REFERENCES[i]

Hamadi McIntosh
University of Florida
hammcin@ufl.edu
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Comprehensive Approach Mentoring Program

Buch, K., Huet, Y., Rorrer, A., & Roberson, L. (2011). Removing the Barriers to Full Professor: A Mentoring Program for Associate Professors. *Change: The Magazine of Higher Learning, 43*(6), 38-45. Retrieved from http://search.proquest.com/docview/964181501?accountid=10920

Although associate professors comprise only about 20 percent of all full-time instructional faculty in degree-granting institutions, the rank is important because it is the primary pipeline from which institutional leaders emerge. In this article, the authors describe the results of a campus-wide needs assessment at the University of North Caroline (UNC), Charlotte, that identified career challenges facing associate professors, as well as a comprehensive mid-career mentoring program for associate professors that is part of the institution's response to these challenges. This program is supported by an ADVANCE institutional transformation grant from the National Science Foundation (NSF), a national initiative to increase the representation, retention, and career advancement of women faculty in STEM disciplines. However, because the needs assessment indicated that all associate professors might benefit from career-development opportunities, most of the initiatives are open to all associates, regardless of gender or discipline. The authors also report the results of a survey--administered two years into the program--to examine the effects the program might have had on faculty perceptions of the processes and expectations regarding promotion to full professor. While their findings revealed commonalities across genders, the authors also observed some significant gender differences that reinforce and extend emergent findings from a string of recent studies on mid-career faculty. (Contains 1 figure, 1 table and 12 resources.) (ABSTRACT FROM AUTHOR).

Gorman, S. T., Durmowicz, M. C., Roskes, E. M., & Slattery, S. P. (2010). Women in the Academy: Female Leadership in STEM Education and the Evolution of a Mentoring Web. *Forum on Public Policy Online, 2010*(2), 21. Retrieved from http://search.proquest.com/docview/815958378?accountid=10920

Women continue to be underrepresented in science, technology, engineering, and mathematics (STEM) fields and in STEM leadership positions. According to the most recent data available from the National Science Foundation, in academia only 31% of full-time STEM faculty and 27% of STEM deans and department heads are women. By comparison at Stevenson University (SU), 71% of the full-time STEM faculty members are female and 100% of the academic leadership in STEM is provided by women, which sets the university apart from the national norm. Together with an informed, innovative approach to curriculum reform, synergistic leadership and management principles and practices have allowed the School of the Sciences (SOS) at SU to do more with less in STEM education. Total enrollment in the SOS has grown dramatically in recent years and now represents 29% of the total full-time undergraduate population. Local and national STEM outreach programs led by the SOS serve to complement the

undergraduate programs and to strengthen the STEM workforce and education pipelines at multiple points. By sharing strategies and results in a case study format, this paper will demonstrate a model for "what works" with regard to female leaders building and sustaining successful and effective academic programs in STEM. An important element of the model is the mentoring web that has been developed to support and sustain the leaders, faculty, staff, and students in the SOS. The SOS network includes both formal and informal structures in which one-on-one and group mentoring occurs on a regular basis. The nature of the mentoring is tailored to the position of the participants involved, but in each case the mentoring contributes to professional growth and development. The emphasis on mentoring has contributed to an increased sense of community and collegiality in the SOS and has enabled the School of the Sciences to make rapid progress in STEM curricular reform and program improvement. (Contains 4 tables.)
(ABSTRACT FROM AUTHOR).

Karukstis, K. K., Gourley, B. L., Wright, L. L., & Rossi, M. (2010). Mentoring Strategies to Recruit and Advance Women in Science and Engineering. *Journal of Chemical Education, 87*(4), 355-356. doi:10.1021/ed800138s

Supporting faculty with professional development resources at all career stages is vital to the success of faculty members, their students, and academic institutions. In science and engineering fields where women are underrepresented, practices that promote career advancement, such as formal and informal mentoring programs, can be effective in both increasing the visibility and numbers of senior women and also encouraging female students to pursue technical majors and careers. A symposium at the March 2010 National Meeting of the American Chemical Society will feature an array of successful mechanisms for enhancing the leadership, visibility, and recognition of women faculty members using various mentoring strategies.
(ABSTRACT FROM AUTHOR).

McDaniels, M. (2012). *Realizing The Impact Of Mentoring Policies & Best Practices: Empowering Early Career Academic Researchers To Utilize Mentoring Relationships To Achieve Important Professional Milestones.* Unpublished paper presented at 2012 Women in Engineering Programs and Advocates Network National Conference, Columbus, OH.

