Faculty Demographics: A Look at Science and Engineering

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Diversity in Science Association

http://chem.ou.edu/~djn/djn.html

Concerns

1. Demographics of the US population are changing due to increases in some racial groups
2. Demographics of the US workforce are changing due to more women working
3. In order to become a part of the scientific workforce, a person must pass through an educational institution
4. In order to maintain an effective US scientific workforce, women and underrepresented minorities (URMs) must be adequately represented in scientific education

Gauge a group's status in academia, by assessing and comparing its representation among students vs among faculty (pipeline analysis).

Faculty Survey Methodology

1. **Obtained tenured/tenure track faculty headcount, disaggregated by race/ethnicity, by gender, and by rank**
2. **Faculty data from department chairs**
3. **"Top 50" departments in 14 disciplines, NSF-ranked -> research expenditures**
4. **Obtain populations, instead of samples.**

Table 1. Tenured/Tenure Track Chemistry Faculty at the "Top 50" Chemistry Departments by Race/Ethnicity and by Rank (FY 2001)*

University	White				Black				Hispanic				Asian				Native Am.				Total
	Full	Assoc	Asst	Tot	Full	Assoc	Asst	Tot	Full	Assoc	Asst	Tot	Full	Assoc	Asst	Tot	Full	Assoc	Asst	Tot	
U of California, Berkeley	35.003	3.001	7.001	45.005	1	-	-	1	1	-	-	1	2	-	2	4	-	-	-	0	51.005
Johns Hopkins U	11	2	3.001	16.001	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	16.001
California Instit. Of Tech.	18.002	2	3	23.002	-	-	-	0	-	-	-	0	1	1	1.001	3.001	-	-	-	0	26.003
Pennsylvania State U	18.001	6.002	5.001	29.004	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	29.004
U of Illinois, Urbana	29.002	1.001	6.001	36.004	-	-	-	0	-	-	1	1	-	1	1	2	-	-	-	0	39.004
U of Colorado, Boulder	23.003	5.001	5.001	33.005	-	-	-	0	-	-	-	0	-	1.001	3.001	4.002	-	-	-	0	37.007
Purdue U	31.002	6.002	5.002	42.006	1	-	-	1	-	-	-	0	1	-	2	3	-	-	-	0	46.006
Stanford U***	17.001	2	2	21.001	-	-	-	0	-	-	-	0	-	1	2	3	-	-	-	0	24.001
Cornell U	23.001	4.001	3	30.002	1	-	-	1	1	-	-	1	1	-	-	1	-	-	-	0	33.002
U of Wisconsin, Madison	32.002	1.001	4.001	37.004	-	-	-	0	-	-	-	0	1	1	1	3	-	-	-	0	40.004
U of California, LA	34.004	7.002	6.002	47.008	-	1	-	1	-	1	-	1	-	1.001	1	2.001	-	-	-	0	51.009
U of Florida	30.001	10.001	2	42.002	-	1.001	-	1.001	1	-	1.001	2.001	-	-	1	1	-	-	-	0	46.004
U of Pennsylvania	20.002	4	3.001	27.003	-	-	-	0	-	-	-	0	2	-	1	3	1	-	-	1	31.003
U of Texas, Austin	30.001	5	8.002	43.003	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	43.003
Harvard U	19.001	-	2	21.001	-	-	-	0	-	-	-	0	2	-	2	4	-	-	-	0	25.001
U of Massachusetts, Amherst	16.002	8.001	4	28.003	-	-	-	0	-	1.001	1	2.001	-	-	-	0	-	-	-	0	30.004
Massachusetts Inst. Of Tech.	20.003	2	5.001	27.004	-	-	-	0	-	-	-	0	1	-	1	2	-	-	-	0	29.004
Georgia Instit. Of Tech	18	2	12.003	32.003	-	-	-	0	-	-	1	1	-	1	-	1	-	-	-	0	34.003
U of California, San Diego	30.004	4.001	4	38.005	1	1	-	2	-	-	-	0	2	1	3	6	-	-	-	0	46.005
