	☐	☐	☐

C21. How satisfied are you with the quality of program-sponsored activities designed to promote social interaction of students with faculty and with other students?

☐ Very satisfied
☐ Somewhat satisfied
☐ Not satisfied

C22. How much do you feel you belong to your program?

☐ A lot
☐ Some
☐ Not at all

C23. In the space below, please provide any additional comments you would like to make about your doctoral program, its characteristics or quality:

_____

_____

_____

Part D: Resources

We are interested in your perception of the adequacy of the resources available to you for your graduate work and dissertation research.

D1. Thinking about your graduate education and dissertation research, please rate the adequacy of the support that has been available to you in each of the following areas:

Mark one for each category

	Excellent	Good	Fair	Poor	Not Applicable	Don't Know
a. Computer resources?	☐	☐	☐	☐	☐	☐
b. Other research, laboratory, clinical or studio facilities?	☐	☐	☐	☐	☐	☐
c. Library resources?	☐	☐	☐	☐	☐	☐
d. Your on campus personal work space?	☐	☐	☐	☐	☐	☐
e. Space available for social interaction among students in your program (e.g., coffee nook, lunch room)?	☐	☐	☐	☐	☐	☐
f. University-provided housing or housing support?	☐	☐	☐	☐	☐	☐
g. University-provided child care facilities or child care support?	☐	☐	☐	☐	☐	☐
h. University recreational/athletic facilities?	☐	☐	☐	☐	☐	☐
i. Healthcare and/or health services provided by your program or university?	☐	☐	☐	☐	☐	☐

D2. In the space below, please provide any additional comments you would like to make about program or university resources available to you:

_____

_____

_____

Part E: Background Information

E1. Are you:

☐ Male
☐ Female

E2. What is your marital status?

Mark one only

☐ Married
☐ Living in a marriage-like relationship
☐ Widowed
☐ Divorced
☐ Separated
☐ Never married

E3. Not including yourself or your spouse/partner, how many <u>dependents</u> do you have—that is, how many others receive at least one half of their <u>financial</u> support from you?

If No Dependents: Mark this box: ☐

		Number
a.	5 years of age or younger.....	☐☐
b.	6 to 18 years.....	☐☐
c.	19 years or older	☐☐

E4. Including children, elderly parents or others, as appropriate, for how many people are you a primary caregiver?

Number: ☐☐

E5. What is the highest educational attainment of your mother and father (or guardian)?

		Mark one for each	
		Mother	**Father**
a.	Less than high/secondary school graduation	☐	☐
b.	High/secondary school graduate.....	☐	☐
c.	Some college.....	☐	☐
d.	Bachelor's degree	☐	☐
e.	Master's degree (e.g., MA, MS, MBS, MSW, etc.).....	☐	☐
f.	Professional degree (e.g., JD, LLB, D.Min, MD, DDS, etc.)	☐	☐
g.	Doctoral degree.....	☐	☐
h.	Not applicable.....	☐	☐

E6. In what year were you born?

Year of Birth: ☐☐☐☐

E7. What is your citizenship status?

Mark one only

U.S. Citizen
☐ Since birth
☐ Naturalized

Non-U.S. Citizen
☐ With a Permanent U.S. Resident Visa ("Green Card")
☐ With a Temporary U.S. Visa

E8. Are you Hispanic (or Latino)?

☐ Yes
☐ No *(skip to E10)*

E9. Which of the following best describes your Hispanic origin or descent?

Mark one only

☐ Mexican or Chicano
☐ Puerto Rican
☐ Cuban
☐ Other Hispanic – Specify Hispanic descent:
_____

E10. What is your racial background?

Mark all that apply

☐ American Indian or Alaska Native
☐ Native Hawaiian or other Pacific Islander
☐ Asian
☐ Black or African-American
☐ White

Thank you for your time!

Admitted to Candidacy Student Questionnaire
Question Rationale

General Rationale for Questionnaire

The data collected from the student questionnaire will provide important information for prospective students seeking to compare programs within a field; academic administrators seeking to examine program quality within a field, within an institution, or across institutions; and education policy researchers seeking to explore changes or potential changes in doctoral education and their implications.

Since this is the first time a student questionnaire has been administered as part of the Assessment of Doctoral Programs, its administration will be limited to five fields: English, economics, chemical engineering, physics, and neuroscience/neurobiology.

Part A. Education

The questions in this section are designed to collect information on your area of research, your educational progress and financial support.

Time to Degree: Questions 1-3 obtain data on when you enrolled, what your research specialty is, when you were admitted to candidacy and when you expect to complete. In combination with completion data provided by programs, these data will provide a picture of how students progress through their programs.

Post-Baccalaureate Credentials: Questions 4-8 obtain data on the master's and other degrees and certificates you may have obtained before or en route to the doctorate. This information provides a fuller picture of the post-baccalaureate credentials that students in a given program obtain in order to matriculate into a program or to prepare themselves for their career.

Research Opportunity: Questions 9-10 obtain data on the number of research publications you may have written and presentations given. These data provide an indication of the research experiences that students obtain in a program and offer an indicator of the extent to which students are encouraged to develop their own research interests and skills

Financial Support: Questions 11-13 obtain information on the level and type of financial support that students in a program have. This information, in combination with other data on the program and institutional questionnaires, will provide valuable information on financial support.

Part B: Postgraduation Plans

The questions in this section are designed to collect information on the career plans and goals of doctoral students and whether and how they have changed over time.

Career Goals: Questions 1-2 obtain data on career goals both when the respondents entered the program and now. Similarly, questions 4-5 obtain data on the type of employer the respondents expected to work for when they entered their program and now. These questions will provide a picture of the kinds of career goals students in different programs have and how they change over time.

Faculty Support for Career Goals: Question 3 is designed to obtain information on how supportive faculty are of students who seek a variety of career aspirations, particularly those outside of academia.

Part C: Program Characteristics

This section obtains data on program characteristics and the respondent's perception of program quality.

Career Skills: Numerous reports, beginning with the COSEPUP's *Reshaping the Graduate Education of Scientists and Engineers* (1995), have advocated that graduate students learn a variety of career skills in addition to the substance of their discipline. Question 1 will collect data on the opportunity to acquire written and oral communication skills, proposal writing, teamwork, independent research, project management, ethics, pedagogy, and others. Question 2 focuses more specifically on opportunities to acquire teaching skills and experience.

Academic Progress: Questions 3-8 and 14 collect data on how students acquire information about the expectations of their program for academic progress and the kinds and quality of feedback on their progress that they receive.

Mentoring and Career Counseling: The availability of a mentor has been identified as an important key to success in graduate education. Question 9 asks whether respondents have a faculty member they consider a mentor. The availability of career advice—particularly advice that covers the range of potential employment sectors is important potentially for both student retention and career preparation. Questions 10-13 obtain data on the availability and source of career advice for doctoral students. Question 15 also asks respondents about the quality of the relationships they have with their advisors.

Social Integration: Barbara Lovitts' book, *Leaving the Ivy Hall*, identified the degree to which a student feels part of a department as a critical factor in determining whether a student completes a doctoral program. Questions C15, C16, C17, C18, C20, C21, and D1 collect data on the degree to which students feel supported by faculty and peers, have opportunities to interact with faculty and students, and the quality of the interaction.

Program Quality: Questions 19-24 provide respondents with an opportunity to provide their perceptions of program quality (curriculum, research experience, faculty teaching ability, dissertation supervision, and intellectual environment).

Part D: Resources

This section collects data on respondent perceptions of the adequacy of the resources and benefits available for doctoral students.

