

Why Do Women Engineers and Architects Leave the Field?

Melek Yalcintas, Ph.D., P.E., CxA, LEED AP, CEM

www.ameltech.com



AMEL Technologies, Inc.
*Engineering Consulting &
Construction Management Services*



Society of
SAME
American Military Engineers
Honolulu Post



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SAME Honolulu Post Awards \$25,500 in
Student Scholarships



Dean's Diversity Committee



Dean's Council

If nothing else,
we are talking about wasted



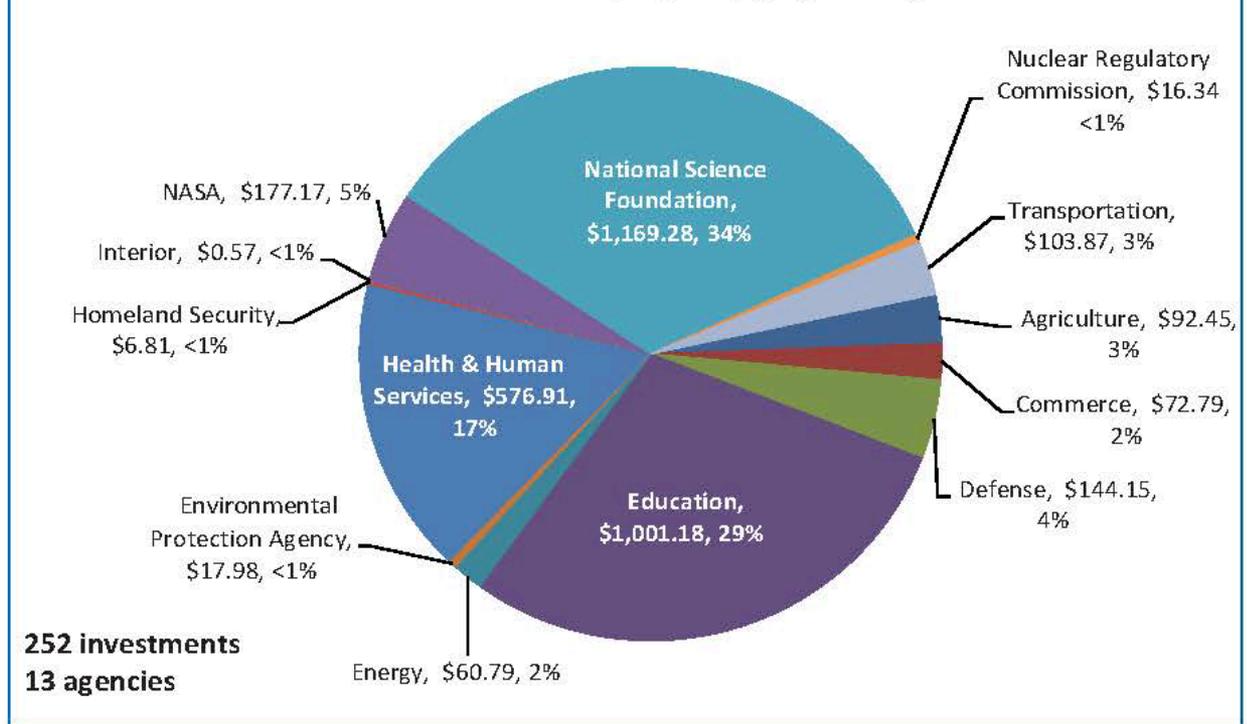


THE FEDERAL SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) EDUCATION PORTFOLIO

