

## **AC 2010-2025: INTEGRATING NEW MALE AND FEMALE JUNIOR FACULTY INTO THE DREXEL UNIVERSITY COLLEGE OF ENGINEERING**

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# **Integrating New Male and Female Junior Faculty into the Drexel University College of Engineering**

## **Abstract**

Over the past ten years, the Drexel University College of Engineering has hired more than thirty new junior faculty. While this rapid influx of young engineering researchers has dramatically changed the face of the college, a significant challenge lies in integrating such a large number of new faculty into existing, established departments. We initiated three programs to facilitate new faculty integration: a junior faculty advisory board, engineering-specific new faculty orientation, and a women in engineering research network.

The junior faculty advisory board's function is to advise the dean of significant issues facing individual junior faculty or the entire cohort. The board is composed of at least one junior faculty member from each engineering department. The board is led by the Assistant Dean for Faculty Development, who is also a junior faculty member, and who meets regularly with the dean and attends the engineering department heads meeting. The junior faculty representatives on the advisory board meet once per quarter with the junior faculty members in their departments and then report their findings back to the advisory board. The advisory board then initiates programming to address junior faculty needs when possible, or advises the engineering dean about significant issues beyond the board's control.

An engineering-specific new faculty orientation was also recently initiated. While Drexel University does have a university-wide new faculty orientation, these sessions did not provide much of the necessary information required for success in the college of engineering. Our new faculty orientation took place after the university orientation but before classes started to ease new faculty tension. Sessions were held on the three tenure criteria: research, teaching, and service. In each session, a panel of three tenured faculty (one senior and two recently tenured) spoke about what was required for success and answered junior faculty questions. Following the three sessions, the junior faculty had lunch with senior administrators and a discussion with the engineering dean.

A particular problem in new faculty integration is bringing women into departments in which few or no women currently work. We started a women in engineering research network to connect junior and senior women in all engineering departments, and thereby attain a critical mass for effective peer-mentoring. The network meets once a month either for a social lunch or for an educational session designed to help female faculty achieve successful research careers. Past sessions included negotiation skills, communication styles, and work-family balance.

Through these three programs, we hope to successfully integrate a large number of new junior faculty into our existing engineering departments. Success will be measured both quantitatively through funding, publication, and tenure rates, as well as qualitatively through new faculty surveys.

## Introduction

Recruiting and hiring new junior faculty is an expensive process for the institution, yet a significant number of junior faculty either leave prior to their application for tenure or do not survive the tenure process. Previous studies indicate the process used to select junior faculty for hire is not a successful predictor of those who will achieve tenure<sup>1</sup>. Despite the motivation to retain high quality junior faculty due to limited institutional resources, these same limited resources can inhibit efforts to create successful faculty retention programs.

Even more challenging is the process of recruiting and retaining diverse faculty, in particular in science, engineering, and mathematics. From 1999 to 2007, 18% of bachelor's degrees and 21.1% of doctoral degrees in engineering were awarded to women. However, only 12.3% of tenured or tenure-track faculty were women in 2008. The highest percentage of women faculty was at the assistant professor level (20.7%), and this decreased to 14.1% at the associate professor level and 7.4% at the full professor level<sup>2</sup>. These trends are similar for both African Americans and Hispanics, however the percentages are significantly lower. Less than 4% of doctorates were awarded to African Americans and Hispanics, and only 2.5% of tenured or tenure-track engineering faculty were African American and 3.5% were Hispanic in 2008<sup>2</sup>.

Faculty diversity is highest at the assistant professor level, therefore a primary challenge in maintaining a diverse engineering faculty is retaining these professors through tenure and promotion to full professor. When junior faculty were assessed in terms of social support and collegiality, teaching, and scholarly productivity, a major problem faced by junior faculty was a lack of collegiality<sup>3</sup>. Social and collegial support, including mentor relationships with senior faculty, critically influence faculty career satisfaction<sup>4</sup>. In a study by Burke, the reasons provided for assistant professor departure (other than tenure denial) were primarily quality of life issues, rather than money. The quality of life issues included intellectual isolation, intellectual incompatibility with senior colleagues, and spousal employment, or lack thereof<sup>1</sup>. Additional supportive evidence showed that many of the reasons faculty provide for leaving research universities are intangibles, such as congeniality of associates, rapport with departmental leadership, research opportunities, and the reputations of the department, institution, and associates<sup>5</sup>. In a study of one research university, when retirement and death were removed from the analysis, institutional issues such as concern with the balance between teaching and research, lack of support for programs (attitudinal and financial), disenchantment with institutional or departmental policies, concerns about departmental interpersonal relations, lack of intellectual stimulation, and inability to find research collaboration opportunities were the third most frequently cited reason for faculty departure<sup>6</sup>.