Education and Research Resources: The availability of adequate resources is important to both the speed and quality of a student's academic progress. Questions 1-4 collect data on respondents' perceptions of the resources available (from the institution or program) to support their education and research. They ask for perceptions of the adequacy of computer resources, research, laboratory, or studio facilities, library resources, and on-campus work-space.

Social Integration: As noted above, the degree to which a student feels part of a department as a critical factor in determining whether a student completes a doctoral program. Question D5, along with other questions, collects data on opportunities for social interaction.

Quality of Life: In addition to financial support and health care benefits, support for doctoral students may also include provision of housing or housing assistance, provision of child care or financial support for child care, and recreational facilities. These pieces of the support package a doctoral student can expect—particularly students with children—may affect the ability of students to matriculate, complete in a timely manner, or complete at all. Questions 6-8 collect data on respondent perceptions of these benefits.

Part E: Background Information

The information collected in this section of the questionnaire will allow analysts to examine the comparative demographics of programs, and also examine how the answers to questions in Parts A-D of the questionnaire may vary across such dimensions as age, gender, race/ethnicity, citizenship status, family background, marital status, and responsibility for dependents. The participation in doctoral education of students from a variety of backgrounds is important to the academic enterprise, the conduct of research, and society in general, so understanding how doctoral education works for students across groups will provide the opportunity to evaluate success to date and areas where further progress is necessary.

The National Academies
National Research Council
Assessment of Research Doctorate Programs

Survey of Program Quality

Thank you for agreeing to participate as a rater in **{taxonomy field name}** in the Survey of Program Quality, a critical component of the National Research Council's Assessment of Research Doctorate Programs. This survey asks for your judgment—and the judgment of other faculty members like you—about the quality of a sample of doctoral programs in your field.

How your judgments will be used. The judgments of over 200 raters in each field will be used to calculate ratings of perceived quality for a sample of the programs, rather than all the programs in a field. Previous research (Ostriker & Kuh, 2003[1]) has shown us how to use faculty views on the strength of different PhD programs combined with objective data concerning program characteristics to produce ratings of additional programs. These new ratings are based on objectively measured characteristics, such as publications, citations and time to degree, but imitate, to the extent achievable, the judgment criteria of the initially surveyed faculty.

Thinking about your perception of a program's quality. As part of this survey, you will be asked to rate 15 programs on a scale of 1 to 6 (1=a program not sufficient for graduate education, 6=a distinguished program). ***We urge you to keep two things in mind as you decide on your ratings:***

- Prior to rating these 15 programs, you will have the opportunity to view a list of all programs in your field. Keep this "universe" of programs in mind as you rate each of the 15 programs relative to this universe, not to each other.

- Please reflect on what you consider important in a doctoral program as you decide on your ratings. To assist you, a link below each program's name goes to an information page that lists several program and faculty characteristics, a list of the program's faculty and a link to the program's web site as well, should you want to seek additional information before finalizing your rating.

Your efforts will improve doctoral education through benchmarking and better information about programs. The survey is being conducted by Mathematica Policy Research (MPR), an organization experienced in the conduct of confidential surveys. Your responses will be compiled by MPR and provided to the NRC for their analyses. The National Research Council staff who analyze the data will sign non-disclosure confidentiality agreements to protect the identity of individuals participating in the survey. The survey will be conducted using secure web-based survey technology and any information that could be used to identify or link responses to an individual respondent for any survey question will be maintained in storage that is secure. Your identity will be known only to the National Research Council and Mathematica Policy Research who have signed non-disclosure agreements. Only aggregate information from the survey, such as means and distributions of ratings for programs, will be included in publications from the

[1] Link to citation url.

project. If you have any questions about the study or this questionnaire, please email us at NRC-Assessment@mathematica-mpr.com.

I provide my informed consent to participate in this study ☐ Yes ☐ No

Instructions

1. Listed below are the 15 programs in your field that you are being asked to rate. Given the range of programs within some fields, you may or may not be familiar with all of the programs you are being asked to rate. Consequently, you will be asked two questions about each program. The first asks how familiar you are with the program and the second asks you to rate its quality.

2. Before considering programs individually, please take a moment to familiarize yourself with the larger range of programs in your field. To do so, please click on this link:

   Click here for a list of all institutions in the study with programs in this field: ☐

3. To begin considering programs individually, click on the link provided for each institution. You will be taken to that program's information page. If it was provided to the NRC, the information pages will also list a link to that program's home page.

   NOTE: The two rating questions for each program will appear at the bottom of that program's information page. Your rating will only be considered valid if both questions are answered.

4. Finally, after you have rated all 15 programs, a summary page will appear with all of your responses. Please review your responses and make any final changes at that point. Once submitted, your responses are final.

Names of Programs to be Rated	**Information Link**
Cornell University	link to information page
Duke University	link to information page
Etc.	

SAVE QUIT FOR NOW | **SAVE—GO TO SUMMARY PAGE**

Institution: {name} **Location: {place}**
Program: {name} **Program URL: {URL}**

Two types of information are presented about this program – the names of the faculty who are currently working with doctoral students, followed by a few facts about the program and its faculty.

Faculty Names (Faculty spreadsheet)		
Core[2]	**New[3]**	**Associated[4]**

[2] There will be a link to explain this term.
[3] There will be a link to explain this term.
[4] There will be a link to explain this term.

Some Facts about the Program

- Number of Ph.D.s 2001-2006: _____
- % PhDs in academic positions (average 2001-2005) : ____
- Percent of entering cohort who complete in eight years or less (average for Ph.D.s admitted between 1996-97 and 1997-1998) : _____
- Median Time to Degree (average 2004-2006): ____
- Faculty % Female : ____
- Faculty % Non-white : _____

The Rating Questions

1. **On a scale from 1 to 3, where 1 means you have little or no familiarity with this program and 3 means that you have considerable familiarity, how familiar are you with this program?**

Little or None	Some	Considerable
1	2	3
□	□	□

2. On a scale from 1 to 6, where 1 equals not adequate for doctoral education and 6 equals a distinguished program, how would you rate this program?

Not Adequate For Doctoral Education	Marginal	Adequate	Good	Strong	Distinguished	Don't Know Well Enough
1	**2**	**3**	**4**	**5**	**6**	**9**
□	□	□	□	□	□	□

SAVE QUIT FOR NOW | **SAVE—GO TO SUMMARY PAGE** | **SAVE/GO TO NEXT PROGRAM**

Listed below are your responses to the rating questions you answered. Please review them carefully.

- NOTE - If you wish to review a program's information sheet once again, click on the link under the university's name
- If you wish to change a response, you can do so by making the change on this page. The correct question will be updated automatically for you

University/Program Name	Familiarity Rating	Quality Rating
{name-link to info page}	{inserted automatically}	{inserted automatically}

CAUTION: Please make sure you have <u>thoroughly reviewed</u> your answers. Once you click the "submit button" your responses are final.