U of Oklahoma	14	2	4.001	20.001	1	-	-	1	-	-	-	0	1	-	2.001	3.001	-	1.001	-	1.001	25.003
Northwestern U	21	-	2.001	23.001	-	-	-	0	-	-	-	0	-	-	1	1	-	-	-	0	24.001
Ohio State U	20.001	7.001	6.001	33.003	-	-	-	0	-	-	1.001	1.001	4	2	-	6	-	-	-	0	40.004
Rutgers, State U of NJ	26.005	6.002	3.001	35.008	-	1	-	1	-	1.001	-	1.001	1	-	1.001	2.001	-	-	-	0	39.010
Arizona State U	22	2	6	30	-	-	-	0	1.001	-	1	2.001	-	-	-	0	-	-	-	0	32.001
Texas A&M U	35.002	2.001	5.001	42.004	1	-	-	1	-	-	1	1	1	-	-	1	-	-	-	0	45.004
Princeton U	22	2.001	1	25.001	-	-	-	0	-	-	-	0	-	-	1	1	-	-	-	0	26.001
Columbia U	15.001	1	5.001	21.002	-	-	-	0	-	-	-	0	1	-	-	1	-	-	-	0	22.002
U of Notre Dame	14	5	6.002	25.002	1	-	-	1	-	-	-	0	1	-	-	1	-	-	-	0	27.002
U of California, Irvine	22.001	1.001	7	30.002	1	-	-	1	-	-	-	0	1	1	2.001	4.001	-	-	-	0	35.003
U of NC, Chapel Hill	29.003	-	10.002	39.005	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	39.005
U of Akron	10.001	2.002	3	15.003	-	-	-	0	-	-	-	0	1	-	1	2	-	-	-	0	17.003
U of Chicago	18.001	2	2.001	22.002	-	-	-	0	-	-	-	0	3	-	1.001	4.001	-	-	-	0	26.003
Indiana U, Bloomington	17	4	7.002	28.002	-	-	-	0	-	-	-	0	-	2	-	2	-	-	-	0	30.002
U of Southern California	17.001	1	2.001	20.002	1	-	-	1	-	1	-	1	1	1	1	3	1	-	-	1	26.002
Florida State U	21.003	9	4.001	34.004	-	-	-	0	-	-	-	0	-	-	3.002	3.002	-	-	-	0	37.006
U of Michigan	31.002	7.002	7.002	45.006	1	-	-	1	-	-	-	0	1	-	1	2	-	-	-	0	48.006
Colorado State U	16.002	6.002	5	27.004	-	-	-	0	-	-	-	0	-	1	1	2	-	-	-	0	29.004
U of Minnesota, Minneapolis	20.001	8.002	8	36.003	-	-	-	0	-	-	1	1	2	1	1	4	-	-	-	0	41.003
State U of NY, Buffalo	20	5.001	2	27.001	-	-	-	0	-	-	1	1	2	1	1	4	-	-	-	0	32.001
U of Utah	19.001	4	5.001	28.002	-	-	-	0	-	-	-	0	-	1	-	1	-	-	-	0	29.002
U of South Carolina	15	7.001	4	26.001	-	-	-	0	-	-	-	0	-	-	1.001	1.001	-	-	-	0	27.002
U of Kansas	12.002	7.001	5.003	24.006	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	24.006
U of Washington	26	4.002	4.002	34.004	2	1	-	3	-	-	1	1	-	1	2	3	-	-	-	0	41.004
Virginia Polytechnic Inst.	14.001	8.002	6	28.003	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	28.003
Yale	18.001	1	4.001	23.002	-	-	-	0	-	-	1	1	-	-	-	0	-	-	-	0	24.002
U of Rochester	14	1	5.001	20.001	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	20.001
U of Maryland	24.003	11.002	6	41.005	-	-	-	0	-	-	1	1	-	1	1	2	-	-	-	0	44.005
U of Arizona	23.004	4.001	3	30.005	-	-	-	0	-	1	1	2	1	-	1	2	-	-	-	0	34.005
State U of NY, Stony Brook	10	9.003	2.001	21.004	-	1	-	1	-	-	-	0	2	1	1	4	-	-	-	0	26.004
U of Georgia	22	3.001	4.001	29.002	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	30.002
Chemistry Total	1060.071**	205.042	232.044	1497.157	12**	6.001	0	18.001	4.001	6.002	12.002	22.005	36	21.002	44.009	101.011	2	1.001	0	3.001	1641.175
Percent within race	71%	14%	15%	100%	67%	33%	0%	100%	18%	27%	55%	100%	36%	21%	44%	100%	67%	33%	0%	100%	
Percent of grand total	64.6%	12.5%	14.1%	91.2%	0.7%	0.4%	0%	1.1%	0.2%	0.4%	0.7%	1.3%	2.2%	1.3%	2.7%	6.2%	0.1%	0.1%	0.0%	0.2%	100%
Females in column	6.7%	20.5%	19.0%	10.5%	0%	16.7%	0%	5.6%	25.0%	33.3%	16.7%	22.7%	0.0%	9.5%	20.5%	10.9%	0%	100%	0%	33%	10.7%