On my own campus, Michigan State University, we are fortunate to have one of the National Science Foundation's NSF ADVANCE Institutional Transformation grants (www.adappadvance.msu.edu). Utilizing the fiscal and intellectual resources this ADVANCE grant provided, we were able to propose and secure approval (as of September, 2011) for a university-wide faculty mentoring policy (Appendix A) that requires all units on campus to provide access to mentoring for early career faculty. We developed a nationally recognized mentoring toolkit (Luz, 2011) that serves as a valuable resource for mentors, mentees, and administrators alike. In sum, my campus has a lot of what I might call 'mentoring capital'. In August 2011, my colleagues and I were very pleased with our progress – a new university wide faculty mentoring policy was in place (one of only a few in the nation) and our deans understood that each college needed to have a college-wide program that affirmed the nine principles identified in the university-level policy. What was missing? I soon realized that we needed to shift our focus back to the most important question – "How can we translate these best practices and policies to concrete career

outcomes that facilitate the success of our faculty?" It was very easy for those of us working hard to get the policies and programs in place to lose sight of the fact that mentoring is a means to a greater end of producing positive career outcomes for faculty. This quote from Einstein sums up this dilemma quite nicely: "Perfection of means and confusion of ends seem to characterize our age".
(Adapted from the source document).

Group Mentoring

Yen, J. W., Quinn, K., Carrigan, C., Litzler, E., & Riskin, E. A. (2007). The Advance Mentoring-for-Leadership Lunch Series for Women Faculty in Stem at the University of Washington. *Journal of Women and Minorities in Science and Engineering, 13*(3), 191-206. Retrieved from http://search.proquest.com.lp.hscl.ufl.edu/docview/35213914?accountid=10920

Given the increasingly smaller number of women in science, technology, engineering, and mathematics (STEM) fields as one progresses through the academic pipeline, it is often very difficult for women in STEM faculty positions to find a community of women and identify women mentors, especially at the upper rungs of the academic ladder. Group mentoring opportunities are one strategy to connect women STEM faculty and generate greater interest and success in academic leadership. In 2003 the University of Washington (UW) ADVANCE program introduced the Mentoring-for-Leadership lunch series to encourage women faculty to consider leadership; expose women faculty to various career paths; and build a community of women faculty in STEM. This paper describes the UW program, the literature that informs the program, and the participants' experiences. This paper also offers recommendations for replicating this program at other campuses.
(ABSTRACT FROM AUTHOR).

Mentors

Dunham, C. C., Weathers, L. H., Hoo, K., & Heintz, C. (2012). I Just Need Someone Who Knows the Ropes: Mentoring and Female Faculty in Science and Engineering. *Journal of Women and Minorities in Science and Engineering, 18*(1), 79-96. Retrieved from http://search.proquest.com.lp.hscl.ufl.edu/docview/1022852932?accountid=10920

Although women are making inroads into academic science and engineering, they are under-represented in all science and engineering disciplines, are less likely to be full professors (J. Burrelli, in InfoBrief: Science Resource Statistics, NSF, Washington, DC 2008), and are more likely to have exposure to negative experiences with a sexist and hostile climate (H. Dryburgh, Gender Soc., vol. 13, pp. 664-682, 1999; . J.G. Robinson and J.S. McIlwee, Sociol. Q., vol. 32, pp. 403-421, 1991). As a result of these inequities many universities have implemented mentoring programs to provide equal career support for women and men in order to improve success in achieving tenure and promotion. The goal of this research is to report findings from a small interview study of female faculty in science and engineering, reporting their perceptions of their mentoring experiences and the role of gender in shaping those perceptions in an effort to gain insights that will help to make mentoring programs more effective. Three distinct types of mentoring emerged, including: (1) global mentoring, which was the most wide-ranging, involved and committed mentoring relationship; (2) formal targeted mentoring, which occurred in the context of a

formal program, was aimed specifically toward providing advice and support toward attaining a career goal; and (3) informal targeted mentoring often initiated by the protegee herself. We found that the mentoring relationship is affected by the use of traditional gender ideology that supports the belief that being a woman and an engineer/scientist is not compatible, which has the potential to influence the mentoring relationship by making protegees feel more vulnerable to negative evaluation. Finally, we make a series of concrete recommendations for developers of mentoring programs to make them more supportive for women faculty.
(ABSTRACT FROM AUTHOR).

