SECTION A.
TECHNICAL NOTES

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These technical notes on the 2001 National Survey of Recent College Graduates (NSRCG) include information on sampling and weighting, survey methodology, sampling and nonsampling errors, and discussions of data comparisons to previous cycles of the NSRCG and the Integrated Postsecondary Education Data System (IPEDS) data. For a more detailed discussion of survey methodology, readers are referred to the 2001 NSRCG Methodology Report.

OVERVIEW

The National Survey of Recent College Graduates is sponsored by the National Science Foundation (NSF), Division of Science Resources Statistics (SRS). The NSRCG is one of three data collections covering personnel and graduates in science and engineering (S&E). The other two surveys are the National Survey of College Graduates (NSCG) and the Survey of Doctorate Recipients (SDR). Together, they constitute NSF's Scientists and Engineers Statistical Data System (SESTAT). These surveys serve as the basis for developing estimates and characteristics of the total population of scientists and engineers in the United States.

The first NSF-sponsored NSRCG (then known as the New Entrants Survey was conducted in 1974. Subsequent surveys were conducted about every two years. The initial survey collected data on only bachelor's degree recipients, but all subsequent surveys included both bachelor's and master's degree recipients.

For the 2001 NSRCG, a sample of 280 colleges and universities was asked to provide lists of eligible bachelor's and master's degree recipients. From these lists, a sample of 13,516 graduates (9,472 bachelor's and 4,044 master's recipients) was selected. These graduates were interviewed between June 2001 and May 2002. Computer-assisted telephone interviewing (CATI) served as the primary means of data collection. In addition to telephone data collection, mail data collection was used only for those who could not be reached by telephone. The weighted response rates were 99.2 percent for institutions and 79.6 percent for graduates.

The NSRCG questionnaire underwent relatively few revisions for the 2001 survey. All revisions were done in coordination with revisions to the other SESTAT surveys. Topics covered in the survey include:

- Educational experience before and after obtaining the sampled degree;
- Graduate's employment characteristics including occupation, salary, unemployment, underemployment, and post-degree work-related training;
- Relationship between education and employment; and
- Background and demographic characteristics of graduates.

SAMPLE DESIGN

The NSRCG used a two-stage sample design. In the first stage a stratified nationally representative sample of 280 institutions was selected. The first stage sample was drawn in two steps. In the first step, certainty institutions were identified from the list of all institutions; all of these were included in the sample. In the second step, noncertainty institutions were sampled from the list that did not include the certainty institutions. For each institution, the measure of size, a composite related to both the number of eligible graduates and the proportion of these who were black or Hispanic, was assigned. There were 107 self-representing or certainty institutions that were identified and included in the sample in the first step. The remaining noncertainty institutions on the list were implicitly stratified by sorting the list by type of control (public, private), region, and the percentage of degrees awarded in science or engineering fields of study. There were 173 noncertainty units selected by systematically sampling from the ordered list with probability proportional to size in the second step.

The second stage of the sampling process selects S&E graduates within the sampled institutions. Each sampled institution was asked to provide lists of graduates for sampling. Within graduation year (cohort), each eligible graduate was then classified into one of 40 strata based on the graduate's major field of study and degree level. While race was not an explicit stratification variable, black, Hispanic, and American Indian/Alaskan Native graduates were assigned a measure of size equal to three, while all other graduates were assigned a measure of size equal to one. This method had the same effect as oversampling black, Hispanic, and American Indian/Alaskan Native graduates by a factor of three. Table 1 lists the major fields and the corresponding sampling

rates by cohort and degree. These rates are overall sampling rates for the major field, and include the institution's probability of selection and the within-institution sampling rate. To achieve the within-institution sampling rate, the overall rate was divided by the institution's probability of selection. The sampling rates by stratum were applied within each eligible, responding institution, and resulted in sampling 13,516 graduates. The sample size for graduates with known majors was 13,271; the sample also included 245 graduates whose major field of study was unknown at the time of sampling.

Graduate Eligibility

To be included in the sample, the graduates had to meet all of the following criteria:

- They received a bachelor's or master's degree in an eligible S&E major from the college or university from which they were sampled;
- They received their degree within the two academic years in the study. For the 2001 study, there were two academic years (July 1998 through June 1999, and July 1999 through June 2000);
- They were under the age of 76 and were not institutionalized during the week of April 15, 2001 (the reference week); and
- They lived in the United States during the reference week.

Data Collection and Response

Prior to data collection from graduates, it was first necessary to obtain the cooperation of the sampled institutions that provided lists of graduates. Of the 280 sampled institutions, 276 provided lists of graduates for sampling in the 2001 NSRCG, two were not eligible, and two did not provide graduate lists. The response rates for the institutional list collection were 99.3 percent unweighted and 99.2 percent weighted.

Graduate data collection took place between June 2001 and May 2002, with computer-assisted telephone interviewing as the primary means of data collection. Flyers were sent to all graduates announcing the study and asking for the phone numbers at which they could be reached during the survey period. Extensive tracing of graduates was required to obtain the desired response rate.

Table 1. **Major fields and corresponding sampling rates, by cohort and degree: April 2001**

Major field	1999 bachelor's rate	1999 master's rate	2000 bachelor's rate	2000 master's rate
Computer sciences	0.0068	0.0172	0.0057	0.0159
Biological sciences	0.0065	0.0154	0.0066	0.0153
Environmental, agricultural & forestry sciences	0.0102	0.0169	0.0099	0.0172
Mathematics/statistics	0.0129	0.0247	0.0124	0.0234
Chemistry	0.0155	0.0229	0.0155	0.0283
Physics/astronomy	0.0484	0.0343	0.0443	0.0372
Other physical sciences, earth sciences, geology, oceanography	0.0382	0.0370	0.0365	0.0362
Psychology	0.0055	0.0092	0.0055	0.0094
Economics	0.0088	0.0187	0.0087	0.0190
Political science	0.0094	0.0139	0.0094	0.0144
Sociology/anthropology	0.0050	0.0174	0.0049	0.0174
Other social sciences	0.0076	0.0141	0.0075	0.0155
Aero/astronautical engineering	0.1454	0.0886	0.1439	0.0861
Chemical engineering	0.0248	0.0477	0.0258	0.0499
Civil engineering	0.0162	0.0229	0.0178	0.0235
Electrical engineering	0.0117	0.0231	0.0109	0.0224
Industrial engineering	0.0356	0.0257	0.0347	0.0254
Mechanical engineering	0.0129	0.0267	0.0129	0.0276
Other engineering	0.0244	0.0246	0.0239	0.0255
Unknown major	0.0050	0.0092	0.0049	0.0094

SOURCE: National Science Foundation/Division of Science Resources Statistics, National Survey of Recent College Graduates, 2001.

Tracing activities included computerized telephone number searches, national change of address searches (NCOA), school alumni office contacts, school major field department contacts, internet searches, directory assistance, military locators, post office records, personal referrals from parents or others who knew the graduate, and the use of professional tracing organizations.

Table 2 gives the response rates by cohort, degree, major, type of address, sex, and race/ethnicity. The overall unweighted graduate response rate was 80.1 percent; the weighted response rate was 79.6 percent. As can be seen from Table 2, response rates varied somewhat by graduate characteristics. Rates were lowest for graduates identified on the school sampling lists as non-resident aliens. It is possible that many unlocated persons listed as non-resident aliens were actually ineligible for the survey due to living outside the United States during the survey reference week. However, a graduate was only classified as ineligible if his/her ineligibility status could be confirmed.

Weight Calculations

To produce national estimates, the data were weighted. The weighting procedures adjusted for unequal selection probabilities, for nonresponse at the institution and graduate level, and for duplication of graduates on the sampling file (graduates in both cohorts).[1] In addition, a ratio adjustment was made at the institution level, using the number of degrees awarded as reported in IPEDS for specified categories of major and degree level. Because this adjustment was designed to reduce the variability associated with sampling institutions, it was not affected by the differences in target populations between NSRCG and IPEDS at the person level. These differences between NSRCG and IPEDS are discussed in a later section of these notes. The final adjustment to the graduate weights adjusted for responding graduates who could have been sampled twice. For example, a person who obtained an eligible bachelor's degree in 1999 could have obtained an eligible master's degree in 2000 and could have been sampled for either degree. To make the estimates from the survey essentially unbiased the weights of all responding graduates who could have been sampled twice were divided by 2. The weights of the graduates who were not eligible to be sampled twice were not adjusted.