*By chemical research expenditures FY1998, NSF; numbers after decimals designate females. **One prof. changed departments mid-year & is counted twice. ***Declined; data are from other sources.

Reference: "The Nelson Diversity Surveys" Nelson, D. J.: Norman, OK, 2002; http://cheminfo.chem.ou.edu/faculty/djn/diversity/top50.html

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PhDs in Chemistry

	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	83-02	%	93-02	%
US cit & perm res	1424	1415	1432	1413	1472	1451	1383	1497	1461	1441	1400	1616	1624	1462	1439	1466	1400	1241	1230	1227	28494	100%	14105	100%
male	1175	1149	1154	1104	1145	1123	1018	1114	1093	1040	999	1152	1087	1024	1008	1004	980	819	822	807	20817	73.1%	9702	68.8%
female	249	266	278	309	327	328	365	383	368	401	401	464	537	439	431	463	426	422	408	420	7685	27.0%	4411	31.3%
White	1264	1211	1243	1208	1267	1257	1188	1284	1239	1219	1145	1179	1112	1063	1078	1127	1088	988	974	985	23119	82.9%	10739	77.6%
male	1057	988	1013	952	996	981	872	969	926	901	846	872	760	754	773	785	797	665	677	663	17247	61.8%	7592	54.8%
female	207	223	230	256	271	276	316	315	313	318	299	307	351	308	305	344	293	323	297	322	5874	21.1%	3149	22.7%
Asians	83	97	112	109	108	85	96	99	122	135	157	332	416	295	235	207	187	121	126	127	3249	11.6%	2203	15.9%
male	60	70	79	74	77	57	73	70	86	79	84	203	269	187	142	134	103	67	65	76	2055	7.4%	1330	9.6%
female	23	27	33	35	31	28	23	29	36	56	71	128	148	108	92	72	80	54	61	51	1184	4.2%	863	6.2%
Native Am.	3	3	2	5	6	5	5	3	9	6	2	4	5	4	6	7	5	7	11	5	103	0.4%	56	0.4%
male	3	3	2	3	4	5	5	3	7	4	1	4	3	3	6	6	3	6	9	5	85	0.3%	46	0.3%
female	0	0	0	2	2	0	0	0	2	2	1	0	3	1	0	1	2	1	2	0	19	0.1%	11	0.1%
Black	16	23	23	17	13	21	26	24	23	17	31	34	33	45	35	45	56	44	42	44	612	2.2%	409	3.0%
male	14	21	17	14	11	14	19	17	18	12	22	25	16	35	26	17	33	25	23	22	401	1.4%	244	1.8%
female	2	2	6	3	2	7	7	7	5	5	9	9	17	10	9	28	23	19	19	22	211	0.8%	165	1.2%
Hispanic	21	33	17	25	44	48	43	57	46	42	51	59	43	35	44	34	42	51	43	38	816	2.9%	440	3.2%
male	7	24	12	19	29	35	26	33	37	26	33	43	29	29	32	25	25	30	26	20	540	1.9%	292	2.1%
female	14	9	5	6	15	13	17	24	9	16	18	16	14	7	12	9	21	21	17	18	281	1.0%	153	1.1%