SUBMIT MY FINAL RESPONSES

APPENDIX C
Number of Programs by Field

Broad Field	Program Field	Number of Rated Programs	Number of Programs Not Rated	Notes
AGRICULTURAL SCIENCE	ANIMAL SCIENCE	60	1	
	ENTOMOLOGY	28	0	Statistically derived ratings from plant sciences used to generate ratings
	FOOD SCIENCE	31	0	Statistically derived ratings from plant sciences used to generate ratings
	FORESTRY AND FOREST SCIENCE	33	1	Statistically derived ratings from plant sciences used to generate ratings
	NUTRITION	44	1	
	PLANT SCIENCES	116	2	
BIOLOGICAL AND HEALTH SCIENCES	BIOCHEMISTRY, BIOPHYSICS, AND STRUCTURAL BIOLOGY	159	1	
	CELL AND DEVELOPMENTAL BIOLOGY	122	0	
	ECOLOGY AND EVOLUTIONARY BIOLOGY	94	0	
	GENETICS AND GENOMICS	65	1	
	IMMUNOLOGY AND INFECTIOUS DISEASE	78	0	
	INTEGRATED BIOLOGY	120	0	
	MICROBIOLOGY	74	0	
	NEUROSCIENCE AND NEUROBIOLOGY	94	0	
	PHARMACOLOGY, TOXICOLOGY, AND ENVIRONMENTAL HEALTH	116	2	
	PHYSIOLOGY	63	0	
	KINESIOLOGY	41	0	
	NURSING	52	3	
	PUBLIC HEALTH	92	1	
PHYSICAL SCIENCES	APPLIED MATHEMATICS	33	1	
	ASTRONOMY AND ASTROPHYSICS	34	0	Statistically derived ratings from physics used to generate ratings

	CHEMISTRY	178	2	
PHYSICAL SCIENCES (contd)	COMPUTER SCIENCES	126	2	
	EARTH SCIENCES	140	1	
	MATHEMATICS	127	0	
	OCEANOGRAPHY, ATMOSPHERIC SCIENCES AND METEOROLOGY	50	0	
	PHYSICS	160	1	
	STATISTICS AND PROBABILITY	61	0	
ENGINEERING	AEROSPACE ENGINEERING	31	0	Statistically derived ratings from mechanical engineering used to generate ratings
	BIOMEDICAL ENGINEERING AND BIOENGINEERING	74	0	
	CHEMICAL ENGINEERING	106	1	
	CIVIL AND ENVIRONMENTAL ENGINEERING	130	1	
	COMPUTER ENGINEERING	20	0	Statistically derived ratings from electrical and computer engineering used to generate ratings
	ELECTRICAL AND COMPUTER ENGINEERING	136	0	
	ENGINEERING SCIENCE AND MATERIALS	12	2	Statistically derived ratings from mechanical engineering used to generate ratings
	MATERIAL SCIENCE AND ENGINEERING	83	1	
	MECHANICAL ENGINEERING	127	1	
	OPERATIONS RESEARCH, SYSTEMS ENGINEERING AND INDUSTRIAL ENGINEERING	72	2	
SOCIAL SCIENCES	AGRICULTURAL AND RESOURCE ECONOMICS	28	0	Statistically derived ratings from economics used to generate ratings
	ANTHROPOLOGY	82	0	
	COMMUNICATIONS	83	0	
	ECONOMICS	117	1	
	GEOGRAPHY	49	0	
	LINGUISTICS	52	1	
	POLITICAL SCIENCE	105	1	

	PSYCHOLOGY	236	1	
	PUBLIC AFFAIRS, PUBLIC POLICY AND PUBLIC ADMINISTRATION	54	0	
	SOCIOLOGY	118	2	
Broad Field	**Program Field**	**Number of Rated Programs**	**Number of Programs Not Rated**	**Notes**
HUMANITIES	AMERICAN STUDIES	22	1	Statistically derived ratings from English used to generate ratings
	CLASSICS	31	0	
	COMPARATIVE LITERATURE	46	0	
	ENGLISH LANGUAGE AND LITERATURE	119	3	
	FRENCH AND FRANCOPHONE LANGUAGE AND LITERATURE	43	0	
	GERMAN LANGUAGE AND LITERATURE	29	0	
	HISTORY	137	2	
	HISTORY OF ART, ARCHITECTURE, AND ARCHEOLOGY	58	1	
	LANGUAGE SOCIETIES AND CULTURE	0	94	Unrated field
	MUSIC	63	0	
	PHILOSOPHY	90	0	
	RELIGION	40	0	
	SPANISH AND PORTUGUESE LANGUAGE AND LITERATURE	60	0	
	THEATER AND PERFORMANCE STUDIES	27	0	Statistically derived ratings from English used to generate ratings
	BIOINFORMATICS	0	17	
	BIOTECHNOLOGY	0	4	
EMERGING FIELDS (unrated)	COMPUTATIONAL ENGINEERING	0	4	
	CRIMINOLOGY AND CRIMINAL JUSTICE	0	14	
	FEMINIST, GENDER, AND SEXUALITY STUDIES	0	8	
	FILM STUDIES	0	7	

	INFORMATION SCIENCE	0	19	
	NANOSCIENCE AND NANOTECHNOLOGY	0	8	
	NUCLEAR ENGINEERING	0	19	
	RACE, ETHNICITY AND POST-COLONICAL STUDIES	0	9	
EMERGING FIELDS (cont'd)	RHETORIC AND COMPOSITION	0	9	
	SCIENCE AND TECHNOLOGY STUDIES	0	5	
	SYSTEMS BIOLOGY	0	2	
	URBAN STUDIES AND PLANNING	0	23	

APPENDIX D

Institutions and Programs in a Field

A list of the institutions and programs in each field may be found at

http://sites.nationalacademies.org/pga/Resdoc/

APPENDIX E

List of Variables

VARIABLES USED IN THE RATINGS CALCULATION

Publications per Allocated Faculty,* 2001-2006 (Non-Humanities): Data from the Institute for Scientific Information were used to construct this variable. It is the average over the seven years, 2000-2006, of the number of articles for each allocated faculty member divided by the total number of faculty allocated to the program. Data were obtained by matching faculty lists supplied by the programs to the ISI list of publications.

Number of Published Books and Articles per Allocated Faculty (Humanities): Data from resumes submitted by the humanities faculty were used to construct this variable. This variable is made up of two measures; the number of published books and the number of articles published during the period 1986 to 2006 that were listed on the resume. The calculated measure was the sum of five times the number of books plus the number articles for each allocated faculty member divided by the faculty allocated to the program. In computing the allocated faculty to the program, only the allocations of the faculty who submitted resumes were added to get the allocation.

Average Citations per Publication (Non-Humanities): Data from the Institute for Scientific Information were used to construct this variable. It is the per-year average of the number of allocated citations in the years 2000-2006 to papers published during the period 1981-2006 by program faculty divided by the allocated publications that could contribute to the citations. For example, the number of allocated citations for a faculty member in 2003 is found by taking the 2003 citations to that faculty member's publications between 1981 and 2003. These counts are summed over the entire faculty in the program and divided by the sum of the allocated publications to the program in 2003.

Percent of Faculty with Grants: Data from the faculty questionnaire were used to construct this variable. The faculty questionnaire asks whether a faculty member's work is currently supported by an extramural grant of contract (E1). The total of faculty who answered this question in the affirmative was divided by the total respondents in the program and the percentage was calculated.

* Because many faculty members supervise dissertations in more than one program, faculty members were allocated across the programs that they were associated with so that the total, taken across all programs, equaled one.

Percent Interdisciplinary: Data from the program questionnaire were used for this variable. Faculty were identified as either core, new, or associated. Percent interdisciplinary is the ratio of associated to the sum of core, new, and associated faculty. Allocations were not used in the construction of this variable.

Percent Non-Asian Minority Faculty of Core and New Faculty, 2006[**]: Data from the program questionnaire were used for this variable. For each program the data reported for question B7, the race/ethnicity of core and new faculty in the program, was used to compute the ratio of non-Hispanic Blacks, Hispanic, and American Indians or Alaska Natives to that of non-Hispanic Whites, non-Hispanic Blacks, Hispanic, Asian or Pacific Islanders, and American Indians or Alaska Natives. Faculty with Race/Ethnicity Unknown were excluded from the ratio. Allocations were not used in the construction of this variable.

Percent Female Faculty of Core and New Faculty, 2006: Data from the program questionnaire were used for this variable. For each program the data reported for question B5, the gender of core and new faculty in the program, was used to compute the ratio of core or new female faculty to the total of core and new faculty. Allocations were not used in the construction of this variable.

