



UNIVERSITY *of* DELAWARE

Asymmetric Outcomes in Career Progression: Peeling back the layers to understand the sources of gender inequality

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The opinions expressed here are my own but the research is derived from joint work with Robin Andreasen, Pam Cook & Heather Doty



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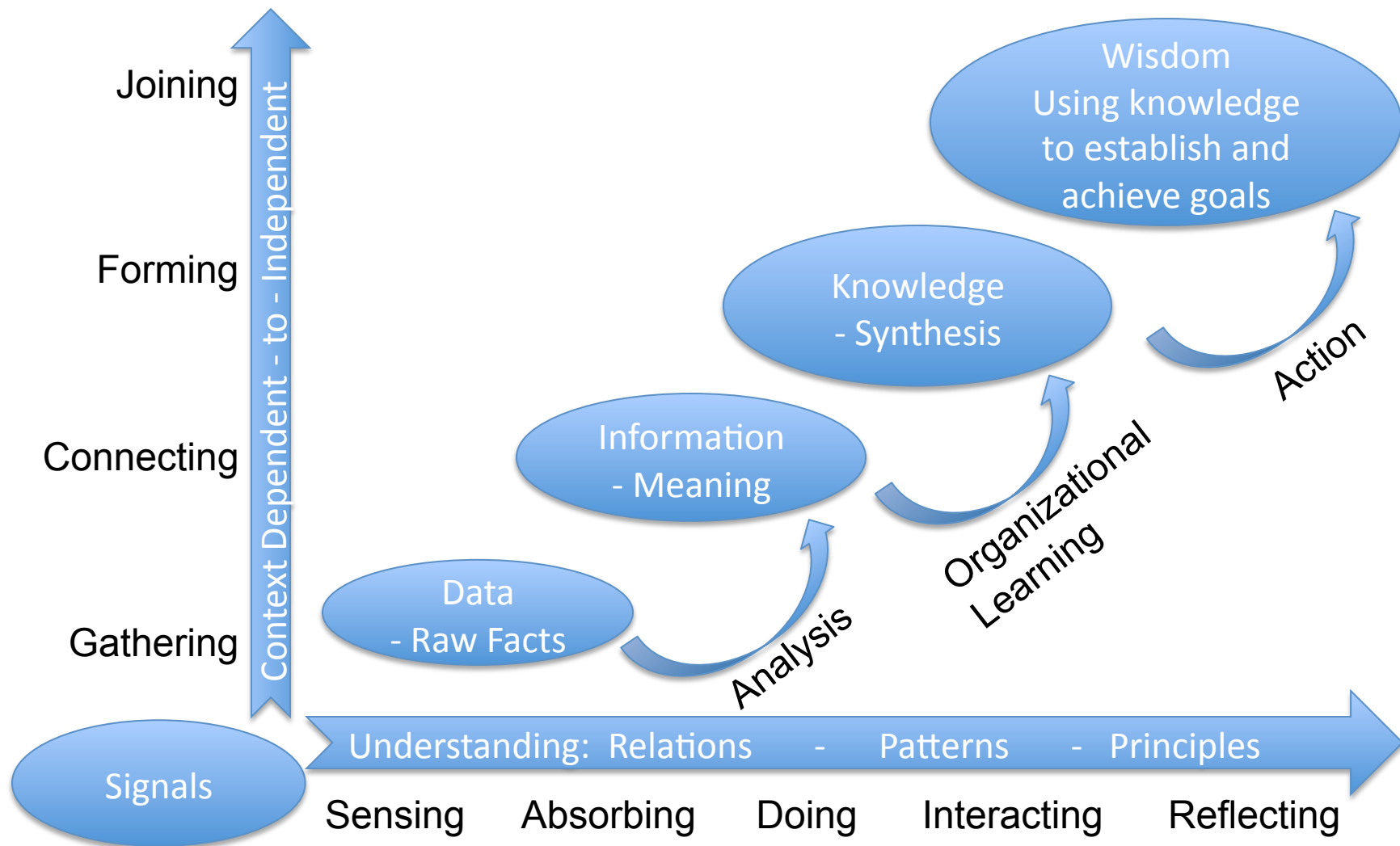
What is NSF ADVANCE - IT?

- National Science Foundation program to increase the number of women faculty in STEM (including Social and Behavioral Sciences)
- Institutional Transformation (because localized change, STEM-only change, will not be *institutionalized*)
- Additional focus on women faculty from under-represented groups



Institutional Research – Why me?

- Institution's goals:
 - Transform reporting function to provide analysis to support information driven institutional decision-making
 - Bring a faculty viewpoint to institutional decision-making.
 - Engage faculty and academic concerns in analysis and decision-making.
- Why me?
 - Relevance to my training in Industrial and Organizational Psychology
 - Studies of employment processes (career progression, equity, decision-making)
 - Deep and broad institutional knowledge
 - Known as a “change agent”





Why all the concern with female representation?