Hill, S. T. Ph.D.s 1990-99, National Science Foundation, Division of Science Resources Studies, Science and Engineering Doctorate Awards: 1999, NSF 01-314, Arlington, VA, 2001. (www.nsf.gov/cgi-bin/getpub?nsf01314)

PhDs 1985-94, National Science Foundation, Selected Data on Science and Engineering Doctorate Awards: 1995, NSF 96-303, (Arlington, VA, 1996); (www.nsf.gov/sbe/srs/s4095/start.htm).

PhDs 1983-93, Science and Engineering Doctorates Awarded, by Citizenship Status, Sex, Racial/Ethnic Group, and Major Field of Study of Recipients: 1993, NSF 94-318, (Arlington, VA, 1994).

The Nelson Diversity Surveys

Track women's representation in STEM academic pipeline at one point in time

- Deficiencies in women's advancement
- Identify transitions with greatest loss
- Group disciplines with similarities

Track representation of women and URM STEM faculty through time

- Order disciplines by increases & decreases

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Track women's representation in STEM academic pipeline at one point in time

Pipeline Analysis of FY2007 Data

- **Pipeline source (NSF BS and PhD data)**
- **Critical mass of women? (15 – 30%)**
- **Sufficient same-gender mentors? (compare %women in BSs vs in faculty)**
- **Utilization of hiring pool? (compare % women among PhDs vs asst profs)**
- **Compare and group disciplines by patterns in data.**

Females in the Academic Pipeline*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.
http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

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% Females*

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Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
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√ favorable   % Females*   X unfavorable

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Civil Engr	24.1%	23.6%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	13.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	8.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.3%	37.9%	30.1%	17.4%	25.6%
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NELSON DIVERSITY SURVEYS

% Females*

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Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
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Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.

http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

NSF DATA % Females*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.
http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

SOME DECLINES >1%

% Females*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.
http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

SMALL SOURCE <25%   % Females*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.
http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

% Females*

ALL INCREASE

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.

http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

% Females*

CRITICAL MASS 15–30%

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.

http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

% Females* **factor > 3**

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.

http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / **OXIDE**

compare hiring pool vs recent hires
% Females*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.

http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

HIRING POOL UTILIZATION (under)

% Females*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
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Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.
http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

% Females*　　　　　**HIRING POOL UTILIZATION**
　　　　　　　　　　　　　　　　　　　　　(over)

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
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Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

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http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

Donna Nelson at NDEW 2011 / OXIDE

% Females*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
Biological Sci	62.5%	62.2%	39.6%	46.3%	36.0%	30.9%	17.7%	24.8%
Earth Sciences	42.1%	41.9%	22.5%***	31.8%	28.6%	21.7%	10.6%	16.1%

*Females were 50.7% of the 2006 US population. **Top 40 departments. ***1995 data only.
http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html

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% Females*

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
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Patterns revealed

1. **Chemistry and math each have a large pipeline source, but no critical mass among faculty, and leakiest pipeline (worst performance with sufficient raw materials to do much better).**

2. **Social sciences and life sciences generally have a good source and critical mass, but a leaky pipeline.**

3. **Engineering pipeline source is too small, and it has no critical mass, but good utilization.**
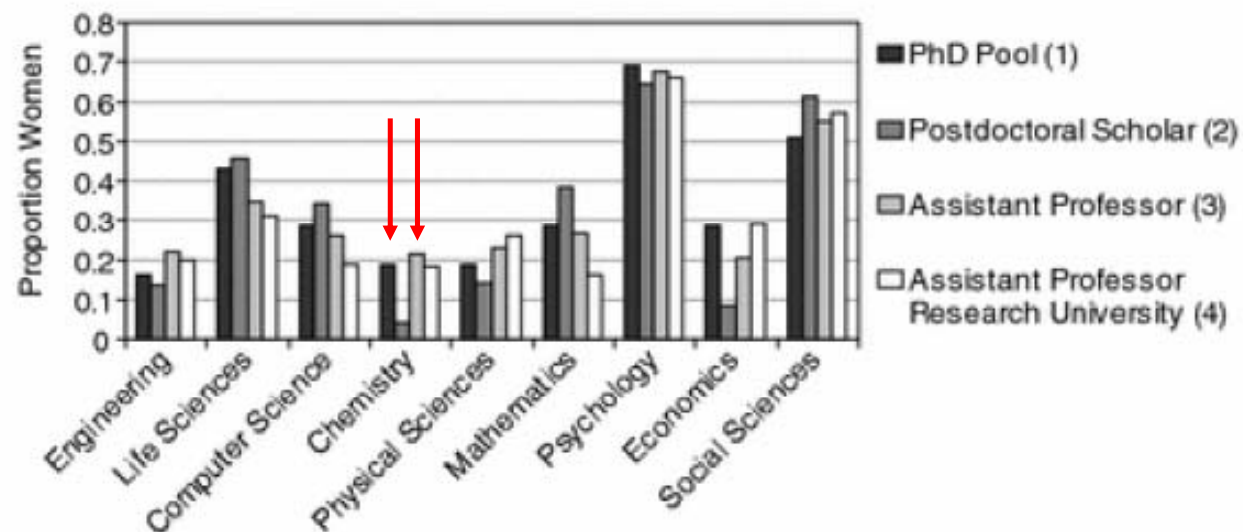
√ favorable   % Females*   X unfavorable