The weights developed for the 2001 NSRCG comprise both full NSRCG sample weights for use in computing survey estimates, and replicate weights for variance estimation using a jackknife replication variance estimation procedure.

Data Editing

Editing checks were included within the CATI system, including range checks, skip pattern rules, and logical consistency checks. Skip patterns were controlled by the CATI system so that inappropriate items were avoided and appropriate items were not missed. For logical consistency check violations, CATI screens appeared that explained the discrepancy and asked the respondent for corrections. All of the edit checks discussed above were rerun after data collection and again when item nonresponse imputation was completed.

Imputation of Missing Data

Missing data occurred if the respondent cooperated with the survey but did not answer one or more individual questions. The level of item nonresponse in this study was generally low (less than 4 percent) due to the use of CATI for data collection and of data retrieval techniques for missing key items. However, imputation for item nonresponse was performed for each survey item to make the study results simpler to present and to allow consistent totals to be obtained when analyzing different questionnaire items. "Not applicable" responses were not imputed since these represented respondents who were not eligible to answer the given item.

Imputation was performed using a hot-deck method. Hot-deck methods estimate the missing value of an item by using values of the same item from other record(s) in the same file. Using the hot-deck procedure, each missing questionnaire item was imputed separately. First, respondent records were sorted by items thought to be related to the missing item. Next, a value was imputed for each item nonresponse recipient from a respondent donor within the same subgroup. The results of the imputation procedure were reviewed to ensure that the plan had been followed correctly. In addition, all edit checks were run on the imputed file to be sure that no data inconsistencies were created in the imputation process.

[1]Prior to graduate sampling, we unduplicated the sampling frames (sampling lists received from the institutions) for degrees received within the same academic year, same degree level, and from the same institution. These cases were generally due to double majors. For example, if a graduate received two eligible bachelor's degrees during the 1999 academic year, we kept only one record on the frame, recording one major as the first major and the other as the second major (according to a set protocol).

Table 2. **Response status of sampled graduates and unweighted and weighted graduate response rates, by graduate characteristics**

Graduate characteristic	Number of sampled graduates by status				Unweighted graduate response rate[2]	Weighted graduate response rate[2]
		Response				
	Total	Complete	Ineligible[1]	Non-response	Percent	
Total	13,516	9,887	937	2,692	80.1	79.6
Graduation cohort[3]						
1998-1999	6,733	4,810	519	1,404	79.1	78.9
1999-2000	6,783	5,077	418	1,288	81.0	80.3
Sampled degree[3]						
Bachelor's	9,472	7,083	528	1,861	80.4	79.8
Master's	4,044	2,804	409	831	79.5	78.9
Sampled degree major[3]						
Chemistry	471	372	29	70	85.1	85.2
Physics/astronomy	479	395	34	50	89.6	88.8
Other physical sciences, earth science	459	372	28	59	87.1	87.4
Mathematics/statistics	595	451	41	103	82.7	84.4
Computer sciences	965	675	50	240	75.1	75.7
Environmental/agricultural science	462	373	29	60	87.0	86.6
Aero/astronautical engineering	460	352	20	88	80.9	79.7
Chemical engineering	470	355	30	85	81.9	82.9
Civil engineering	555	426	25	104	81.3	81.4
Electrical engineering	932	686	53	193	79.3	78.8
Industrial engineering	461	328	25	108	76.6	74.7
Mechanical engineering	605	485	29	91	85.0	84.9
Other engineering	683	520	48	115	83.2	83.2
Biological sciences	1,318	1,001	79	238	81.9	83.0
Psychology	1,543	1,109	68	366	76.3	77.4
Economics	521	338	45	138	73.5	73.6
Sociology/anthropology	605	425	31	149	75.4	75.0
Other social sciences	621	439	48	134	78.4	79.6
Political sciences	1,066	731	69	266	75.0	75.9
Not reported	245	54	156	35	85.7	85.1
Type of address provided by school at time of sampling[4]						
U.S. address only	11,813	8,850	638	2,325	80.3	79.6
Foreign address	507	244	131	132	74.0	74.1
No address	1,196	793	168	235	80.4	81.6
Sex of graduate[3]						
Male	7,122	5,257	480	1,385	80.6	79.9
Female	5,609	4,114	384	1,111	80.2	80.0
Not reported	785	516	73	196	75.0	73.4
Race/ethnicity[3]						
Nonresident alien	517	303	74	140	72.9	71.7
Black, non-Hispanic	1,735	1,265	76	394	77.3	75.6
American Indian or Alaskan Native	153	120	10	23	85.0	84.5
Asian or Pacific Islander	1,048	695	78	275	73.8	72.4
Hispanic	1,647	1,178	100	369	77.6	75.4
White, non-Hispanic	5,840	4,631	283	926	84.1	82.6
Not reported	2,576	1,695	316	565	78.1	77.9

[1]The 937 ineligibles include the following: graduates living outside of the U.S. during the week of April 15, 2001 (418); graduates who reported an ineligible major field for their sampled degree (249); those who did not attend the sampled school within the time frame (237); deceased (16); duplicates (8); those who did not receive a bachelor's or master's degree (7); and institutionalized (2).

[2]The graduate response rate is calculated as (R-I)/ [(R-I) + (N * p)] where R = Response (complete plus ineligible), I = Ineligible, N = Nonresponse, p = Proportion of response found in scope calculated as (R-I)/R.

[3] The cohort, degree, major, sex, and race/ethnicity codes are those reported by institutions at the time of sampling and may not match data reported by the respondents on the survey.

[4]This reflects the type of address provided by the institution at the time of sampling. Additional address information may have been provided by the alumni office during data collection. Graduates from whom both a U.S. and a foreign address were provided are included in the foreign address category.

SOURCE: National Science Foundation/Division of Science Resources Statistics, National Survey of Recent College Graduates, 2001

Accuracy of Estimates

The survey estimates provided in these tables are subject to two sources of error: sampling and nonsampling errors. Sampling errors occur because the estimates are based on a sample of individuals in the population rather than on the entire population and hence are subject to sampling variability. If the interviews had been conducted with a different sample, the responses would not have been identical; some figures might have been higher, while others might have been lower.

The standard error is the measure of the precision expected from a particular sample. Tables 3 and 4 contain standard errors for key statistics included in the detailed tables.

If all possible samples were surveyed under similar conditions, intervals within plus or minus 1.96 standard errors of a particular statistic would include the statistic computed from all members of the population in about 95 percent of the samples. This is the 95 percent confidence interval. For example, suppose the estimate of the total number of 1999 and 2000 bachelor's degree recipients majoring in engineering is 109,247 and the estimated standard error is 2,536. In this case, the 95 percent confidence interval for the statistic would extend from:

109,247 - (2,536 x 1.96) to 109,247 + (2,536 x 1.96)
=104,276 to 114,218

This means that one can be confident that intervals constructed in this way contain the true population parameter for 95 percent of all possible samples.

Estimates of standard errors were computed using a technique known as jackknife replication. As with any replication method, jackknife replication involves constructing a number of subsamples (replicates) from the full sample and computing the statistics of interest for each replicate. The mean square error of the replicate estimates around their corresponding full sample estimate provides an estimate of the sampling variance of the statistic of interest. To construct the replicates, 86 stratified subsamples of the full sample were created. Eighty-six jackknife replicates were then formed by deleting one subsample at a time from the full sample. WesVar, a computer program developed at Westat, was used to calculate the jacknife estimates of standard errors for the statistics presented in this report.

Generalized Variance Functions

For this survey, generalized variance functions (GVFs) were developed for estimating the standard errors of the estimates. First, the standard errors for a large number of different estimates were directly computed using the jackknife replication procedures described above. Next, models were fitted to the estimates and standard errors and the parameters of these models were estimated from the direct estimates. These models and their estimated parameters were used to approximate the standard error of an estimate from the survey. This process is called the development of generalized variance functions.