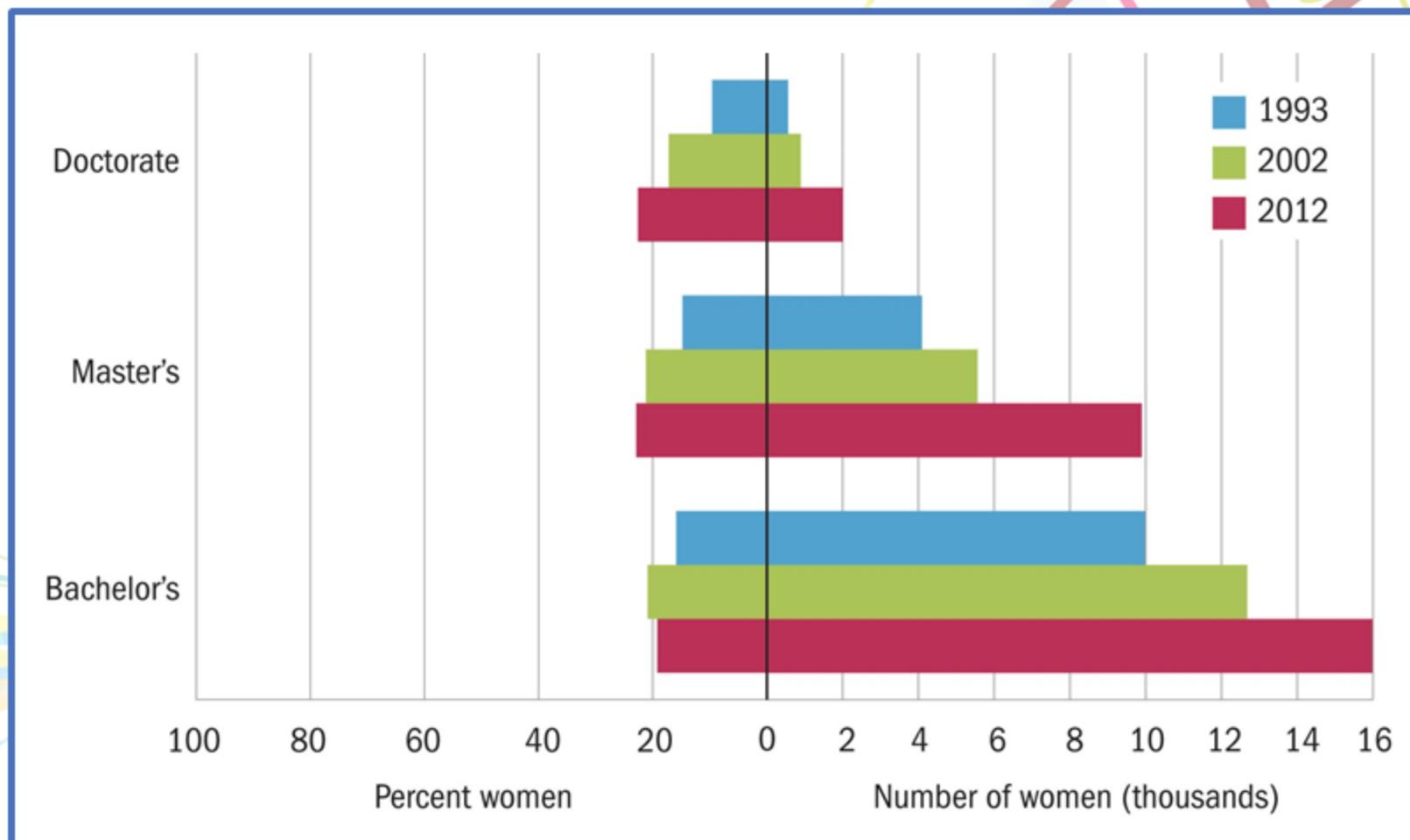
*A Report from the
Federal Inventory of STEM Education
Fast-Track Action Committee
Committee on STEM Education
National Science and Technology Council*

DECEMBER 2011

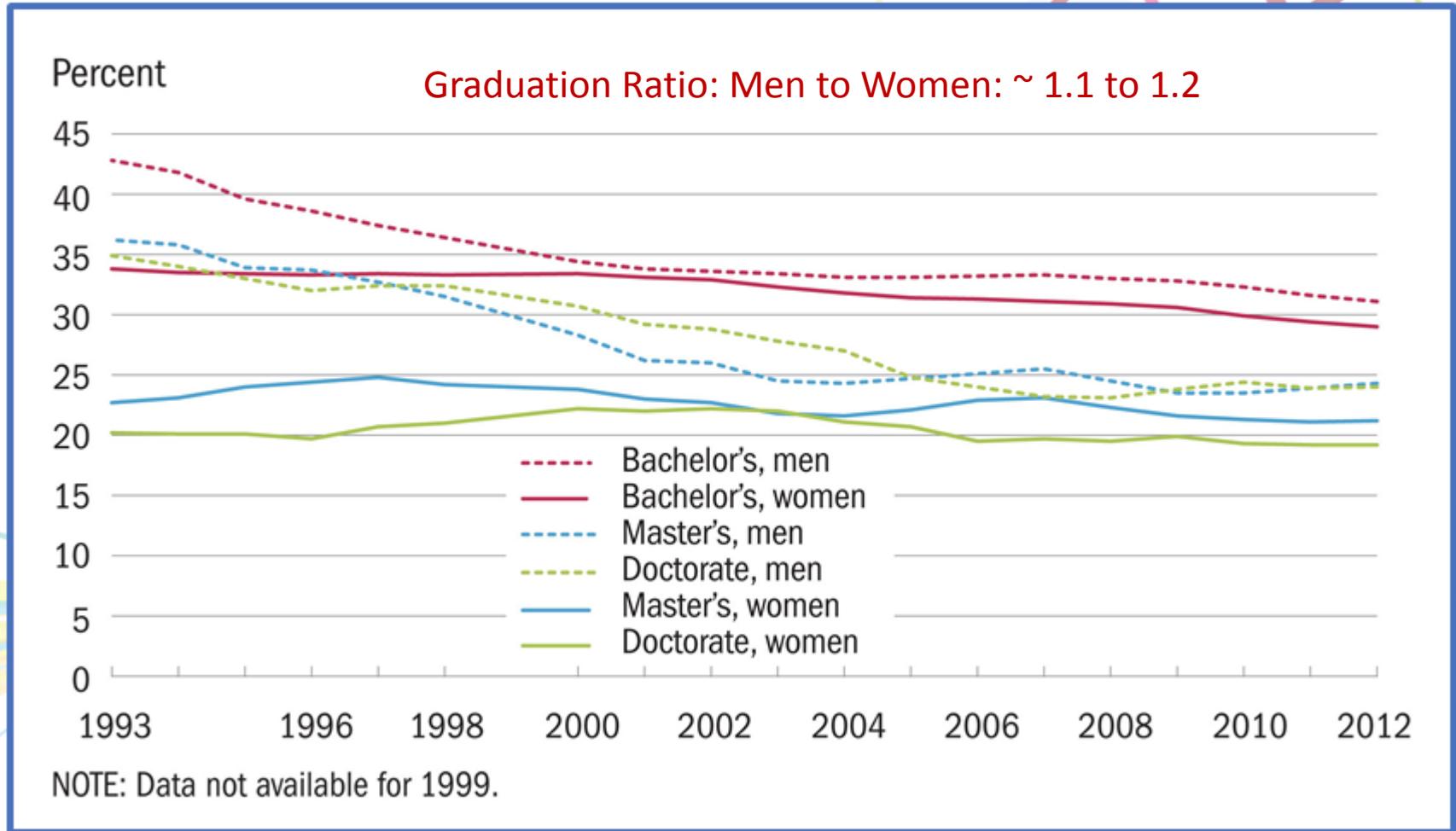
Federal STEM Education Investments by Agency (\$3,440 M)



