



ANALYZING ACADEMIC WOMEN IN CHEMISTRY AND ENGINEERING: PROMOTING THE RECRUITMENT AND ADVANCEMENT OF WOMEN IN THE PROFESSORIAL



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ABSTRACT

The purpose of my research is to analyze the faculty demographics in current university institutions, specifically Florida State University, in order to identify the need for a better representation of academic women in the chemistry & biochemistry and engineering departments. There is a large discrepancy between the number of male faculty in STEM (Science, Technology, Engineering, and Math) fields as well as in tenured and leadership positions when compared to the positions of women in these same areas. This project is part of a collaborative partnership to advance, implement, and dissemination programs to advance academic women. This project will build on the research by prior NSF ADVANCE grants to recruit and mentor women faculty in the chemistry and engineering as well as promote leadership of the women faculty within the university and science.

OVERVIEW

A Collaborative Research Partnership

FSU is one of five universities in the Alliance for the Advancement of Florida's Academic Women in Chemistry and Engineering (AAFAWCE). With support from USF, UF, FAMU, and FIU, researchers at Florida State University are attempting to transform our university system in terms of recruiting a more diverse science and engineering workforce in which women hold tenure and leadership positions. This project is funded by a National Science Foundation ADVANCE-PAID grant. The development and execution of this project was based on models of research done by prior NSF ADVANCE grant recipients. AAFWCE built on other universities work in ways such as adapting a faculty recruitment workshop from the University of Michigan, modeling mentoring programs on ones at University of Texas at El Paso, creating a faculty climate survey similar to the one developed at the University of Wisconsin at Madison and a leadership workshop built on the COACH program.



AAFWCE Leaders



Problems in University Institutions

Women are extremely underrepresented in STEM (Science, Technology, Engineering, and Math) fields as well as in tenured and leadership positions. More specifically, AAFWCE identified these three specific issues in current university institutions :

- There is an inadequate recruitment of academic women candidates
- Women faculty are overrepresented in non-tenure track positions
- There has been a failure to retain and advance women faculty in academic leadership positions

