

ADVANCE PROGRAM

Analysis of Trends in Faculty 2001-02 to 2007-08

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EXECUTIVE SUMMARY

The University of California, Irvine has made significant progress in institutional transformation as a National Science Foundation (NSF) ADVANCE campus between 2001 and 2008. During this period, we observe diversification in the professoriate within STEM-intensive schools especially regarding the presence of women faculty. This study examines the recruitment and advancement of women faculty and it assesses salary equity. Data sources for the analysis of these indicators of institutional transformation include UCI's Academic Personnel System, the Survey of Earned Doctorates (SED), and the Integrated Postsecondary Education Data Systems (IPEDS). The data from IPEDS and other sources made possible an objectively constructed institution level comparison group, which consists of two members from the American Association of Universities. Striving to analyze gender equity in various outcomes, the statistical results reported in this study are predominantly descriptive and nonparametric in nature that are derived from procedures including the two independent samples test and the one sample t-test. Those results serve to portray the overall trend toward gender parity between AY 2001-02 and AY 2007-08 and to highlight the differences between various sets of groups in any of those academic years. The last analytic section of this report examines female salaries in relation to male salaries through its incorporation of male-to-female salary ratios. The report concludes with four recommendations that flow from the analyses discussed within the confines of its pages.

INTRODUCTION AND OVERVIEW

This report analyzes the results of recent strategies at UCI to add females to the ranks of faculty and it presents comparisons across institutions and disciplines and over time. Evidence of UCI's expansion of those frontiers is discernable in light of a few facts. Forty seven percent of its faculty members in service during AY 2007-08 arrived after 1999. In addition, the composition of new faculty members suggests there is a trend toward inclusiveness especially along the lines of gender. For instance, the presence of females entering into faculty ranks at UCI appears more consistent with the pool of doctoral degree recipients in recent times than that seen in the last decade.

In terms of doctoral degrees conferred in the United States, women earned about 37 percent of them in 1999 and about 46 percent of them in 2007 according to the Survey of Earned Doctorates (SED). That increase in the availability of females among new hires at the national level provides a partial explanation for some trends found at UCI. In terms of female presence at UCI, the overall proportions of faculty who are female grew substantively from 22 percent in AY 2001-02 to 48 percent in AY 2007-08.

As another matter of historical context, it is important to note that UCI was beginning to pursue its successful application for funding from the National Science Foundation's Institutional Transformation program and its organization of the Advance Program, which provides a variety of services designed to address gender equity with participation through a number of schools. That set consists of the College of Health Sciences (basic sciences within the School of Medicine); the Donald Bren School of Information and Computer Sciences; the Henry Samueli School of Engineering; the Paul Merage School of Business; the School of Biological Sciences; the School of Social Ecology; the School of Physical Sciences, and the School of

Social Sciences. In addition, UCI-funded arrangements extend participation in the Advance Program to the Claire Trevor School of the Arts and the School of Humanities.

This report contains the results of analyses of those schools participating in the Advance Program during AY 2007-08. Readers of this report will find its analytic segments covering gender equity as it pertains to recruitments, promotion, attrition, and salary. The first stage of analysis involves external-oriented comparisons across a couple other institutions on a set of measures. Institutional comparisons occur along the lines of female presence among academic ranks in the hiring of Assistant Professors and female salaries in relation to male salaries.

Comparisons and contrasts of those entrants occur by externally relating UCI to those other institutions and by internally examining its and their female presence against the Survey of Earned Doctorates. In addition, the analysis of new hires at UCI involves examining the progression of two cohorts of female faculty members. Specifically, those cohorts consist of faculty who recruited by UCI during Academic Years 1998-99 or 2001-02 and who became members of departments attached to aforementioned STEM set schools or the Arts & Humanities' set of schools. Analyses of those cohorts include examining them at their first year and again at the sixth year of service to UCI with respect to an array of variables. Examinations hiring, promotion, attrition, and salary associated with those cohorts proceed by analyzing group-based differences and patterns across various points of time.

As they move through this report, readers will find references to trends and changes in the presence of females in the set of comparisons of UCI to Pennsylvania State University (PSU) and to The University of California-Los Angeles (UCLA). Furthermore, in terms of patterns within UCI, there were remarkable gains in the STEM aggregate and remarkable losses in the Arts and Humanities aggregate. In order to shed more light on those changes, this report

includes a longitudinal and cohort-based comparative analysis of those two aggregates in terms of hiring, promotion, attrition, and salary patterns. In addition, as noted above, this report includes analyses of trends within various levels of aggregation and of differences between those aggregates all the while describing gender equity as it pertains to the aforementioned patterns. In doing so, the analyses draw from internal and external data sources.

Data Sources and Usage

Sources of data for this report include extracts taken from UCI's Academic Personnel System (APS; from the Advance Program staff), the Survey of Earned Doctorates (SED), and a data repository from the United States Department of Education called the Integrated Postsecondary Education Data System (IPEDS); both latter sources were obtained over the Internet by the research consultant. An additional source is the consultant's own database, which facilitated the selection of two institutions for comparison to UCI. The next section provides some details on the methods adopted in that selection process and it describes some content of the database.