Low participation field for women: Engineering, 1993, 2002, 2012

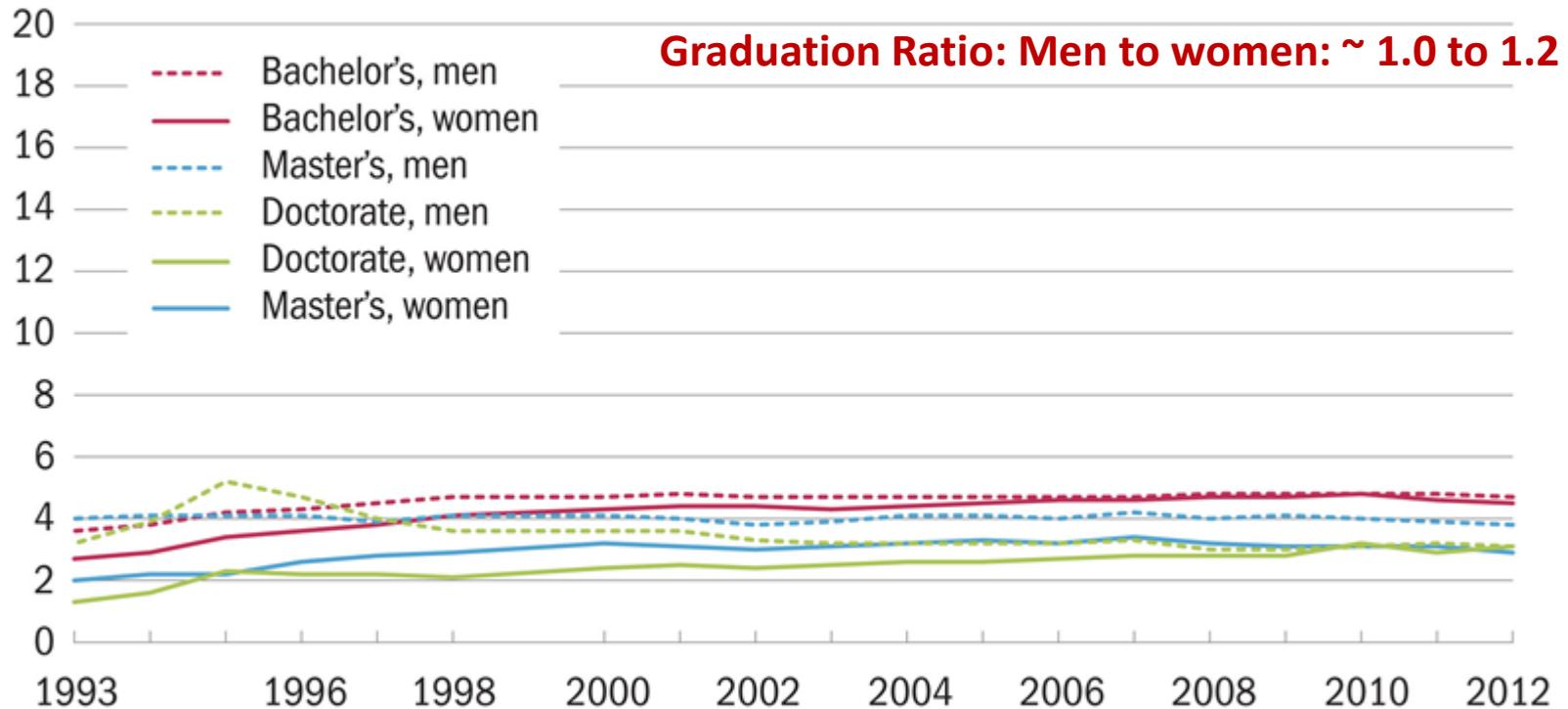


Science and engineering degrees earned by white women and men: 1993–2012



Science and engineering degrees earned by Asian women and men: 1993–2012

Percent

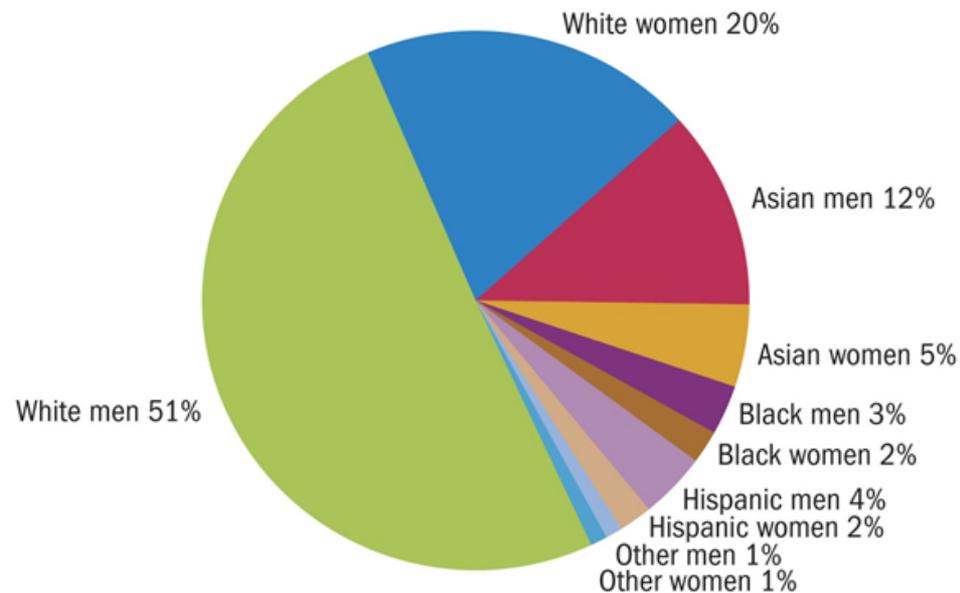


NOTE: Data not available for 1999.



Occupation Ratio: men to women: 2.5

Scientists and engineers working in science and engineering occupations: 2013



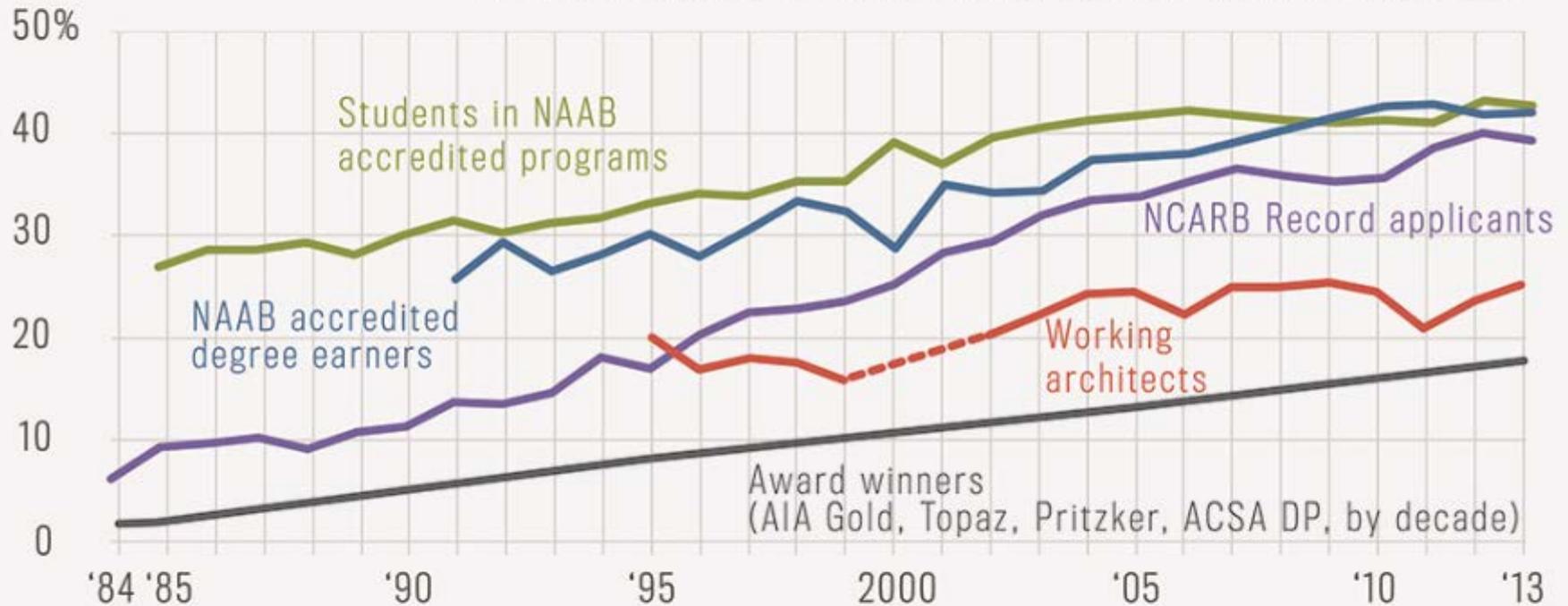
NOTE: Hispanic may be any race. Other includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and multiple race.



Pipeline Into the Profession of Architecture

Female students, graduates, NCARB applicants, and awardees by %

Number of women at early career stages stabilizing around 40%.



Employment data interpolated for 2000-01. Occupational definition changed in 2003.





UNIVERSITY
of HAWAII®

MĀNOA

Facts of University of Hawaii Graduates

Female Graduates makes up:

- ~50 of College of Natural Sciences
- ~ 38% of College of Architecture
- ~ 20 of College of Engineering

[Science Home](#) » [Science Careers](#) » [Career Magazine](#) » [Previous Issues](#) » [2014](#) » [August 15](#)



Laylo Musaeva/United Nations Development Program

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Women in Science

Nearly 40 percent of women leave engineering

By Xochitl Rojas-Rocha
August 15, 2014

Email Article

Email Editor

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WASHINGTON, D.C.—Engineering fields, from aerospace to biotech, have a history of struggling to recruit and retain women. Past studies have blamed those struggles on women's lack of confidence and the demands of family. But a study released last weekend at the 122nd Annual Convention of the American Psychological

Women who left reported feeling belittled or undermined by their supervisors and co-workers, and they struggled to advance in a workplace.

