

Work in Progress: The Power of Cross-Institutional "Speed" Mentoring and Networking Program in Advancement of Women, URM, and Foreign Born/Trained Engineering Faculty

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The Power of Cross-Institutional “Speed” Mentoring and Networking Program in Advancement of Women Engineering Faculty considering the URM and Foreign Born/Foreign Trained Status (Work-in-Progress)

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Abstract:

Mentoring interventions, particularly mentoring that incorporates networking, have been effective at meeting the professional needs of women and under-represented minority (URM) faculty. However, women, especially URM women, in STEM careers report feeling left out of networks and thus face decreased social and administrative support. The isolation of women, especially URM women, in engineering in the California State University (CSU) System is apparent in the fact that many CSU engineering departments have only a few women faculty and no more than a single URM woman faculty. Thus, despite current mentoring programs at each CSU campus, there is only a few (if any) other women within their engineering department with whom they may discuss shared experiences. As part of the NSF funded ADVANCE Partnership grant, “Kindling Inter-university Networks for Diverse (KIND) Engineering Faculty Advancement in the California State University System”, in order to address this isolation and to provide mentoring and networking opportunities for women engineering faculty in the CSU system, particularly woman who identify as URM, a series of virtual (to enable cross-campus mentoring), small group setting (to incorporate networking) mentoring events was organized. Another aspect of this initiative emphasizes foreign-born (FB) or foreign-trained (FT) women, a unique focus. Although the speed mentoring events are open to all engineering faculty in the CSU system, there is specific emphasis on those who are normally excluded from formal mentoring. In this paper, the post-event survey results which include the demographics of the participants are reported and the importance and impact of these events are discussed.

Background:

Mentoring interventions, particularly mentoring that incorporates networking, have been effective at meeting the professional needs of women and URM faculty ([1], [2]). However, women in STEM careers have reported feeling left out of networks and thus face decreased social and administrative support [3]. Moreover, past studies have found that women born or trained outside the US face unique challenges in academia [4]. Among these challenges for women and URM faculty are the lack of diversity among senior faculty members [5], shortage of sense of connection [6], lack of community connectedness [6], lack of knowledge to support their career aspirations [7], cultural taxation [8], discrimination [8], feelings of isolation [6], and lack of legal support and leadership training and opportunities. The literature review of research on mentoring shows strong evidence for mutual benefits of persistent mentoring [5]. In addition,

heavy workloads and lack of mentorship opportunities between early-career and senior faculty act as institutional barriers to tenure and promotion for African-American and Latino women faculty [6]. Career mentoring, such as peer mentoring and mentorship between early-career and senior faculty, considerably influence professional advancement of African-American women faculty [6]. We anticipate that the establishment of such mentorship opportunities and support networks at a cross-campus level for early-career women engineering faculty will help to retain these faculty and provide them with opportunities to develop and disseminate research, find collaborators, and enhance their educational abilities. It is our hypothesis that establishing a mentoring program will improve women, particularly URM women, faculty's career satisfaction and enrich the level of their academic skills and scholarly achievements, and eventually facilitate institutional transformations to facilitate their success, retention, tenure and promotion. Research shows women faculty, particularly URM women, benefit from mechanisms that bring them together [8]. Therefore, one of the goals of the "Kindling Inter-university Networks for Diverse (KIND) Engineering Faculty Advancement in the California State University System" program is to establish cross-campus mentoring for all CSU women engineering faculty in order to increase access to women mentors and to improve satisfaction, retention, tenure, and promotion for women, including intersectional subsets, at these large primarily undergraduate institutions.

Note that the research presented in this paper is part of an NSF ADVANCE Partnership grant focused on increasing diversity in the engineering professoriate occurring in the CSU system, a multi-campus primarily undergraduate, non-PhD granting system. The activities of this grant led by California State University, Fresno are in partnership with California State University, Los Angeles, California Polytechnic State University at San Luis Obispo, and San Jose State University. The data across the partnering campuses and from the Chancellor's Office at the CSU system shows women, especially URM women faculty, constitute a minority in engineering colleges, providing limited opportunities for networking and mentoring with other women engineering faculty. This grant follows the NSF definition of URM as Black, Hispanic, American Indian or Alaska Native, or Native Hawaiian/Pacific Islander racial backgrounds. In fact, at the time the NSF ADVANCE Partnership proposal was being prepared in 2020, women constituted just 22% of the tenured and tenure track engineering faculty within the CSU system. Women of URM backgrounds were a small subset of that (there is no exact data on this). For example, each of the four partnering campuses on this grant had only one URM tenured or tenure track woman engineering faculty. Although the CSU system does not currently track the FB status of its faculty, in a previous study involving a survey of CSU tenure track and tenured faculty, 55% of women and 48% of men identified as FB [4].