Fox, & Fonseca. (2007). Gender and Mentoring of Faculty in Science and Engineering: Individual and Organisational Factors. *International Journal of Learning and Change, 1*(4), 460-483. doi:http://dx.doi.org.lp.hscl.ufl.edu/10.1504/IJLC.2006.013912

The study significantly advances understanding of faculty's mentoring of other faculty, by gender, in science and engineering. The empirical analyses are grounded in a conceptual framework about the importance of individual and organisational characteristics in explaining faculty performance, including mentoring. The models investigate factors that explain: (1) who mentors, by gender and (2) who are mentored (women only, men only, or both women and men), by gender. Findings highlight the importance of individual and organisational/institutional characteristics for mentoring. Specifically, higher levels of rank significantly increase the likelihood of being a mentor among both women and men; while being a principal investigator is significant for men only. Departmental climates perceived as 'stimulating' influence being a mentor, but differ by gender. Any effect of field on being a mentor is present only for women. Multinomial models point to gender differences in explaining who mentors women only, men only, or both.
(ABSTRACT FROM AUTHOR).

Riegle. (2007). Mentoring and Socialisation: Senior Female Faculty and Mentoring Practices. *International Journal of Learning and Change, 1*(4), 446-459. doi:http://dx.doi.org.lp.hscl.ufl.edu/10.1504/IJLC.2006.013911

The research and literature on mentoring practices is relatively new, and within this emerging area, there are few studies that focus on the experiences of mentors. The purpose of this study is to gain insight into the experiences of one group of mentors: senior female faculty in the sciences and engineering. Through interviews with female professors and associate professors, mentoring experiences are explored. Based on a grounded theory approach to collect and analyse the data, two major findings emerge. First, the interviewees revealed an overall organisational emphasis on mentoring students. This phenomenon is fostered by an academic environment that values anticipatory socialisation and scientific productivity over organisational socialisation and personal development. However, the interviewees explicitly expressed that a lack of mentoring for faculty members was detrimental to their careers. This second finding defines a clear disconnect between the values of the institution and the needs of the female faculty members.
(ABSTRACT FROM AUTHOR).

Mentees

Jenkins, S. R. (2010). A Practical Guide for Mentees. *Psyccritiques, 55*(25), No Pagination Specified. doi:10.1037/a0020021

Reviews the book, Getting the most out of your mentoring relationships: A handbook for women in STEM by Donna J. Dean (see record 2009-09390-000). As implied by the back-cover note, this book is a quick-reference guide addressing a wide variety of questions that women in the STEM disciplines (science, technology, engineering, and mathematics) who are potential protégées might bring to the search for a mentor and the development of such a relationship. The overall trajectory of the book moves from guidelines for planning and action in the first few chapters to anecdotal personal accounts in later ones. However, the prospective protégée need not follow that trajectory; the book is equally useful for a quick browse when a crisis threatens. The detailed six-page table of contents and similarly sized index together account for 14 percent of the book's length, the former listing more headings than the book has pages. Rather than defining a clearly focused and systematic structure, the "chapters" are loose rubrics for organizing the many short sections under general topics such as Preparing to be Mentored and Voices of Experience. Many sections are introduced by short aphoristic quotations that range from advice to encouragement to inspiration. The language and tone throughout are advisory rather than scientific; the author writes as a friendly coach. There are few citations to literature, and little of that is empirical research. "Science" here emphasizes math and the physical and technical sciences; social and behavioral sciences are invisible, as is the large body of research on the present topics from those fields. A few carefully selected resources for more comprehensive information on dual career families, balancing work and personal life, sexual harassment, discrimination, and, yes, mentoring, would help the mentee facing these challenges to pursue further assistance. Finally, the frequent word-level typographical errors are frustrating and distracting, requiring the reader to backtrack to untangle the resulting confusion. Overall, this book has much to recommend it to women in science, who even today are not yet situated similarly to their male colleagues. This guide makes a good beginning for women students of science, and its encouraging, welcoming tone and readability are congenial for undergraduate audiences as well as graduates and early-career scientists. (PsycINFO Database Record (c) 2012 APA, all rights reserved) (ABSTRACT FROM AUTHOR).

Layne, P. (2011). *The Role of Mentoring in the Careers of Women Engineering Deans.* Unpublished paper presented at 2011Women in Engineering Programs and Advocates Network National Conference, Seattle, WA.