Several tactics have proven successful in faculty retention, including involvement in the administrative process, keeping new faculty well-informed, and establishing peer and/or collective mentoring. In a study of faculty in pharmacy schools, a participatory style of decision-making was suggested as a means for increasing faculty career satisfaction and therefore retention<sup>7</sup>. By creating faculty committees and task-forces centered around critical university issues, faculty members are given an opportunity to observe how decisions can impact the university and provide critical input into the university's direction. In 1992, the National Science Foundation sponsored the Southeastern University and College Coalition for Engineering

Education (SUCCEED), a coalition of eight institutions in the Southeastern United States with a combined engineering faculty of over 1500. This program focused on developing innovative teaching materials and promoting faculty development. In the SUCCEED model, the designation of a faculty development coordinator within engineering was important to faculty retention programs<sup>8</sup>. This engineering-specific coordinator worked together with campus faculty development personnel to synergize efforts across the university.

New faculty must also be kept well-informed, both about logistical university issues (course assignments, campus services) and less tangible challenges that remain critical to academic success (time management, stress-reduction, lab management). It has been suggested that new faculty receive a strategic welcome followed by a yearlong orientation, which includes instructional workshops in effective teaching, research, and service led by deans, department chairs, and senior faculty<sup>9</sup>. In addition, nonmajority new faculty should receive instrumental mentoring and guidance in leveraging small successes into larger ones, such as how one can convert a successful conference presentation into an article for publication. One of the most successful components of the SUCCEED program was a new faculty orientation workshop which covered effective teaching, establishing and maintaining a successful research program, time management, and learning about and integrating into the campus faculty culture<sup>8</sup>. Whereas it can typically take a new faculty member 4 to 5 years to become productive in research and effective in teaching, a good faculty development program can reduce the learning curve to 1 to 2 years<sup>10</sup>.

Finally, faculty satisfaction has been shown to increase when faculty are part of a caring community, which may include a peer or collective mentoring group. This may be particularly true for women and minorities, who typically receive less mentoring than majority faculty<sup>9</sup>. In general, women faculty members report less social support and fewer intra- and inter-departmental professional interactions than their male colleagues<sup>11</sup>. This isolation, combined with marginalization from male colleagues, may contribute to the “leaky pipeline” of women in engineering<sup>11-13</sup>. Women faculty members who thrived in an engineering environment reported positive relationships with their own graduate advisors<sup>11,14</sup>. However, senior female faculty are rarely available as mentors for new junior faculty, and even if there is an adequate number they may be less appealing to junior faculty since they are outside the departmental norm, have less power and influence in the department, or may already have an overloaded agenda<sup>15</sup>. Furthermore, a variety of mentors are likely required to meet a new faculty members needs rather than a single dedicated person<sup>16</sup>.

Two potential solutions to the female faculty mentoring challenge are peer mentoring and collective mentoring. In peer mentoring, woman faculty build a community that helps them learn while de-emphasizing seniority and hierarchy<sup>18</sup>. These types of communities are more flexible and informal, allowing women to commit at varying levels, which can assist with unpredictable family and child-care responsibilities<sup>18</sup>. In collective mentoring, senior colleagues as a group take responsibility for creating a mentoring team. This sends a message that faculty performance, retention, and advancement are concerns of the larger group<sup>17</sup>. This type of program builds upon the collective knowledge of a group of senior faculty who know how engineering departments works. In a medical school setting, a collaborative peer-group mentoring program was implemented that incorporated development of skills in key areas for career development, a

structured values-based approach to career planning, and instruction in scholarly writing. Most participants enjoyed several key meaningful outcomes, including structured short- and long-term career planning; development of close, collaborative relationships; development of skills in negotiation and conflict management, scholarly writing, and oral presentation; and improved satisfaction linked to participants' decisions to remain in academic medicine<sup>19</sup>. These types of mentoring models may produce organizational change that benefits men as well as women<sup>17</sup>.