Methodology:

The KIND speed mentoring and networking program is a cross-institutional networking-based mentoring program that aims to provide networking and mentoring opportunities for women and URM engineering faculty in the entire CSU system. In order to achieve this goal, two-hour speed

mentoring events are organized three times a year (fall, spring, and summer). These events are virtual to enable cross-institutional mentoring. Moreover, in order to incorporate networking, a small group setting is adopted for the mentoring sessions. The fall and spring events are open to all tenure track/tenured engineering faculty in the CSU system. The summer event is open to all CSU tenure track/tenured engineering faculty and also lecturers, PhD students, and Postdocs who are interested in a career as an engineering faculty in the CSU system. Note that since the main focus of the grant that funds this mentoring program is on the retention, promotion, and advancement of the tenure track/tenured faculty in the CSU system, the lecturers and PhD students/Post Docs were only included in the summer event. This event was selected because it precedes the typical job application process for tenure track positions. High ranking women faculty from the CSU system and other faculty who are familiar with and understand the obstacles faced by women and URM faculty are recruited as mentors. Mentees rotate to breakout rooms on topics of their choice, such as navigating tenure, attaining full professorship, academic leadership, proposal writing, building a research network, dealing with biases, engineering education, and work life balance. Each mentee can choose 2 to 3 topics per event. For the summer sessions, besides the above topics, there are two more topics: 1) transitioning from a lecturer position to a tenure-track position (for lecturers) and 2) getting a tenure track job in the CSU system (for lecturers, Postdocs, and PhD students). There are usually 3 to 7 people in each breakout room, providing an opportunity to make meaningful connections and broaden faculty networks. Note that there was no such cross-institutional mentoring program available in the CSU system before this initiative.

The networking and mentoring events were advertised by sending information about the events to deans of colleges containing engineering programs throughout the CSU system. At most campuses, the dean forwarded this advertising to their faculty. The KIND program followed up by directly emailing women faculty about the event. Because the summer event was also open to individuals outside CSU system, additional advertising was performed using LinkedIn.

So far, the KIND program has organized three speed mentoring events. In order to collect data, an Institutional Review Board (IRB) approved survey was administered after each of these events. The post event survey questions were divided into four categories, as discussed below:

- 1) Demographic Information – Because this study focuses on women, URM women, and FB/FT engineering faculty in the CSU system, collecting the demographic information was the first step. The data in this category included gender, race/ethnicity, and FB/FT status. Note that FT is defined in this study as having at least one university degree from outside of the United States.
- 2) Employment Information – The main objective of the KIND speed mentoring program is to provide mentoring and networking opportunities for women and URM engineering faculty in order to help the advancement of their academic career. Therefore, data regarding the tenure status of the participants was collected. This data consisted of questions regarding mentees'

campus, rank, and discipline.

3) Access to mentors – The authors wanted to assess the access of women and URM engineering faculty in the CSU system to mentors. Hence, the survey questions in this section focused on collecting data on the access of these faculty to mentors. There were also questions to identify whether faculty value having mentors from outside their own institution, but from the CSU system, and whether they value having mentors of the same gender.

4) Satisfaction with KIND speed mentoring events – The authors wanted to evaluate the level of satisfaction of the participants with the KIND speed mentoring events in order to improve future mentoring events. Therefore, this section asked participants to rate their level of satisfaction with topics of the mentoring sessions and networking opportunities provided by these events. The survey questions are listed in the Results and Discussions section.

Results and Discussions:

Three events were organized in Spring 2022, Summer 2022, and Fall 2022. In the Spring 2022 event, 13 topics were offered by 13 different mentors. Twenty-nine faculty attended the event. Twenty faculty from 10 CSU campuses responded to the post event survey. In the Summer 2022 event, which was open to tenure track/tenured engineering faculty, but also lecturers and PhD students and Postdocs interested in careers at the CSU, 10 topics were offered by 10 different mentors. Thirty-eight people attended the event. Seventeen people from 6 CSU campuses and 3 non-CSU campuses responded to the post event survey. In the Fall 2022 event, 6 topics were offered by 6 different mentors. Note that the number of topics that were offered in this event was less than the other two events and participants could only attend two mentoring sessions in comparison to the previous events at which participants could attend three mentoring sessions. These changes were made based on the feedback provided by the participants from the previous events. Thirty-two faculty attended the Fall 2022 event. Sixteen faculty from 7 CSU campuses responded to the post event survey. Table 1 shows the summary of the number of participants, mentors, and the survey participants for all three events.