Association in Washington, D.C., shows that nearly 40% of women left the field after earning an engineering degree, many due to hostile work climates, unsupportive supervisors, or limited opportunities for advancement.

Over the course of 3 years, psychologists Nadya Fouad and Romila Singh of the University of Wisconsin, Milwaukee, surveyed more than 5000 women with engineering degrees. About 11% of those women never took on an engineering job. Another 27% left the field after taking a job.

Women who continued working in engineering fields—more than 60%—reported that their organizations invest in training, have clear paths to advancement, and support a work-life balance. Women who left reported feeling belittled or undermined by their supervisors and co-workers and say they struggled to advance in the workplace. Unrealistic workloads also pushed them to leave. One survey respondent said, "My supervisor has to talk to everybody on his team before we leave for the evening. I'm the last one he talks to, and he never gets to me before 10 p.m."

The Architectural Review

"Why Do Women Really Leave Architecture"

Maria Smith, shortlisted for The Architect's Journal's Emerging Woman Architect of the Year," –

Women architects make up over 40% of architecture students in the US but only 23% of the profession.



Attributed Reasons Why Women Architects Leave:

- One: Being an architect is horrible – long hours, low pay, stress and poor job satisfaction.*
- Two: It's very hard to balance architecture with motherhood.*
- Three: Architecture is sexist, stuck in the wattle and daub ages when it comes to sexual discrimination with a macho culture, unequal pay and unequal opportunities*

One: Being an architect is horrible – long hours, low pay, stress and poor job satisfaction

"Our first explanation, that architecture is horrible, must ring true for the majority of practicing architects, but that does not make it a women's issue. At best this explanation is a red herring; at worst it supports dodgy statements that architecture is too tough for girls. You can say architecture-is-competitive-and-aggressive-in-a-way-that-women-tend-to-identify-less-with until you're blue in the face, but until architecture is less eager to revel in its own agony, how can we expect healthy, non-masochistic individuals, male or female, to become architects? So indulge me a minute, and let's put this aside."

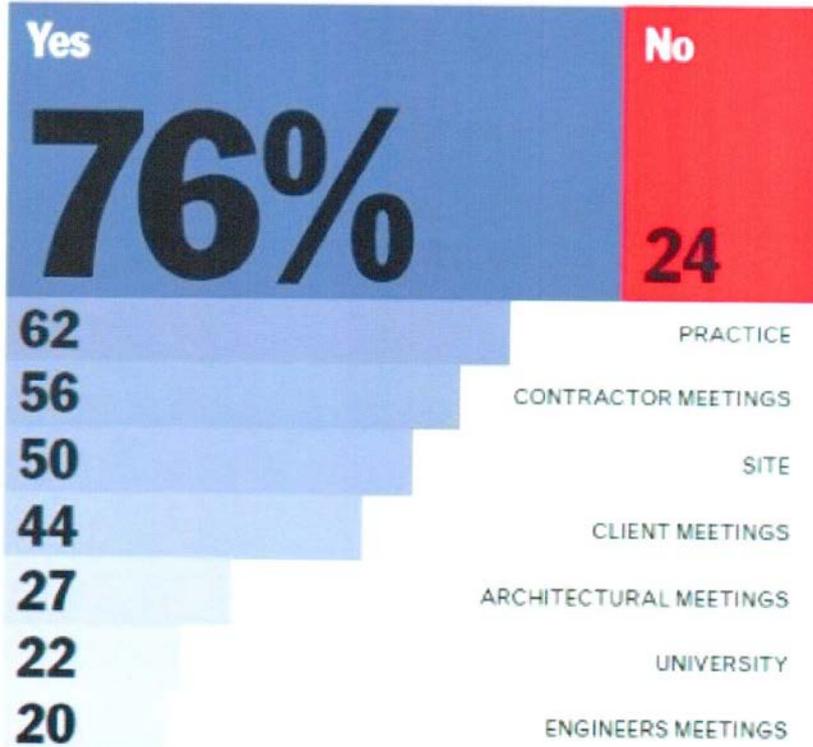
Reason Two: It's very hard to balance architecture with motherhood.

"It is absolutely true that until maternity leave and paternity leave are legally equivalent and transferable and culturally acceptably so, the burden for early childcare will continue to rest predominantly with the mother. [...] But that men still have to abandon family for architecture goes to long, inflexible hours, and that takes us back to [explanation] one, that architecture is horrible, and that fool's errand."