Models were fitted for the two types of estimates of primary interest: estimated totals and estimated percentages. It should be noted that the models used to estimate the generalized variance functions may not be completely appropriate for all estimates (especially median salary estimates).

Sampling Errors for Totals

For estimated totals, the generalized variance function applied assumes that the relative variance of the estimate (the square of the standard error divided by the square of the estimate) is a linear function of the inverse of the estimate. Using this model, the standard error of an estimate can be computed as:

$$se(y) = \sqrt{ay^2 + by} \qquad (1)$$

where $se(y)$ is the standard error of the estimate y, and a and b are estimated parameters of the model. The parameters of the models were computed separately for bachelor's and master's degree recipients for important domains of interest. The estimates of the parameters are given in Table 5.

The following steps should be followed to approximate the standard error of an estimated total:

1) obtain the estimated total from the survey,
2) determine the most appropriate domain for the estimate from Table 5,
3) refer to Table 5 to get the estimates of a and b for this domain, and
4) compute the generalized variance using equation (1) above.

Table 3. **Unweighted number, weighted estimates, and standard errors for 1999 and 2000 science and engineering bachelor's degree recipients, by graduate characteristics: April 2001**

Characteristic	Unweighted number	Weighted number		Weighted percent	
		Estimate	Standard error[1]	Estimate	Standard error[1]
Total 1999 and 2000 science and engineering bachelor's degree recipients	7,154	758,288	12,138	100	–
Sex					
Male	3,951	370,751	7,974	48.9	0.85
Female	3,203	387,538	9,650	51.1	0.85
Race/ethnicity					
White, non-Hispanic	4,395	536,869	12,176	73.4	0.78
Black, non-Hispanic	1,017	57,145	3,424	7.5	0.47
Hispanic	1,030	58,749	2,413	7.8	0.32
Asian/Pacific Islander	624	78,590	3,793	10.4	0.50
American Indian/Alaskan Native	88	6,935	994	0.9	0.13
Type of major field					
Science	5,034	649,041	12,906	85.6	0.44
Engineering	2,120	109,247	2,536	14.4	0.44
Major field of study					
Computer and information sciences	374	61,520	4,534	8.1	0.57
Life and related sciences	1,135	159,366	4,647	21.0	0.48
Mathematical sciences	306	24,372	1,446	3.2	0.18
Physical and related sciences	868	32,182	1,295	4.2	0.16
Psychology	799	152,905	4,650	20.2	0.48
Social and related sciences	1,552	218,696	6,440	28.8	0.62
Engineering	2,120	109,247	2,536	14.4	0.44
Labor force status					
Employed	6,166	640,446	11,350	84.5	0.55
Unemployed	278	30,556	2,155	4.0	0.28
Not in labor force	710	87,286	4,092	11.5	0.52
Occupation (those employed)					
Computer and information scientists	601	66,158	3,299	10.3	0.51
Life and related scientists	189	25,694	1,854	4.0	0.29
Mathematical and related scientists	43	3,023	562	0.5	0.09
Physical scientists	317	14,190	946	2.2	0.15
Psychologists	74	14,113	1,587	2.2	0.24
Social and related scientists	85	11,850	1,661	1.9	0.26
Engineers	1,437	74,681	2,167	11.7	0.40
Other occupations	3,420	430,736	10,649	67.3	0.79

[1]Standard errors were calculated with the WesVar program using the JK2 option.

KEY: – = Not applicable

NOTES: Represents graduates from July 1998 through June 2000. Details may not add to totals due to rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, National Survey of Recent College Graduates, 2001

Table 4. **Unweighted number, weighted estimates, and standard errors for 1999 and 2000 science and engineering master's degree recipients, by graduate characteristics: April 2001**

Characteristic	Unweighted number	Weighted number		Weighted percent	
		Estimate	Standard error[1]	Estimate	Standard error[1]
Total 1999 and 2000 science and engineering master's degree recipients	2,864	160,050	5,036	100	–
Sex					
Male	1,725	87,656	2,420	54.8	1.21
Female	1,139	72,394	3,658	45.2	1.21
Race/ethnicity					
White, non-Hispanic	1,541	100,078	4,233	62.5	1.14
Black, non-Hispanic	305	8,902	748	5.6	0.42
Hispanic	328	10,166	773	6.4	0.45
Asian/Pacific Islander	670	40,140	1,628	25.1	1.09
American Indian/Alaskan Native	20	764	221	0.5	0.14
Type of major field					
Science	1,760	115,288	5,051	72.0	1.14
Engineering	1,104	44,763	1,331	28.0	1.14
Major field of study					
Computer and information sciences	328	24,258	1,716	15.2	0.94
Life and related sciences	261	16,184	1,564	10.1	0.97
Mathematical sciences	145	6,218	527	3.9	0.32
Physical and related sciences	270	8,567	525	5.4	0.34
Psychology	341	33,000	3,531	20.6	1.72
Social and related sciences	415	27,059	1,306	16.9	0.76
Engineering	1,104	44,763	1,331	28.0	1.14
Labor force status					
Employed	2,583	144,164	4,505	90.1	0.80
Unemployed	82	4,584	627	2.9	0.36
Not in labor force	199	11,302	1,247	7.1	0.73
Occupation (those employed)					
Computer and information scientists	471	28,198	1,717	19.6	1.18
Life and related scientists	121	6,929	645	4.8	0.44
Mathematical and related scientists	69	3,077	399	2.1	0.27
Physical scientists	183	6,609	502	4.6	0.34
Psychologists	113	11,456	1,427	8.0	0.89
Social and related scientists	117	7,972	756	5.5	0.50
Engineers	732	29,694	1,020	20.6	0.90
Other occupations	777	50,228	3,013	34.8	1.35

[1]Standard errors were calculated with the WesVar program using the JK2 option.

KEY: – = Not applicable

NOTES: Represents graduates from July 1998 through June 2000. Details may not add to totals due to rounding.

SOURCE: National Science Foundation/Division of Science Resources Statistics, National Survey of Recent College Graduates, 2001

Table 5. **Estimated parameters for computing generalized variances for estimates from the 2001 NSRCG**

Domain	Bachelor's recipients parameter estimates			Master's recipients parameter estimates		
	a	b	DEFF*	a	b	DEFF*
All graduates	0.000012	196.577	1.9	0.000488	89.726	1.6
Sex						
Male	0.000085	146.758	1.7	-0.000398	86.421	1.4
Female	0.000179	205.268	1.7	0.001770	81.031	1.5
Major						
Science majors	0.000084	216.345	1.7	0.001340	90.822	1.5
Engineering majors	-0.000263	83.473	1.5	-0.000368	48.357	1.2
Occupation						
Scientists	0.000016	158.701	1.5	0.000386	79.817	1.5
Engineers	-0.000104	70.250	1.4	-0.000537	48.996	1.2
Other	0.000059	221.846	1.7	0.002810	61.565	1.4
Race/ethnicity						
White, non-Hispanic	0.000093	198.565	1.6	0.000867	91.155	1.4
Black, non-Hispanic	0.002670	64.945	1.6	0.003510	29.633	1.3
Hispanic	-0.000277	109.805	1.8	0.000124	49.669	1.5
Asian/Pacific Islander	0.000159	152.473	1.3	-0.000809	92.410	1.5
American Indian/Alaskan Native	0.002190	129.822	1.8	0.082410	24.713	1.1

*DEFF = design effect

SOURCE: National Science Foundation/Division of Science Resources Statistics, National Survey of Recent College Graduates, 2001.

For example, suppose that the estimate of bachelor's degree recipients in engineering who were employed in an occupation other than S&E is 16,154 (y = 16,154). The most appropriate domain from table 5 is engineering majors with bachelor's degrees and the parameters are a = -0.000263 and b = 83.473. Approximate the standard error using equation (1) as:

$$se(16{,}154) = \sqrt{-0.000263(16{,}154)^2 + 83.473(16{,}154)} = 1{,}131$$

Sampling Errors for Percentages

The model used to approximate the standard errors for estimates of percentages was somewhat less complex. The generalized variance for estimated percentages assumed that the ratio of the variance of an estimate to the variance of the same estimate from a simple random sample of the same size was a constant. This ratio is called the design effect and is often labeled the DEFF. Because the variance for an estimated percentage, p, from a simple random sample is p(100-p) divided by the sample size, the standard error of an estimated percentage can be written as:

$$se(p) = \sqrt{DEFF(p)(100 - p)/n} \qquad (2)$$

where n is the sample size or denominator of the estimated percentage. DEFFs were computed separately for bachelor's and master's degree recipients, as well as for other important domains of interest. The average values of the DEFFs from these computations are given in Table 5.