Since 2003, the Drexel University College of Engineering has hired and retained 35 new faculty members at the assistant professor level. Of these, 37% are women. However, after several junior faculty left the college either at the mid-tenure or tenure review, several new initiatives were implemented to retain junior faculty and assist in their successful achievement of tenure. These include a Junior Faculty Advisory Board with an Assistant Dean for Faculty Development, a New Faculty Orientation Program, and the Women in Engineering Research Network.

### **Junior Faculty Advisory Board**

The Junior Faculty Advisory Board (JFAB) has several functions, including advising the Dean of Engineering about significant issues facing individual junior faculty and implementing programs to assist junior faculty in progression towards tenure. Each engineering department head nominates two junior faculty from his or her department to serve on the advisory board for a year-long term. The board is led by the Assistant Dean for Faculty Development, who is also a junior faculty member. The Assistant Dean for Faculty Development also meets regularly with the campus-wide faculty development committee, which is chaired by the Associate Vice Provost for Faculty Development and Equity. Both the JFAB and the Assistant Dean meet quarterly with the Dean of Engineering, however the Board meetings are for members only to allow open and honest discussion.

The junior faculty representatives to the Board meet quarterly with junior faculty in their respective departments. The purpose of these meetings is to uncover issues facing individual junior faculty members or larger issues that face many junior faculty across departments. These issues are then raised to the JFAB at the next meeting, where they are discussed anonymously to protect the individual faculty member who reported the issue. If possible, the Board itself will address the issue. However, if necessary, the Board will bring the issue to the attention of the Dean of Engineering. In this way, a specific faculty member's concern can be raised and addressed without potentially damaging that faculty member's reputation.

In addition, the JFAB initiates programming to address junior faculty needs. In 2009, the Board identified four areas considered critical to junior faculty success: faculty education, graduate student recruiting and funding, junior faculty visibility, and mentoring to achieve tenure. The purpose of the faculty education program will be to answer frequently asked questions by new and junior faculty. An educational program will be put together by determining common questions through a junior and senior faculty survey, since senior faculty are often the ones who are asked the questions. The JFAB members will then seek answers to the questions from faculty, staff, and administrators and compile these into a packet that will be handed out to new faculty and placed online.

Incorporating high quality graduate students into a new laboratory is critical to junior faculty research success, yet can be extremely challenging for new faculty. Often graduate students are needed to produce preliminary data needed for grant proposals, but without research funding, these students cannot be supported. Additionally, it is difficult to commit to support a graduate student long-term when future research funding is uncertain after start-up funds run out. The JFAB will explore ways both to improve the quality of graduate students recruited to the College of Engineering, as well as propose creative ways to fund these students.

To achieve tenure, junior faculty must become known as experts in the field. This requires high visibility, both inside the university and in the larger academic community. The JFAB is exploring ways in which junior faculty can be highlighted in internal seminars, socials, and websites. In addition, the Board is investigating formalizing processes to nominate junior faculty for prestigious national and international awards, and ensure that junior faculty are well-represented among the invited talks at conferences and on national professional organization committees.

Finally, the primary concern for junior faculty is achieving tenure in the university. However, the College of Engineering is primarily composed of senior faculty who were tenured under a different model than the current junior faculty will experience. Therefore, traditional one-on-one mentoring between junior and senior faculty may not be effective. The JFAB is exploring ways to educate junior faculty about the tenure process, including providing meaningful checkpoints on the way to tenure, within the existing limitations. One possibility is creating mentoring groups, in which the junior faculty could collectively ask questions of the relatively small faculty population who have been tenured under the new system.

The JFAB provides a meaningful step to retain junior faculty and ensure their academic success. Issues facing junior faculty can anonymously be brought to the attention of the Dean of Engineering, and new programs can be initiated to help junior faculty achieve success. Perhaps most importantly is the process of involving junior faculty in the College of Engineering administration itself. The junior faculty members of the Board have increased access to the Dean, camaraderie with junior faculty across engineering departments, and a feeling of involvement in the university decision-making process.

### **New Faculty Orientation**

Drexel University hosts a general new faculty orientation, however this program does not provide much of the necessary information required for success in the College of Engineering. Last year, the JFAB initiated a new faculty orientation that took place after the university orientation but prior to the start of classes. Since resources and time were limited, a half day program was planned to focus on the three tenure criteria: research, teaching, and service.

In each session, a panel of three tenured faculty (one senior and two recently tenured) spoke about what was required for success in the College of Engineering in that particular area. Each tenured faculty member provided their own background, spoke briefly about their experiences at the university, and then answered junior faculty questions as a panel. In this way, the junior

faculty had the opportunity to learn as well as meet nine senior faculty from various departments, which further helped increase their visibility.