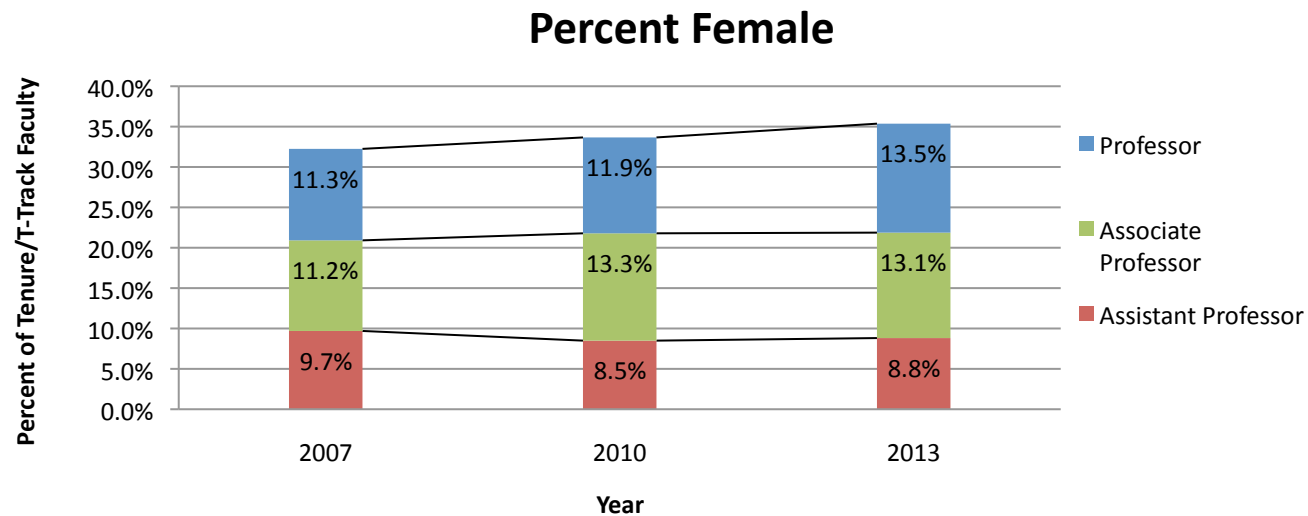
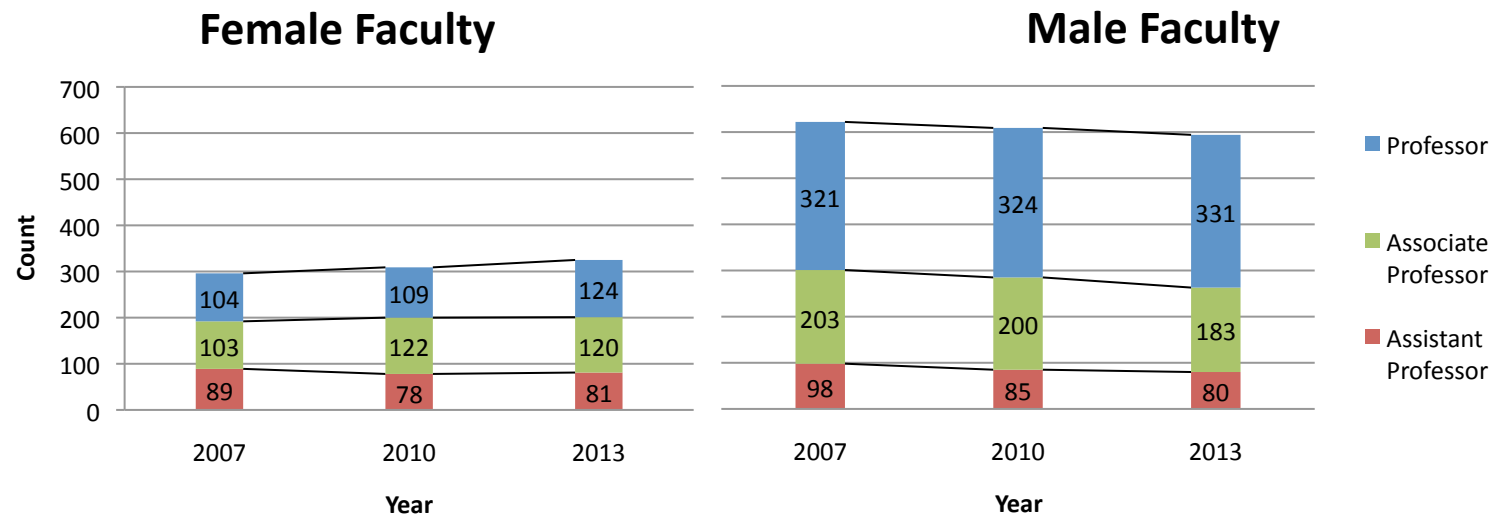
- Women are 57% of our student population, but only 35% of faculty population (tenure/tenure-track faculty)
- Women are 50% of the population, but strongly underrepresented in STEM fields, and yet STEM fields are identified as the fastest growing and have highest salary potential.

“The reason there aren't more women computer scientists is because there aren't more women computer scientists.”

—Jocelyn Goldfein, a director of engineering at Facebook



Tenured/Tenure Track Faculty by Sex





Female Tenured and Tenure Track Faculty, by Rank and College Fall 2013 UD compared to AAU Public Institutions.

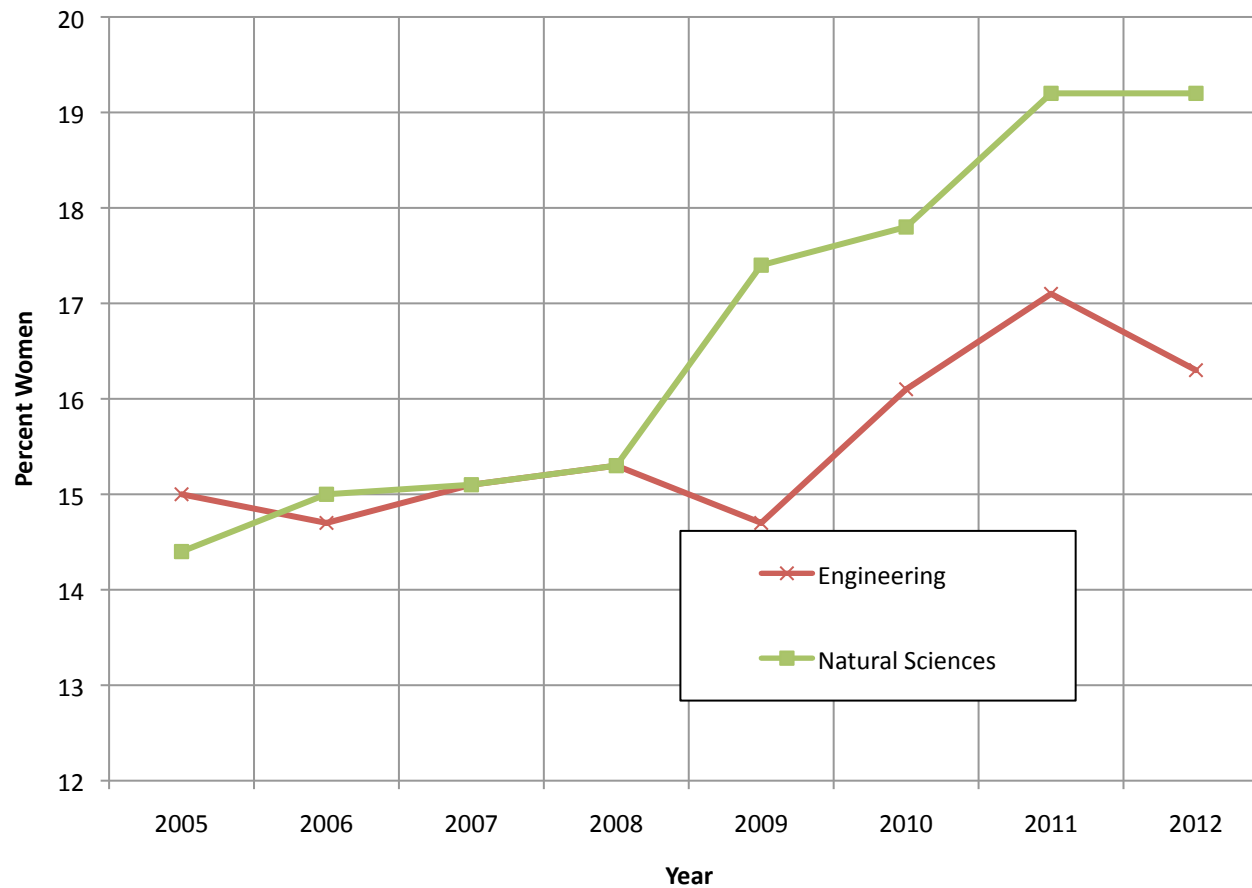
College (Portfolio)	Professor			Associate Professor			Assistant Professor			All Ranks		
	Female	Total	% F	Female	Total	% F	Female	Total	% F	Female	Total	% F
Agriculture & Natural Resources	8	41	19.5%	7	19	36.8%	5	13	38.5%	20	73	27.4%
Arts & Sciences (Arts)	7	16	43.8%	12	25	48.0%	2	8	25.0%	21	49	42.9%
Arts & Sciences (Humanities)	23	62	37.1%	19	45	42.2%	8	13	61.5%	50	120	41.7%
Arts & Sciences (Natural Sciences)	14	93	15.1%	8	36	22.2%	15	27	55.6%	37	156	23.7%
Arts & Sciences (Social Sciences)	26	49	53.1%	18	39	46.2%	11	19	57.9%	55	107	51.4%
Business & Economics	4	38	10.5%	11	43	25.6%	13	23	56.5%	28	104	26.9%
Earth, Ocean, & Environment	5	31	16.1%	5	17	29.4%	5	11	45.5%	15	59	25.4%
Education & Human Development	14	28	50.0%	15	21	71.4%	5	7	71.4%	34	56	60.7%
Engineering	9	76	11.8%	6	28	21.4%	5	23	21.7%	20	127	15.7%
Health Sciences	14	22	63.6%	21	32	65.6%	12	17	70.6%	47	71	66.2%
UNIVERSITY TOTAL	124	457	27.1%	122	306	39.9%	81	161	50.3%	327	924	35.4%
AAU Public (Total)*	5,844	25,235	23.2%	5,622	14,757	38.1%	4,351	10,168	42.8%	15,917	50,358	31.6%