Table 1. Number of participants in the KIND speed mentoring events

	Spring 2022	Summer 2022	Fall 2022	Total
Participants	29	38	32	99
Mentors	13	10	6	29
Survey participants	20	17	16	53

a) Demographics of participating faculty

Of the total 99 CSU engineering faculty/lecturers who attended these mentoring events, fifty-three responded to the post event survey and are reflected in the following analysis. Figure 1 shows the respondent demographics based on gender and US born (USB) versus FB/FT status. Note that while FB and FT status are separate identities, all but one FB respondent were also FT. Similarly, all but one USB respondent were entirely US trained. Therefore, the four possible combinations of birth location and training location are reduced to USB and FB/FT, in which participants who had either FB or FT status were categorized under the FB/FT category. The choice to include the FB/US trained and USB/FT with the FB/FT group reflects that their upbringing or education have been influenced by cultural and ethnic experiences outside the United States, and they may face challenges more similar to FB/FT faculty in terms of navigating careers in the US educational system.

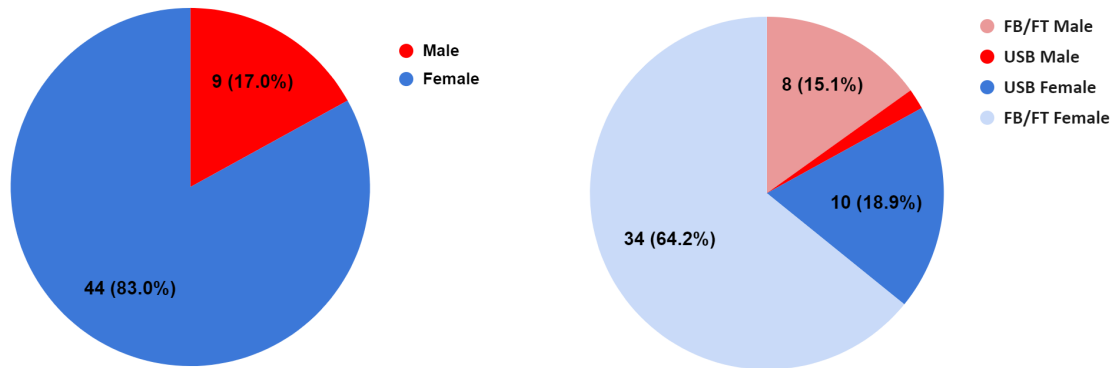


Figure 1. Participant demographics based on gender, USB and FB/FT status

As can be seen in Figure 1, 44 respondents (83%) identified as women and 9 (17%) identified as men. None of the respondents identified as non-binary or declined to state. The proportion of women began at 80% at the first mentoring event and increased with each successive event to 87.5% at the third event. Considering that women constitute only 22 percent of the overall 873 engineering professoriate (data from 2020 Fall), the disproportionately high ratio of women attendees indicates that special recruitment efforts for possible mentees for this program was successful in reaching its targeted audience. Note that the first event was advertised only through the Deans of the engineering colleges. However, in order to increase the number of women attendees for the last two events, the flier was also sent directly to all women engineering faculty in the CSU system. As can be seen in Figure 1, this advertisement method was successful in attracting more women faculty.

Eleven respondents (1 man and 10 women) identified as USB (20.8% of respondents), while the remaining 79.2% of the participating faculty were either FB, FT or both. Compared to earlier

surveys of CSU tenured and tenure track engineering faculty in which 55% of women and 48% of men identified as FB [4], the mentoring session does appear to be disproportionately attracting foreign born faculty as over 75% of all participants at each event have identified as FB. This may be an indication that foreign born faculty have a stronger desire for mentoring. Note that the demographics of the faculty especially, in terms of FB/FT or USB status are not tracked by the CSU university system. Thus, the inferences in this paper pertain to the survey participants only.

Figure 2 describes the ethnicity and rank distribution of participating faculty. This figure indicates that although the participating faculty were racially diverse, only a small percentage were Hispanic (7.6%) and none of the participating faculty were from any of the other under-represented ethnic backgrounds: i.e., Black or African American, Native American or Alaska Native, or Native Hawaiian or Other Pacific Islander.