OBJECTIVES

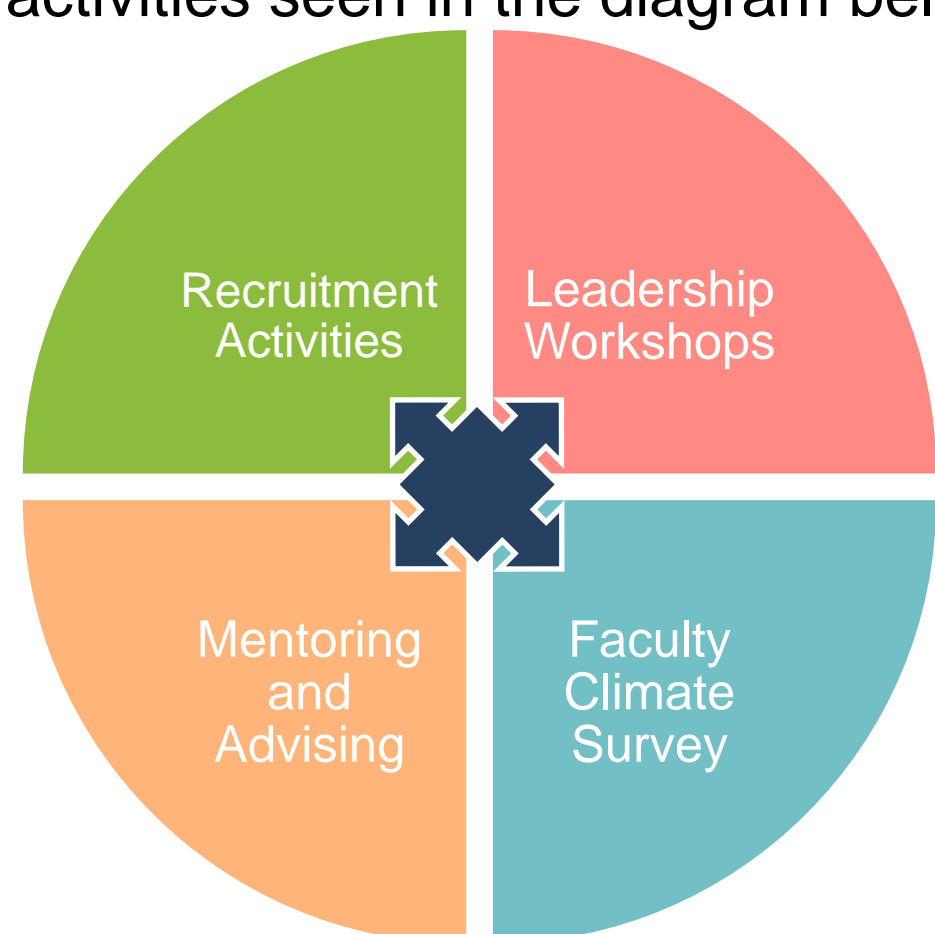
AAFWCE Project Objectives

•To Increase the recruitment of women faculty in chemistry and engineering

•To enhance the retention of women faculty by mentoring academic women

•To promote women's leadership within the departments of chemistry and engineering and within the university

These objectives will be achieved through the implementation of the project activities seen in the diagram below:



Research Objective

To build evidence of the discrepancies between male and female academic faculty in terms of total numbers and tenured positions, through the collection and analysis of faculty demographic data from the FSU Department of Chemistry and Biochemistry as well as the FAMU-FSU College of Engineering

METHODS OF RESEARCH

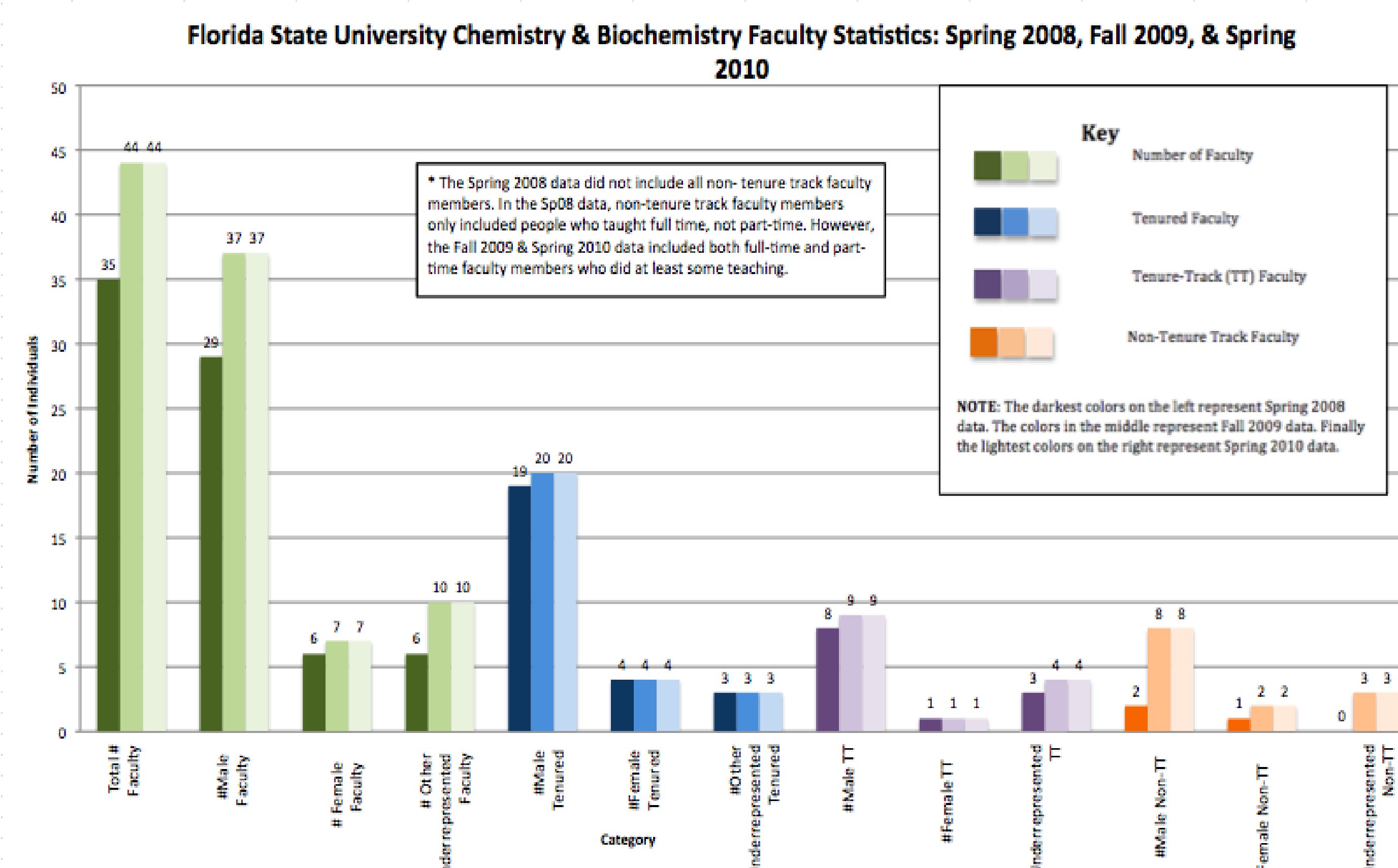
Faculty Demographics: Data Collection & Statistical Analysis