*Data Source: 2013 IPEDS Human Resources Survey



Growth in Female Faculty Representation

University of Delaware College of A&S Natural Science and College of Engineering





Assumed Explanations

- Women are denied tenure at a greater rate than men
- Women are denied promotion to full at a greater rate than men
- Different pay/compensation standards are applied to women than to men



Tenure/Tenure Track Reviews in 2009-2013 N=227

	Promotion to Associate w/Tenure						
	Reviews	Approvals		Denials		Withdrew	
		N	%	N	%	N	%
Male	75	68	90.7%	5	6.7%	2	2.7%
Female	56	52	92.9%	4	7.1%	0	0%
Summary	131	120	91.6%	9	6.9%	2	1.5%

	Promotion Associate to Full Professor						
	Reviews	Approvals		Denials		Withdrew	
		N	%	N	%	N	%
Male	68	66	97.1%	2	2.9%	0	0%
Female	28	26	92.9%	1	3.6%	1	3.6%
Summary	96	92	95.8%	3	3.1%	1	1.0%



New Hired Assistant Professor Left UD prior to Tenure Application, Male vs. Female

	Left Prior to Tenure		Persisted		Overall
	N	%	N	%	
Female	20	17.5%	94	82.5%	114
Male	18	13.3%	117	86.7%	135
All	38	15.3%	211	84.7%	249