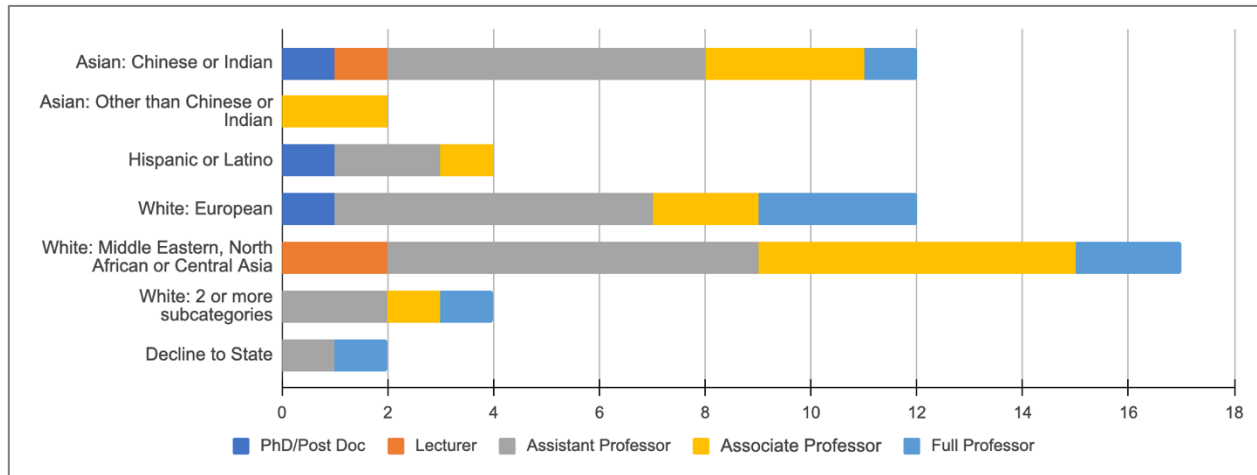


Figure 2. Racial distribution and rank of the participating faculty

Figure 3 shows the ranks of the participating faculty at each event. While the majority of attendees at the Spring 2022 event were Assistant Professors, with each successive event, the Assistant professors became a relatively smaller proportion of the attendees relative to Associate and Full Professors, and Associate professors actually constituted the largest share of attendees at the most recent mentoring event. At the Summer 2022 event, over one-third of the attendees were from the lecturer or PhD/Post-Doc ranks.

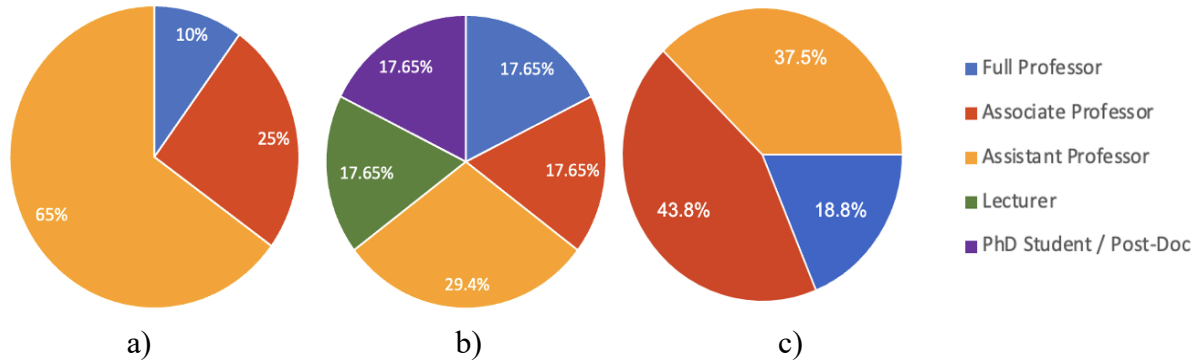


Figure 3. Rank of the participating faculty; a) Spring 2022 event, b) Summer 2022 event, c) Fall 2022 event) Mentee responses on access to mentors and networking

On average, 47.2% of the participants did not have a mentor (47.7% of women and 44.4% of men) which indicates that mentoring needs strongly exist among CSU engineering faculty. The responses of women participants are summarized in Table 2. Note that the proportions for each rank do not sum to 100% because faculty who indicated “yes” to having a mentor were able to select more than one of the three “yes” options. Table 2 indicates that women of higher ranks were less likely to have mentors, and women lecturers who participated were entirely without mentors. While Assistant professors were the most likely to have a mentor, the vast majority only had mentors at their own campus, with very small proportions of attendees having mentors at other CSU campuses or from outside the CSU system. The lack of mentors, either from within department/campus or from the CSU system is particularly concerning given that women are underrepresented in engineering in the CSU system.