Discipline	Students				Departments 1 - 50 FY2007			
	BS2004	BS2005	PhD86-95	PhD96-05	asst	assoc	prof	all
Chemistry	51.0%	51.7%	26.3%	32.4%	21.7%	21.3%	9.7%	13.7%
Math	46.1%	44.9%	22.5%	28.7%	28.0%	15.5%	7.2%	12.1%
Computer Sci	24.7%	22.0%	19.8%	21.2%	19.5%	11.3%	11.5%	13.5%
Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.9%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.9%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.0%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	13.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.5%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	8.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.3%	34.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
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Beyond Bias and Barriers, 2007

A: Postdoctoral Scholars and Assistant Professors

Legend:
- PhD Pool (1)
- Postdoctoral Scholar (2)
- Assistant Professor (3)
- Assistant Professor Research University (4)

Y-axis: Proportion Women (0 to 0.8)

Categories: Engineering, Life Sciences, Computer Science, Chemistry, Physical Sciences, Mathematics, Psychology, Economics, Social Sciences

NOTES: The Survey of Doctoral Recipients includes only those who earned doctorates in the United States and may underrepresent the actual number of postdoctoral scholars and tenure-track and tenured professors, particularly in those fields such as life sciences where there are a substantial number of international postdoctoral scholars and engineering where there are substantial number of international professors.[7] *Engineering* includes aeronautics, civil, electrical, environmental, industrial, mechanical, and other engineering fields; *Life Sciences* includes agricultural and biological sciences; *Chemistry* includes chemical engineering and chemistry fields; *Physical Sciences* includes geosciences, physics, and other physical science fields; *Social Sciences* includes political science, sociology and anthropology, and other social science fields. (1) The PhD pool for assistant professors was derived from a sum of all PhDs earned 0-6 years before 2003. (2) Includes those in postdoc-
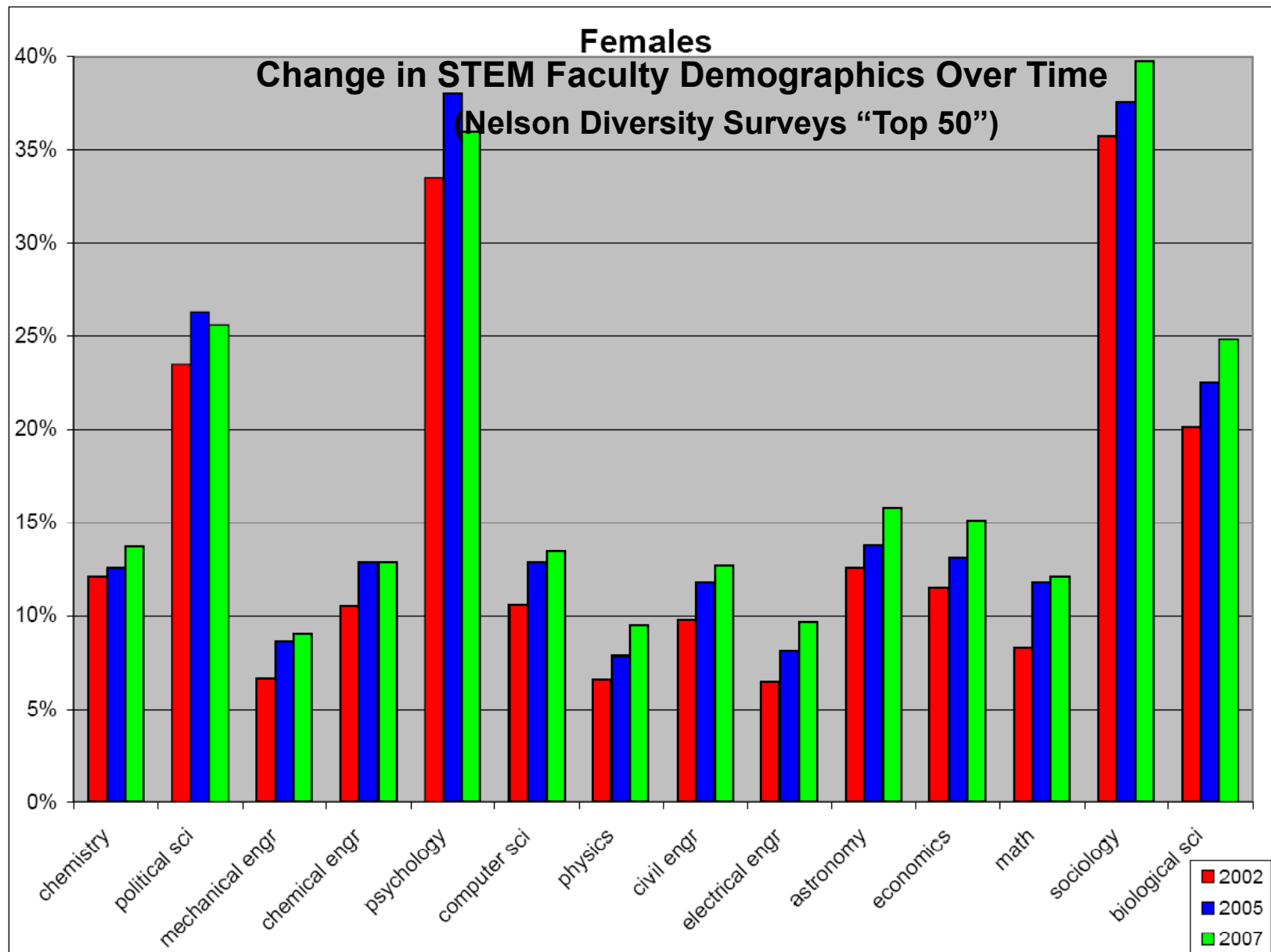
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% Females*