Note: the report contains new hired assistant professors since 2005

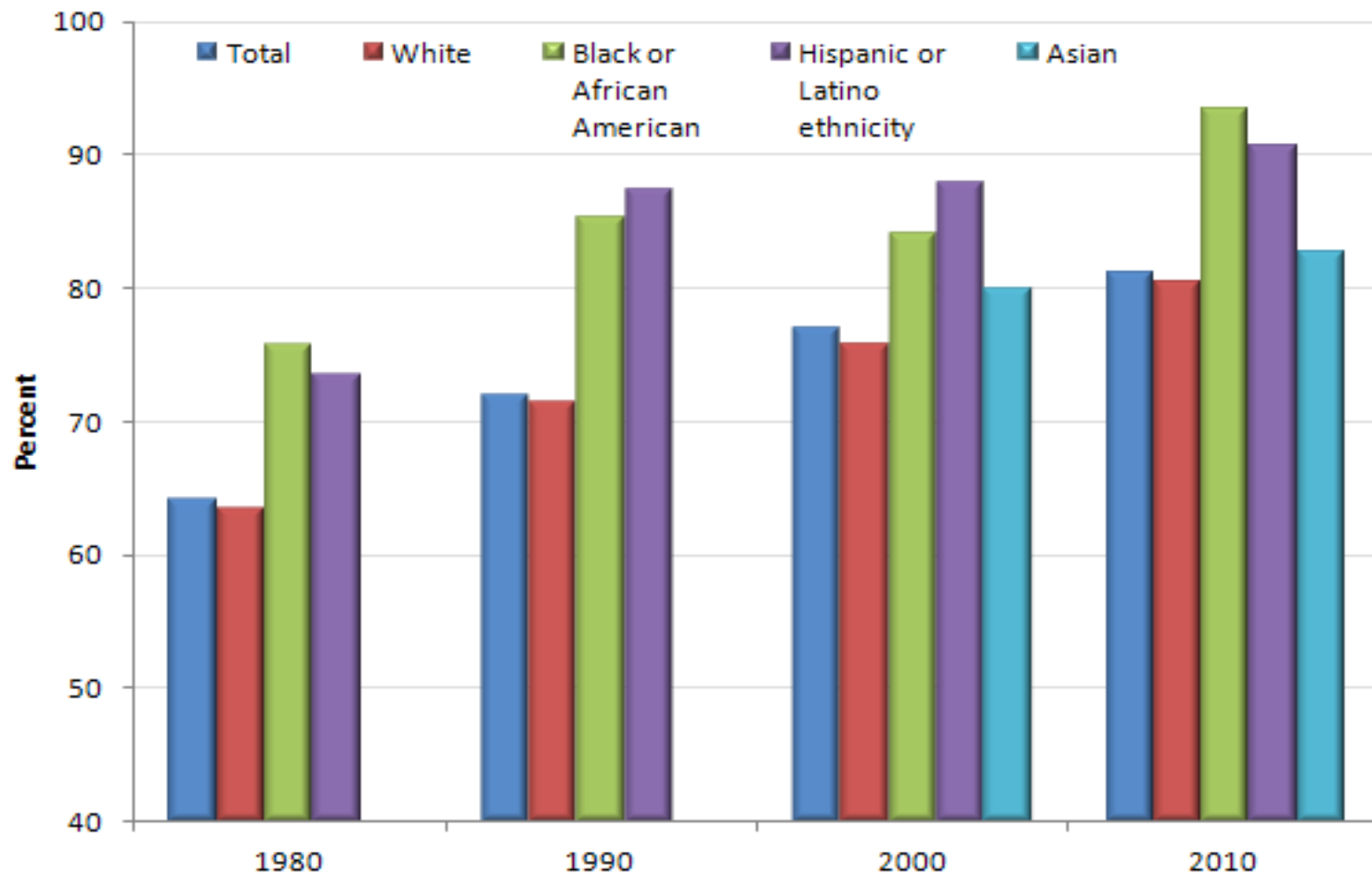


More explanations under consideration

- What happens at pre-tenure contract renewals?
- In sciences and engineering, are female faculty equally supported with start up resources?
 - Laboratory equipment
 - Laboratory and office space
 - Graduate student stipend and tuition support
 - Supplemental pay
 - Etc.
- Are the post-tenure expectations for service and teaching equal for men and women – are women encouraged to keep on track toward promotion to full.
- When women and URP withdraw, what is the reason for withdrawal and what could be done to prevent it?



**Women's earnings as a percent of men's, median usual weekly earnings
of full-time wage and salary workers, in current dollars,
by race and ethnicity, 1980–2010 annual averages**



Source: U.S. Bureau of Labor Statistics

Note: Data for Asians were not tabulated prior to 2000.



Sources of Gender Pay Gap

- Women over represented in lower paying professions
- Life choices and policies supporting work family balance
- Negotiation skills of men versus women
- Work choices to allocate time to high reward versus low reward activities (i.e., service compared to scholarship).
- Implicit biases in evaluation standards (teaching evaluations, Citation counts, etc.)
- Variance in application of market wages to compensation decisions.

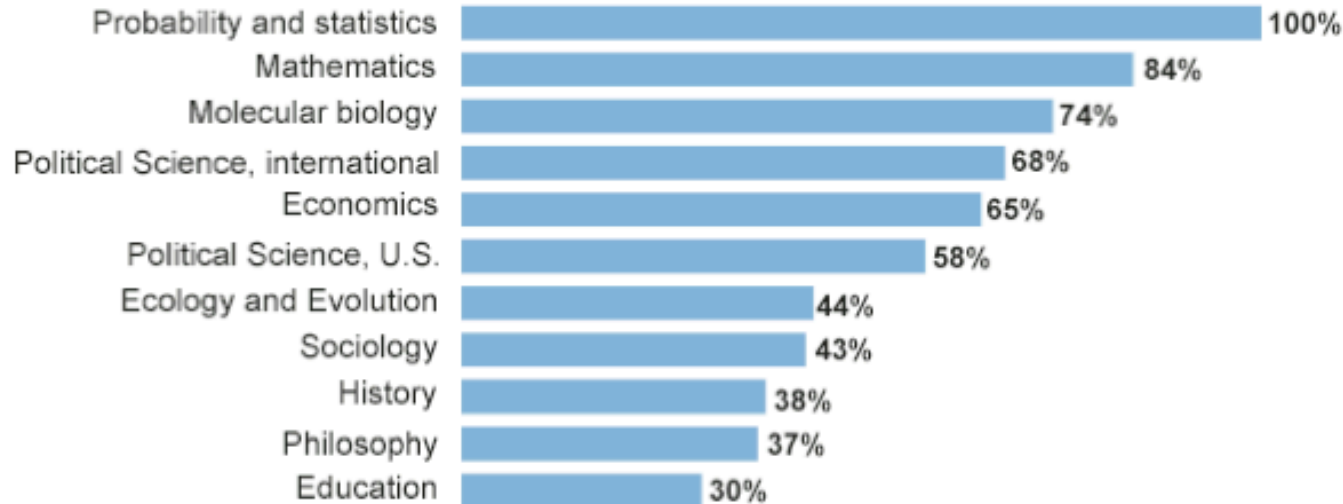
The Simple Truth about the Gender Pay Gap. AAUW 2014.



Faculty mentoring, Chair training, Dean involvement
& Dangers of implicit bias and of metrics
(H-Index, citations, teaching evaluations)

Not Afraid To Give Themselves Credit

At a time when scholars are increasingly judged by how frequently their work is cited, research shows that men are more likely than women to cite their own work—driving up their citation rates. The percentages below show how much more likely male authors have been than female authors to cite themselves in select disciplines over the past 60 years.





Salary disparity study methodology

- HLM nesting faculty within department
- Discipline as surrogate for market rates (assumes departments adjust to market for their respective disciplines).
- Model of salaries based on faculty characteristics that departments typically take into account when setting salaries.
 - Rank & time in rank
 - Years service
 - Tenure status (T/TT, Temporary, Non-tenure track)
- performance appraisal score weighted by workload allocation
- years in assistant professor rank (seven or more years was flagged to create a 'stop the clock' variable),
- Prior administrative experience
- Whether the faculty is a recently hired at full professor rank.



Aggregated residual by Sex

(including outliers and assistant professors stop the clock)

Note: the residual is the salary gap after adjusting for the factors relating to higher salaries.

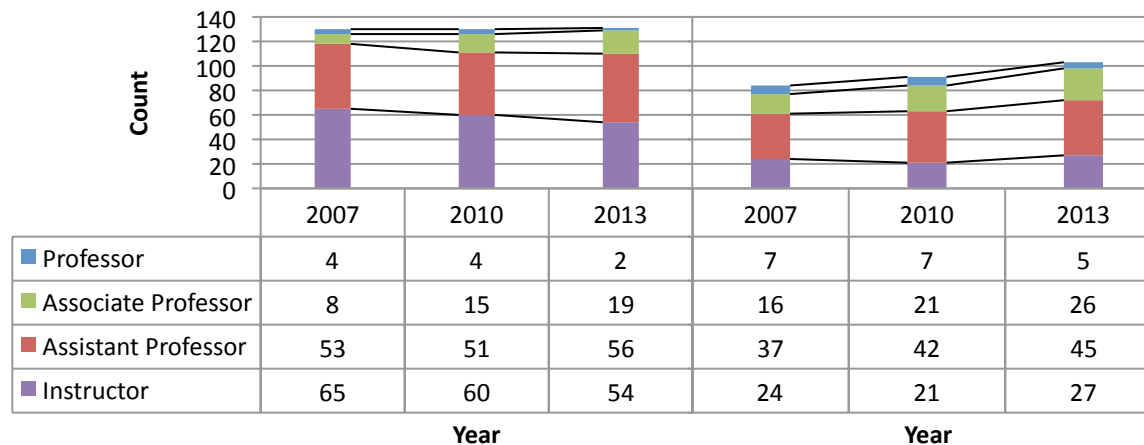
	Count	RESIDUAL		F value	(Pr>F)
		% (Actual-Predicted)/ Actual	\$		
Female	378	0.008	1,578	0.02	0.89
Male	626	0.005	1,823		