Faculty demographic data from the FSU Department of Chemistry and Biochemistry as well as the FAMU- FSU College of Engineering was collected, compiled, and analyzed. These data were obtained from faculty databases with help from departmental office assistants. The data were then organized in comprehensive excel data sheets (not shown on poster) then visually represented through the creation of histograms. Furthermore, the other participating universities followed the same guidelines of data collection and analysis set out by FSU in order to compare the conditions of the universities statewide. Additionally, national faculty demographic data in science and engineering was also researched in order to support the central claims of this research.

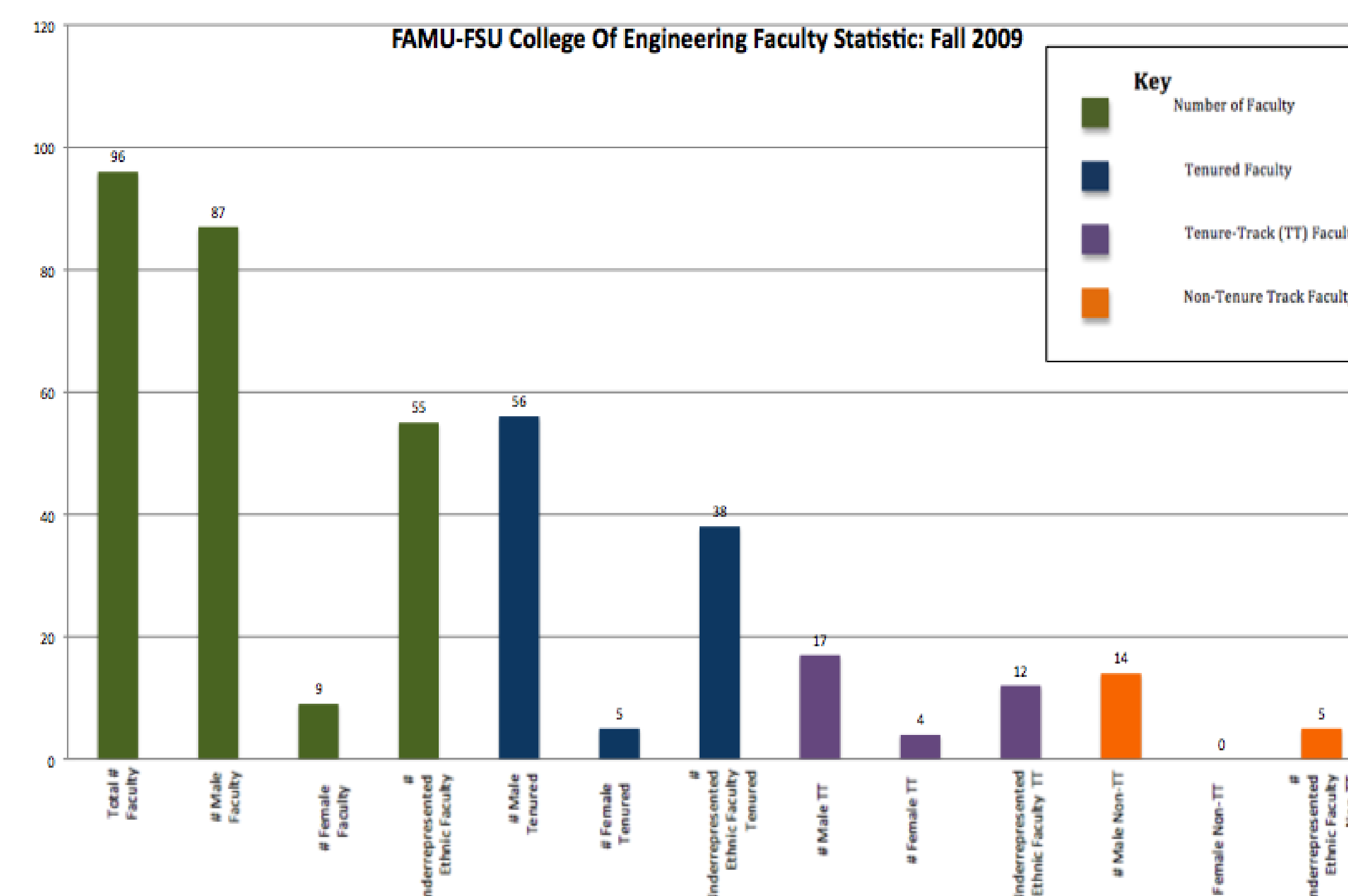
Aspects of the Faculty Demographic Data Include:

- Only instructional and active (not emeritus) faculty members were accounted for
- Faculty data will be collected once every fall
- Total numbers of male and female faculty
- Total numbers of underrepresented ethnic groups, including African-Americans, Hispanics, Asians, and other groups.
- Number of tenured faculty members in each group above. This includes professors and associate professors.
- Number of tenure-track faculty members in each group, those of which are assistant professors
- Number of non tenure-track faculty members in each group, those of which are assist-in or adjunct faculty.

Faculty Demographics for FSU Department of Chemistry and Biochemistry



Faculty Demographics for FAMU-FSU College of Engineering



Faculty Climate Survey

The faculty climate survey is an online survey given to tenure, tenure-track, and non-tenure track instructional faculty members in Chemistry, Physics, and Engineering departments in all five universities. Because the faculty climate survey research does deal with the use of human subjects, great considerations had to be made in order to respect and protect the rights of the respondents. For this reason, the faculty climate survey was reviewed and approved by the FSU Human Subjects Committee. The survey investigates topics related to the satisfaction of the faculty member the faculty recruitment process in their department, the support s/he feels in the department, as well as the person's tenure status, gender, ethnicity and other aspects regarding their personal lives. Essentially, through the analysis of the responses given on the survey the main factors causing the problems at hand will hopefully become apparent.

An Excerpt from the Faculty Climate Survey

1. With respect to the recruitment of, climate for, and leadership of women faculty, how much would you agree or disagree with the following statements about your primary department/unit?	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly	Don't Know
There are too few women faculty in my department.					
My department has identified ways to recruit women faculty.					
My department has actively recruited women faculty.					
The climate for women in my department is good.					
My department has identified ways to enhance the climate for women.					
My department has taken steps to enhance the climate for women.					
Women in my department must work harder than men to convince colleagues of their competence.					
My department has too few women faculty in leadership positions.					
My department has identified ways to move women into leadership positions.					