The two institutions noted above provide comparative publicly available data for use in analyzing gender equity at UCI. The research consultant accessed two sources of data in determining which institutions will serve as comparisons. In accordance with agreement provisions, this project includes UCLA, which is a member of the University of California system, and PSU, which is also a member of the American Association of Universities. These reputable doctorate granting, research intensive institutions met various criteria for their selection and they essentially provide another base against which to develop a profile of trends in faculty between AY 2001-02 and AY 2007-08. In other words, this comparison group is instrumental

and instructive in the first of a successive set of analytic steps in assessing outcomes such as the number of women, their pay relative to men, and their status in terms of rank, promotion, and attrition. Most importantly, the comparison group will provide a means with which to portray the Advance Program and to evaluate its contributions to gender equity.

In consideration of specific results from those comparative analyses, it is important to examine the extent to which hiring of females into tenure track assistant professor positions at UCI corresponds with the overall availability of women at the national level. Furthermore, one way to view that academic labor market is in terms of the demand for and the supply of new entrants. On the supply side of the labor market equation, the SED provides data on individuals who earned a doctorate degree in a given year. On the other side of the labor market equation, the demand for faculty originates primarily through the enrollment of students, the research and development initiatives of faculty and their institutions, and the activities of various parties that provide federal domestic assistance and address societal needs.

As it engages partially in an analysis of the correspondence between supply and demand, this project involves examinations of data for 2002 and 2007 and many of the years between those two bookends. A summary tabulation for these two years was readily available for use in this project and matches precisely key points in the advent and operation of the Advance Program. The 2002 SED, for instance, collected data on those who graduated between July 1, 2001 and June 30, 2002, which corresponds with hiring plans and actions for Academic Year 2001-02; the year of Program inception. Likewise, the tabulation for 2007 coincides with the endpoint of this analysis of trends in the recruitments of females into full-time faculty positions within specific schools at UCI. Integrating the data provided by SED, IPEDS, and UCI also

paves the way for comparisons on the gender compositions of both the new doctoral degree recipient pools and the new hire pools at UCI, UCLA, and PSU for 2002 and 2007.

Gender Equity and New Hires at UCI

How well does UCI's recruitment of new Assistant Professors who are female track with the data on doctorate degree recipients? Answers to that question reside with the evidence in Table 1 and in Table 2. Suggesting close alignments exist at multiple levels, those tables describe the presence of females among new hires at UCI in relation to females who are available nationally for recruitment into faculty rank by virtue of their receipt of an earned doctorate degree during the applicable, corresponding timeframes.

The broadest level of results presented in Table 1 are those campus wide for UCI, which are discussed in detail after coverage of the results specific to the Arts & Humanities aggregate set of schools and to the STEM aggregate set of schools. With reference to the STEM-related set of schools, which appear on first line of that table, the reader will see that 39 percent of doctorate degrees in the U.S.A. went to females in 2002 while 33 percent of new hires at UCI that year were female. With their examination of STEM specific results for 2007, which appear on the first line in the bottom half of the table, the reader will see a smaller difference exists between the percentages for the USA and UCI respectively 40 percent and 38 percent. In short, these results signify favorable outcomes in STEM-related disciplines and schools, as represented by a reduction in those differences from four percent in 2002 to two percent in 2007.

The results in Table 1, which are associated with the Arts and Humanities group of schools, stand in contrast to those for the STEM group. A favorable difference in 2002 of eight percent (50 percent versus 58 percent) grew into an unfavorable difference in 2007 of 12 percent (49 percent to 37 percent). A similar trend was observed for the Science and Engineering group.

Table 1: Comparisons on Expected and Actual New Hires of Females into Assistant Professor Rank

	SED		UCI		Differences		
	Total	% Female	Total	% Female	Pct.	Chi-Sq.	Sig.
	2002						
STEM Fields	25,943	39%	30	33%	-6%	0.41	.53
Science & Engineering	19,130	34%	16	37%	3%	0.09	.77
Arts & Humanities	5,211	50%	12	58%	8%	0.33	.56
All Fields	39,943	45%	43	40%	-5%	0.52	.47
	2007						
STEM Fields	33,565	40%	37	38%	-2%	0.07	.79
Science & Engineering	26,379	35%	23	26%	-9%	0.80	.37
Arts & Humanities	5,103	49%	8	37%	-12%	na	na
All Fields	48,025	46%	53	47%	1%	0.01	.92

Notes: SED is abbreviation for Survey of Earned Doctorates; "na" indicates cells with less than five cases; SED represents expected presence of female new hires.