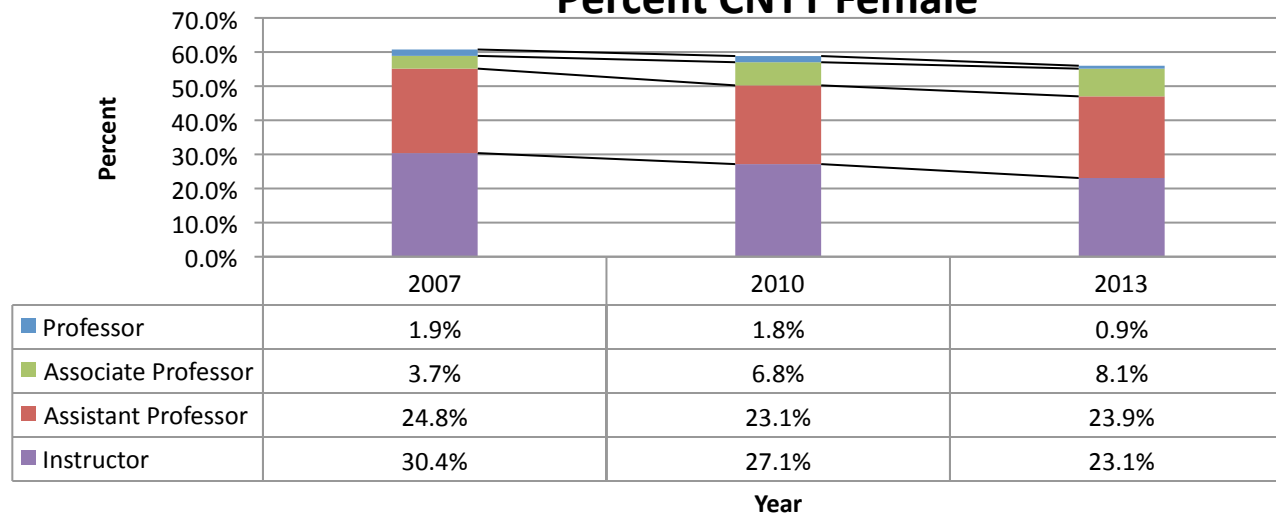
Continuing Non-Tenure Track Faculty by Gender

Female CNTT Faculty

Male CNTT Faculty



Percent CNTT Female





Average Salary by Rank Compared to Benchmark

Sex balance by discipline	Salaries as % of Benchmark		
Male Dominated	Assistant	Associate	Professor
Chemical Engineering	115%	129%	133%
Civil Engineering	111%	118%	115%
Computer Engineering	115%	121%	123%
Materials Science	112%	111%	143%
Mechanical Engineering	115%	115%	126%
Female Dominated	Assistant	Associate	Professor
Nursing	107%	105%	109%
Education	107%	109%	111%
Human Development	110%	109%	99%

Benchmarks are RVH institutions that participate in the Oklahoma Salary Survey.



2014 Faculty Climate Survey Select Results

- Promotion, Tenure & Evaluation
- Policies and Procedures
- Mentoring
- Departmental and University Climate



Promotion, Tenure and Evaluation

- Clarity of communication of policies
- Satisfaction with the process
- Consistency between criteria and workload

Notable Results

- ✧ Tenure track and tenured faculty are moderately satisfied with the P&T process.
- ✧ At all ranks, significant clarity and satisfaction accrues from having successfully completed the process compared to those who have not yet gone through the process.



Policies and Procedures

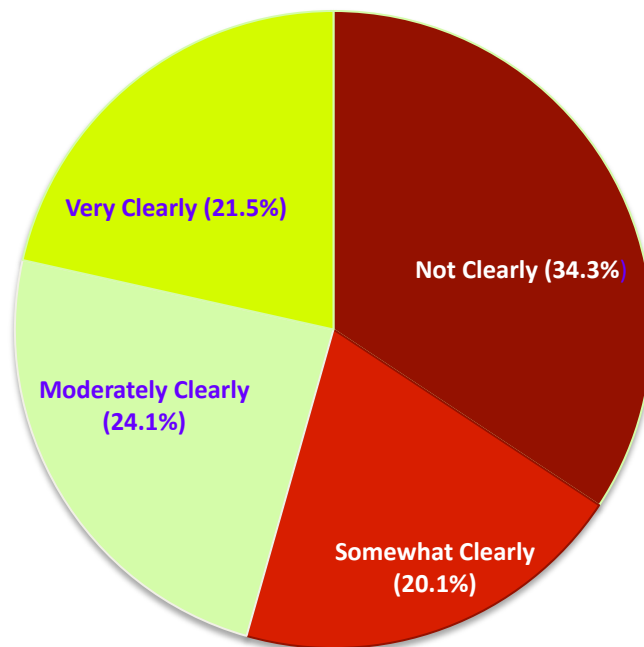
- Workload
- Merit
- Stop the Clock
- Parental & Family Leave

Notable Results

- ✧ Faculty are moderately satisfied with the clarity and communication of workload and merit policies.
- ✧ Parental and family leave policies are poorly communicated, and Department chairs do not encourage faculty to take advantage of the policies.



How clearly is UD's parental & family leave policy communicated to faculty by their department chairs?



Broken Down by Sex

Female Faculty

- ☉ Very Clearly Communicated (16%)
- ☉ Not Clearly Communicated (37%)

Male Faculty

- ☉ Very Clearly Communicated (27%)
- ☉ Not Clearly Communicated (28%)

Figure 1: Chair Communication Parental/Family Leave Policy, UD Faculty Satisfaction Survey 2014, All Full-Time Faculty



Climate & Satisfaction

Overall

- ✧ Aggregated over all respondents, faculty are satisfied with their professional lives at UD.
- ✧ Black faculty are less satisfied with their departmental climates (relationships with peers and department chair) than nonblack faculty.