Awards per Allocated Faculty: Data from a review of 1,393 awards and honors from various scholarly organizations were used for this variable. The awards were identified by the committee as "Highly Prestigious" or "Prestigious" with the former given a weight of 5. The award recipients were matched to the faculty in all programs, and the total awards for a faculty member in a program was the sum of the weighted awards times the faculty member's allocation to that program. These awards were added across the faculty in a program and divided by the total allocation of the faculty in the program.

Average GRE, 2004-2006 (Verbal Measure for the Humanities, Quantitative Measure for All Other Fields): Data from the program questionnaire were used for this variable. For each program, question D4 reported the average GRE verbal and quantitative scores for the 2003-2004, 2004-2005, and 2005-2006 academic years and the number of individuals who reported their scores. A weighted average was used to compute the average GRE, which was calculated by multiplying the number of individuals reporting scores by the reported average GRE score for each year, adding these three quantities and dividing by the sum of the individuals reporting scores.

Percent Students Receiving Full Support in the First Year (Fall 2005): Data from the program questionnaire were used for this variable. For each program question E8 reported the type of support that full-time graduate students received during the fall term each year of enrollment. For this variable the data for the first year were added for all types of support and divided by the total number of students.

[**] "Core" faculty are those whose primary appointment is in the doctoral program. "New" faculty are those with tenure track appointments who were appointed in 2003-2006.

Percent First-Year Students with External Funding, 2005: Data from the program questionnaire were used for this variable. For each program question E8 reported the type of support full-time graduate students received during fall term each year of enrollment. For this variable the data for the first year were added for support by externally funded fellowships and combinations of external fellowships and other internal support and then divided by the total number of students.

Percent Non-Asian Minority Students, 2005: Data from the program questionnaire were used for this variable. Question C9c reported the race/ethnicity of graduate students in the program. This was used to compute the ratio of non-Hispanic Blacks, Hispanics, and American Indians or Alaska Natives to that of non-Hispanic Whites, non-Hispanic Blacks, Hispanics, Asian or Pacific Islanders, and American Indians or Alaska Natives. Data with Race/Ethnicity Unknown where excluded from the ratio.

Percent Female Students, 2005: Data from the program questionnaire were used for this variable. Question C9 reported the gender of graduate students in the program. This was used to compute the percentage by taking the number of female graduate students divided by the total number of graduate students.

Percent International Students, 2006: Data from the program questionnaire were used for this variable. Question C9b reported the citizenship of graduate students in the program. These data were used to compute the percentage of international graduate students by taking the number with temporary visas and dividing it by the number of graduate students with known citizenship status.

Average Annual Ph.D.'s Graduated 2002-2006: Data from the program questionnaire were used for this variable. Question C1 reported the number of doctoral degrees awarded each academic year from 2001-2002 to 2005-2006. The average of these numbers was used for this variable. If no data were provided for a particular year, the average was taken over the years for which there were data.

Average Completions (8-Year Completion Percentage for Humanities Fields, 6 Years for Other Fields): Data from the program questionnaire were used for this variable. Questions C16 and C17 reported for males and females separately the number of graduate students who entered in different cohorts from 1996-1997 to 2005-2006 and the number in each cohort who completed in 3 years or less, in their 4th, 5th, 6th, 7th, 8th, 9th years, and in 10 or more years. To compute the completion rate, the number of doctoral students for a given entering cohort who completed their doctorate in 3 years or less and in their 4th, 5th, 6th years were totaled and the total was divided by the entering students in that cohort. This computation was made for each cohort that entered from 1996-1997 to 1998-1999 for the humanities and 1996-1997 to 2000-2001 for the other fields. Cohorts beyond these years were not considered, since the students could complete in a year that was after the final year 2005-2006 for which data were collected. To compute the average completion rate, an average was taken over 3 cohorts for the humanities and over 5 cohorts for other fields.

Time to Degree (for Full- and Part-Time Graduates): Data from the program questionnaire were used for this variable. Question C2 reported the median time to degree for full-time and part-time students. That reported number was used for this variable.

Percent Ph.D.'s with Definite Plans for an Academic Position, 2001-2005: Data from the National Science Foundation 2005 Doctorate Records File (DRF) were used for this variable. A crosswalk was generated between the DRF Specialty Fields of Study and the fields in the study taxonomy. Data from the DRF for 5 years (2001-2005) were matched by field and institution to the programs in the research-doctorate study. The percentage was computed by taking the number of individuals who have a signed contract or are negotiating a contract for a position at an educational institution and dividing by the number of doctorates in those years. Positions included employment and postdoctoral fellowships.

Student Work Space: Data from the program questionnaire were used for this variable. Question D12 reported the percentage of graduate students who have work space for their exclusive use. If reported percentage was 100 percent, then a value of 1 was given to this variable. Otherwise the value was -1.

Health Insurance: Data from the institutional questionnaire were used for this variable. Question A1 reported whether or not the institution provided health care insurance for its graduate students. If the response to this question was yes, then a value of 1 was given to this variable. If it was no, then the value was -1.

Student Activities: Data from the program questionnaire were used for this variable. Question D8 listed 18 different kinds of support for doctoral students or doctoral education. This variable is a count of the number of support mechanisms proved by the program or the institution.

APPENDIX F

Weights and Variables for the Dimensional Measures

Weights Used to Calculate the Dimensional Measures

Table 3a **Research Activity**

Average Weights	Average publications per faculty*	Average citations/ publication	Percent faculty with grants	Awards per faculty
Biological Sciences	0.30	0.21	0.36	0.13
Health Sciences	0.35	0.16	0.37	0.11
Engineering	0.29	0.25	0.29	0.17
Physical Sciences	0.28	0.26	0.29	0.17
Agricultural Sciences	0.34	0.18	0.34	0.13
Social Sciences	0.36	0.26	0.22	0.16
Humanities	0.53		0.15	0.32

* For the humanities, the measure is of books per allocated faculty member.

Table 3b **Student Support and Outcomes**

Average Weights	Percent w/ full support	Average cohort completing in 6 years*	Time to degree full and part time	Placement of students	Program collects outcomes data
Biological Sciences	0.26	0.26	0.14	0.17	0.17
Health Sciences	0.24	0.29	0.14	0.16	0.16
Engineering	0.34	0.20	0.10	0.18	0.18
Physical Sciences	0.29	0.23	0.12	0.18	0.18
Agricultural Sciences	0.28	0.23	0.12	0.18	0.18
Social Sciences	0.27	0.24	0.12	0.18	0.18
Humanities	0.29	0.25	0.11	0.17	0.17

*For the humanities, the completion time is 8 years

Table 3c **Diversity of the Academic Environment**

Average Weights	Percent core or new faculty underrepresented minority	Percent core or new faculty female	Percent students underrepresented minority	Percent students female	Percent students international
Biological Sciences	0.14	0.23	0.30	0.25	0.09
Health Sciences	0.24	0.14	0.38	0.18	0.07
Engineering	0.13	0.16	0.26	0.27	0.18
Physical Sciences	0.10	0.20	0.20	0.29	0.21
Agricultural Sciences	0.15	0.17	0.30	0.22	0.15
Social Sciences	0.22	0.20	0.26	0.17	0.16
Humanities	0.21	0.24	0.20	0.18	0.16