Considering the campus wide results, it is clear that UCI experienced a more representative presence of females between 2002 and 2007. For instance, the five percent deficit in 2002 (SED's 45 percent versus UCI's 40 percent) emerges as a one percent surplus (SED's 46 percent versus UCI's 47 percent) in 2007. It is reasonable to conclude that the six percent gain in STEM-related hires between 2002 and 2007 contributed to that favorable trend. At this point, the discussion will turn away from comparisons between UCI and the SED and toward comparisons of UCI to the two institutions noted above.

In terms of institution-based percentages for females hired in 2001, Table 2 provides data showing Penn State at 40 percent, UCLA at 21 percent, and UCI at 22 percent; data for 2002 are unavailable from IPEDS for one or more institutions prompting the consultant to use 2001 as the first year against which to conduct the next set of analyses. It is also important to note that 2001 coincides with the inception of the NSF-funded Advance Program. As noted in the lower section of Table 2, the difference of 18 percent in 2002 between UCI and Penn State bears statistical significance. However, the difference of 8 percent in 2007 between those two institutions is not statistically significant. This finding suggests there is convergence between the two institutions on the portion of females being hired as new full-time non-tenured tenure track faculty members, in part, reflecting remarkable gains in the presence of females among UCI's recruitments.

The percentage of females hired at UCI grew from 22 percent in 2001-02 to 48 percent in 2007-08. That gain of 26 percent provides some evidence of progress toward gender parity in UCI's recruitments of female faculty members. In comparison to Penn State's recruitments of female new hires, an 18 percent difference between Penn State and UCI in 2001-02 became a 4 percent difference by 2007-08. This finding attests to the current comparability between PSU and UCI.

Table 2: Comparisons of Female Presence in New Non-tenured Tenure-track Faculty

	2001-02		2007-08		Change in
	Total	% Female	Total	% Female	% Female
Univ of CA - Irvine	41	22%	44	48%	26%
Univ. of CA - L.A.	29	21%	26	35%	14%
PA State University	58	40%	55	44%	4%

Within Year Comparisons to UCI

	Chi-Sq.	Sig.	Chi-Sq.	Sig.
	Univ. of CA - L.A.	0.01	.92	2.46
PA State University	9.67	.00	0.04	.85

Source: US Department of Education's Integrated Postsecondary Education Data System (IPEDS)

Remarkable progress occurred over that five-year period at the comparative institution level and within UCI in all three levels of aggregation presented above in Table 2. Furthermore, it is worthwhile to glance at the minimal difference that existed in 2002 between UCLA and UCI and the size of that difference in 2007. Moreover, UCI is the only institution listed in this set of three to receive the IT grant from NSF. In other words, the grant-induced Advance Program appears to be a plausible explanation for the aforementioned favorable trends and comparisons in female hiring at UCI.

Some descriptions of other recruitment trends and comparisons are worthy of mention, as the reader's attention is turned to analyses of gender-based differences within the STEM group of schools. Statistically significant differences at the .05 level are evident with regard to the ranks into which males and females are hired. During the period between AY 2001-02 and AY 2007-08, seventy-seven percent of the females that began service to UCI in the STEM group of schools did so at the assistant professor rank whereas it was sixty-seven percent for males. The incidence of beginning service at the associate level was 16 percent for females and 20 percent for males. In addition, during that same period, the incidence of beginning service as a full professor was 12 percent for females and 20 percent for females.

Those statistically significant percentages coincide around the time of Advance Program inception and the NSF award receipt. Consider the following years and incidence of initial rank for new recruits. Of those hired into full-time faculty positions within STEM schools for AY 2001-02, the incidence of being an associate professor at the onset was 33% for females and 5% for males. For AY 2002-03 recruits, that incidence was 0% or nil for females and 14% for males; in terms of starting as a full professor on day one that year, it was nil for females and 24 percent for males. For AY 2004-05, the incidence of starting service as an assistant professor

was 88% for females and 62% for males; into full rank, it was 6% percent for females and 31 percent for males. In sum, males began service in ranks higher than females during the early years of the Advance Program.

These patterns in recruitment may relate to the overall presence of females across ranks at UCI. Furthermore, as a matter of providing background and context, a larger need exists to consider that presence across ranks at UCLA and at Penn State. Table 3 provides institutional comparisons on the presence of females.

One of the first items to note is that UCI leads the pack with respect to gains in the percentages of rank that are occupied by female faculty members. The last column on the right-hand side of the table presents those gains. Between 2001 and 2007, there was a 12- point increase in the percentages of female assistant professors reflecting movement from a 31 percent presence to a 43 percent presence for that rank. In addition, considering all ranks combined, UCI gained six points in the presence of females over that same six-year span of time.

As one attends to those growth patterns, it is also important to note the comparable levels in the presence of females across ranks among the three institutions at the beginning of that referent timeframe. For example, female presence among assistant professors ranged from 31 percent to 40 percent, 33 percent to 35 percent among associate professors, 13 percent to 19 percent among full professors, and 23 percent to 26 percent among all ranks combined. In essence, some of the content in Table 3 relates to content from Table 1 and Table 2 merely reflecting the facts that females comprised 26 percent of UCI's new hires overall (recall Table 2) and 38 percent of the new hires into STEM (recall Table 1). In sum, those trends point toward the effect of external and internal resource allocations on female presence. Two cohorts of new hires are the subjects of analyses in the next section in its focus on promotion and attrition.