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Astronomy**	41.5%	42.4%	15.2%	22.7%	25.3%	21.6%	12.3%	15.8%
Physics	21.6%	21.1%	10.8%	14.3%	17.5%	12.6%	6.8%	9.5%
Chemical Engr	35.6%	36.7%	17.1%	23.7%	23.7%	17.8%	8.3%	12.9%
Civil Engr	24.1%	23.9%	12.7%	22.0%	25.3%	14.3%	7.1%	12.7%
Electrical Engr	14.0%	12.9%	8.6%	12.3%	14.5%	14.1%	6.2%	9.7%
Mechanical Engr	13.7%	13.2%	7.3%	8.4%	18.2%	12.0%	4.9%	9.0%
Economics	32.5%	31.5%	25.7%	30.2%	30.7%	16.0%	8.5%	15.1%
Political Science	51.1%	51.0%	32.8%	38.9%	35.9%	30.1%	17.4%	25.6%
Sociology	71.5%	70.5%	53.4%	60.8%	57.9%	45.6%	28.0%	39.7%
Psychology	77.8%	77.8%	59.1%	67.8%	44.9%	41.9%	29.9%	36.0%
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http://www.census.gov/popest/national/asrh/NC-EST2006-srh.html
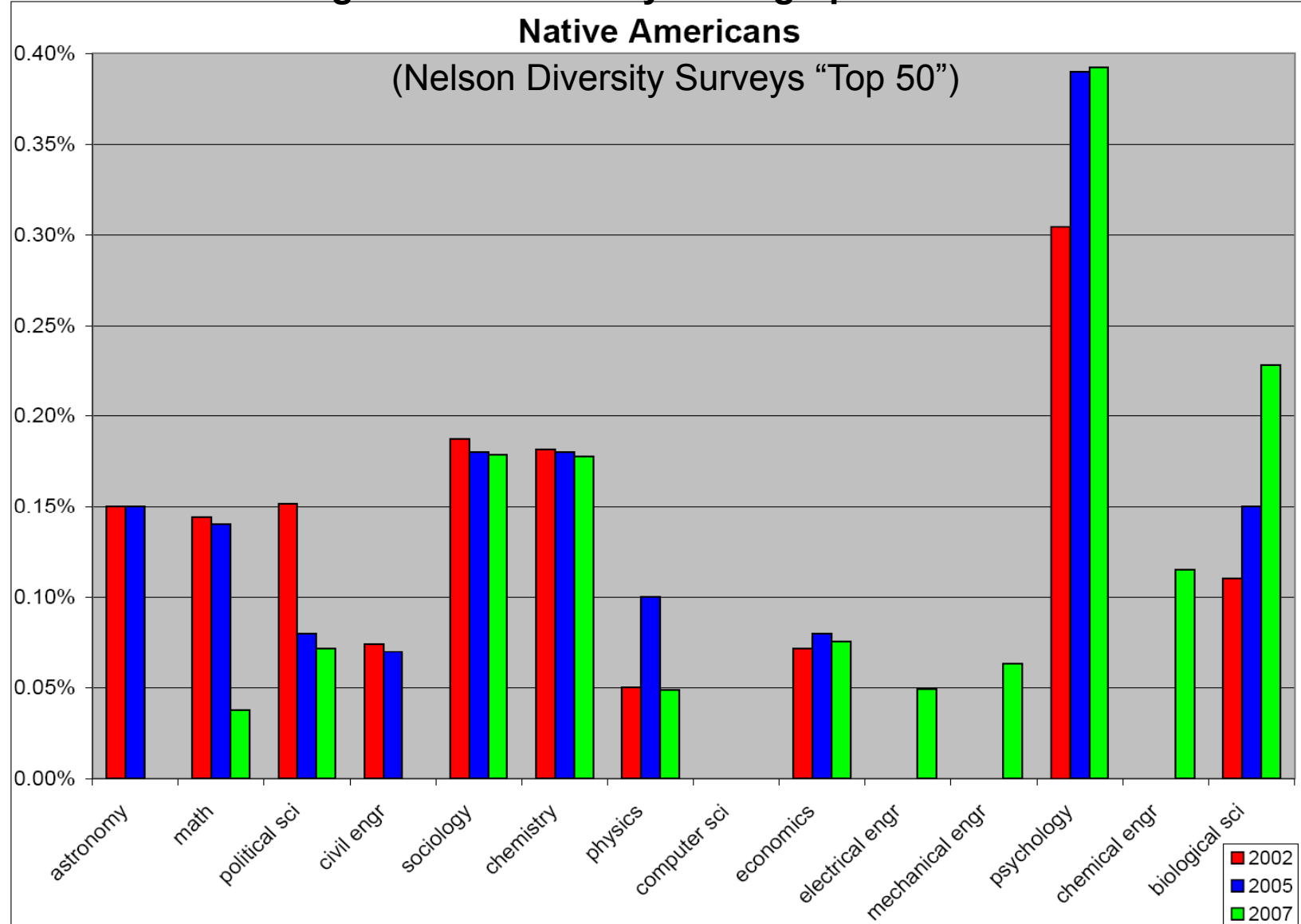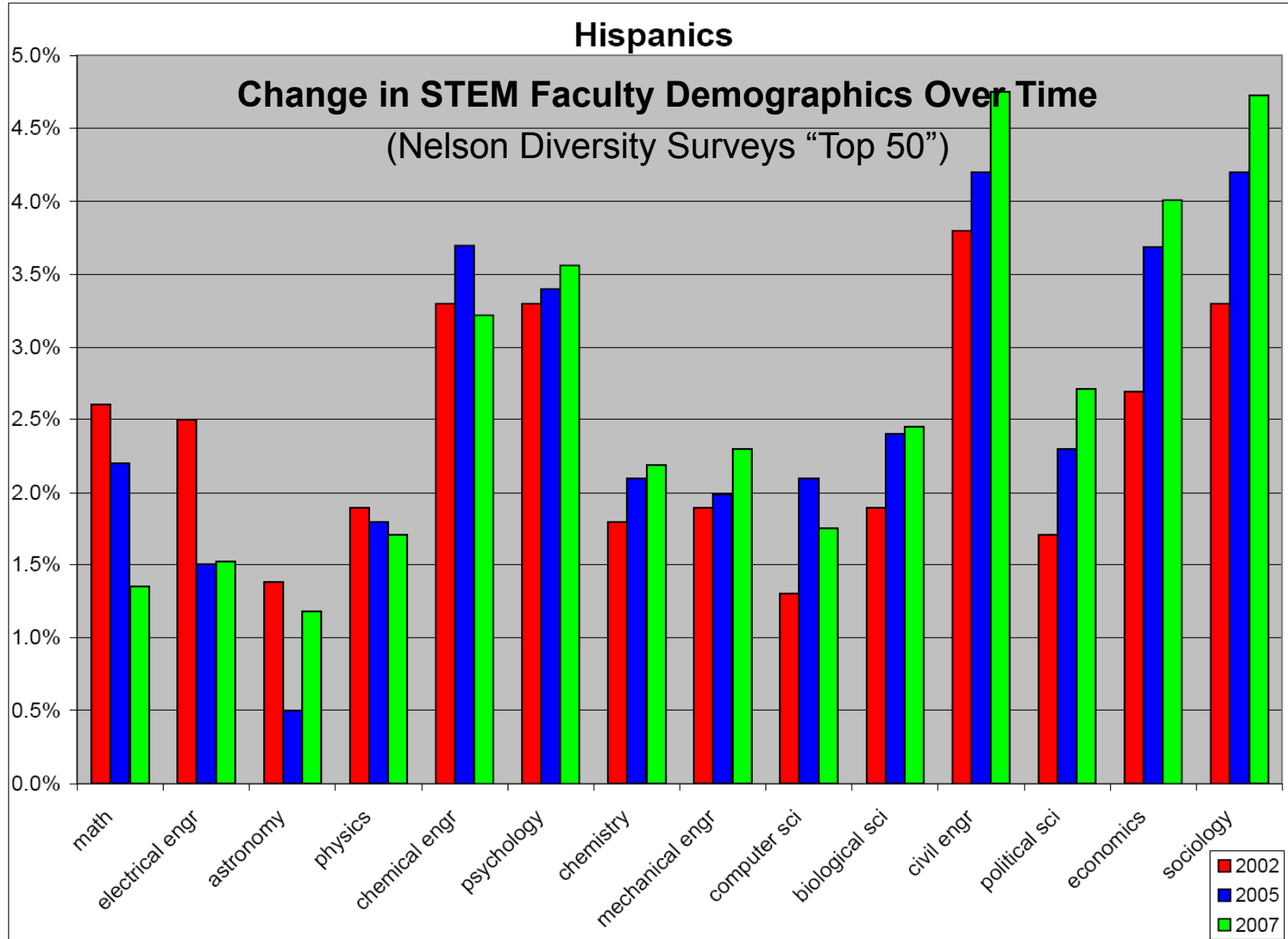
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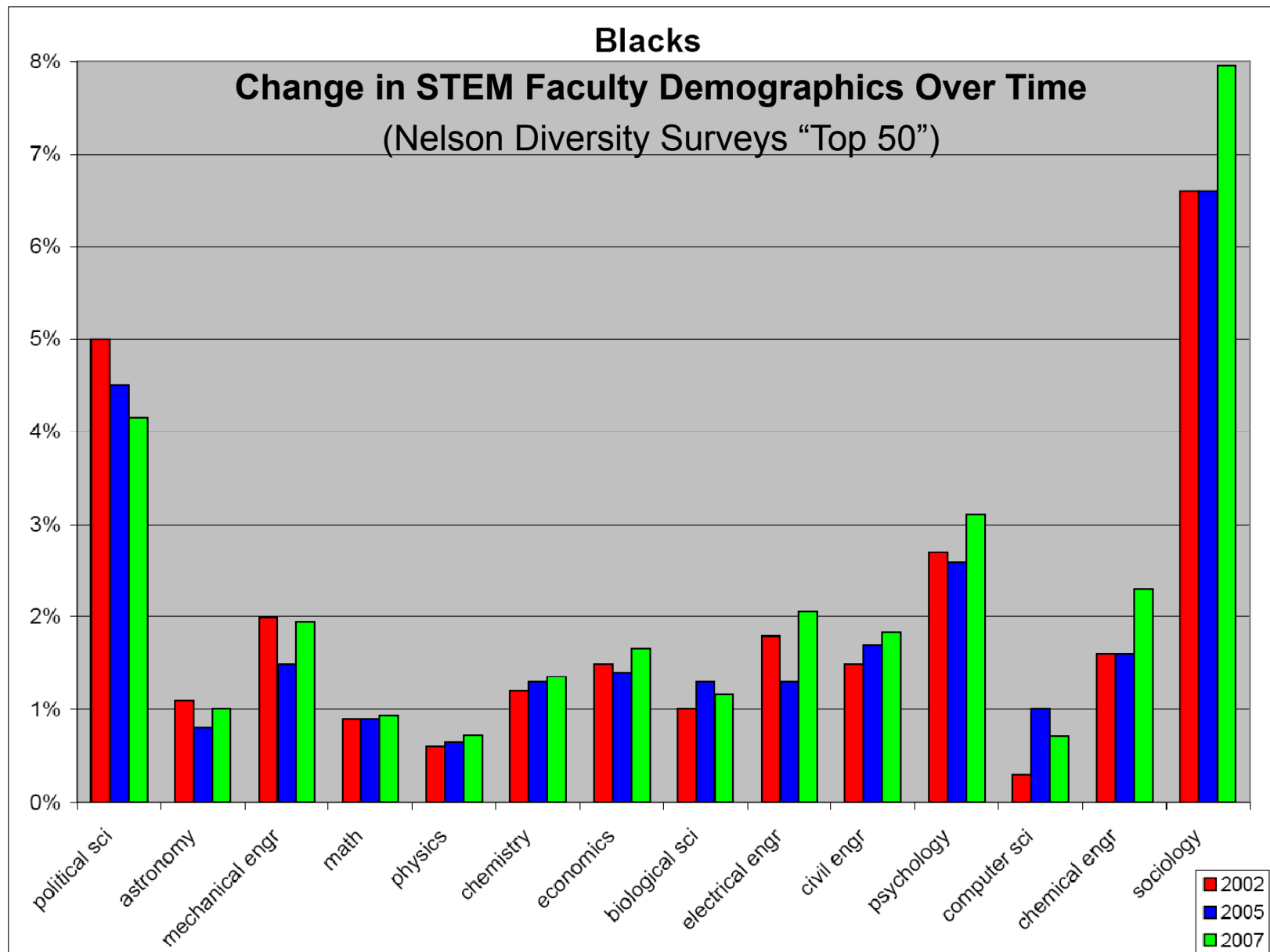# Track representation of women and URM STEM faculty through time
2002 -2007