APPENDIX G

Dimensional Ranges of Rankings for Programs in Economics and the Overall Ranges

	Research Activity			Student Support and Outcomes			Diversity of the Academic Environment			Overall Measure	
Program	Third Quartile	First Quartile		Third Quartile	First Quartile		Third Quartile	First Quartile		Third Quartile	First Quartile
1	15	19		18	26		61	76		10	14
2	103	108		9	18		1	1		91	98
3	94	100		53	72		24	42		104	109
4	18	22		9	20		78	92		20	22
5	75	86		46	61		78	92		67	75
6	58	65		28	40		41	61		56	62
7	70	84		79	92		4	12		78	88
8	10	13		27	40		111	113		34	47
9	84	93		99	105		83	93		112	114
10	13	18		53	67		61	77		12	15
11	58	66		68	81		79	90		42	50
12	49	57		62	79		73	87		42	53
13	107	112		105	111		75	89		114	116
14	62	70		45	62		116	117		37	44
15	74	90		14	22		104	109		76	85
16	39	44		44	58		9	23		37	45
17	12	24		103	110		40	57		28	39
18	86	98		2	6		49	65		95	104
19	53	66		34	49		32	53		34	43
20	36	43		39	55		20	37		35	44
21	11	13		48	64		60	78		10	13
22	50	65		9	19		101	106		66	74
23	103	110		43	62		12	28		94	101
24	76	84		27	39		81	91		46	55
25	45	56		90	97		102	108		76	85
26	104	111		109	113		16	31		112	115

Continued on next page

	Research Activity			Student Support and Outcomes			Diversity of the Academic Environment			Overall Measure	
Program	Third Quartile	First Quartile		Third Quartile	First Quartile		Third Quartile	First Quartile		Third Quartile	First Quartile
27	97	104		8	17		76	87		97	105
28	101	108		39	63		116	117		109	111
29	73	86		86	93		28	50		79	86
30	102	110		57	75		13	31		97	104
31	22	30		25	34		51	71		19	23
32	20	25		57	74		103	108		17	21
33	90	96		39	58		49	64		73	83
34	28	32		56	71		31	51		15	19
35	77	85		28	40		87	96		82	88
36	94	99		75	90		40	58		93	98
37	49	58		15	25		54	72		41	49
38	68	75		53	69		47	67		48	55
39	75	82		71	89		6	13		66	74
40	29	34		80	90		106	111		51	60
41	86	94		38	53		10	22		72	79
42	107	112		96	102		39	60		97	103
43	54	68		14	23		100	107		62	69
44	110	114		33	48		20	33		111	115
45	75	85		80	91		76	89		81	87
46	101	106		77	91		81	93		98	104
47	72	81		114	114		47	67		93	101
48	52	67		32	44		94	103		77	84
49	35	41		100	107		69	81		35	45
50	5	7		37	50		62	79		3	4
51	52	67		16	27		25	41		55	63
52	54	62		73	87		114	115		50	57
53	14	17		78	89		93	100		17	20
54	77	87		21	30		17	33		65	72
55	49	57		81	91		50	70		26	28
56	41	50		108	112		84	95		55	62
57	31	35		59	73		55	70		29	34

Program	Research Activity		Student Support and Outcomes		Diversity of the Academic Environment		Overall Measure	
	Third Quartile	**First Quartile**	**Third Quartile**	**First Quartile**	**Third Quartile**	**First Quartile**	**Third Quartile**	**First Quartile**
58	5	7	50	67	99	104	5	6
59	41	51	33	47	79	92	36	47
60	69	78	57	70	32	50	55	63
61	116	116	105	110	112	114	113	115
62	**21**	**31**	**74**	**87**	**64**	**77**	**45**	**56**
63	47	60	65	84	3	6	48	57
64	89	96	105	111	4	12	83	89
65	78	88	55	75	39	59	75	83
66	106	111	103	109	7	19	106	109
67	12	15	13	23	80	94	7	9
68	7	9	1	4	106	109	7	8
69	43	54	59	73	28	48	66	75
70	84	96	54	73	13	26	94	103
71	59	69	59	76	2	7	70	78
72	92	98	68	83	33	55	88	94
73	51	67	28	39	34	50	71	81
74	39	44	82	94	21	42	40	48
75	2	3	5	13	64	81	3	5
76	35	39	74	86	15	33	29	35
77	27	33	91	98	84	94	69	77
78	106	113	115	117	58	73	103	108
79	47	57	54	69	38	58	30	36
80	22	27	10	19	72	89	12	14
81	117	117	73	85	24	39	116	117
82	56	64	63	79	67	81	60	67
83	11	14	47	61	13	28	11	14
84	55	63	93	100	30	48	45	54
85	2	3	6	13	76	88	2	2
86	87	94	30	41	52	73	92	97
87	112	115	3	10	101	107	82	88

	Research Activity			Student Support and Outcomes			Diversity of the Academic Environment			Overall Measure	
Program	Third Quartile	First Quartile		Third Quartile	First Quartile		Third Quartile	First Quartile		Third Quartile	First Quartile
88	83	91		39	53		96	102		89	96
89	32	39		90	98		69	87		34	44
90	23	28		54	69		20	41		31	37
91	53	63		27	41		31	51		40	49
92	7	9		6	14		111	114		4	5
93	1	1		4	10		88	98		1	1
94	4	5		10	20		94	102		9	11
95	37	45		48	62		23	40		52	61
96	49	61		74	86		24	43		57	64
97	77	89		115	116		33	50		92	101
98	111	115		105	110		49	64		111	113
99	69	80		11	22		110	113		61	67
100	96	104		28	39		3	7		102	107
101	65	78		32	43		50	68		71	79
102	21	28		63	78		52	68		21	25
103	102	106		10	21		29	51		84	89
104	21	28		34	47		51	66		22	24
105	19	25		95	103		10	23		16	21
106	65	75		82	93		21	38		67	76
107	79	91		104	111		18	33		102	107
108	72	79		100	105		16	32		67	74
109	40	46		19	29		71	87		28	30
110	6	9		1	3		99	105		11	14
111	15	18		36	49		11	25		17	20
112	38	43		96	101		7	18		32	39
113	25	29		100	106		5	11		24	26
114	42	49		43	56		24	43		34	42
115	31	37		9	18		35	53		41	54
116	17	23		8	18		13	25		25	27
117	94	101		116	117		46	63		95	103

1

APPENDIX H

Number of Ratings for Programs in Each Field

Fields	Max Number of Ratings for a Program in the Field	Min Number of Ratings for a Program in the Field	Average Number of Ratings for a Program in the Field	Number of Programs Rated	
Animal Sciences	54	21	40.4	37	
Anthropology	51	33	43.3	50	
Applied Mathematics	65	35	48.7	27	
Biochemistry, Biophysics, and Structural Biology	45	30	37.3	50	
Biology/Integrated Biology/Integrated Biomedical Sciences	48	27	38.3	50	
Biomedical Engineering and Bioengineering	55	29	41.9	50	
Cell and Developmental Biology	56	21	40.0	50	
Chemical Engineering	54	23	44.0	50	
Chemistry	58	37	47.2	50	
Civil and Environmental Engineering	53	32	43.4	50	
Classics	47	36	41.6	25	
Communication	57	28	40.7	50	
Comparative Literature	54	31	38.8	30	
Computer Engineering	46	42	44.3	4	*Note* 1
Computer Sciences	61	41	50.7	46	
Earth Sciences	64	26	48.5	50	
Ecology and Evolutionary Biology	53	26	40.3	50	
Economics	52	34	44.5	50	
Electrical and Computer Engineering	82	52	68.9	50	
English Language and Literature	63	30	45.6	50	
French and Francophone Language and Literature	51	36	42.3	30	

Genetics and Genomics	51	28	36.5	40
Geography	56	35	47.1	40
German Language and Literature	56	45	50.0	26
History	57	31	41.8	50
History of Art, Architecture and Archaeology	48	16	39.7	40
Immunology and Infectious Disease	56	26	40.4	50
Kinesiology	44	29	36.2	30
Linguistics	58	22	48.4	30
Materials Science and Engineering	56	27	45.3	50
Mathematics	56	39	48.2	50
Mechanical Engineering	85	53	70.2	50
Microbiology	43	26	35.2	50
Music (except performance)	52	24	40.7	45