Table 3: Comparisons on Females by Academic Ranks of Full-time Faculty

	2001-02		2007-08		Change in Pct. Female
	Total	Pct. Female	Total	Pct. Female	
Assistant Professors					
UCI	189	31%	233	43%	12%
UCLA	238	32%	242	38%	5%
PSU	425	40%	365	46%	6%
Associate Professors					
UCI	172	34%	241	37%	3%
UCLA	283	35%	280	33%	-1%
PSU	549	33%	545	36%	3%
Full Professors					
UCI	445	17%	541	21%	4%
UCLA	1,132	19%	1,171	23%	4%
PSU	741	13%	801	19%	6%
All Ranks Combined					
UCI	806	24%	1,015	30%	6%
UCLA	1,653	23%	1,693	27%	3%
PSU	1,715	26%	1,711	30%	4%

Source: IPEDS

Promotion and Attrition

This and subsequent sections provide information portraying the overall trend toward gender parity between AY 2001-02 and AY 2007-08 and the differences between various sets of groups in any given academic year. Furthermore, one level of those portrayals focuses on gender-oriented differences within the STEM group of schools and another level focuses on female-oriented differences between the STEM group and the Arts and Humanities group of schools. Moreover, organization of the analyses within each level tends to compare and to contrast two cohorts of new hires.

With consultation from key staff of the Advance Program at the onset of this research project, the decision was focus on one set of individuals who began service at the Assistant Professor rank for Academic Year 1998-99 and another set of individuals who began service at that rank for AY 2001-02. The analyses begin by examining patterns in promotion and attrition that occurred during their first six years at UCI.

Promotion from assistant professor to associate professor is of analytical interest fitting the grant's baseline and timeline and other purposes. The understanding of this research consultant is University policy specifies attainment of that promotion within six to eight years from the hire date. However, the dataset under analysis is current through AY 2007-08, which represents the sixth year of service for the AY 2001-02 cohort of new hires. In order to examine various patterns in a way that provides reasonable comparability, the analyses examine the first six years of service for the AY 1998-99 cohort of new hires.

This consultant's identification and tracking of the individuals within those cohorts was possible through extracts from UCI's Academic Personnel System. The consultant received those extracts from program staff. Tables 4a and 4b provide data for the next set of analyses.

Table 4a: Details on Cohorts of Female Faculty Hired as Full-time Assistant Professors into Arts & Humanities' and STEM Schools

Cohort	Group	School	Department	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6
1998-99	A & H	ARTS	DANCE	SAS	SAS	SAS	SAS	PAO	SAO
		HUMANITIES	AFRICAN AMERICAN STUDIES	SAS	SAS	SAS	SAS	SAS	SAS
			ENGLISH	SAS	SAS	SAS	L	.	.
	STEM	COHS	FILM AND MEDIA STUDIES	SAS	SAS	SAS	SAS	SAS	PAO
			PROGRAM IN PUBLIC HEALTH	SAS	SAS	SAS	SAS	SAS	SAS
		ENGINEERING	CIVIL & ENVIRONMENTAL ENGR	SAS	SAS	SAS	SAS	SAS	PAO
		ICS	CS - SYSTEMS	SAS	SAS	SAS	SAS	SAS	PAO
			INFORMATION & COMPUTER SCI	SAS	SAS	SAS	SAS	SAS	L
		PHYSICAL SCIENCES	EARTH SYSTEM SCIENCE	SAS	SAS	L	.	.	.
		SOM (BASIC SCIENCE)	ANATOMY & NEUROBIOLOGY	SAS	SAS	SAS	SAS	SAS	SAS
2001-02	A & H	ARTS	DRAMA	SAS	SAS	SAS	SAS	SAS	PAO
		HUMANITIES	CLASSICS	SAS	SAS	SAS	SAS	SAS	SAS
			COMPARATIVE LITERATURE	SAS	SAS	SAS	SAS	SAS	SAS
	STEM	ENGINEERING	FILM AND MEDIA STUDIES	SAS	SAS	SAS	SAS	SAS	SAS
			SPANISH & PORTUGUESE	SAS	SAS	SAS	SAS	SAS	PAO
		SOCIAL ECOLOGY	CIVIL & ENVIRONMENTAL ENGR	SAS	SAS	SAS	SAS	SAS	SAS
		SOCIAL SCIENCES	CRIMINOLOGY, LAW & SOCIETY	SAS	PAO	SAO	SAO	SAO	SAO
			CHICANO/LATINO STUDIES	SAS	SAS	SAS	SAS	PAO	SAO
		SOCIOLOGY	SOCIOLOGY	SAS	SAS	SAS	SAS	SAS	PAO