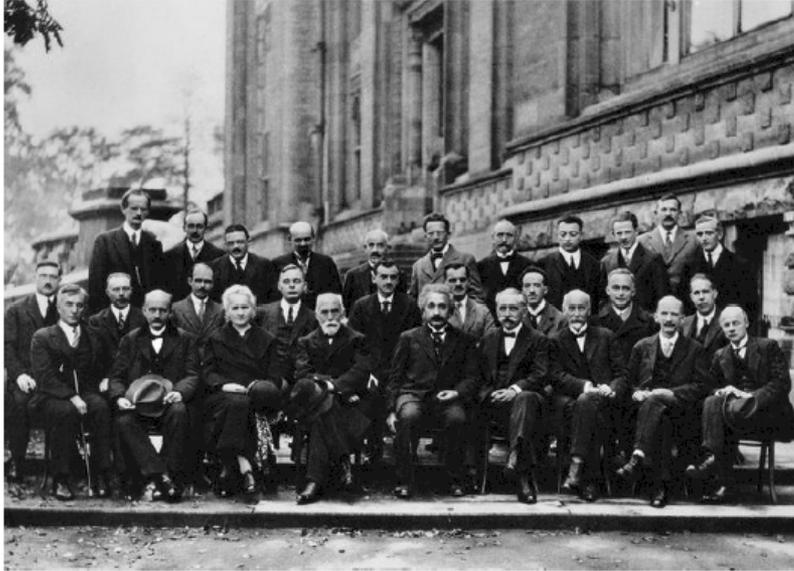
AJ survey reveals rise in workplace sex discrimination

23 January, 2015 By [Laura Mark](#)

Have you ever suffered sexual discrimination during your career in architecture? ... and where has this discrimination occurred?
Female architects say



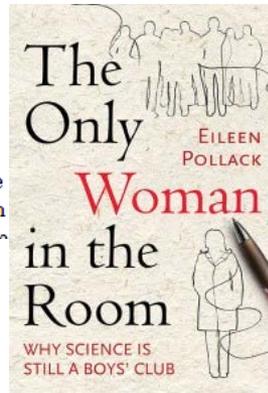
Why Are There Still So Few Women in Science?



At the Solvay Conference on Physics in 1927, the only woman in attendance was Marie Curie (bottom row, third from left).
Mondadori Portfolio, via Getty Images

By EILEEN POLLACK
Published: October 3, 2013 | 1006 Comments

Last summer, researchers at Yale published a study proving that physicists, chemists and biologists are likely to view a young male woman with the same qualifications. Studies of the accomplishments of two women at six major research institutions found that 70 percent of them were not offered the man a job. If they did hire a woman, they offered her an average, nearly \$4,000 lower than what they offered their male counterparts.



As one of the first two women to earn a bachelor of science degree in physics from Yale —graduated in 1978.

“I was dismayed to find that the cultural and psychological factors that I experienced in the '70s not only persist but also seem all the more pernicious in a society in which women are told that nothing is preventing them from succeeding in any field. If anything, the pressures to be conventionally feminine seem even more intense now than when I was young.”

NBER WORKING PAPER SERIES

WHY DO WOMEN LEAVE SCIENCE AND ENGINEERING?

Jennifer Hunt

Working Paper 15853

<http://www.nber.org/papers/w15853>

NATIONAL BUREAU OF ECONOMIC RESEARCH

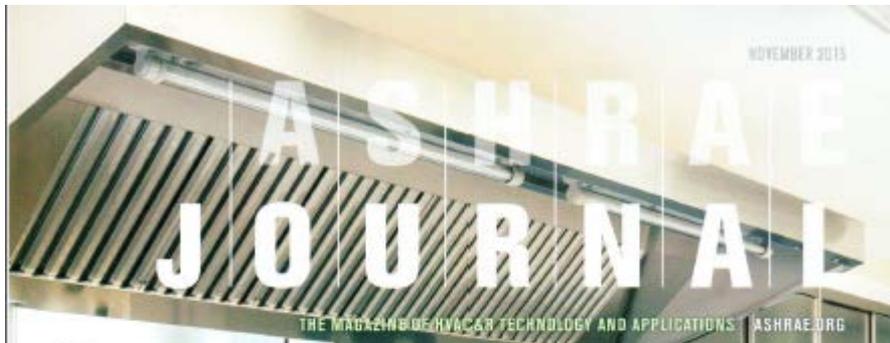
1050 Massachusetts Avenue

Cambridge, MA 02138

March 2010

“60% of the excess exits are attributable to concerns of women engineers regarding pay and promotion opportunities.

The factors stressed in the literature, such as family considerations and work conditions, play little or no role.”



Study Examines Barriers for Women

WEST LAFAYETTE, Ind.—Purdue University has launched a three-year study on the challenges for women in engineering. The study, “Why We Persist: An Intersectional Study to Characterize

and Examine the Experiences of Women Tenure-Track Faculty in Engineering,” has received \$1.4 million in funding from the National Science Foundation. ■





Understanding the Gender Gap In STEM Fields Entrepreneurship

[Full Report](#) 

[Research Summary](#) 

October 2014

No. 424

Understanding the Gender Gap in STEM Fields Entrepreneurship

By Margaret E. Blume-Kohout, MBK Analytics, LLC

Purpose

While it is generally understood that a gender gap exists in science, technology, engineering, and math (STEM) fields, less research has been done on women entrepreneurs in the STEM fields. This report expands on the limited literature specific to women entrepreneurs within STEM fields. In addition, it aims to identify any significant factors or trends that may prove useful to those interested in policies directed at increasing participation of women entrepreneurs in STEM fields.

Gender differences in STEM entrepreneurship expose issues unique to female entrepreneurs in STEM fields while also echoing general gender gap issues in entrepreneurship and in STEM fields.

The gender gap persists for women-owned businesses. While women-owned businesses contribute significantly to the small business economy, they continue to be smaller, less profitable, and more short-lived than their male-owned counterparts.

Is there discrimination against
women owned A&E firms in Hawaii?