Diversity

- ✧ Aggregated results indicate that faculty perceive the climate for diversity to be good.
- ✧ However, women report poorer climate for gender diversity than do men, and URM faculty report poorer climate for racial diversity than do whites



Mentoring

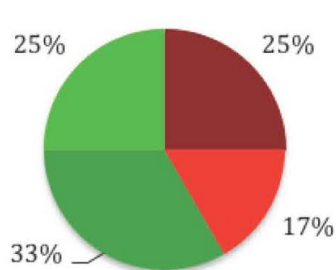
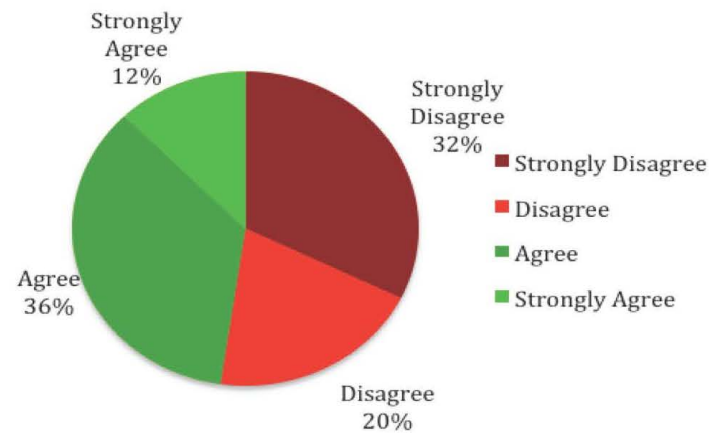
- Did you receive formal mentoring within your department?
- Did you receive informal mentoring within your department?
- Did you receive formal mentoring within university outside department?
- Did you receive informal mentoring within university outside department?
- Did you receive formal mentoring outside the university?
- Did you receive informal mentoring outside the university?



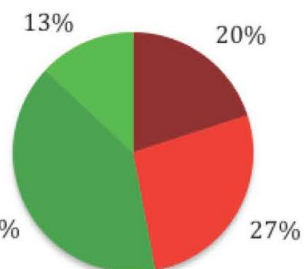
"I receive formal mentoring within my department."

Work-Life Satisfaction Survey of All Full Time Faculty Spring 2014

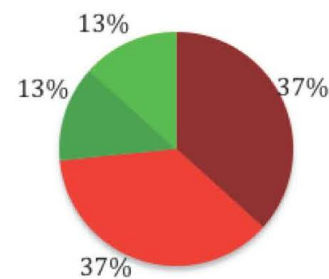
Tenure Track Assistant Professors



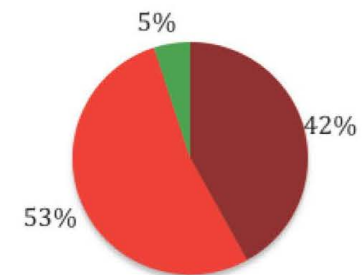
COE



CA&S, NS



CA&S, SS



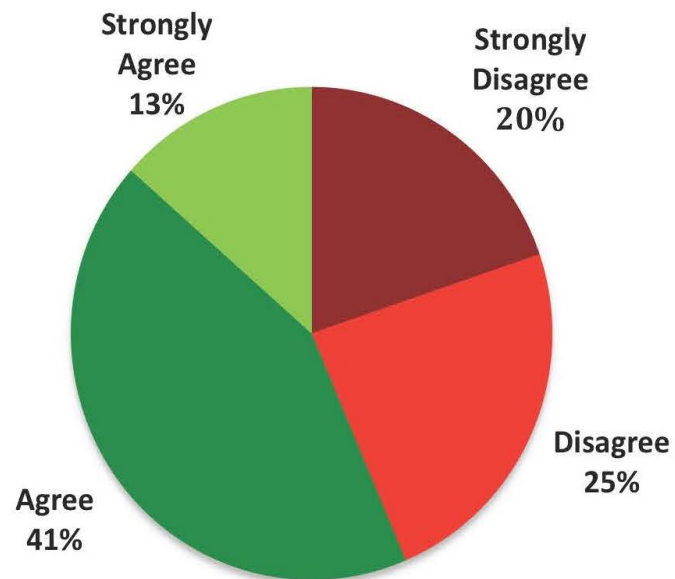
Health Sci.

T/t assistant professors and associate professors

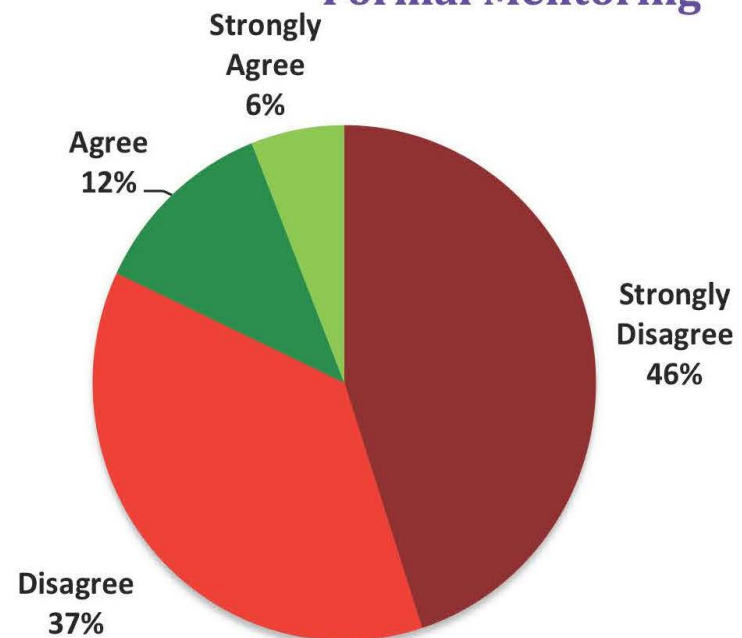


"I receive mentoring within my department."
Responses from Tenured Associate Professors (N = 126)
Results from Work-Life Satisfaction Survey of All Full Time Faculty Spring 2014

Informal Mentoring



Formal Mentoring





Further research

- Qualitative analysis (exit interviews) to determine why women leave before tenure.
- Collect hiring and support contracts to determine if female faculty receive similar resources to male counterparts (e.g. lab space, startup funds, etc)
- Gather additional data on pre-tenure process to understand progression toward tenure and why women withdraw pre tenure.



Planned Institutional Transformation Interventions.