Notes: Key: same (S) rank as previous year; promotion (P); left (L); Assistant (AS) Professor; Associate (AO) Professor

Source: Academic Personnel System's Snapshot Data

Table 4b: Details on Cohorts of Faculty Hired into STEM Schools as Full-time Assistant Professors for AY 1998-99 & AY 2001-02

Cohort	School	Department	Sex	YR1	YR2	YR3	YR4	YR5	YR6		
9899	BIOLOGICAL SCIENCES	DEVELOPMENTAL & CELL BIOLOGY	M	SAS	SAS	SAS	SAS	SAS	PAO		
		ECOLOGY & EVOLUTIONARY BIOLOGY	M	SAS	SAS	L	.	.	.		
		MOLECULAR BIO & BIOCHEMISTRY	M	SAS	SAS	SAS	SAS	PAO	SAO		
	COHS	PROGRAM IN PUBLIC HEALTH	F	SAS	SAS	SAS	SAS	SAS	SAS	SAS	
		CIVIL & ENVIRONMENTAL ENGR	F	SAS	SAS	SAS	SAS	SAS	SAS	PAO	
		ELECTRICAL ENGR & COMPUTER SCI	M	SAS	SAS	L	.	.	.		
	ICS	MECHANICAL & AEROSPACE ENGR		M	SAS	SAS	SAS	SAS	PAO	SAO	
				M	SAS	SAS	SAS	SAS	SAS	SAS	
				M	SAS	SAS	SAS	SAS	PAO	SAO	
		PHYSICAL SCIENCES	CS - SYSTEMS	F	SAS	SAS	SAS	SAS	SAS	SAS	PAO
			INFORMATION & COMPUTER SCI	F	SAS	SAS	SAS	SAS	SAS	SAS	L
			EARTH SYSTEM SCIENCE	F	SAS	SAS	L	.	.	.	
SOCIAL ECOLOGY	PLANNING, POLICY & DESIGN	M	SAS	SAS	SAS	PAO	PAO	SAO	SAO		
	SOCIOLOGY	M	SAS	SAS	SAS	SAS	SAS	SAS	PAO		
SOM (BASIC SCIENCE)	ANATOMY & NEUROBIOLOGY	F	SAS	SAS	SAS	SAS	SAS	SAS	SAS		

Notes: Key: same (S) rank as previous year; promotion (P); left (L); Assistant (AS) Professor; Associate (AO) Professor
 Source: Academic Personnel System's Snapshot Data

Table 4b: Details on Cohorts of Faculty Hired into STEM Schools as Full-time Assistant Professors for AY 1998-99 & AY 2001-02 (cont)

Cohort	School	Department	Sex	YR1	YR2	YR3	YR4	YR5	YR6
0102	BIOLOGICAL SCIENCES	ECOLOG & EVOLUTIONARY BIOLOGY	M	SAS	SAS	SAS	SAS	SAS	PAO
		MOLECULAR BIO & BIOCHEMISTRY	M	SAS	SAS	SAS	SAS	SAS	PAO
		NEUROBIOLOGY & BEHAVIOR	M	SAS	SAS	SAS	SAS	SAS	SAS
	ENGINEERING	CIVIL & ENVIRONMENTAL ENGR	F	SAS	SAS	SAS	SAS	SAS	SAS
		ELECTRICAL ENGR & COMPUTER SCI	M	SAS	SAS	SAS	SAS	PAO	SAO
				SAS	SAS	SAS	PAO	SAO	SAO
	ICS			SAS	SAS	SAS	SAS	SAS	PAO
		CS - COMPUTING	M	SAS	PAO	SAO	SAO	PPR	SPR
		CS - SYSTEMS	M	SAS	SAS	SAS	SAS	SAS	SAS
	PHYSICAL SCIENCES			SAS	SAS	SAS	SAS	SAS	SAS
EARTH SYSTEM SCIENCE		M	SAS	SAS	SAS	SAS	SAS	SAS	
MATHEMATICS		M	SAS	SAS	SAS	PAO	SAO	SAO	
SOCIAL ECOLOGY			SAS	SAS	SAS	SAS	SAS	PAO	
	PHYSICS AND ASTRONOMY	M	SAS	SAS	PAO	SAO	SAO	SAO	
			SAS	SAS	SAS	SAS	SAS	PAO	
SOCIAL SCIENCES			SAS	SAS	PAO	SAO	PPR	SPR	
	CRIMINOLOGY, LAW & SOCIETY	F	SAS	PAO	SAO	SAO	SAO	SAO	
	PLANNING, POLICY & DESIGN	M	SAS	SAS	SAS	SAS	SAS	PAO	
SOM (BASIC SCIENCE)	CHICANO/LATINO STUDIES	F	SAS	SAS	SAS	SAS	PAO	SAO	
	ECONOMICS	M	SAS	SAS	SAS	SAS	SAS	SAS	
	LOGIC & PHILOSOPHY OF SCIENCE	M	SAS	SAS	SAS	SAS	PAO	SAO	
SOM (BASIC SCIENCE)	SOCIOLOGY	F	SAS	SAS	SAS	SAS	SAS	PAO	
	BIOLOGICAL CHEMISTRY	M	SAS	SAS	SAS	SAS	SAS	SAS	
			SAS	SAS	SAS	SAS	SAS	PAO	