Summary of awarded A&E contracts by the agencies of the State of Hawaii and the City and County of Honolulu 2009-2014

Agency	Total \$ Amount of Contract Award (2009-2014)	Total \$ Amount of Contract Awarded to WO A&E Firm	# of Total Awarded A&E contract	# of Contracts Awarded to WO A&E Firms	# of MO Firms Awarded Contract	# of WO Firms Awarded Contract	% of # of A&E Contracts Awarded to WO Firms	% of \$ Amount of A&E Contracts Awarded to WO Firms
DAGS	\$56,692,437	\$3,281,551	349	13	76	4	3.7	5.8
DOA	\$12,043,565	\$646,913	37	3	18	2	8.8	5.37
DBEDT	\$12,483,239	\$550,000	33	1	26	1	3.3	4.4
DOE	\$95,359,434	\$3,978,803	765	42	126	10	5.5	4.2
DHHL	\$37,553,568	\$2,832,867	75	7	25	2	9.3	8.2
DLNR	\$24,866,914	\$768,401	124	4	52	2	3.2	3.1
DOD	\$9,883,977	\$183,158	68	2	37	2	2.9	1.9
DOT	\$385,937,990	\$325,000	257	1	74	1	0.4	0.08
UH	\$96,146,698	\$2,467,475	450	15	119	8	3.33	2.6
Total State	\$730,967,822	\$15,034,168	2158	88	553	32	2.06	4.08
CCH	\$262,770,880	\$676,000	79	2	55	1	2.5	0.25
BWS	\$49,626,430	\$1,233,525	122	4	47	2	3.3	2.5
Total City	\$312,397,310	\$1,909,525	201	6	102	3	0.6	3.0

Is There Evidence of Discrimination?

Disparity Study?

October 18, 2010

The State of Minority- and Women-Owned Business Enterprise: Evidence from Hawai'i

Prepared for the Hawai'i Department of Transportation

DOT study: ‘evidence’ of discrimination

From 2003-2008, DBEs got 35% of dollars from federally funded projects

Sep 30, 2011, 12:00am HST

INDUSTRIES & TAGS [Commercial Real Estate](#)

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 Order

Curtis Lum

Reporter
*Pacific Business
News*



A study commissioned by the Hawaii Department of Transportation concludes that there is “evidence of business discrimination” against minority and women-owned companies that try to do work with the department.

The report was conducted by Texas-based NERA Economic Consulting to determine if businesses in the Disadvantaged Business Enterprise program are receiving what the state considers full and fair opportunities to compete for prime contract and subcontract work with the DOT. The study also was commissioned to determine if the DOT should be allowed to implement race- and gender-specific



DBE Program

Purpose of the Program:

“The DBE program was established to ensure that firms owned by minorities, women and other socially and economically disadvantaged persons have an equal opportunity to participate in U.S. DOT-assisted projects. The goal of the program is to level the playing field on which DBEs may compete for contracts and subcontracts in the transportation industry.”



When requested information on what percentage of Federal DOT contracts awarded to women owned A&E firms, Response of HDOT DBE Director (2015) after strongly denying any discrimination against women owned A&E firms stated the following:

“HDOT maintains a Disadvantaged Business Enterprise (DBE) Directory, it does not maintain a list of contracts awarded to DBEs”

October 18, 2010

**The State of Minority- and Women-
Owned Business Enterprise:
Evidence from Hawai'i**

Prepared for the Hawai'i Department of Transportation



NERA
Economic Consulting

“... minorities and women are substantially and significantly less likely to own their own businesses as the result of marketplace discrimination than would be expected based upon their observable characteristics, including age, education, geographic location, and industry. We find that these groups also suffer substantial and significant earnings disadvantages relative to comparable nonminority males, whether they work as employees or entrepreneurs...”

DBEDT Experience

SID-P5-11-13-01 - Professional Services Solicitation for General Engineering
 Advancing Energy Efficiency in Hawaii Public Facilities (Baseline)
 Debriefing Session

July 25, 2014
 AMEL Technologies, Inc.

EVALUATION CRITERIA - Individual Scores	Total Possible Points	A	B	C	TOTAL SCORE	TOTAL POSSIBLE SCORE	%
1. Experience/Professional qualifications relevant to energy baselines and building assessments and analysis	59	48	52	32	132	177	75%
2. Past performance on projects of similar scope for public agencies or private industry	16	16	16	16	48	48	100%
3. Capacity to Accomplish Work in required time	15	15	15	12	42	45	93%
4. Other Criteria	10	10	10	9	29	30	97%
TOTAL POSSIBLE POINTS/SCORE	100	89	93	69	251	300	84%

Proposal Weaknesses:

1. Provided EnergyStar assessments for two Department of Accounting and General Services (DAGS) facilities and incorrectly completed both of them; in subsequent project did not verify square footage numbers collected in regard to criteria for the audit; did not show working knowledge of Energy Star Portfolio Manager (ESPM) in regard to verifying data; no discussion of government policy and strategies; no discussion on performance contracting statute beyond statement made; no resumes included; misspellings on p. 23 and confusing double paginations.
2. Perfect score in this category.
3. Provided EnergyStar assessments for two (DAGS) facilities and incorrectly completed both of them.
4. Limited information provided.