- Enhance data/information transparency: Remove significant uncertainty and allows people to focus attention where actions are most needed.
- Improve clarity of promotion and other policies that affect guide and affect career progression.
- Workshops for department chairs to better understand how to implement policies, and what constitutes supportive climate for different populations.
- Mentoring – particularly post-tenure to help faculty progress to full professor and into department, college and leadership roles.
- Engage senior university leadership to champion change.
- Establish best practices in recruitment, retention and assessment.
 - Examples from MIT
 - Differences in self promotion (see citation example)

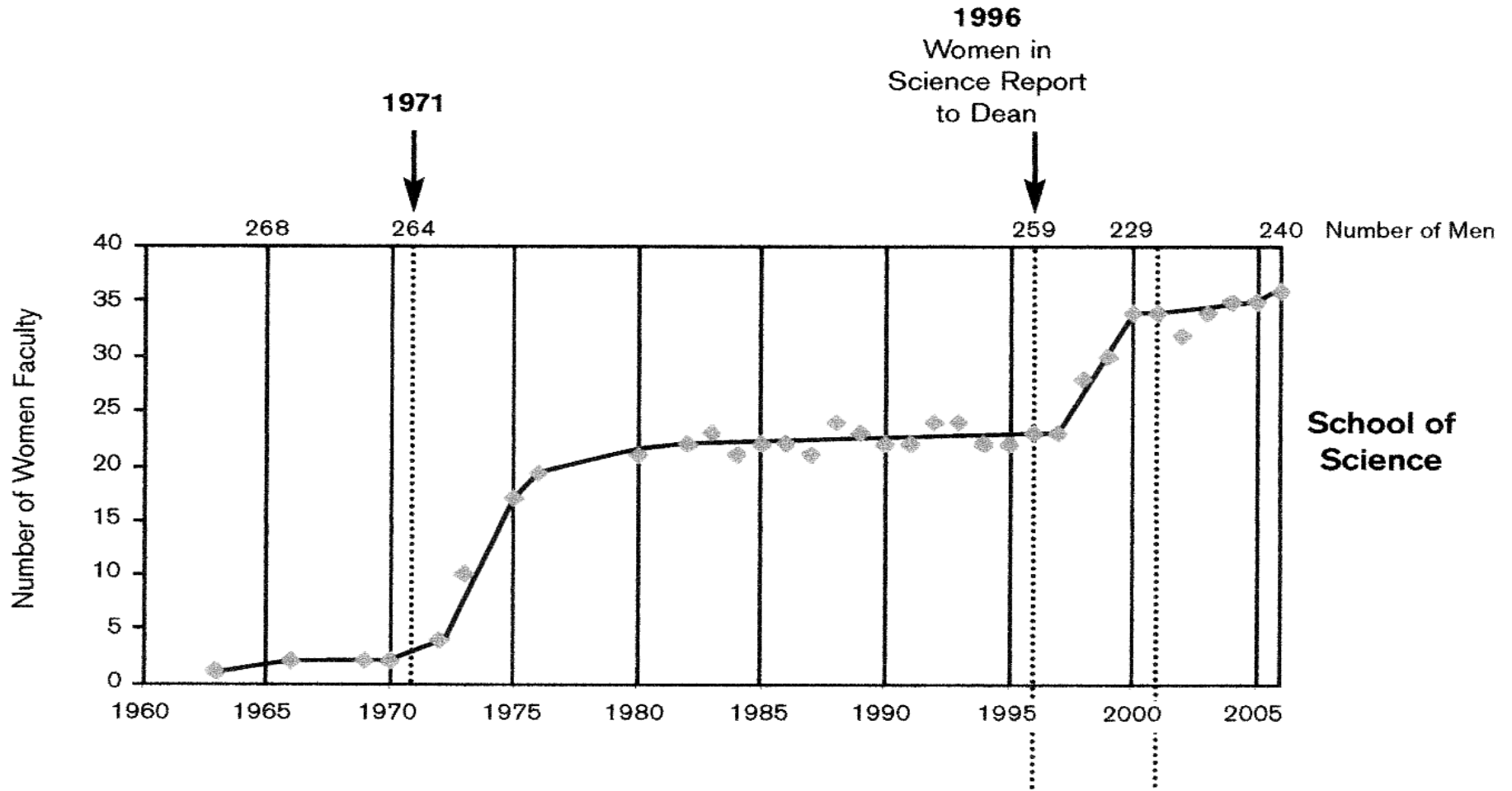


Interventions

The MIT Study

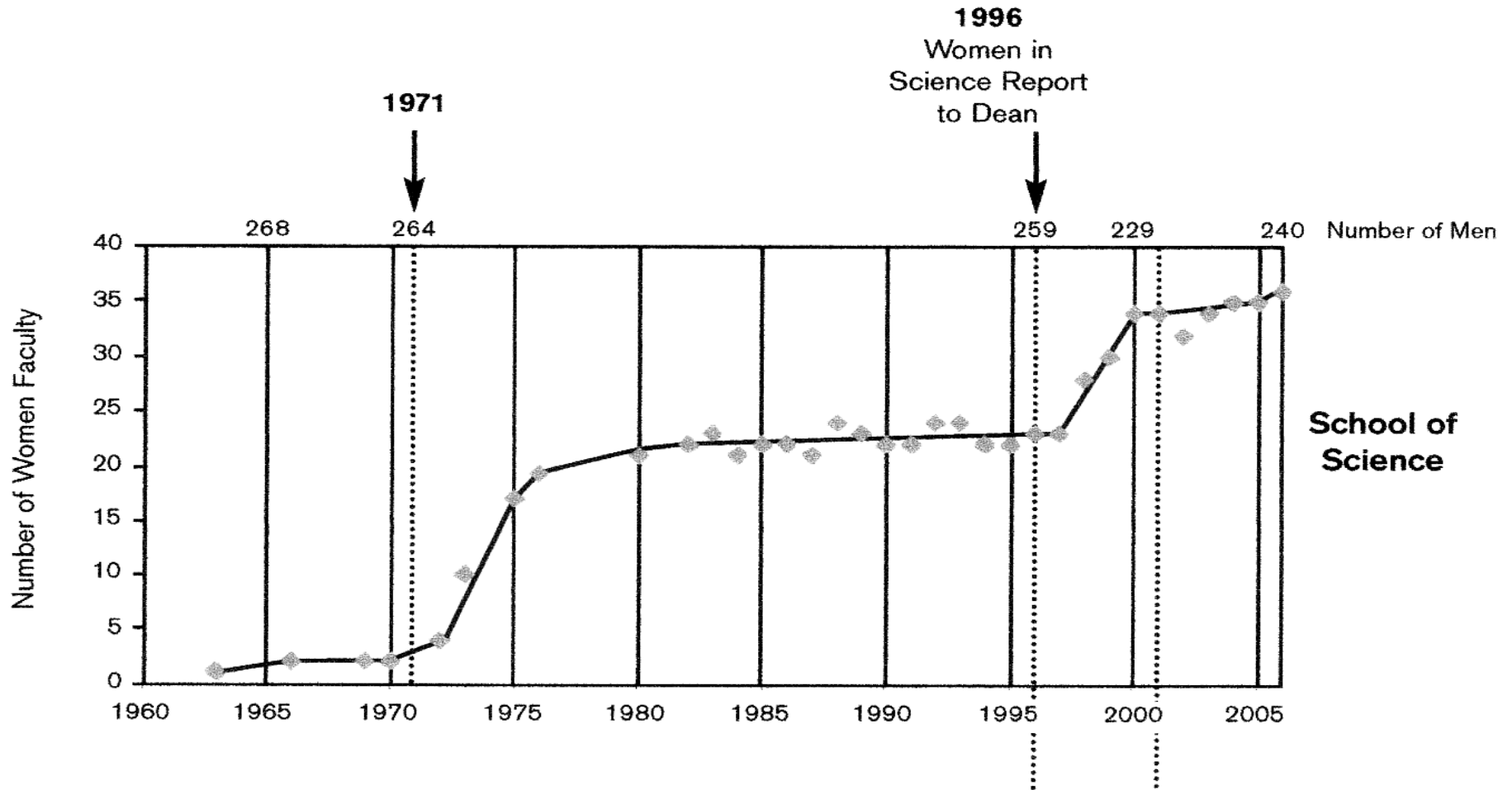
Some history and reasons for hope

Number of Women Faculty in the Schools of Science (1963-2006)



Hopkins--Diversification of a University Faculty: Observations on Hiring Women Faculty in the Schools of Science and Engineering at MIT, MIT Faculty Newsletter XVIII No. 4 March/April 2006

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Women have been scientifically as successful as the men—no sacrifice of quality for diversity.



MIT Best Practices

- “**Dean** made it known to department heads that hiring women faculty was a high priority for him, and he reinforced his commitment by returning a chosen male candidate to the department because he concluded that the search committee had failed to interview qualified female applicants.”