Table 2. Access to mentors for women engineering faculty in the CSU system

	Lecturer n = 2	Assistant Professor n = 18	Associate Professor n = 13	Full Professor n=7
No Mentor	100% (2)	33% (6)	54% (7)	57% (4)
Yes, from my own institution	0%	61% (11)	31% (4)	43% (3)
Yes, from another CSU campus	0%	6% (1)	23% (3)	29% (2)
Yes, from an institution outside the CSU system	0%	6% (1)	15% (2)	14% (1)

One of the objectives of this study was to identify the degree to which particular aspects of mentoring and networking are valued by women in the CSU system in order to determine how best to serve this population. The following three questions were asked:

1. How valuable is it for you to have mentors NOT from your institution but from within the CSU system
2. How valuable is it for you to have mentors of the same gender as yours?
3. How much do you value the networking component of this event?

The questions were asked on a scale of 1 to 10. Figure 4 shows the responses to each of the three questions asked with responses shown for USB women, FB women, and All men. Because only one USB man attended the events, responses of men were not separated by USB or FB status. Although the study was interested in understanding and serving the needs of URM women, only one respondent identified as a URM woman. Thus, URM responses were not separated from non-URM responses in this analysis. Table 3 tabulates the mean response to the three networking questions.

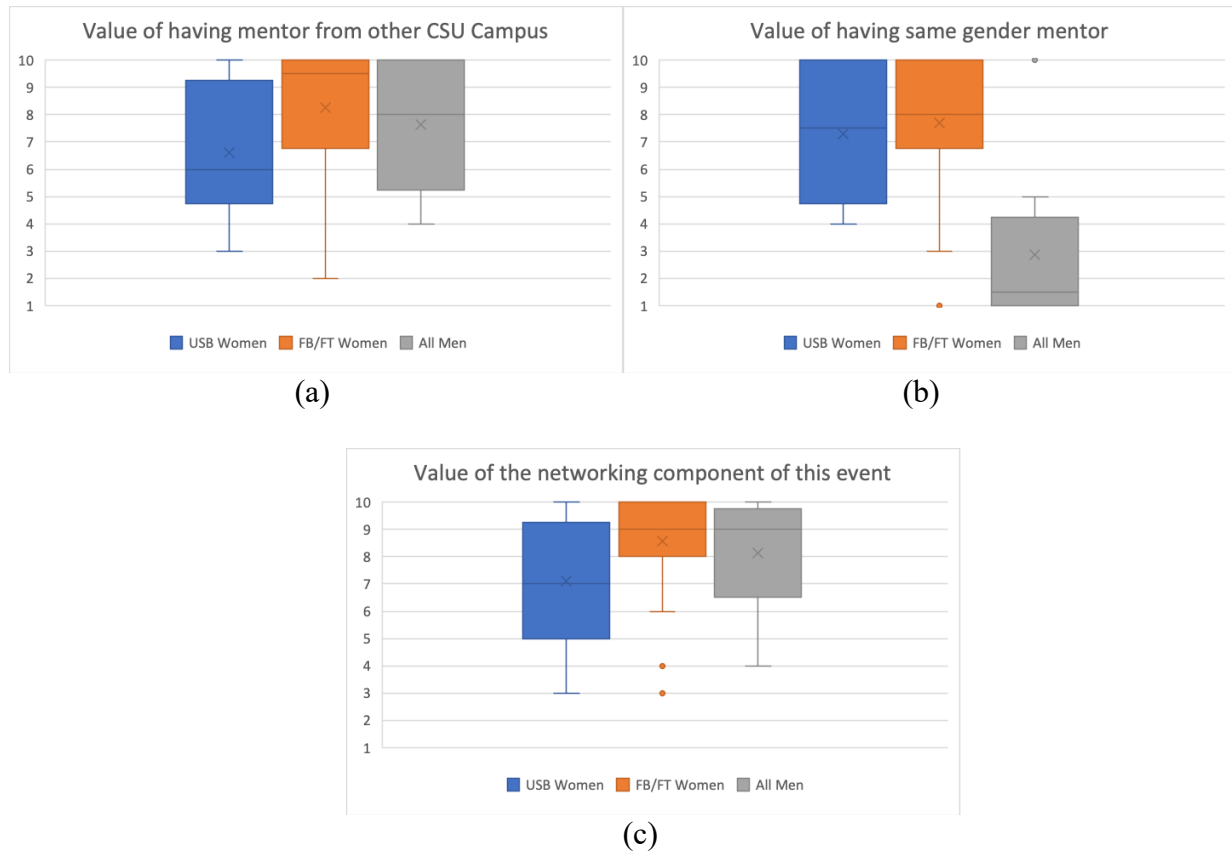


Figure 4. CSU Faculty responses regarding perceived value of a) having mentors from CSU campuses other than their own, b) having mentors of their same gender, and c) the networking component of the event.