The following steps should be followed to approximate the standard error of an estimated percentage:

1) obtain the estimated percentage and sample size from the survey,

2) determine the most appropriate domain for the estimate from Table 5,

3) refer to Table 5 to get the estimates of the DEFF for this domain, and

4) compute the generalized variance using equation (2) above.

For example, suppose that the estimated percentage of bachelor's degree recipients in engineering who were currently working in an S&E job was 16 percent (p = 16) and the number of engineering majors from the survey

(sample size, *n*) was 1,956. The most appropriate domain from Table 5 is engineering majors with bachelor's degrees and the DEFF for this domain is 1.5. Approximate the standard error using equation (2) as:

$$se(16\%) = \sqrt{1.5(16)(100-16)/1,956} = 1.02\%$$

NONSAMPLING ERRORS

In addition to sampling errors, the survey estimates are subject to nonsampling errors that can arise because of nonobservation (nonresponse or noncoverage), reporting errors, and errors made in the collection and processing of the data. These errors can sometimes bias the data. The 2001 NSRCG included procedures specifically designed to minimize nonsampling error. In addition, some special studies conducted during the previous cycles of the NSRCG provided some measures of nonsampling errors that are useful in understanding the data from the current survey as well.

Procedures to minimize nonsampling errors were followed throughout the survey. Extensive questionnaire design work was done by Mathematica Policy Research (MPR), NSF, and Westat. This work included focus groups, expert panel reviews, and mail and CATI pretests. This design work was done in conjunction with the other two SESTAT surveys.

Comprehensive training and monitoring of interviewers and data processing staff helped to ensure the consistency and accuracy of the data file. Data collection was done almost entirely by telephone to help reduce the amount of item nonresponse and item inconsistency. Mail questionnaires were used for cases difficult to complete by telephone. Nonresponse was handled in ways designed to minimize the impact on data quality (through weighting adjustments and imputation). In data preparation, a special effort was made in the area of occupational coding. Respondent-chosen codes were verified by data preparation staff using a variety of information collected on the survey and applying coding rules developed by NSF for the SESTAT system.

While general sampling theory can be used to estimate the sampling variability of a statistic, the measurement of nonsampling error is not easy and usually requires that an experiment be conducted as part of the data collection, or that data external to the study be used. In the 1995 NSRCG, two quality analysis studies were conducted: (1) an analysis of occupational coding; and (2) a CATI reinterview. As noted above, these special studies can also inform analysts about the 2001 survey data.

The occupational coding report included an analysis of the 1995 CATI autocoding of occupation and the best coding operation. During CATI interviewing, each respondent's verbatim occupation description was autocoded by computer into a standard SESTAT code whenever possible. Autocoding included both coding directly to a final category and coding to an intermediate code-selection screen. If the description could not be autocoded, the respondent was asked to select the appropriate occupation category during the interview. For the primary occupation, 22 percent of the responses were autocoded to a final category and 19 percent were autocoded to an intermediate screen. The results of the occupation autocoding were examined, and the process was found to be successful and efficient.

For the best coding operation, an occupational worksheet for each respondent was generated and reviewed by an experienced occupational coder. This review was based on the work-related information provided by the graduate. If the respondent's self-selected occupation code was inappropriate, a new or "best" code was assigned. A total of 17,894 responses were received to the three occupation questions in the 1995 survey cycle. Of these, 25 percent received updated codes during the best coding process, with 16 percent being recoded from the "other" category and 9 percent recoded from the "non-other" categories. This analysis indicated that the best coding activity was necessary to ensure that the most appropriate occupation codes were included on the final data file. As a result of this 1995 NSRCG quality study, the best coding procedure was implemented in the 1997, 1999, and 2001 surveys as well.

The second quality analysis study conducted in the 1995 NSRCG involved a reinterview of a sample of 800 respondents. For this study, sampled respondents were interviewed a second time, and responses to the two interviews were compared. This analysis found that the questionnaire items in which respondents were asked to provide reasons for certain events or behaviors had relatively large index of inconsistency values. Examples include reasons for not working during the reference week and reasons for working part-time. High response variability is typical for items that ask about reasons and beliefs rather than behaviors, and the results were not unusual for these types of items. Some of the other

differences between the two interviews were attributed to the time lag between the original interview and reinterview.

For the 1993 NSRCG, two data quality studies were completed: (1) an analysis of interviewer variance, and (2) a behavioral coding analysis of 100 recorded interviews. The interviewer variance study was designed to measure the impact of interviewer effects on the precision of the estimates. The results showed that interviewer effects for most items were minimal and thus had a very limited effect on the standard error of the estimates. Interviewer variance was highest for open-ended questions.

The behavioral coding study was done to observe the extent to which interviewers were following the structured interview and the extent to which it became necessary for them to give unstructured additional explanation or comments to respondents. As part of the study, 100 interviews were taped and then coded on a variety of behavioral dimensions. This analysis revealed that, on the whole, the interview proceeded in a very structured manner, with 85 percent of all question and answer "dyads" being "asked and answered only." Additional unstructured interaction/discussion took place most frequently for those questions in which there was some ambiguity in the topic. In most cases this interaction was judged to have facilitated obtaining the correct response.

For both survey cycles, results from the quality studies were used to identify those questionnaire items that might need additional revision for the next study cycle. Debriefing sessions concerning the survey were held with interviewers, and this information was also used in revising the survey for the next cycle.

Comparisons of Data With Previous Years' Results

A word of caution needs to be given concerning comparisons with previous NSRCG results. During the 1993 cycle, the SESTAT system underwent considerable revision in several areas, including survey eligibility, data collection procedures, questionnaire content and wording, and data coding and editing procedures. The changes made for the 1995 through 2001 cycles were less significant, but might affect some data trend analysis. While the 1993 through 2001 survey data are fairly comparable, care must be taken when comparing results from the 1990s surveys to surveys from the 1980s, due to the significant changes made in 1993. For a detailed discussion of these changes, please see the 1993 through 2001 NSRCG methodology reports.

For the 2001 NSRCG, there were no significant procedural changes that would affect the comparison of results between the 1999 and 2001 survey cycles.

Comparisons With IPEDS Data

The National Center for Education Statistics (NCES) conducts a survey of the nation's postsecondary institutions, called the Integrated Postsecondary Education Data System (IPEDS). The IPEDS Completions Survey reports on the number of degrees awarded by all major fields of study, along with estimates by sex and race/ethnicity.

Although both the NSRCG and IPEDS are surveys of postsecondary education and both report on completions from those institutions, there are important differences in the target populations for the two surveys that directly affect the estimates of the number of graduates. The reason for the different target populations is that the goals of the surveys are not the same. The IPEDS estimates of degrees awarded are intended to measure the output of the educational system. The NSRCG estimates are intended to measure the supply and utilization of a portion of graduates in the years following their completion of a degree. These goals result in definitions of the target population that are not completely consistent for the two surveys. Other differences between the estimates can be explained to a very large extent by a few important aspects of the design or reporting procedures in the two surveys. The main differences between the two studies that affect comparisons of estimates overall and by race/ethnicity are listed below.

- The IPEDS Completions data file represents a count of degrees awarded, whereas the NSRCG represents graduates (persons). If a person receives more than one degree, institutions are instructed to report each degree separately in IPEDS. In the NSRCG, each person is counted only once.

- The NSRCG includes only people who were residing in the United States during the reference week for the survey (the week of April 15 of the survey year). People who received degrees during the years covered by the survey, but resided outside the United States during the reference week, appear in IPEDS counts, but not in NSRCG counts.

