

NETWISE II:

Empirical Research: Breaking through the Reputational Ceiling: Professional Networks as a Determinant of Advancement, Mobility, and Career Outcomes for Women and Minorities in STEM (NSF Grant # DRL-0910191)

Co-Pi's

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Project Summary

This *empirical research* proposal addresses the characteristics and role of networks in career advancement, outcomes, and mentoring for women and underrepresented minority academic scientists in non-Research I institutions. The underrepresentation of women and the “invisibility” of minorities in academic science are recognized to be a significant national policy crisis and “waste” of human capital (NAS, 2007). A common thread in many of studies regarding the advancement of women and minorities in STEM fields is reference to the importance of **professional networks**. This observation has been underscored in the recently issued NAS report, *Beyond Bias and Barriers*, that repeatedly points to issues of lack of network access and participation for women in the sciences, noting “...**differences in career trajectories for men and women are generated and reinforced by the social structures in which people are situated and by the networks of interactions in which they participate**” (NAS, 2006; p. 174). Studies on science focus considerable attention on the most competitive scientists – those employed in Research I institutions. Yet, women and under-represented minority PhDs are disproportionately employed in Research II and Comprehensive institutions. The purpose of this research is to address the structural and resource determinants of underrepresentation, career success, and satisfaction of women and underrepresented minorities PhDs who have faculty appointments in Research II and Comprehensive institutions. We give particular attention to the role of mentorship and aspects of specific mentor resource exchange in affecting network access and participation.

This proposed study will capture detailed content and dynamics of professional networks in the less research intensive academic science setting and relates them statistically to both tangible and intrinsic career outcomes. Specifically, this involves an interdisciplinary multi-method approach that blends extensive quantitative social network, productivity, and career data with detailed and rich qualitative data to address issues of structure and impact of professional networks in this environment. The purpose of this research are **1)** to quantitatively measure the structure and resources of individual professional networks (collaborative, professional development, mentoring and advice-related) of academic scientists in non-Research I environments; **2)** to determine how network structure and resources vary by gender, race, rank, and other control factors; **3)** use these data to develop and test a series of explanatory models that provide a causal understanding of the role of networks in the productivity, advancement, mobility, and satisfaction of women and especially underrepresented faculty in these fields; and **4)** integrate network findings with qualitatively rich interview data, to advance the understanding of issues facing women and underrepresented minorities and transform the empirical findings into practical applications.

Intellectual merit This research utilizes multiple methods and types of data to apply existing knowledge about social networks to explain low representation of women and minorities in Research II and Comprehensive universities. It builds on a cross disciplinary research in higher education, academic science, evaluation of science, sociology, social network theory, science policy, human resources studies, mentoring literature, and statistical and qualitative methodology. The proposed research represents an extension and expansion of current work NSF funded work on networks in the Research I environment to the study of the structure and resources of professional networks in Research II and Comprehensive institutions. The study not only builds on the learned capacity of the project team to undertake the proposed methodologies and data collection techniques, but also enables informed reflection by the team on the important differences in the effects of network structure and resources on scientists in Research II and Comprehensive universities.

The **broader impacts** are potentially significant and transformative. Better understanding of the characteristics and roles that professional networks play for women and underrepresented minorities can improve career advancement and outcomes in academic science. An empirically based, detailed understanding of the composition and implications of network access and interaction for advancement and can improve interventions designed to create a more diverse STEM workforce. The results have the potential to inform structural aspects of non Research intensive academic environments, and the nature of interventions designed to attract, retain, and advance women and minorities in those institutions. Because the data are not limited to women and minorities in these fields, the study also has the capacity to provide outcomes relevant to the non research intensive academic communities overall. The dissemination plan proposed here will work towards these ends. Finally, graduate and undergraduate students will be thoroughly integrated in all aspects of the research, thereby enhancing the future capacity of individuals to study STEM workforce issues.