Note 1: Field was combined with electrical and computer engineering

Fields	Max Number of Ratings for a Program in the Field	Min Number of Ratings for a Program in the Field	Average Number of Ratings for a Program in the Field	Number of Programs Rated
Neuroscience and Neurobiology	51	32	41.9	50
Nursing	54	32	43.5	30
Nutrition	61	38	47.6	30
Oceanography, Atmospheric Sciences and Meteorology	72	28	49.5	30
Operations Research, Systems Engineering and Industrial Engineering	52	28	37.9	50
Pharmacology, Toxicology and Environmental Health	60	36	46.7	50
Philosophy	57	34	46.7	50
Physics	58	23	43.7	50
Physiology	48	27	35.6	49
Plant Sciences	54	25	39.3	43

Political Science	48	29	40.9	50
Psychology	69	28	50.9	50
Public Affairs, Public Policy and Public Administration	51	29	38.7	34
Public Health	73	27	49.0	32
Religion	54	28	40.1	30
Sociology	53	27	43.0	51
Spanish and Portuguese Language and Literature	54	36	43.9	50
Statistics and Probability	60	38	47.2	49
Grand Total	**85**	**16**	**44.2**	**2228**

APPENDIX I

Committee Biographies

JEREMIAH P. OSTRIKER, Ph.D. (NAS), Committee Chair, is a professor of astrophysical sciences at Princeton University and Plumian Professor of Astronomy and Experimental Philosophy, Emeritus, at the University of Cambridge. He received his B.A. in physics and chemistry from Harvard University and his Ph.D. in astrophysics from the University of Chicago. After a postdoctoral fellowship at Cambridge University, Dr. Ostriker served on the faculty at Princeton University as a professor (1966-present), as department chair Charles A. Young Professor of Astronomy and director of the Princeton University Observatory (1979-1995), and as university provost (1995-2001). During his tenure as provost, Princeton received a major grant from the Mellon Foundation to improve doctoral education in the humanities. He is a renowned astrophysicist and has received many awards and honors, including membership in the National Academy of Sciences (NAS) and the 2001 recipient of the U.S. National Medal of Science. He has served on several National Research Council (NRC) and National Academies committees, including the NAS Council and the NRC Governing Board. Dr. Ostriker also served as the Chair of the Panel on Quantitative Measures. Currently, he is Treasurer of the National Academy of Sciences.

VIRGINIA S. HINSHAW, Ph.D. (Committee Vice-Chair), is Chancellor of the University of Hawai‘i at Mānoa and Professor of Virology in the John A. Burns School of Medicine at UH Mānoa. Dr. Hinshaw earned her B.S.in laboratory technology, M.S. and Ph.D. in microbiology from Auburn University. Her research for over 25 years focused on influenza viruses in humans, lower mammals and birds, investigating such aspects as: important hosts in nature; transmission among species; genetic changes related to disease severity; the molecular basis of cell killing; and new approaches to vaccines. She has conducted research at various hospitals and universities, including Medical College of Virginia, the University of California Berkeley, St. Jude Children’s Research Hospital, Harvard Medical School, and the University of Wisconsin—Madison. She has been recognized for her innovative and energetic teaching style and her continual advocacy for research and education. Prior to joining UH Mānoa, Hinshaw served as the provost and executive vice chancellor at the University of California, Davis, and as dean of the graduate school and vice chancellor for research at the University of Wisconsin-Madison.

ELTON D. ABERLE, Ph.D., is Dean Emeritus and Professor Emeritus of the College of Agricultural and Life Sciences at the University of Wisconsin-Madison. He received his B.S. from Kansas State University in 1962, his M.S. from Michigan State University in 1965, and his Ph.D. from Michigan State University in food sciences in 1967. Previously, Dr. Aberle held administrative positions at the University of Nebraska-Lincoln's Institute of Agriculture and Natural Resources, and a faculty position at Purdue University. His research and teaching background is in muscle biology, and animal and food sciences. Dr. Aberle has received teaching and research awards from the American Society of Animal Sciences and the American Meat Science Association, and is a Fellow of the American Association for the Advancement of Science and the American Society of Animal Science. He also served on the Panel of Taxonomy and Interdisciplinarity.

NORMAN M. BRADBURN, Ph.D., is Tiffany and Margaret Blake Distinguished Service Professor Emeritus at the University of Chicago and senior fellow at the National Opinion Research Center at the University of Chicago. He has served three terms as director of the center, from 1967 to 1992. From 2000-2004 he was the Assistant Director for Social, Behavioral and Economic Sciences at the National Science Foundation. He also served as provost of the University of Chicago from 1984 to 1989. He received his Ph.D. degree in social psychology from Harvard University. He has been a member of the research and advisory panel of the U.S. General Accounting Office; a member and former chair of the Committee on National Statistics, National Research Council/National Academy of Sciences; and a member of the Panel to Review the Statistical Procedures for the Decennial Census. He also is an elected member of the International Statistical Institute and a fellow of the American Academy of Arts and Sciences and the American Statistical Association. His research has focused on psychological well-being and assessing the quality of life; non-sampling errors in sample surveys; and research on cognitive processes in responses to sample surveys. He is currently working on developing a humanities indicator system and a large scale study of the cultural infrastructure. His book, *Thinking About Answers: The Application of Cognitive Process to Survey Methodology* (co-authored with Seymour Sudman and Norbert Schwarz; Jossey-Bass, 1996), follows three other publications on the methodology of designing and constructing questionnaires: *Polls and Surveys: Understanding What They Tell Us* (with Seymour Sudman; Jossey-Bass, 1988); *Asking Questions: A Practical Guide to Questionnaire Construction* (with Seymour Sudman; Jossey-Bass, 1982; 2nd edition with Brian Wansink, 2004) and *Improving Interviewing Method and Questionnaire Design* (Jossey-Bass, 1979).

JOHN BRAUMAN, Ph.D. (NAS), is J. G. Jackson - C. J. Wood Professor of Chemistry, Emeritus at Stanford University. John Brauman was born in Pittsburgh, PA in 1937. He attended M.I.T. (S.B., 1959) and the University of California at Berkeley (Ph.D., 1963). He was a National Science Foundation Postdoctoral Fellow at UCLA, then took the position at Stanford University. He was Department Chair, Associate Dean for Natural Sciences, and has been Associate Dean of Research since 2005-. He also currently serves as the Home Secretary of the National Academy of Sciences. Brauman has received a number of awards including the American Chemical Society Award in Pure Chemistry, Harrison Howe Award, Guggenheim Fellowship, R. C. Fuson Award, Arthur C. Cope Scholar Award, the James Flack Norris Award in Physical-Organic Chemistry, the National Academy of Sciences Award in Chemical Sciences, the Linus Pauling Medal, the Willard Gibbs Medal, and the National Medal of Science. He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the American Philosophical Society, a Fellow of the American Association for the Advancement of Science, and an Honorary Fellow of the California Academy of Sciences. He received the Dean's Award for Distinguished Teaching from Stanford University in 1976. Brauman has served on many national committees and advisory boards. He was Deputy Editor for Physical Sciences for SCIENCE from 1985 to 2000 and is currently the Chair of the Senior Editorial Board. Brauman's research has centered on structure and reactivity. He has studied ionic reactions in the gas phase, including acid-base chemistry, the mechanisms of proton transfers, nucleophilic displacement, and addition-elimination reactions. His work includes inferences about the shape of the potential surfaces and the dynamics of reactions on these surfaces. He has made contributions to the field of electron photodetachment spectroscopy of negative ions,

measurements of electron affinities, the study of dipole-supported electronic states, and multiple photon infrared activation of ions. He has also studied mechanisms of solution and gas phase organic reactions as well as organometallic reactions and the behavior of biomimetic organometallic species.