- The NSRCG includes only major fields of study that meet the specific SESTAT system definition of science and engineering (S&E), while IPEDS includes all fields. The SESTAT field codes were designed to map directly to the 6-digit Classification of Instructional Program (CIP) codes used in IPEDS. However, published reports from the two studies may group the specific field codes differently for reporting purposes. Therefore, when comparing the NSRCG estimates in this report to IPEDS, care must be taken to select and group the IPEDS estimates according to the NSRCG field definitions shown in the appendix. For example, the NSRCG reporting category of Computer and Information Sciences does not include computer programming or data processing technology, but these fields are included in this category in NCES's *Digest of Education Statistics*. In addition, several NSRCG reporting categories include fields classified as multi/interdisciplinary studies in IPEDS. The NSRCG reporting category of Social and Related Sciences has the most differences in definition from IPEDS. The IPEDS category for Social Sciences also includes History, whereas the NSF category excludes History.

- The IPEDS data reflect information submitted by institutions from administrative records, whereas the NSRCG represents reports of individual graduates collected in interviews. Often, estimates differ when the mode of data collection and sources of data are different.

- Whereas the IPEDS is a census of postsecondary institutions, the NSRCG is a sample survey. As a result, NSRCG estimates include the sampling error inherent in all sample surveys.

- There is an additional consideration for estimates by race/ethnicity. Prior to the 1994–95 academic year, IPEDS collected race/ethnicity data only by broad 2-digit CIP code fields, not by the specific 6-digit CIP fields needed to identify the S&E fields as defined on NSRCG. Therefore, it is not possible to obtain IPEDS race/ethnicity data that precisely match the S&E population as defined by NSRCG for the academic years prior to 1995. For example, the 2-digit CIP for Social Sciences and History includes history, which is not an S&E field, but does not include such S&E fields as agricultural economics and public policy analysis which are included in the NSF category for Social and Related Sciences.

Despite these factors, the NSRCG and IPEDS estimates are consistent when appropriate adjustments for these differences are made. For example, the proportional distributions of graduates by field of study are nearly identical, and the numerical estimates are similar. Further information on the comparison of NSRCG and IPEDS estimates is available in the report, *A Comparison of Estimates in the NSRCG and IPEDS*, available on the SESTAT website, at http://srsstats.sbe.nsf.gov in the Research Compendium section.

Other Explanatory Information

Definitions

The following definitions are provided to facilitate the reader's use of the data in this report.

Major field of study: This is derived from the survey major field category most closely related to the respondent's degree field. Exhibit 1 gives a listing of the detailed major field codes used in the survey. Exhibit 2 gives a listing of the summary major field codes developed by NSF and used in the tables. The appendix lists the eligible and ineligible major fields within each summary category.

Occupation: Occupation is derived from the survey job list category most closely related to the respondent's primary job. Exhibit 3 gives a listing of the detailed job codes used in the survey, and Exhibit 4 gives the summary occupation codes developed by NSF and used in the tables.

Labor force: The labor force includes individuals working full or part time as well as those not working but seeking work or on layoff. It is a sum of the employed and the unemployed.

Unemployed: The unemployed are those who were not working on April 15 and were seeking work or on layoff from a job.

Type of employer: This is the sector of employment in which the respondent was working on his or her primary job held during the week of April 15, 2001. The following are the definitions for each of these categories. Private industry and business includes all private for-profit and private not-for-profit companies, businesses, and organizations, except those reported as educational institutions. It also includes persons reporting

they were self-employed. Educational institutions include elementary and secondary schools, 2-year and 4-year colleges and universities, medical schools, university-affiliated research organizations, and all other educational institutions. Government includes local, state, and Federal Government, military, and commissioned corps.

Primary work activity: This refers to the activity that occupied the most time on the respondent's job. In reporting the data, those who reported applied research, basic research, development, or design work were grouped together in "research and development (R&D)." Those who reported accounting, finance or contracts, employee relations, quality or productivity management, sales and marketing, or managing and supervising were grouped into "management, sales, administration." Those who reported production, operations, maintenance, professional services or other activities were given the code "other."

Full-time salary: This is the annual salary for the full-time employed, defined as those who were not self-employed (either incorporated or not incorporated), whose principal job was not less than 35 hours per week, and who were not full-time students on the reference date (April 15, 2001). Graduates who did not receive salaries were asked to report earned income, excluding business expenses. To annualize salary, reported hourly salaries were multiplied by the reported number of hours paid per week, then multiplied by 52; reported weekly salaries were multiplied by 52; reported monthly salaries were multiplied by 12. Yearly and academic yearly salaries were left as reported.

Race/ethnicity: All graduates, both U.S. citizens and non-U.S. citizens, are included in the race/ethnicity data presented in this report. In tables with sufficient sample size, race/ethnicity data are presented by the specific categories of white, non-Hispanic; black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaskan Native. In tables where the sample size is not sufficient to present data by specific category, the groups of black, Hispanic, and American Indian or Alaskan Native are combined into the underrepresented minority category.

Coverage of Tables

The tables in this report present information for two groups of recent graduates. The first of these groups consists of persons who earned bachelor's degrees in S&E fields from U.S. institutions during academic years 1999 and 2000. The second group includes those who earned S&E master's degrees during the same two years.

EXHIBIT 1. LIST A: EDUCATION CODES

This EDUCATION CODES list is ordered alphabetically. The titles in bold type are broad fields of study. To make sure you have found the BEST code, please review ALL broad categories before making your choice. If you cannot find the code that BEST describes your field of study, use the "OTHER" code under the most appropriate broad field in bold print. If none of the codes fit your field of study, use Code 995.

Agriculture Business and Production
601 Agriculture, economics (also see 655 and 923)
602 OTHER agricultural business and production

Agricultural Sciences
605 Animal sciences
606 Food sciences and technology (also see 638)
607 Plant sciences (also see 633)
608 OTHER agricultural sciences

610 **Architecture/Environmental Design**
(for architectural engineering, see 723)

620 **Area/Ethnic Studies**

Biological/Life Sciences
631 Biochemistry and biophysics
632 Biology, general
633 Botany (also see 607)
634 Cell and molecular biology
635 Ecology
636 Genetics, animal and plant
637 Microbiology
638 Nutritional sciences (also see 606)
639 Pharmacology, human and animal (also see 788)
640 Physiology, human and animal
641 Zoology, general
642 OTHER biological sciences

Business Management/Administrative Services
651 Accounting
652 Actuarial science
653 Business administration and management
654 Business, general
655 Business/managerial economics (also see 601 and 923)
656 Business marketing/marketing management
657 Financial management
658 Marketing research
843 Operations research
659 OTHER business management/admin. services

Communications
661 Communications, general
662 Journalism
663 OTHER communications

Computer and Information Sciences
671 Computer/information sciences, general
672 Computer programming
673 Computer science (also see 727)
674 Computer systems analysis
675 Data processing technology
676 Information services and systems
677 OTHER computer and information sciences

Conservation/Renewable Natural Resources
680 Environmental science studies
681 Forestry sciences
682 OTHER conservation/renewable natural resources

690 **Criminal Justice/Protective Services**
(also see 922)

Education
701 Administration
702 Computer teacher education
703 Counselor education/guidance services
704 Educational psychology
705 Elementary teacher education
706 Mathematics teacher education
707 Physical education/coaching
708 Pre-elementary teacher education
709 Science teacher education
710 Secondary teacher education
711 Special education
712 Social science teacher education
713 OTHER education

Engineering
721 Aerospace, aeronautical, astronautical engineering
722 Agricultural engineering
723 Architectural engineering

Engineering (continued)
724 Bioengineering and biomedical engineering
725 Chemical engineering
726 Civil engineering
727 Computer/systems engineering (also see 673)
728 Electrical, electronics, communications engineering (also see 751)
729 Engineering sciences, mechanics, physics
730 Environmental engineering
731 General engineering
732 Geophysical engineering
733 Industrial engineering (also see 752)
734 Materials engineering, including ceramics and textiles
735 Mechanical engineering (also see 753)
736 Metallurgical engineering
737 Mining and minerals engineering
738 Naval architecture and marine engineering
739 Nuclear engineering
740 Petroleum engineering
741 OTHER engineering

Engineering-Related Technologies
751 Electrical and electronic technologies
752 Industrial production technologies
753 Mechanical engineering-related technologies
754 OTHER engineering-related technologies