Following the three sessions, the junior faculty had lunch with senior administrators and a discussion with the Dean of Engineering. The lunch was attended by the Provost, Vice Provost for Research, Vice Provost for Academic Affairs, Assistant Dean for Facilities, and Engineering Outreach Coordinator among others. This provided the new faculty with visibility to senior administrators, as well as the feeling that they were being welcomed to the university at a higher level. In the private session with the Dean of Engineering, the new junior faculty learned directly from the source what was expected of them in their first few years.

This initial orientation was followed by a quarterly update lunch with the Dean of Engineering. In each of these sessions, the junior faculty approach the Dean with their questions and concerns, and the Dean informs them of changes and policies within the College. This maintains the line of communication with the new faculty, and improves their perception of being an integral part of the Dean's plan for College of Engineering success.

While the orientation was small, short, and easy to organize, the initial feedback from new junior faculty was positive. One faculty member commented:

*“Thanks for putting together the CoE orientation for us today. It was very useful and was nice to hear different experiences from faculty.”*

One area for improvement was the incorporation of a student panel into the orientation so that the new faculty could also learn about the diverse needs of the unique student population at Drexel University.

### **Women in Engineering Research Network**

The Women in Engineering Research Network (WERN) is a model for peer and collective mentoring. This group was started after the departure of several new junior female faculty, primarily related to their feelings of isolation in their respective departments. While some departments within the College of Engineering have one or more tenured female faculty, several departments only have female faculty at the assistant professor level.

The WERN group is composed of both faculty and graduate students in engineering. It has been suggested that the learning curve for new professors can be shortened by providing training while they are still in graduate school (5). Therefore, workshops are created that address faculty only, graduate students only, or the group together. This allows for each group to learn about issues critical to research career success while networking and mentoring among peers, from senior to junior faculty, and from faculty to graduate students.

Several workshops were created for faculty only. These included three sessions on “Communication Skills for Effective Management,” including gender issues in management, arranged and led by the Human Resources Department. This program used a well-researched tool, the DiSC profile, to help female faculty identify their own dominant communication style

complete with its inherent strengths and challenges. Faculty then learned how to communicate more effectively with others who have a different behavioral style than their own and how to leverage their strengths and compensate for weaknesses in style, with the end goal of creating more productive and fun classrooms and workplaces. An additional faculty-only session addressed cross-cultural mentoring to assist female faculty in finding and being effective mentors to men, women, and minorities. Alternative workshops were created for graduate students only. These included a panel discussion on Research Careers in Industry, a research writing workshop, as well as a series on how to apply and interview for academic positions.

However, the majority of workshops were available to both faculty and graduate students. Over the past two years, the WERN group members learned about negotiation, time management, impression of women in leadership roles, and work/life balance from Phoebe Leboy (National President of the Association for Women in Science). Purely social events were also scheduled, such as a chocolate tasting, to improve collegiality among the women in engineering. This year, we will also initiate programs with women's groups in other universities in our local area to further expand networking for women in engineering.

The WERN events are scheduled at lunch, to allow faculty and students with home and childcare commitments to attend. 30 to 40 women in engineering research attend each event, and many have found the group an excellent way to expand their supportive community. The group has the enthusiastic support of the Dean of Engineering and the Associate Vice Provost for Faculty Development and Equity. We hope to soon initiate a yearly retreat.

*"I just wanted to write to say thank you for setting up the monthly women's meetings. I find them to be a lot of fun and very beneficial. It is great to have female role models to look up to!"* - **PhD candidate, mechanical engineering**

*"Thank you for bringing such good people to visit Drexel. I enjoyed the discussion about the importance of finding mentors that have the time and desire to work with you."*  
- **Assistant Professor, mechanical engineering**

## **Conclusions**

The Drexel University College of Engineering has instituted several new programs to enhance junior faculty retention and success in progression to tenure. These programs are designed to involve junior faculty in the administrative process (JFAB), keep new faculty well-informed (new faculty orientation), and establish peer and/or collective mentoring (WERN). These programs have only recently started, therefore we do not yet have quantitative measures of their success. However, we will monitor junior faculty research funding, as well as retention and tenure rates, to assess their success. Finally, junior faculty will be surveyed each year to measure their career satisfaction. The three programs described are inexpensive and require little work to implement, however we believe that they can significantly impact junior faculty satisfaction, retention, and success.



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