Although "top 50" departments differed among years, data were checked to insure that percentages of URMs did not differ significantly than if the original "top 50" departments had been used.
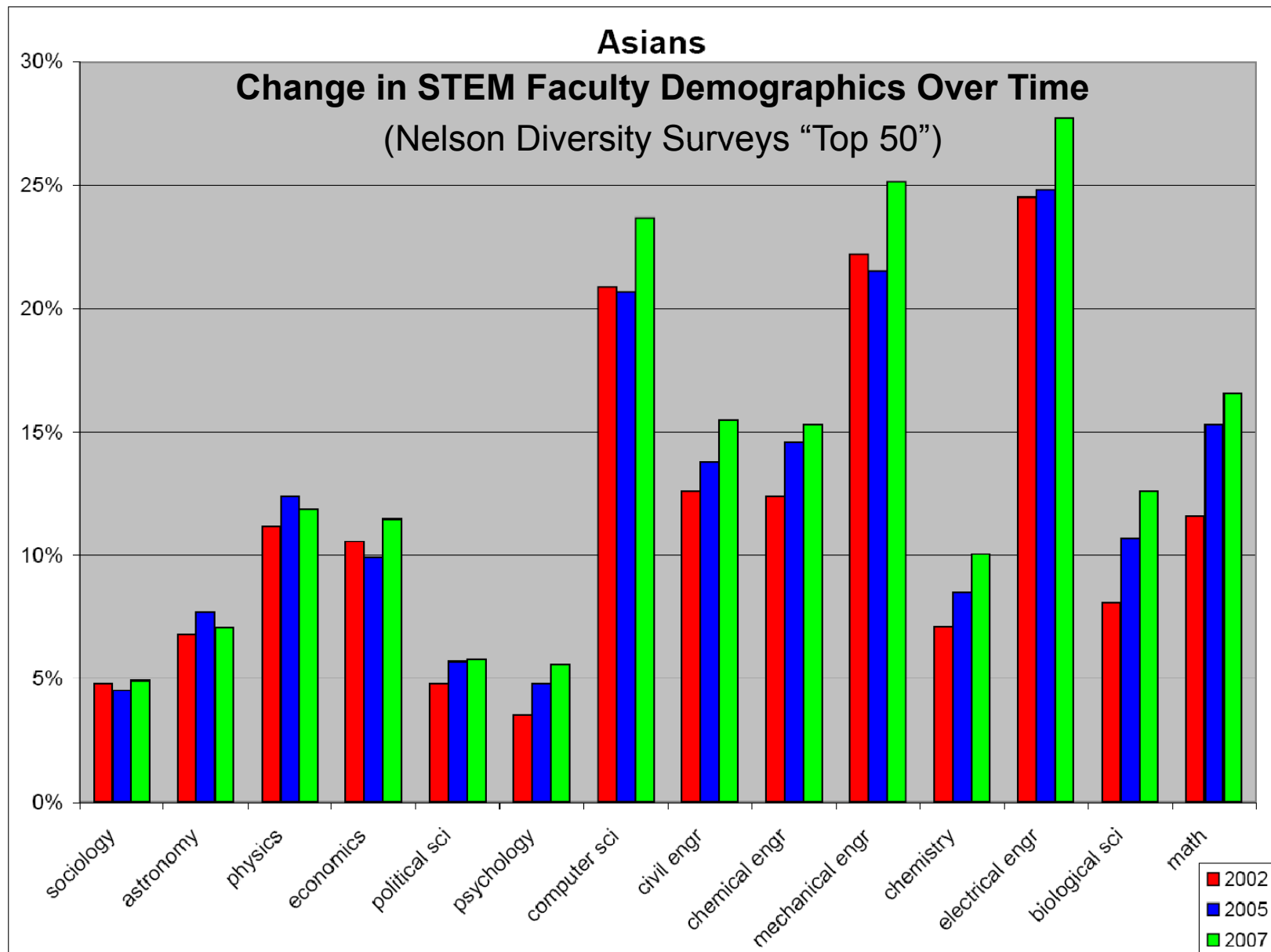
Females
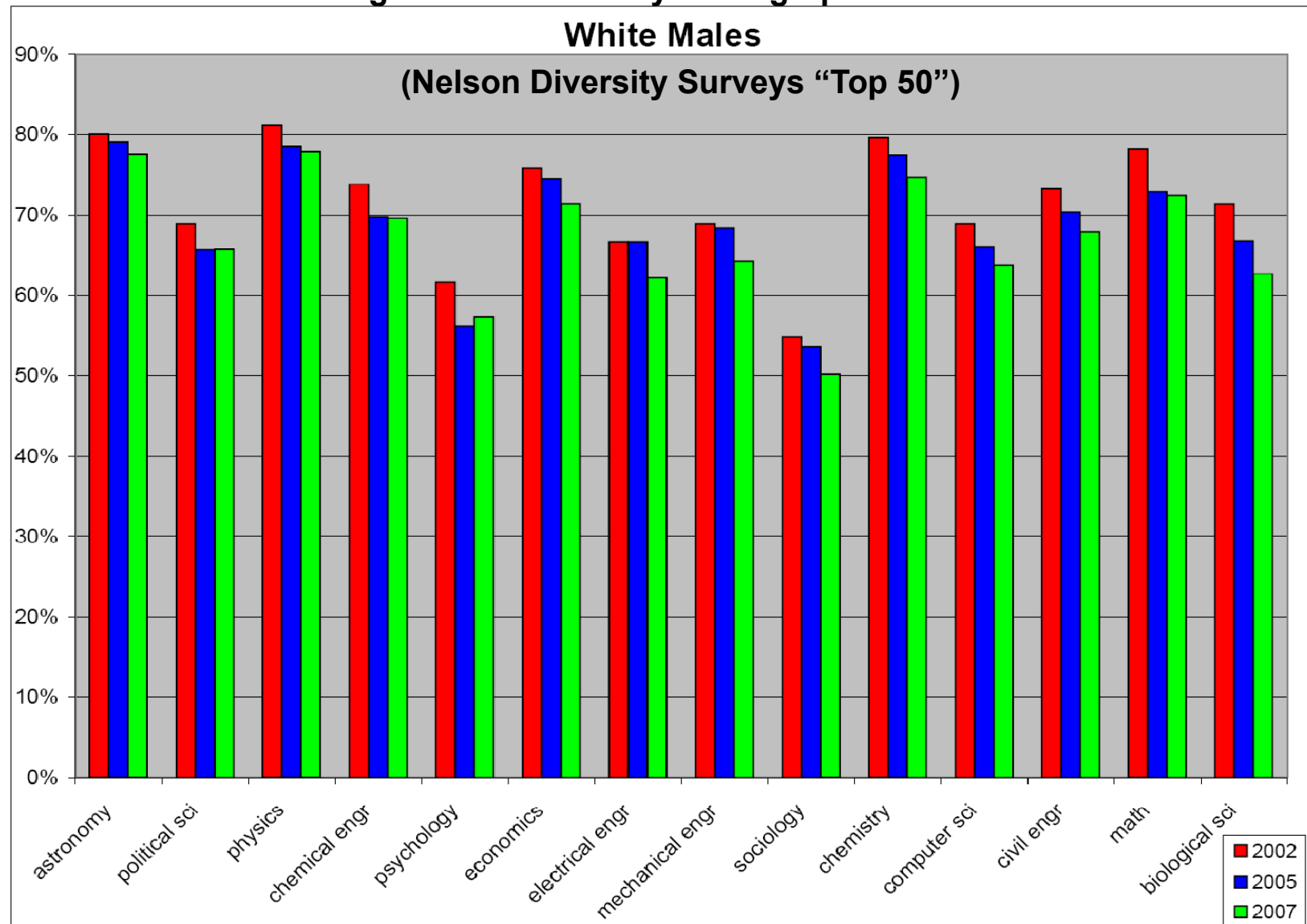Change in STEM Faculty Demographics Over Time
(Nelson Diversity Surveys "Top 50")

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Change in STEM Faculty Demographics Over Time

Native Americans
(Nelson Diversity Surveys "Top 50")

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Hispanics

Change in STEM Faculty Demographics Over Time
(Nelson Diversity Surveys "Top 50")

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Blacks
Change in STEM Faculty Demographics Over Time
(Nelson Diversity Surveys "Top 50")

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Asians
Change in STEM Faculty Demographics Over Time
(Nelson Diversity Surveys "Top 50")

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Change in STEM Faculty Demographics Over Time
White Males
(Nelson Diversity Surveys "Top 50")

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Acknowledgements

ADVANCE LEADERSHIP AWARD

MIT MLK Visiting Professor

UT-Austin OU Big 12 Faculty Fellow

http://chem.ou.edu/~djn/djn.html

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