Languages, Linguistics, Literature/Letters
760 English Language and Literature/Letters
771 Linguistics
772 OTHER foreign languages and literature

Health Professions and Related Sciences
781 Audiology and speech pathology
782 Health services administration
783 Health/medical assistants
784 Health/medical technologies
785 Medical preparatory programs (e.g., pre-dentistry, pre-medical, pre-veterinary)
786 Medicine (e.g., dentistry, optometry, osteopathic, podiatry, veterinary)
787 Nursing (4 years or longer program)
788 Pharmacy (also see 639)
789 Physical therapy and other rehabilitation/ therapeutic services
790 Public health (including environmental health and epidemiology)
791 OTHER health/medical sciences

800 **Home Economics**

810 **Law/Prelaw/Legal Studies**

820 **Liberal Arts/General Studies**

830 **Library Science**

Mathematics
841 Applied mathematics (also see 843, 652)
842 Mathematics, general
843 Operations research
844 Statistics
845 OTHER mathematics

850 **Parks, Recreation, Leisure, and Fitness Studies**

Philosophy, Religion, and Theology
861 Philosophy of science
862 OTHER philosophy, religion, theology

Physical Sciences
871 Astronomy and astrophysics
872 Atmospheric sciences and meteorology
631 Biochemistry and biophysics
873 Chemistry
874 Earth sciences
680 Environmental science studies
875 Geology
876 Geological sciences, other
877 Oceanography
878 Physics
879 OTHER physical sciences

Psychology
891 Clinical
892 Counseling
704 Educational
893 Experimental
894 General
895 Industrial/Organizational
896 Social
897 OTHER psychology

Public Affairs
901 Public administration
902 Public policy studies
903 OTHER public affairs

910 **Social Work**

Social Sciences and History

921 Anthropology and archeology
922 Criminology (also see 690)
923 Economics (also see 601 and 655)
924 Geography
925 History of science
926 History, other
927 International relations
928 Political science and government
929 Sociology
930 OTHER social sciences

Visual and Performing Arts

941 Dramatic arts
942 Fine arts, all fields
943 Music, all fields
944 OTHER visual and performing arts

991 **Other science/engineering**
995 **Other Fields - Not Listed**

EXHIBIT 2. MAJOR CODE CATEGORIES FOR TABULATIONS

Computer and information sciences
11 Computer science and information sciences 671, 673, 674, 676, 677

Life and related sciences
21 Agricultural and food sciences 605-608
22 Biological sciences 631-642, 991, (781-791 Ph.D. degree only)
23 Environmental life sciences, including forestry sciences 680, 681

Mathematics and related sciences
12 Mathematics and related sciences 841-845

Physical and related sciences
31 Chemistry, except biochemistry 873
32 Earth sciences, geology, and oceanography 872, 874-877
33 Physics and astronomy 871, 878
34 Other physical sciences 879

Psychology
43 Psychology 891-897, 704

Social and related sciences
41 Economics 601, 923
42 Political science and related sciences 902, 927, 928
44 Sociology and anthropology 921, 922, 929
45 Other social sciences 771, 861, 924, 925, 930, 620

Engineering
51 Aerospace and related engineering 721
52 Chemical engineering 725
53 Civil and architectural engineering 726, 723
54 Electrical, electronic, computer, and communications engineering 727, 728
55 Industrial engineering 733
56 Mechanical engineering 735
57 Other engineering 722, 724, 729-732, 734, 736-741

Other majors (60)
602, 610, 651-659, 661-663, 672, 675, 682, 690, 701-703, 705-713, 751-754, 760, 772, 781-791*, 800, 810, 820, 830, 850, 862, 901, 903, 910, 926, 941-944, 995

*At the BA, MA, or professional level.

EXHIBIT 3. LIST B: JOB CODES

This JOB CODES list is ordered alphabetically. The titles in bold type are broad job categories. To make sure you have found the BEST code, please review ALL broad categories before making your choice. If you cannot find the code that BEST describes your job, use the "OTHER" code under the most appropriate broad category in bold print. If none of the codes fit your job, use Code 500.

010 **Artists, Broadcasters, Editors, Entertainers, Public Relations Specialists, Writers**

Biological/Life Scientists
021 Agricultural and food scientists
022 Biochemists and biophysicists
023 Biological scientists (e.g., botanists, ecologists, zoologists)
024 Forestry, conservation scientists
025 Medical scientists (excluding practitioners)
026 Technologists & technicians in the biological/life sciences
027 OTHER biological/life scientists

Clerical/Administrative Support
031 Accounting clerks, bookkeepers
032 Secretaries, receptionists, typists
033 OTHER administrative (e.g., record clerks, telephone operators)

040 **Clergy & Other Religious Workers**

Computer Occupations (Also see 173)
*** Computer engineers (See 087, 088 under Engineering)
051 Computer programmers (business, scientific, process control)
052 Computer system analysts
053 Computer scientists, except system analysts
054 Information systems scientists or analysts
055 OTHER computer, information science occupations

*** **Consultants** (select the code that comes closest to your usual area of consulting)

070 **Counselors, Educational & Vocational** (Also see 236)

Engineers, Architects, Surveyors
081 Architects
*** Engineers (Also see 100-103)
082 Aeronautical, aerospace, astronautical

Engineers, Architects, Surveyors (continued)
*** Engineers
083 Agricultural
084 Bioengineering & biomedical
085 Chemical
086 Civil, including architectural & sanitary
087 Computer engineer - hardware
088 Computer engineer - software
089 Electrical, electronic
090 Environmental
091 Industrial
092 Marine engineer or naval architect
093 Materials or metallurgical
094 Mechanical
095 Mining or geological
096 Nuclear
097 Petroleum
098 Sales
099 Other engineers

*** Engineering Technologists and Technicians
100 Electrical, electronic, industrial, mechanical
101 Drafting occupations, including computer drafting
102 Surveying and mapping
103 OTHER engineering technologists and technicians

104 **Surveyors**

110 **Farmers, Foresters & Fishermen**

Health Occupations
111 Diagnosing/Treating Practitioners (e.g., dentists, optometrists, physicians, psychiatrists, podiatrists, surgeons, veterinarians)
112 Registered nurses, pharmacists, dieticians, therapists, physician assistants
113 Health Technologists & Technicians (e.g., dental hygienists, health record technologist/technicians, licensed practical nurses, medical or laboratory technicians, radiologic technologists/technicians)

Health Occupations (continued)

114 OTHER health occupations

120 **Lawyers, Judges**

130 **Librarians, Archivists, Curators**

Managers, Executives, Administrators (Also see 151-153)

141 Top and mid-level managers, executives, administrators (people who manage other managers)

*** All other managers, including the self-employed - *Use the code that comes closest to the field you manage*

Management-Related Occupations (Also see 141)

151 Accountants, auditors, and other financial specialists

152 Personnel, training, and labor relations specialists

153 OTHER management related occupations

Mathematical Scientists

171 Actuaries

172 Mathematicians

173 Operations research analysts, modeling

174 Statisticians

175 Technologists and technicians in the mathematical sciences

176 OTHER mathematical scientists

Physical Scientists

191 Astronomers

192 Atmospheric and space scientists

193 Chemists, except biochemists

194 Geologists, including earth scientists

195 Oceanographers

196 Physicists

197 Technologists and technicians in the physical sciences

198 OTHER physical scientists

*****Research Associates/Assistants**

(Select the code that comes closest to your field)

Sales and Marketing

200 Insurance, securities, real estate, & business services

201 Sales Occupations - Commodities Except Retail (e.g., industrial machinery/equipment/supplies, medical and dental equip/supplies)

202 Sales Occupations - Retail (e.g., furnishings, clothing, motor vehicles, cosmetics)

203 OTHER marketing and sales occupations

Service Occupations, Except Health (Also see 111-114)