Notes: Key: same (S) rank as previous year; promotion (P); left (L); Assistant (AS) Professor; Associate (AO) Professor
Source: Academic Personnel System's Snapshot Data

Those analyses examine both the changes within a group and the differences between groups. As mentioned above, two levels of analysis are applicable in examining promotion and attrition. Table 4a presents basic information on male and female faculty members who were hired as full-time assistant professors into the STEM group of schools for either AY 1998-99 or AY 2001-02. Table 4b presents basic information on female faculty members who were hired as same into the STEM group of schools or the Arts and Humanities group of schools for those two academic years.

Analyses of these two cohorts proceeded along various levels of aggregation and comparison in terms of their departures and their promotions from these schools within the University. With close examination of the tables appearing above, the reader will notice that several females gained promotion with first accomplishing it the second year of service to a STEM school. Most promotions occurred in the fourth, fifth, or sixth year and a number of departures occurred beginning with the third year of service. It is also noteworthy that, as of their sixth of service to UCU, no one in the two cohort groups left the University after receiving a promotion.

Table 4c below summarizes those patterns in promotion and attrition. Taking into account the first six years of service, the average rates for promotion and for attrition vary over time and by school and gender within cohorts. Some interesting patterns emerge from that summary when comparing females in the STEM group to those in the Arts and Humanities group. As seen in the upper half of that table, the highest average promotion rate for the 1998-99 cohort occurred in the Arts and Humanities group whereas it occurred in the STEM group for the 2001-02 cohort. However, a different pattern occurred as seen in the lower half of that table in which the comparisons made are between males and females within the STEM group of schools.

As noted in the lower half of Table 4c, promotion rates for males are higher than that for females in both cohorts though the difference in those rates is smaller for the 2001-02 cohort. For instance, there was a 37-point difference in promotion rates between males and females within the STEM group for the 1998-99 cohort. In contrast, there was a 3-point difference in promotion rates between males and females within the STEM group for the 2001-02 cohort. Taking into account the data on these two new hire cohorts, females are essentially gaining promotions at a rate significantly better than those hired in earlier years and at a rate more comparable to the rate experienced by males.

The attrition rates, moreover, are as low as they can go for the AY 2001-02 cohort. In general, the data in Table 4c provide some evidence of program success especially when considering that both the attrition rates are better for the latter cohort and the promotion rates for females in STEM schools went from 33 percent for the 1998-99 cohort to 75 percent for the 2001-02 cohort. Additional unfavorable results are associated with the 1998-99 cohort, as will be seen in the forthcoming section on salary.

In moving toward closure of this section focused on cohorts and their individual members, readers should keep in mind these results emerge from unit level analyses portraying the overall patterns in promotion and attrition, which may or may not be applicable to specific faculty members. In others, readers need to exercise caution and avoid any attempt to generalize from group-based statistics to individual cases. By extension, Tables 4a and 4b are formatted to resemble that in Appendix 4 of NSF's Toolkit and included for the explicit purpose of identifying specific individuals, departments, or schools for closer examination and possible tracking over time.

Table 4c: Promotion and Attrition Rates at Year Six by Cohort and School Group

School Group	Total	Promotions		Attrition	
		No.	Rate	No.	Rate
1998-99					
Arts & Humanities Females	4	2	50%	1	25%
STEM Females	6	2	33%	2	33%
Cohort Totals	10	4	40%	3	30%
2001-02					
Arts & Humanities Females	5	2	40%	0	0%
STEM Females	4	3	75%	0	0%
Cohort Totals	9	5	56%	0	0%
1998-99					
STEM Females	6	2	33%	2	33%
STEM Males	10	7	70%	2	20%
Cohort Totals	16	9	56%	4	25%
2001-02					
STEM Females	4	3	75%	0	0%
STEM Males	23	18	78%	0	0%
Cohort Totals	27	21	78%	0	0%

Source: Data reported in Table 6a, which originates from Academic Personnel System snapshots

Some trends become evident in the overall set of data on promotions as we examine groups of faculty hired in years other than those pertaining to the cohorts. On average, females in the STEM group of schools have four fewer years of service as faculty members than do males in that group; five years less than males hired as assistant professors; four years as associate; three years as a full professor. These averages suggest females are holding higher ranks for shorter periods. Taking into consideration these overall averages along with the specific decrease in promotion rate differentials from Table 4c, one can conclude that women within the STEM group of schools are achieving promotions in a manner more favorable in the near term than the distant term relative to males within the STEM group of schools.