- When canvassing colleagues to ask informally for names of potential hires “**search committees** specifically asked for names of outstanding female candidates . . .”
- “the **Dean** made exceptional personal efforts . . .” to “attract” candidates “once offers had been made.”



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But - no mention of mentoring (advocating, coaching) – the problem that started all this. The dean’s take was that increasing the number of women would take care of this. Will it?



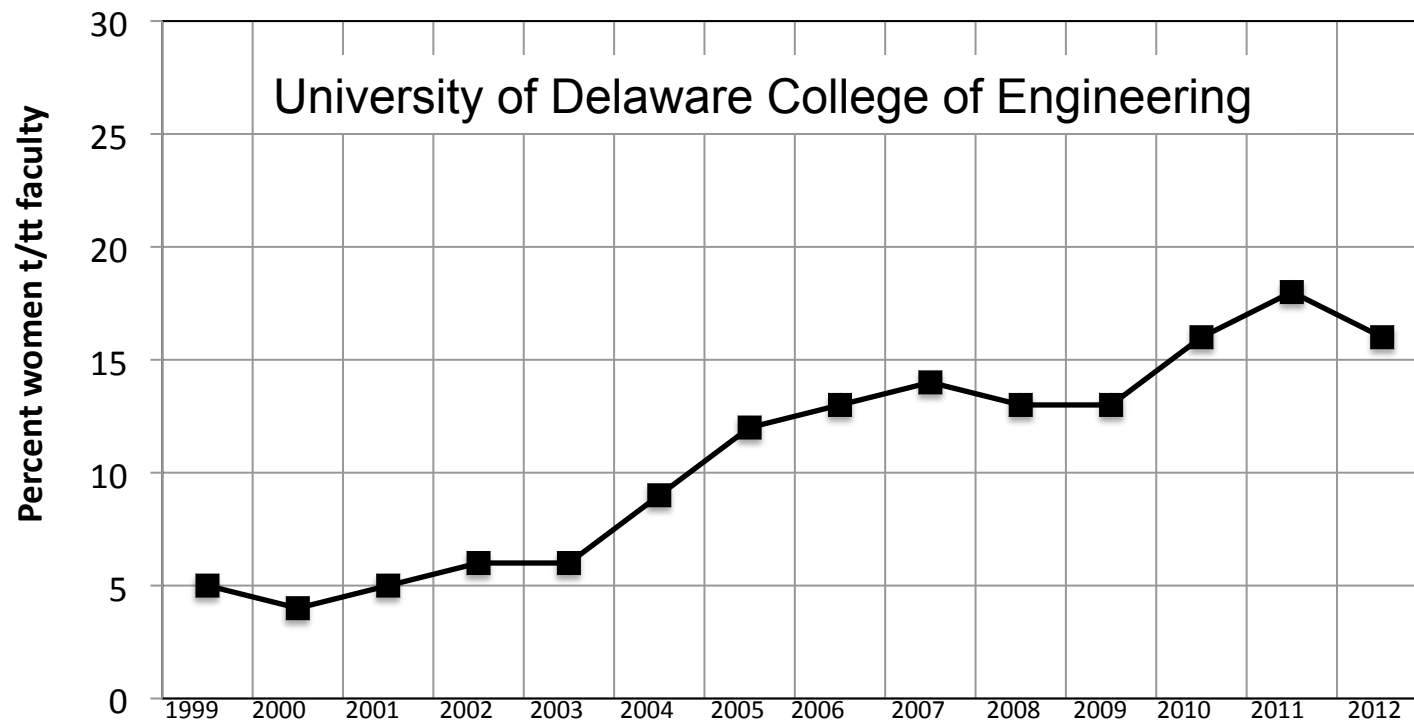
MIT

In recent year the biological sciences in the School of Science . . . have expanded to include faculty in several new Centers and Institutes. . . *no woman heads any unit of the seven units* . . . Particularly concerning is that in some new units, where, given many recent hires, one might expect to see more women than in the sections that now contain most of the very senior faculty, the percent of women faculty is extremely low. . . The Picower Center for Learning and Memory has only 10%, and the Broad has had a small but *entirely male core faculty* since its inception . . . *These latter numbers rival those of the 1970s and show how rapidly gains in diversifying the faculty can be lost*"

Leadership is critical
Constant attention is critical



How does UD compare?



Note 15% \approx 20 women

Loss of 9 women in the last 10 years