221 Food Preparation and Service (e.g., cooks, waitresses, bartenders)

222 Protective services (e.g., fire fighters, police, guards)

223 OTHER service occupations, except health

Social Scientists

231 Anthropologists

232 Economists

233 Historians, science and technology

234 Historians, except science and technology

235 Political scientists

236 Psychologists, including clinical (Also see 070)

237 Sociologists

238 OTHER social scientist

240 **Social Workers**

Teachers/Professors

251 Pre-Kindergarten and kindergarten

252 Elementary

253 Secondary - computer, math, or sciences

254 Secondary - social sciences

255 Secondary - other subjects

256 Special education - primary and secondary

257 OTHER precollegiate area

*** Postsecondary

- 271 Agriculture
- 272 Art, Drama, and Music
- 273 Biological Sciences
- 274 Business Commerce and Marketing
- 275 Chemistry
- 276 Computer Science
- 277 Earth, Environmental, and Marine Science
- 278 Economics
- 279 Education
- 280 Engineering
- 281 English
- 282 Foreign Language
- 283 History
- 284 Home Economics
- 285 Law
- 286 Mathematical Sciences
- 287 Medical Science
- 288 Physical Education
- 289 Physics
- 290 Political Science
- 291 Psychology
- 292 Social Work
- 293 Sociology
- 294 Theology

Teachers/Professors (continued)

*** Postsecondary
- 295 Trade and Industrial
- 296 OTHER health specialties
- 297 OTHER natural sciences
- 298 OTHER social sciences
- 299 OTHER Postsecondary

Other Professions

401 Construction trades, miners & well drillers

402 Mechanics and repairers

Other Professions (continued)

403 Precision/production occupations (e.g., metal workers, woodworkers, butchers, bakers, printing occupations, tailors, shoemakers, photographic process)

404 Operators and related occupations (e.g., machine set-up, machine operators and tenders, fabricators, assemblers)

405 Transportation/material moving occupations

500 **Other Occupations (Not Listed)**

EXHIBIT 4. NSF OCCUPATIONAL CODE CATEGORIES FOR TABULATIONS

Computer and information scientists
11 Computer and information scientists 052-055, 088
13 Postsecondary teachers in computer sciences 276

Life and related scientists
21 Agricultural and food scientists 021
22 Biological scientists 022, 023, 025, 027
23 Environmental life scientists including forestry scientists 024
24 Postsecondary teachers in life and related sciences 273, 271, 287, 297

Mathematical scientists
12 Mathematical scientists 172-174, 176
14 Postsecondary teachers in mathematical sciences 286

Physical scientists
31 Chemists, except biochemists 193
32 Earth scientists, geologists, and oceanographers 192, 194, 195
33 Physicists and astronomers 191, 196
34 Other physical scientists 198
35 Postsecondary teachers in physical and related sciences 289, 277, 275

Psychologists
43 Psychologists 236
47 Postsecondary teachers in psychology 291

Social and related scientists
41 Economists 232
42 Political scientists 235
44 Sociologists and anthropologists 231, 237
45 Other social scientists 238, 233
46 Postsecondary teachers in social and related sciences 278, 290, 293, 298

Engineers
51 Aerospace and related engineers 082
52 Chemical engineers 085
53 Civil and architectural engineers 086
54 Electrical, electronic, computer, and communications engineers 087, 089
55 Industrial engineers 091
56 Mechanical engineers 094
57 Other engineers 083, 084, 090, 092, 093, 095-097, 099, 098
58 Postsecondary teachers in engineering 280

All other occupations (occupations other than S&E)

61 Managers and related occupations 141, 151-153
62 Health and related occupations 111-114
63 Educators, other than science and engineering postsecondary 253-254, 251, 252, 255-257, 272, 274, 279, 281-285, 288, 292, 294-296, 299
64 Social services and related occupations 240, 070, 040
65 Technicians including computer programmers 026, 175, 197, 100-104, 081, 051
66 Sales and marketing occupations 200-203
67 Other occupations 010, 031-033, 120, 130, 110, 500, 171, 234, 221-223, 401-405

APPENDIX
ELIGIBLE AND INELIGIBLE MAJORS: 2001

ELIGIBLE SCIENCE AND ENGINEERING FIELDS

Categories & Fields	2001 NSF CODE	1990 CIP CODE
1. Computer and Mathematical Sciences		
11 COMPUTER & INFORMATION SCIENCES		
COMPUTER & INFORMATION SCIENCES, GENERAL	671	11.0101
COMPUTER SCIENCE	673	11.0701
COMPUTER SYSTEMS ANALYSIS	674	11.0501
INFORMATION SCIENCES & SYSTEMS	676	11.0401
COMPUTER & INFORMATION SCIENCES, OTHER	677	11.9999
12 MATHEMATICAL SCIENCES		
APPLIED MATHEMATICS, GENERAL	841	27.0301
APPLIED MATHEMATICS, OTHER	841	27.0399
MATHEMATICS	842	27.0101
OPERATIONS RESEARCH	843	27.0302
MATHEMATICAL STATISTICS	844	27.0501
MATHEMATICS, OTHER	845	27.9999
MATHEMATICS & COMPUTER SCIENCE	845	30.0801
2. Life and Related Sciences		
21 AGRICULTURAL & FOOD SCIENCES		
ANIMAL SCIENCES	605	02.0201-0.0299
FOOD SCIENCES & TECHNOLOGY	606	02.0301
PLANT SCIENCES	607	02.0401-02.0499
SOIL SCIENCE	608	02.0501
AGRICULTURAL SCIENCES, OTHER	608	02.9999
AGRICULTURAL SCIENCES, GENERAL	608	02.0101-02.0102
22 BIOLOGICAL SCIENCES		
BIOCHEMISTRY & BIOPHYSICS	631	26.0202-26.0203
BIOLOGY, GENERAL	632	26.0101
BOTANY	633	26.0301-26.0399
CELL & MOLECULAR BIOLOGY	634	26.0401-26.0499
ECOLOGY	635	26.0603
GENETICS, PLANT & ANIMAL	636	26.0613
MICROBIOLOGY/BACTERIOLOGY	637	26.0501
NUTRITIONAL SCIENCES	638	26.0609
PHARMACOLOGY, HUMAN & ANIMAL	639	26.0705
PHYSIOLOGY, HUMAN & ANIMAL	640	26.0706
ZOOLOGY, GENERAL	641	26.0701
ENTOMOLOGY	641	26.0702

Categories & Fields	2001 NSF CODE	1990 CIP CODE
22 BIOLOGICAL SCIENCES (continued)		
PATHOLOGY, HUMAN & ANIMAL	641	26.0704
ZOOLOGY, OTHER	641	26.0799
ANATOMY	642	26.0601
MARINE/AQUATIC BIOLOGY	641	26.0607
NEUROSCIENCE	641	26.0608
PARASITOLOGY	641	26.0610
RADIATION BIOLOGY/RADIOBIOLOGY	641	26.0611
TOXICOLOGY	641	26.0612
BIOMETRICS	641	26.0614
BIOSTATISTICS	641	26.0615
BIOTECHNOLOGY RESEARCH	641	26.0616
EVOLUTIONARY BIOLOGY	641	26.0617
BIOLOGICAL IMMUNOLOGY	641	26.0618
VIROLOGY	641	26.0619
MISC BIOLOGICAL SPECIALTIES, OTHER	641	26.0699
BIOLOGICAL SCIENCES, OTHER	641	26.9999
BIOLOGICAL & PHYSICAL SCIENCES	991	30.0101
SYSTEMS SCIENCE & THEORY	991	30.0601
23 ENVIRONMENTAL & FORESTRY SCIENCES		
ENVIRONMENTAL SCIENCE/STUDIES	680	03.0102
FORESTRY SCIENCES	681	03.0502
3. Physical and Related Sciences		
31 CHEMISTRY		
CHEMISTRY	873	40.0501-40.0599
32 EARTH SCI, GEOLOGY, OCEAN		
ATMOSPHERIC SCIENCE & METEOROLOGY	872	40.0401
EARTH & PLANETARY SCIENCES	874	40.0703
GEOLOGY	875	40.0601
GEOCHEMISTRY	876	40.0602
GEOPHYSICS & SEISMOLOGY	876	40.0603
PALEONTOLOGY	876	40.0604
GEOLOGICAL SCIENCES, OTHER	876	40.0699
OCEANOGRAPHY	877	40.0702
33 PHYSICS & ASTRONOMY		
ASTRONOMY	871	40.0201
ASTROPHYSICS	871	40.0301
PHYSICS	878	40.0801-40.0899