Start Over Reset Search Back



ENERGY STAR Labeled Building Profile

Facility Profile

ENERGY STAR Labeled Building Profile

Kapolei State Building (Kakuhihewa Building)

601 Kamokila Boulevard

Kapolei, HI 96707

[Map It!](#)

Years Labeled (Rating):

2005 (95), 2006 (94), 2009 (96), 2010 (96), 2012 (96), 2014 (96)

Facility Type:

Office

Total Floor Space:

222000

Year Constructed:

1998

Building Owner:

State of Hawaii - DAGS Central Services

Property Manager:

N/A

For More Info:

Dean Shimomura
Honolulu, HI 96819
8088316736

dean.h.shimomura@hawaii.gov

Please note: The building information in this profile was verified and submitted to EPA at the time of application. Building energy performance, operating characteristics, and ownership/management may be subject to change over time.



STATEMENT OF ENERGY PERFORMANCE Kapolei State Building(Kakuhihewa Building)

Building ID: 1101468
For 12-month Period Ending: November 30, 2005¹

Date SEP Generated:
December 21, 2005

Kapolei State Building(Kakuhihewa Building)
801 Kamokila Boulevard
Kapolei HI 96707

Owner
State of Hawaii - DAGS Central Services
Contact: James Hisano
729-B Kakoi Street
Honolulu HI 96819
808-631-6734

Gross Building Area: 222,000 ft²
Year Built: 1998

Facility Space Use Summary

Space Type	Area(ft ²)	Occupants	Operating hours/week	Number of PCs
Garage	186,000	4	168	N/A
Office (General)	222,000	1,000	55	790

Site Energy Use Summary

Electricity (kBtu)	10,308,971
Natural Gas (kBtu) ²	0
Total Energy (kBtu)	10,308,971

Professional Verification

Melek Yalcintas
1184 Bishop St. Ste 124-302
Honolulu HI 96813
808 590 2340

License Number: 10759-M
State: HI

Results

Energy Performance Rating³ (1-100) 95

Energy Intensity⁴

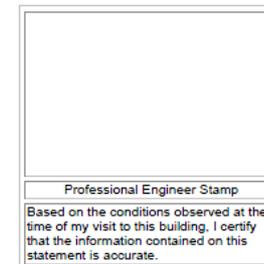
Site (kBtu/ft ² -yr)	46
Weather Normalized Source (kBtu/ft ² -yr)	140

Emissions

CO ₂ (1000 lbs/yr)	3,874
-------------------------------	-------

Indoor Environment Criteria⁵:

Indoor air pollutants controlled?	Yes
Adequate ventilation provided?	Yes
Thermal conditions met?	Yes
Adequate illumination provided?	Yes



Notes:

1. Application for ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of ENERGY STAR is not final until approval is received from EPA.
2. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
3. An energy performance rating of 75 is the minimum required rating to be considered eligible for ENERGY STAR.
4. Values represent energy intensity, annualized to a 365 day calendar.
5. Based on meeting ASHRAE Standard 62-1999 for indoor air quality, ASHRAE Standard 55-1992 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

Tracking Number: SEP200512210001015297



DBEDT Response:

“In the specific case, one member of the selection committee expressed his personal opinion based on his own personal knowledge, knowledge made relevant by AMEL’s reference to some tasks performed by AMEL about which the selection committee member had personnel knowledge. Through due diligence, DBEDT could find no evidence that his scores were unreasonable or unjustified. To overturn these scores after it had been discussed and accepted by the evaluation committee would be an improper and undue influence on the outcome of the procurement process.”

EVIDENCE OF SUBCONCIOUS DISCRIMINATION



State of Hawaii Public Utilities Commission

Table 4: Evaluation Criteria and Scoring

Evaluation Criteria	Scoring
General Requirements	Pass/No Pass
Understanding the EM&V Contractor's Role and the needs of the State	5 points
Offeror Background, Organization and Staff Experience	40 points
Technical Response (including overall proposed approach(es) and responses to essay questions)	35 points
Local Participation	10 points
Cost and Value (value per proposed T&M budget)	10 points
Total points possible	100 points

4.3.5 Local Participation (10 points)

Offerors that engage Hawaii-based firms to participate on the team are viewed favorably, based on the percentage of work allotted to Hawaii-based firm(s) in addition to the Hawaii-based firm(s)' expertise, value and contribution to the overall team.



DEPARTMENT OF COMMERCE AND
CONSUMER AFFAIRS

PUBLIC UTILITIES COMMISSION

LEGAL AD DATE: January 23, 2015

REQUEST FOR PROPOSALS
NO. RFP-PUC-15-01

SEALED PROPOSALS AND PRICING FOR AN
INDEPENDENT EVALUATION, MEASUREMENT & VERIFICATION CONTRACTOR

WILL BE OPENED AT 12:00 P.M. (HST) ON
February 23, 2015

IN THE PUBLIC UTILITIES COMMISSION, KEKUAOAOA BUILDING, 465 SOUTH KING STREET, ROOM 103, HONOLULU, HAWAII 96813. DIRECT QUESTIONS RELATING TO THIS SOLICITATION TO: PROCUREMENT OFFICER, TELEPHONE (808) 586-2020, FACSIMILE (808) 586-2066 OR E-MAIL AT Phyllis.W.Paik@hawaii.gov.

YOUNG FARMERS *p.106* | CAREER TRAINING IN SCHOOLS *p.54*

HawaiiBusiness

OCTOBER 2012



14%

**Why has the number of women
leading big businesses stalled?**

p.32



NATIONWIDE

30%