Three years stand out with reference to those hired into STEM schools; for instance, in 2002, females became associates two years later than males and, in 2004, they became associates three years later than males. Furthermore, with reference to those hired in 2004, the incidence of females promoted from assistant to associate is 31 percent whereas the incidence for males is zero percent. Moreover, out of those hired in 2005, females attained professor rank six months later than males. To recap, it appears that females are achieving promotions at a faster pace and are exhibiting retention at higher rates than that observed for those hired in earlier years.

Gender Equity and Salaries at UCI

The analyses in this report also examine female salaries in relation to male salaries. In keeping with the descriptive nature of this report, one way to pursue those analyses is to calculate and examine salary ratios. Conducting examinations at two levels, this section presents salary ratio results for comparisons of UCI to PSU and to UCLA and for groups within UCI. In terms of the latter, the calculations involved dividing a female's salary by the total average salary of males in the same rank for any given year with each group of schools. For instance, the salary

ratio calculation occurs by dividing the salary for a female associate professor in the Arts and Humanities group by the total average salary of male associate professors in that group. In terms of institutional comparisons, the calculation of salary ratios involves dividing rank specific average salaries for females by those for males for any given year within the subject institution.

Heading toward the conclusion of this report, in the final part of this last section, there is a historical comparison of salary ratios by rank for those two groups and for UCI, UCLA, and PSU overall based on data retrieved from IPEDS. In order to maintain simplicity, the salary ratios for the two school groups within UCI are presented in the analyses of trends against two baseline years and of comparisons between those two groups for any given year. More important, the reader needs to be mindful that a salary ratio equal to 1.00 means that female and male salaries are equal and that movement toward 1.00 implies salaries are becoming more equitable and progressing toward gender parity. Furthermore, a ratio greater than 1.00 means that rank and group specific female salaries are greater than that for comparable males.

With a view towards salary ratio values and their dynamics, the analyses focus on trends within each group and on comparisons between each group. The three-sectioned Table 5 presents summary of baseline-referenced changes in salary ratios over time. In addition, it presents a summary of school group-based differences in salary ratios at specific years in each section. The first and probably most important section summarizes analyses that focus on two cohorts of female new hires, which are those hired for AY 1998-99 and for AY 2001-02, for the STEM group of schools and the Arts and Humanities group of schools. The section presents a summary of analyses on the female population from those school groups who are outside those two cohorts. The third section presents a summary of the analyses that focus on entire school-combined population of females, without regard to cohort status.

Table 5 presents data and statistical procedure results that provide some evidence of the joint impacts of the Advance Program and the NSF-funded Institutional Transformation grant on gender equity at UCI. For example, a feature generally common to all four sections of Table 5 is the upward trend in salary ratios across time, with a few minor oscillations along that path. A noticeable inflection in salary equity for the 1998-99 cohort occurred between AY 2001-02 and AY 2004-05 through which salary ratios in STEM group of schools became smaller in relation to those in the Arts and Humanities' group. However, the salary ratios for the 2001-02 cohort are consistent over time, with the STEM group being the larger of the two groups.

The last column on the right hand side of Table 5 displays the amount of change from the fund-induced Advance Program inception in AY 2001-02 to the beginning of AY 2007-08. Although salaries appear to have become more equitable during that six-year span of time the 2001-02 cohort of new hires seems to be lagging behind across both school group aggregates. Taking a step away from the focus on cohorts, the reader will notice that the lower two sections of Table 5 display the smallest temporal changes and some significant group differences.

Perhaps more interesting is that the results vary as they demonstrate statistically significant changes in a few of the recent years and in many of the early years. Moreover, the three outlined-cell boxes in the Non-Cohort Population section of Table 5 highlight statistically significant differences between the two school groups in the two baseline years (1998-99 and 2001-02) and in AY 2003-04. However, those differences seem to disappear after AY 2003-04 as the Arts & Humanities' group of schools gains ground in relation to the STEM group of schools. In essence, changes in salary equity occurred between and within those groups over time appear favorable and they seem consistent with the aims and purposes of the Advance Program and the Institutional Transformation grant.

Table 5: Trend and Comparative Analyses of Salary Ratios for Females in A&H and STEM Schools

	1998-99	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	Change
1998-99 Cohort									
A & H	0.60	0.63	0.67*#	0.66*#	0.70*#	0.74	0.79	0.80	0.17
STEM	0.62	0.64	0.67	0.64	0.67	0.67	0.77	0.77	0.13
2001-02 Cohort									
A & H	--	0.57	0.57	0.59#	0.60#	0.62	0.62	0.66#	0.09
STEM	--	0.58	0.58	0.62	0.61	0.63	0.69	0.71	0.13
Non-Cohort Population									
A & H	0.83	0.85	0.85	0.84	0.87	0.89*	0.91*#	0.90*#	0.05
STEM	0.90	0.91	0.91	0.92	0.89	0.89	0.90	0.90	-0.01
Entire Population of Females in A&H & STEM									
A & H	0.81	0.82	0.82	0.82	0.85	0.87	0.90	0.89	0.05
STEM	0.88	0.89	0.89	0.90	0.88	0.87	0.89	0.90	0.01