Categories & Fields	2001 NSF CODE	1990 CIP CODE
34 OTHER PHYSICAL SCIENCES		
PHYSICAL SCIENCES, GENERAL	879	40.0101
METALLURGY	879	40.0701
MISC PHYSICAL SCIENCES, OTHER	879	40.0799
PHYSICAL SCIENCES, OTHER	879	40.9999
4. Social Sciences and Related Sciences		
41 ECONOMICS		
AGRICULTURAL ECONOMICS	601	01.0103
ECONOMICS	923	45.0601-45.0699
42 POLITICAL & RELATED SCIENCES		
PUBLIC POLICY ANALYSIS	902	44.0501
INTERNATIONAL RELATIONS & AFFAIRS	927	45.0901
POLITICAL SCIENCE & GOVERNMENT	928	45.1001-45.1099
43 PSYCHOLOGY		
EDUCATIONAL PSYCHOLOGY	704	13.0802
CLINICAL PSYCHOLOGY	891	42.0201
COUNSELING PSYCHOLOGY	892	42.0601
EXPERIMENTAL PSYCHOLOGY	893	42.0801
PSYCHOLOGY, GENERAL	894	42.0101
INDUSTRIAL/ORGANIZATIONAL PSYCH	895	42.0901
SOCIAL PSYCHOLOGY	896	42.1601
PSYCHOLOGY, OTHER	897	42.9999
COGNITIVE PSYCHOLOGY/PSYCHOLING	897	42.0301
COMMUNITY PSYCHOLOGY	897	42.0401
DEVELOPMENTAL & CHILD PSYCH	897	42.0701
PHYSIOLOGICAL PSYCHOLOGY	897	42.1101
SCHOOL PSYCHOLOGY	897	42.1701
BIOPSYCHOLOGY	897	30.1001
44 SOCIOLOGY & ANTHROPOLOGY		
ANTHROPOLOGY	921	45.0201
ARCHEOLOGY	921	45.0301
CRIMINOLOGY	922	45.0401
SOCIOLOGY	929	45.1101
45 OTHER SOCIAL SCIENCES		
AREA STUDIES	620	05.0101-05.0199
ETHNIC & CULTURAL STUDIES	620	05.0201-05.0299
AREA, ETHNIC, CULT, OTHER	620	05.9999
LINGUISTICS	771	16.0102
PHILOSOPHY OF SCIENCE	861	45.0804 (PART)
GEOGRAPHY	924	45.0701-45.0702
HISTORY OF SCIENCE	925	45.0804 (PART)
URBAN AFFAIRS/STUDIES	930	45.1201
SOCIAL SCIENCES, OTHER	930	45.9999
SOCIAL SCIENCES, GENERAL	930	45.0101
DEMOGRAPHY/POPULATION STUDIES	930	45.0501
PEACE & CONFLICT STUDIES	930	30.0501

Categories & Fields	2001 NSF CODE	1990 CIP CODE
45 OTHER SOCIAL SCIENCES (continued)		
GERONTOLOGY	930	30.1101
SCIENCE, TECHNOLOGY, & SOCIETY	930	30.1501
5. Engineering		
51 AERONAUTICAL & ASTRONAUTICAL ENGINEERING		
AERONATUICAL & ASTRONAUTICAL ENGINEERING	721	14.0201
52 CHEMICAL ENGINEERING		
CHEMICAL ENGINEERING	725	14.0701
53 CIVIL & ARCHITECTURAL ENGINEERING		
CIVIL ENGINEERING	726	14.0801-14.0899
ARCHITECTURAL ENGINEERING	723	14.0401
54 ELECTRICAL & COMPUTER ENGINEERING		
COMPUTER ENGINEERING	727	14.0901
SYSTEMS ENGINEERING	727	14.2701
ELECTRIC, ELECTRONICS, COMMUNICATIONS ENGINEERING	728	14.1001
55 INDUSTRIAL ENGINEERING		
INDUSTRIAL/MANUFACT ENGINEERING	733	14.1701
56 MECHANICAL ENGINEERING		
MECHANICAL ENGINEERING	735	14.1901
57 OTHER ENGINEERING		
AGRICULTURAL ENGINEERING	722	14.0301
BIOENGINEERING & BIOMEDICAL ENGINEERING	724	14.0501
ENGINEERING MECHANICS	729	14.1101
ENGINEERING PHYSICS	729	14.1201
ENGINEERING SCIENCE	729	14.1301
ENVIRONMENTAL ENGINEERING	730	14.1401
ENGINEERING, GENERAL	731	14.0101
GEOPHYSICAL ENGINEERING	732	14.1601
MATERIALS ENGINEERING	734	14.1801
CERAMIC SCIENCES & ENGINEERING	734	14.0601
TEXTILE SCIENCES & ENGINEERING	734	14.2801
POLYMER/PLASTICS ENGINEERING	734	14.3201
METALLURGICAL ENGINEERING	736	14.2001
MINING & MINERAL ENGINEERING	737	14.2101
NAVAL ARCHITECTURE & MARINE ENGINEERING	738	14.2201
NUCLEAR ENGINEERING	739	14.2301
PETROLEUM ENGINEERING	740	14.2501
ENGINEERING DESIGN	741	14.2901
ENGINEERING/INDUSTRIAL MANAGEMENT	741	14.3001
MATERIALS SCIENCE	741	14.3101
GEOLOGICAL ENGINEERING	741	14.1501
OCEAN ENGINEERING	741	14.2401
ENGINEERING, OTHER	741	14.9999

Ineligible Nonscience and Nonengineering Fields

Categories & Fields	2001 NSF CODE	1990 CIP CODE
OTHER, AGRI-BUSINESS & MANAGEMENT	602	01.0101-01.0102
OTHER, AGRI-BUSINESS & MANAGEMENT	602	01.0104-01.9999
ARCHITECTURE	610	ALL 04
BUSINESS MANAGEMENT	651-659	ALL 08, ALL 52
COMMUNICATIONS	661-663	ALL 09
COMPUTER PROGRAMMING	672	11.0201
DATA PROCESSING TECHNOLOGY	675	11.0301
OTHER, CONSERVATION	682	03.0101
OTHER, CONSERVATION	682	03.0201-03.0501
OTHER, CONSERVATION	682	03.0506-03.9999
CRIMINAL JUSTICE/PROTECT SERVICES	690	ALL 43
EDUCATION	701-703	ALL 13 EXCEPT 13.0802
EDUCATION	705-713	ALL 13 EXCEPT 13.0802
ENGINEERING-RELATED TECHNOLOGIES	751-754	ALL 15
ENGINEERING-RELATED TECHNOLOGIES	751-754	48.0101-48.0199
ENGLISH LANGUAGE, LITERATURE	760	ALL 23
OTHER, FOREIGN LANGUAGE	772	16.0101
OTHER, FOREIGN LANGUAGE	772	16.0103-16.9999
HEALTH PROFESSIONS	781-791	ALL 51
HOME ECONOMICS	800	ALL 19, ALL 20
LAW/PRELAW/LEGAL STUDIES	810	ALL 22
LIBERAL ARTS	820	ALL 24
LIBRARY SCIENCE	830	ALL 25
PARKS, RECREATION, LEISURE	850	ALL 31
OTHER, PHILOSOPHY, RELIGION	862	ALL 38, ALL 39
PUBLIC ADMINISTRATION	901	44.0401
OTHER, PUBLIC AFFAIRS	903	44.0201,44.9999
SOCIAL WORK	910	44.0701
HISTORY, OTHER	926	45.0801-45.0803
HISTORY, OTHER	926	45.0805-45.0899
VISUAL & PERFORMING ARTS	941-944	ALL 50
OTHER FIELDS	995	ALL 10, ALL 12
OTHER FIELDS	995	29.0101
OTHER FIELDS	995	30.1201
OTHER FIELDS	995	30.1301
OTHER FIELDS	995	30.1401
OTHER FIELDS	995	30.9999
OTHER FIELDS	995	ALL 32 THRU 37
OTHER FIELDS	995	ALL 41, ALL 46, ALL 47
OTHER FIELDS	995	48.0201-48.9999
OTHER FIELDS	995	ALL 49