RESULTS & DISCUSSION

After collecting and organizing the faculty demographic data from the FSU Department of Chemistry & Biochemistry as well as the FAMU-FSU College of Engineering, some definitive trends were revealed. In both chemistry and engineering, women are definitely underrepresented. In chemistry, women only make up 15.9% of faculty. In terms of tenured and tenure track faculty members women only make up 14.7% of that group. In engineering, the numbers are even more one-sided. Women only make up 9.4% of the total faculty. In terms of tenured and tenure track faculty, women make up 11% of that group. The majority of these figures fall are even lower than national statistics, as seen in the figure below.

Comparison of FSU Data with National Data

Institution/ Department	% of Female Faculty	% of Tenured/Tenure-Track Faculty that is Female
FSU Department of Chemistry & Biochemistry	15.9%	14.7%
Physical Science Departments in US Institutions (2006)*	37.3%	17.0%
FAMU-FSU College of Engineering (All Departments)	9.4%	11.0%
Engineering Departments in US Institutions (2006)*	31.9%	10.8%

*From NSF Division of Science Resource Statistics, Survey of Doctorate Recipients: 1973-2006

One very interesting thing that was discovered through the analysis of the faculty demographics was one of the primary problems that was identified by AAFWCE was not found to be true in the FAMU-FSU's College of Engineering, this problem being the overrepresentation of women in non-tenure track positions. In fact, engineering at FAMU-FSU had no women in non-tenure-track positions, not an overrepresentation. In Chemistry and Biochemistry at FSU, there were two women and eight men in non-tenure track positions (therefore, 20% women), which is not statistically different from the 14.7% tenured or tenure-track women. In terms of the other aspect of this project's research, the faculty climate survey, the results of the survey have yet to be analyzed. However, when they are, it is probable that we will have a greater insight on the types of factors, whether they be institutional or personal, contributing to the problems at hand.

DISSEMINATION

A very significant aspect of the AAFWCE's project to advance and promote academic women is dissemination. Unlike most research projects which compile all of their data and evidence and find a solution then present their academic research, we have been disseminating our research throughout the progression of the project. Dissemination throughout this particular research project is done for a variety of reasons. By educating people as soon as possible about this issue, we can allow people to become more conscious of their working environment and in general, more aware of the issues. By disseminating our research throughout the project, it is hoped that more individuals become involved and start taking action for change themselves. Without making the public aware of these issues and help them get involved what needs to be done, it will be extremely difficult to create a more diverse and gender unbiased workplace.

This project raises awareness through:

- Brochures created by AAFWCE leaders and distributed throughout the universities
- The AAFWCE Website
- AAFWCE Recruitment and Mentoring Workshops
- COACH Leadership Conferences
- Online GEOSSET presentations to present our research to audiences all over the World Wide Web.

CONCLUSION

Based on the research evidence and the project activities completed thus far, it is becoming evident that the future of academic women can be changed into a promising one with equity in the workplace and increased opportunity for tenure and leadership positions. As you can see from the statistics compiled in this research, women are indeed underrepresented in the academic chemistry and engineering fields and even more so in tenured positions in those fields. Now that the evidence for this issue has been established, the next step is to promote these findings and continue executing the AAFWCE project activities such as faculty recruitment, mentoring and leadership conferences.

It is the hope of this project that a more diverse science and engineering workforce in which women hold tenure and leadership positions is created. More diversity in the workforce can only reap immense benefits to the scientific world. An increased number of people of different genders, ethnicities, and backgrounds in science and engineering means more perspectives on research and teaching.

In order to continue this project, the AAFWCE workshops will continue to be developed and offered not only to science and engineering faculty but also to men and women from other departments as well as to search committee members and others involved in the hiring of faculty from departments such as human resources. It is hoped that tools from these workshops can be utilized to work with women and men all over university campuses. Furthermore, it is possible that this research project can be used to transform other departments on campus. Departments such as biological sciences, computer sciences, mathematics, and medicine experience similar discrepancies of academic males and females in terms of total individuals on the faculty and tenure status as chemistry and engineering do. With this said, it is hoped that this research project continues and is able to transform our universities.



SOURCES

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