Despite tremendous gains over the past 30 years, women are still severely underrepresented in engineering and engineering education. In 2009, only 17.8% of the more than 74,000 engineering bachelor's degrees awarded in the United States went to women, down from 21.2% in 1999. Women are currently 12.7% of all engineering faculty, and only 7.7% of full professors in U.S. engineering schools (Gibbons 2010). According to the American Society for Engineering Education (ASEE), 69 women had served as dean of engineering at one of the almost four hundred engineering or technology colleges in the United States and Canada that are institutional members of ASEE, and 38 women held that title in spring of 2010. Seven of the 50 largest engineering schools (in terms of bachelor's degrees awarded) are or have been led by women, and one of these institutions (Purdue) currently has its second female dean. The majority of female deans have assumed that role since the turn of the century, with several women

appointed dean each year since 2005, and nine appointed in 2009. Of the 31 former deans, half have gone on to other academic leadership roles including provost, vice-president for research, chancellor, and president. Interviews with 21 women deans between 2002 and 2010 for profiles in the *SWE Magazine* explored their career paths, accomplishments, work/family issues, and leadership styles. This paper focuses on the role of mentors, professional society activities, and other leadership experiences in the career development of female engineering deans. Future leaders may benefit from the experience of these pioneering women.
(ABSTRACT FROM AUTHOR).

Stenken, J. A., & Zajicek, A. M. (2010). The Importance of Asking, Mentoring and Building Networks for Academic Career Success - A Personal and Social Science Perspective. *Analytical and Bioanalytical Chemistry, 396*(2), 541-546. doi:10.1007/s00216-009-3275-x

This article aims to provide both personal and scholarly perspectives on how seeking mentoring and cultivating the skills of asking and networking are important habits that all faculty members can use on a day-to-day basis to build a successful academic career. While there are many different pathways that one can follow to achieve success, the examples included here come from the first author's experiences as a faculty member at Rensselaer Polytechnic Institute and the University of Arkansas (To make the following narrative easier to follow, the pronoun "I" refers to JAS.). The social science perspective for this article focuses on how these practices affect women, because 41% of Association for Women in Science (AWIS) fellows (men and women) state that mentoring of non-tenured ("junior") faculty is still the major institutional policy that must be addressed in order for junior faculty to succeed [Rosser SV (2006) J Women Minor Sci Eng 12:275–293].
(Adapted from the source document).

Predictive Models

Steffen-Fluhr, N., Collins, R., Gruzd, A., Zhu, M., Wu, B., & Passerini, K. (2012). *Leveraging Social Network Data to Support Faculty Mentoring: Best Practices from NJIT Advance.* Unpublished paper presented at 2012 Women in Engineering Programs and Advocates Network National Conference, Columbus, OH.

"The Old Boys Network" used to be a metaphor, signaling hidden inequalities. Now it is a map--a web-like highway on which we can track the flow of social capital from one human node to another. At the NJIT Advance Project, funded by a grant from the National Science Foundation, we are learning how to read that map and to transfer our navigational ability to young faculty and university change agents. In broad terms, the goal of NJIT Advance is to demonstrate that social network analysis can be used to affect institutional transformation, ensuring the full participation of women in academic science and engineering. Our specific objective is to develop predictive models of faculty career success as part of a novel, network data-driven approach to faculty mentoring. In this paper, we discuss the methodology we have used to collect and analyze faculty network data over the past decade (2000-2010) and demonstrate how we are making that data available to faculty mentors and mentees through two new mapping tools: the *Research Interests Map* and the *Faculty Connections Visualizer*.
(Adapted from the source document).

Workshop

Juhas, M. C., Arruda, E., Chesler, N., & Tilbury D. (2011). *Mentoring and Networking Workshop for Junior Women Faculty in the Big Ten.* Unpublished paper presented at 2011Women in Engineering Programs and Advocates Network National Conference, Seattle, WA.

Very few opportunities exist for junior women faculty in engineering to network, foster peer mentoring relationships and interact with other female engineering faculty, particularly with female role models. This lack of professional interaction is often cited as an important contributing factor to the under-representation of women on engineering faculties (Chesler 2003). The disproportionate absence of women faculty, especially since it exists at large engineering schools, is believed to also be adversely affecting the representation of women in the engineering workforce. We held a pilot workshop for junior women engineering faculty from the Big Ten schools with the following purposes: to provide a professional networking opportunity – the workshop included a research poster session and other opportunities to engage in research conversations; to cultivate peer collaboration and mentoring relationships – activities designed to share best practices for success were included; to foster interactions with senior engineering role models – discussions highlighted multiple pathways to success. (Adapted from the source document).

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