JONATHAN R. COLE, Ph.D. is at Columbia University. He is currently the John Mitchell Mason Professor of the University, and was Provost and Dean of Faculties at Columbia from 1989-2003. He received his B.A. from Columbia, 1964; and his Ph.D., Sociology, Columbia, 1969. He was the Adolphe Quetelet Professor of Social Science, 1989 to 2001; Professor of Sociology, Columbia University from 1976 to present; Adjunct Professor, Rockefeller University, 1983-1985; Vice President of Arts and Sciences, Columbia University, 1987-1989. Director, Center for the Social Sciences, 1979-1987; Fellow, Center for Advanced Study in the Behavioral Sciences, Stanford, California, 1975-76; John Simon Guggenheim Foundation Fellowship, 1975-76; Elected Fellow, American Academy of Arts and Sciences, 1992; "National Associate" U.S. National Academies of Sciences, 2003. Elected Member, Council on Foreign Relations, 2003; Elected Member, American Philosophical Society, 2005; Cavaliere Ufficiale in the Order of Merit of the Republic of Italy, 1996; Commendatore in the Order of Merit of the Republic of Italy, 2003. Served on and continues to serve on multiple national committees of the NSF, NRC, and NAS. Some publications in the sociology of science, science policy, and higher education, include: *Social Stratification in Science* (with Stephen Cole) (1973); *Peer Review in the National Science Foundation: Phase One* (1978) and *Phase Two* (1981) *of a Study* (co-authored); *Fair Science: Women in the Scientific Community* (1979); *The Wages of Writing: Per Word, Per Piece, or Perhaps* (1986) (co-authored); *The Outer Circle: Women in the Scientific Community* (1991) (co-edited and author); *The Research University in a Time of Discontent* (co-edited and author)(1994); multiple journal publications on similar topics. His book, *The Great American University: Its Rise to Preeminence, Its Threatened Future*, will be published by Public Affairs in the fall of 2009.

PAUL W. HOLLAND holds the Frederic M. Lord Chair in Measurement and Statistics (retired) in the Research & Development Division at the Educational Testing Service in Princeton, NJ. His educational background includes a M.A. and a Ph.D. in statistics from Stanford University, 1966, and a B.A. in mathematics from the University of Michigan, 1962. His association with ETS began in 1975. In 1979 he became the director of the Research Statistics Group. In 1986 Holland was appointed ETS's first distinguished research scientist. He left ETS in 1993 to join the faculty at University of California Berkeley as a professor in the Graduate School of Education and the Department of Statistics, but returned in 2000 to his current position at ETS. He has made significant contributions to the following applications of statistics to social science research: categorical data analysis, social networks, test equating, differential item functioning, test security issues, causal inference in nonexperimental research, and the foundations of item response theory. His current research interests include kernel equating methods, population invariance of test linking, software for item response theory, and causal inference in program evaluation and policy research.

ERIC W. KALER, Ph.D., became the Provost and Senior Vice President for Academic Affairs at Stony Brook University in 2007. Prior to that, he was the Elizabeth Inez Kelley Professor in

the department of chemical engineering and the Dean of the college of engineering at the University of Delaware. He holds a B.S. from the California Institute of Technology and a Ph.D. from the University of Minnesota, both in chemical engineering. He is known for his distinguished study and applications of complex fluids, including advances in the understanding of surfactant mixtures and for the use of complex fluids to synthesize new materials. Dr. Kaler has served on several NRC panels, including the subpanel for the NIST center for neutron research, which he chaired, and the panel for materials science and engineering. He was named fellow of the American Association for the Advancement of Science in 2001. He was one of the first to receive a Presidential Young Investigator Award from the National Science Foundation in 1984. He also received the Curtis W. McGraw Research Award from the American Society of Engineering Education in 1995 and the 1998 American Chemical Society Award in Colloid or Surface Chemistry. He is Co-editor-in-chief of Current Opinion in Colloid & Interface Science.

EARL LEWIS, Ph.D. is Provost and Executive Vice President for Academic Affairs and the Asa Griggs Candler Professor of History and African American Studies. Before joining the Emory faculty in July 2004, Lewis served as dean of the Horace H. Rackham School of Graduate Studies and vice provost for academic affairs/graduate studies at the University of Michigan. He was the Elsa Barkley Brown and Robin D.G. Kelley Collegiate Professor of History and African American and African Studies and formerly director of the Center for Afro-American and African Studies. From 1984 to 1989 he was on the faculty in the department of African American Studies at the University of California, Berkeley. Lewis, who holds degrees in history and psychology, is author and co-editor of seven books, among them *In Their Own Interests: Race, Class and Power in 20th Century Norfolk* (University of California Press, 1993) and the award-*winning To Make Our World Anew: A History of African Americans* (Oxford University Press, 2000). Between 1997 and 2000 he co-edited the eleven-volume *The Young Oxford History of African Americans*. Lewis co-authored the widely acclaimed *Love on Trial: An American Scandal in Black and White*, published in 2001 by WW Norton. His most recent books are *The African American Urban Experience: Perspectives from the Colonial Period to the Present*, co-edited and published with Palgrave (2004), and the co-written *Defending Diversity: Affirmative Action at the University of Michigan*, published by the University of Michigan Press (2004). He is a current or past member of a number of editorial boards and boards of directors. And he is co-editor of the award-winning book series *American Crossroads* (University of California Press). He received the 2001 University of Minnesota's Outstanding Achievement Award given to a distinguished graduate. And Concordia College, whose board of regents he joined in 2008, honored him with an honorary degree in 2002. He was named a fellow of the American Academy of Arts and Sciences in 2008.

JOAN F. LORDEN, Ph.D., is Provost and Vice Chancellor for Academic Affairs at the University of North Carolina at Charlotte. She received a B.A. from the City College of New York and a Ph.D. from Yale University. Dr. Lorden served for over eight years as Dean of the Graduate School and Associate Provost for Research at the University of Alabama at Birmingham (UAB). During 2002-03, she was the Council of Graduate Schools (CGS) Dean-in-Residence at the Division of Graduate Education at the National Science Foundation and chaired the CGS Board of Directors. She chaired the Board of Directors of Oak Ridge Associated Universities and was President of the Conference of Southern Graduate Schools. Dr. Lorden has

been a member of the Executive Committee of the Council on Academic Affairs and chaired the Executive Committee of the Council on Research Policy and Graduate Education of the National Association of State Universities and Land Grant Colleges. Dr. Lorden's research focuses on brain-behavior relationships. She was awarded the Ireland Prize for Scholarly Distinction by UAB. She has served on review panels and study sections at NSF, NIH, DoD, and private agencies. At UAB she organized the doctoral program in behavioral neuroscience and was a founding member and director of the university-wide interdisciplinary Graduate Training Program in Neuroscience. As Graduate Dean, Dr. Lorden fostered programs that increased opportunities for breadth of training among graduate students, served as the program director for an interdisciplinary biological sciences training grant, and established one of the first offices for postdoctoral support. She is actively involved in programs designed to improve the success of women and minorities in graduate education and faculty careers in science and engineering, and has received several grants to advance these goals. She currently serves as the Principal Investigator for an NSF ADVANCE Institutional Transformation grant.