Notes: Trend against baseline years, with * indicates change since 1998-99 is statistically significant at .05 level;

indicates change in 2001-02 is statistically significant at .05 level; boxes indicate differences between groups are statistically significant at .05 level

Table 6, which is the last table in this report, provides a descriptive summary of salary ratios at various levels of aggregation in increments of two academic years. Those increments correspond in a lagged manner with the award of NSF's Institutional Transformation grant and the related-inception of UCI's Advance Program and AY 2007-08, which is the latest year for which data are available to this study. The top section provides information on UCI Advance Program-related entities namely the STEM group of schools and the Arts and Humanities group of schools and on UCI overall. The lower section of that table provides information with which to compare UCI to UCLA and to PSU on salary ratio trends.

The reader will notice the midsection of Table 6 provides a summary of UCI overall. In addition, the last column on the right contains designations for favorable (F) and unfavorable (U) changes over a two-year post-award commencement and expiration. In other words and perhaps more precisely, those designations reference the change that occurs between AY 2003-04 (two years after award issuance and Program inception) and AY 2007-08 (two years after award expiration). Examining that column and beginning with the summary of UCI overall, there is evidence that indicates favorable changes in salaries as they move toward gender parity.

With respect to the two groups under analysis here, salary ratios for assistant professor and associate professor ranks within UCI equal or exceed 1.00 in AY 2007-08. In addition, a relatively favorable trend occurs for all ranks within STEM. Interestingly, the overall trend appears to be unfavorable for assistant professors within the Arts and Humanities group of schools given that the salary ratio dropped from 1.04 to 1.02. However, among all the details available in Table 6, the reader should note ratios exceed 1.00 for all ranks except full professor. Nonetheless, one may conclude that female full professors are continuing toward parity in salary whether one examines UCI overall or the groups of schools within it despite some fluctuations.

Table 6: Institutional Comparisons on Salary Ratios by Rank

	2001-02	2003-04	2005-06	2007-08	Chg. From 2003-04 to 2007-08
STEM Schools at UCI					
Assistant	0.99	0.99	0.96	1.00	F
Associate	1.00	0.97	0.99	1.02	F
Full	0.92	0.93	0.94	0.98	F
Schools of Arts & Humanities at UCI					
Assistant	1.03	1.04	1.01	1.02	U
Associate	1.03	1.02	1.05	1.04	F
Full	0.86	0.85	0.91	0.92	F
UCI Overall					
Assistant	0.94	0.95	0.94	0.98	F
Associate	0.97	0.93	0.98	1.01	F
Full	0.90	0.88	0.93	0.90	F
Penn State Overall					
Assistant	0.92	0.91	0.91	0.93	F
Associate	0.92	0.92	0.91	0.93	F
Full	0.90	0.93	0.89	0.88	U
UCLA Overall					
Assistant	0.92	0.94	0.95	0.92	U
Associate	1.01	0.95	0.89	0.93	U
Full	0.90	0.90	0.90	0.91	F

Notes: F = favorable and U = unfavorable, which summarizes change between AY 2003-04 and AY 2007-08; ratio is calculated from dividing rank and group specific female salary by total average for comparable male; ratios equal to or greater than 1.00 means females are earning same or more than males in same rank and school; change in ratios toward 1.00 indicates movement toward gender parity in salary; sources of comparative data: Integrated Postsecondary Education Data Survey (IPEDS), US Department of Education

CONCLUSION AND RECOMMENDATIONS

By way of review, this study examines trends in faculty hiring, promotion, attrition, and salary at the University of California-Irvine. In addition, it draws comparisons between the STEM group of schools and the Arts and Humanities group of schools within the University. Moreover, the study offers comparisons of UCI to two other institutions on a variety of outcome measures. Four recommendations emerge from those analyses.

First, the UCI Advance Program appears to making a favorable difference, as a joint consequence of resource allocations from the University itself and from the National Science Foundation. In short, the Program represents a wise investment of resources. However, more work remains in the years ahead. The second recommendation points to the need to address salaries of those hired for AY 1998-99 and to effect substantive movement toward parity. Although salary ratios in that cohort and other groups demonstrate favorable trends, that cohort exhibits the greatest inequity in all the aggregates under consideration in this evaluative study. Third, examine closely the apparent reversal of the hiring trend within the Arts and Humanities group of schools as it pertains to the presence of females. Remarkable changes are observable in the comparative data on new hires at UCI between 2002 and 2007. Further analysis may be able to explain and to address the inordinate decrease in female presence relative to male presence. Fourth and finally, somewhat related to the third recommendation, is the clear need to monitor the gender composition of the faculty body against both the Survey of Earned Doctorates.

The aforementioned trends and comparisons are revealing. Conclusive results and outcomes are evident from efforts to attain gender parity. In closing, the consultant concludes that the Advance Program is successful and making progress in terms of the recruitment and promotion of highly talented women faculty in STEM fields.