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**Gender Differences at Critical Transitions in the Careers of  
Science, Engineering, and Mathematics Faculty.  
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This report is in one sense a cause for optimism. It suggests that for some women in science and engineering in American research-intensive universities formal processes are generally equitable and sometimes operate in their favour. Unfortunately the report fails to capture the experience of those who leave, those who are not on tenure-track paths, those who are part-time and those who do not work in research-intensive institutions or who work in industry.

The study builds on the US National Academies significant body of work on the status of women academics in science and engineering in the U.S. The Committee on Gender Differences in Careers of Science, Engineering, and Mathematics Faculty co-chaired by Professors Canizares (MIT) and Shaywitz (Yale) was asked by Congress to 'conduct a study to assess gender differences in the careers of science, engineering, and mathematics (SEM) faculty, focusing on four-year institutions of higher education that award bachelor's and graduate degrees' (p.vii).



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The committee aimed to update earlier analyses, identify and assess current gender differences and make recommendations to expand knowledge of gender in academic careers in science and engineering. To this end two national surveys were conducted in 2004 and 2006 in six science and engineering disciplines: biology, chemistry, civil engineering, electrical engineering, mathematics and physics. The first survey of 500 departments focused on hiring, tenure and promotion processes (processes under the control of institutions) and the second survey, which looked at departmental characteristics and employment experiences, involved 1,800 faculty. Expert testimonies were also taken and relevant data considered. It is important to note that 'only full-time, regularly appointed professorial faculty who are either tenure eligible or tenured are included in the faculty survey' (p.3).

Following a summary of key findings and brief overview of the status of women in academic science and engineering (2004-2005) the report is structured around findings on academic hiring, organisational culture, and tenure and promotions.

Like the groundbreaking 1999 MIT [\*Study on the Status of Women Faculty in Science at MIT\*](#) and the more recent Committee on Science, Engineering and Public Policy (COSEPUP) report (2007) [\*Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering\*](#) this committee 'found evidence of the overall loss of women's participation in academia' (p.4). However, in contrast to the COSEPUP conclusion that women are lost at every educational transition and that accumulation of disadvantage becomes more acute in more senior positions, this study concludes that 'at many critical transition points in their academic careers women appear to have fared as well in the disciplines and type of institutions studied and they have comparable access to many types of institutional resources' (p.4). A key finding is that 'men and women faculty in science, engineering, and mathematics have enjoyed comparable opportunities within the university, and gender does not appear to have been a factor in a number of important career transitions and outcomes' (p4).

Does this report then offer important new evidence and perspectives not captured by previous studies? Do America's women scientists and engineers see themselves in this largely non-gendered world of academic work?

The reviewer can't help but conclude that the very scale, and therefore limited capacity for detailed and nuanced data collection and analysis, obfuscates rather than elucidates women scientists' career experiences. This is reinforced by critical omissions that need to be emphasized. Firstly, women accounted for only 17% of tenure-track and tenured positions in the departments surveyed and in each discipline this was lower than the percentage of PhDs awarded to women (p.5). The report thus reinforces the concept of a post-doctoral 'tipping-point', but those who have exited the academy or are on non-tenure tracks are not included in the study. Moreover, women were underrepresented among candidates for tenure relative to the number of female assistant professors, particularly in the fields in which they accounted for the largest share of the faculty – biology and chemistry (p.11). In this context the report acknowledges the need for further research to generate deeper understanding of career paths (p.13) and reads as if it is a baseline study for that more comprehensive research.

Important insights elicited from the study include the fact that 'the appearance of a women-friendly environment' (p.50), as evidenced by the percentage of women on the search committee, and whether a woman chaired the search had a significant effect on recruiting women, in contrast to most institutional and departmental strategies for increasing the percentage of women in the applicant pool (p.50). Once women apply for a position at a research-intensive university, their chances of success are disproportionately high (p61). There is also a contribution to the small but growing body of quantitative evidence on the value of mentoring, in that female assistant professors who had a mentor had a higher probability of receiving grants than those who did not have a mentor (p10).

In a study full of surprises, unsurprisingly and consistent with work on gender-pay equity, this study finds that male full professors earn about 8% more than female full professors (p.104). However, there was no significant difference found between the salaries of male and female faculty at the associate professor or assistant professor levels in terms of base salary. Whilst there is much additional research to be done in this space early indicators of some international data suggest that base salaries may be an inadequate indicator and salary differences may accumulate through performance and other discretionary payments. This study only looked at travel grants in this latter category.

The comprehensive appendixes contain a wealth of data and also the survey instruments: the Faculty Hiring, Tenure and Promotion Questionnaire and the Faculty Questionnaire. Elements of these instruments provide important indicators of how the data collection has framed the report outcomes – an important level of transparency. For example, the report finds that there is little evidence overall that men and women spend different percentages of their time on teaching, research and service. This is an area where detailed disciplinary based work provides evidence of highly nuanced but important differences around the questions of exactly what research, what types of teaching and what is acknowledged as service (especially when self-reported). The instruments, and also the framing of the study, reinforce what most work in equity in higher education confirms – that in formal processes and outcomes universities are high performers. This contrasts with the evidence that the academy remains highly gendered and that this dynamic is played out in numerous subtle and cumulative ways that narrow women's choice and reinforce historic workforce patterns.

This study does not ask the right questions of the right people to illuminate the experience of gendered career paths. If it is intended as a baseline study it is a pity that there has been so little referencing of the international work on the gendered nature of the academy, which might have tempered some of the, perhaps premature and at times, if not carefully contextualized, quite misleading, conclusions.