CAROL B. LYNCH, Ph.D., Carol B. Lynch is a Senior Scholar at the Council of Graduate Schools, where she directs the professional master's initiatives. She is Dean Emerita at the University of Colorado at Boulder where she was Professor of Ecological and Evolutionary Biology, and Fellow of the Institute for Behavioral Genetics, having served as Dean of the Graduate School and Vice Chancellor for Research from 1992-2004. She received her B.A. from Mount Holyoke College, her M.A. from the University of Michigan, and her Ph.D. from the University of Iowa. She held a National Science Foundation Postdoctoral Fellowship in the Institute for Behavioral Genetics at the University of Colorado. Much of her professional career was spent at Wesleyan University in Middletown, Connecticut as a Professor of Biology and Dean of the Sciences. She has received a Research Career Development Award from NIH, is a Fellow of the AAAS and was President of the Behavior Genetics Association. Prior to coming to the University of Colorado, Dr. Lynch was the Program Director in Population Biology and Physiological Ecology at the National Science Foundation. Dr. Lynch was President of the Western Association of Graduate Schools and has served on the Board of Directors of the Council of Graduate Schools and on the Executive Committee of the Council on Research Policy and Graduate Education at the National Association of State Universities and Land Grant Colleges. She is currently a member of the Graduate Record Examination Board and the TOEFL Board (ETS), as well as the ETS Board of Trustees. In 2001-2002, she served as the inaugural CGS/NSF Dean in Residence. Dr. Lynch has held research grants from NIH, NSF, NATO, and the BNSF, has authored numerous publications in evolutionary and behavioral genetics, and was Co-PI on an NSF AGEP award and an NSF ADVANCE award.

ROBERT NEREM, Ph.D., joined Georgia Tech in 1987 as the Parker H. Petit Distinguished Chair for Engineering in Medicine. He currently serves as the Director of the Parker H. Petit Institute for Bioengineering and Bioscience, and he also is the Director of the Georgia Tech/Emory Center (GTEC) for the Engineering of Living Tissues, an NSF-funded Engineering Research Center. He received his Ph.D. in 1964 from Ohio State University and was promoted to Professor in 1972, serving from 1975-1979 as Associate Dean for Research in the Graduate School. From 1979 to 1986 he was Professor and Chairman of the Department of Mechanical Engineering at the University of Houston. Professor Nerem is the author of more than 200

publications. He is a Fellow and was the founding President of the American Institute of Medical and Biological Engineering (1992-1994), and he is past President of the Tissue Engineering Society International. In addition, he was the part-time Senior Advisor for Bioengineering in the new National Institute for Biomedical Imaging and Bioengineering at the National Institutes of Health (2003-2006). In 1988 Professor Nerem was elected to the National Academy of Engineering (NAE), and he served on the NAE Council (1998-2004). In 1992 he was elected to the Institute of Medicine of the National Academy of Sciences and in 1998 a Fellow of the American Academy of Arts and Sciences. In March 1990 Professor Nerem was presented with an honorary doctorate from the University of Paris, and in 1994 he was elected a Foreign Member of the Polish Academy of Sciences. In 1998 he was made an Honorary Fellow of the Institution of Mechanical Engineers in the United Kingdom, in 2004 he was elected an honorary foreign member of the Japan Society for Medical and Biological Engineering, and in 2006 a Foreign Member of the Swedish Royal Academy of Engineering Sciences. In 2008 Professor Nerem was selected by NAE for the Founders Award. Research interests include biomechanics, cardiovascular devices, tissue engineering, regenerative medicine and stem cell technology.

SUZANNE ORTEGA, Ph.D. assumed the position of Provost and Executive Vice President for Academic Affairs at the University of New Mexico on August 1, 2008. She previously served as Dean and Vice Provost of the Graduate School at the University of Washington from 2005-2008 and as Vice Provost for Advanced Studies and Dean of the Graduate School at the University of Missouri – Columbia (MU) from 2000 to 2005. She received a bachelor's degree in sociology from Austin Peay State University in Clarksville, Tenn., in 1974, and a master's and doctorate in sociology in 1976 and 1979, respectively, from Vanderbilt University. Dr. Ortega was at the University of Nebraska-Lincoln from 1980 to 2000, serving as assistant professor (1980-1986), associate professor (1986-1995), special assistant to the dean of graduate studies (1994-1995), assistant dean of graduate studies (1995) special assistant to the senior vice chancellor for academic affairs (1997-1998) and associate dean of graduate studies and professor (1995-2000). She is the author of numerous articles and an Introductory Sociology textbook, now in its seventh edition. Her most important administrative accomplishments include securing funding for the Ronald E. McNair Postbaccalaureate Degree, Preparing Future Faculty, Diversity Enhancement, and Ph.D. Completion programs. Dr. Ortega has served as Chair of the Board of Directors of the Council of Graduate Schools, Chair of the Graduate Record Examination Board, Chair of the Midwestern Association of Graduate Schools and on the executive committee of the Council on Research Policy and Graduate Education of the National Association of State Universities and Land Grant Colleges. She has also served on the American Sociological Association (ASA) Advisory Board for Preparing Future Faculty, ASA Executive Office and Budget committee, and the National Science Foundation Human Resources Expert Panel.

CATHARINE R. STIMPSON, Ph.D., is Dean of the Graduate School of Arts and Science, and University Professor at New York University. She earned an A.B. in English, magna cum laude, from Bryn Mawr College in 1958; a B.A. with honors in 1960 and an M.A. in 1966 from Newnham College, Cambridge University; and a Ph.D. with distinction from Columbia University in 1967. Formerly, Dr. Stimpson was a member of the English Department of Barnard College (1963-80), where she was the first director of the Women's Center and the

founding editor of *Signs: Journal of Women in Culture and Society* (1974-80) for the University of Chicago Press. In 1981, she became Professor of English at Rutgers University, then Dean of the Graduate School, Vice Provost for Graduate Education, and University Professor; she was also the first director of the Institute for Research on Women. While at Rutgers, Dr. Stimpson continued to teach, while she served as Director of the MacArthur Foundation Fellows Program (1994-97). She is a former chair of the New York State Humanities Council and the National Council for Research on Women as well as past president of the Modern Language Association. Dr. Stimpson also served as president of the Association of Graduate Schools in 2000-01. She holds honorary degrees from several universities and colleges, including Upsala, Bates, Hamilton, and the University of Arizona. Dr. Stimpson's publications include a book, *Where the Meanings Are: Feminism and Cultural Spaces*, and a novel, *Class Notes*. She has edited seven books, has served as co-editor of *the Library of America's Gertrude Stein: Writings 1903-1932* and *Gertrude Stein: Writings 1932-1946*, and has published over 150 monographs, essays, stories, and reviews.

RICHARD WHEELER, Ph.D., is Vice Provost at the University of Illinois. He received his Ph.D. in English from the State University of Buffalo in 1970. He joined the Department of English at the University of Illinois at Urbana-Champaign in 1969 and has been on the Illinois faculty ever since. From 1987 to 1997 he was Head of the Department of English, and in 1999-2000 he was Acting Head of the Department of Anthropology. He was Dean of the Graduate College from 2000 to 2009. He has chaired the Executive Committee of the Midwest Association of Graduate Schools, the Graduate Deans group of the Committee on Institutional Cooperation, and the Executive Committee of the Board of Directors of the Council of Graduate Schools. His scholarly publications include *Shakespeare's Development and the Problem Comedies: Turn and Counter-Turn* (U of California P, 1981), *The Whole Journey: Shakespeare's Power of Development* (co-authored, U of California P, 1986), *Creating Elizabethan Tragedy* (ed., U of Chicago P, 1988), *Critical Essays on Shakespeare's Measure for Measure* (ed., G.K. Hall, 1999), and articles on Shakespeare, renaissance drama, and modern British literature. His scholarship has been centrally concerned with identifying key psychological patterns that shape the development of Shakespeare's work and, more recently, plausible links between the plays and the life of their author.