Table 3: Mean responses regarding networking

Questions	USB Women n = 10	FB/FT Women n = 34	All Men n = 9
How valuable is it for you to have mentors <u>NOT</u> from your institution but from within the CSU? (1 to 10)	6.6	8.3	7.9
How valuable is it for you to have mentors of the same gender as yours? (1 to 10)	7.3	7.7	2.8
How much do you value the networking component of this event? (1 to 10)	7.1	8.6	8.3

As seen in Figure 4 and Table 3, these responses indicate attendees' overall high desire for inter-institutional mentorship within the CSU system and high value placed on the networking aspect of the mentoring event format. Men and FB/FT women who attended these mentoring events tended to highly value having mentors from CSU campuses other than the one at which they work. The mean response of FB/FT women was significantly higher than the mean response of USB women. Both USB and FB/FT women highly valued having mentors of their same gender, while men did not value this. Women's valuation of having same gender mentors was statistically significantly higher than men's. This may indicate that the scarcity of women faculty in engineering available to serve as mentors makes having them more valued as has been found to be the case for women engineering students [9]. Similar findings were reported with respect to women faculty by [10]. However, in interpreting this finding, it is important to recall that the survey respondents in the present study are not a random sampling of CSU engineering faculty. Instead, they are faculty who chose to attend a mentoring event where they knew all of the mentors would be women. Therefore, the sample may skew towards women who value same gender mentors and men who do not place a strong value on having same gender mentors. Finally, Both USB and FB/FT women placed high value on the networking component of the event and perceived the event to be helpful in broadening their networks. While the mean response of FB/FT women was higher, this difference was not statistically significant. This final observation affirms findings by others that combining mentoring and networking is an effective approach to addressing the needs of women faculty ([1], [2]).

c) Perspectives from Mentors

Four of the faculty mentors were interviewed by the external evaluator to determine their assessment of the mentoring sessions. Two of the mentors interviewed were Deans of Engineering and two were faculty members. During an individual 30-minute interview, each was asked the following questions:

1. I understand that you have served as a mentor for at least one of the KIND speed Mentoring workshops. What was the topic for the mentoring session(s) that you led?

2. Approximately how many individuals participated in your session(s)?
3. May I ask you to briefly describe your impressions/experiences of the session(s)?
4. What did you think went particularly well with the session(s)?
5. Were there any aspects of the session(s) that proved particularly challenging or that you wish you had approached differently?
6. Have you had follow-up contact after the session(s) with any of the individuals who participated in the session you led? If so, may I ask you to describe the sorts of questions they have asked or information they sought?
7. On a scale of 1-5, with 1 being quite unknowledgeable and 5 being very knowledgeable, how would you rate your understanding of the overall goals and objectives of the KIND project?
8. In your opinion, would having a better understanding of the KIND project overall have improved your mentoring session?
9. Is there anything that the leadership team of KIND could have done to better prepare you to lead or facilitate your mentoring session?
10. As you know, the mentoring stipends for these sessions have been supported by a three-year NSF grant. Would you foresee yourself being willing to volunteer as a mentor for this program after the funding is concluded?
11. What thoughts do you have on how to institutionalize this program after the grant period ends?
12. Are there any other comments you would like to make or questions you wish I had asked about leading the mentoring session?

Each of the four mentors interviewed led two sessions where between five and eight mentees had registered, although in two of the sessions only one mentee actually attended the session. The topics of the sessions included grant proposal writing, networking, leadership in academia, and getting an academic job in the CSU system.

All mentors had positive impressions of their sessions and commented upon the enthusiasm of participants and how easily the session flowed. None faced particular challenges, although one mentor asked to discuss an issue privately when a mentee brought up faculty conflicts in departments and shared details that might reveal individual identities. All mentors experienced follow-up contact ranging from being asked to join their network on LinkedIn through asking to be introduced to a potential collaborator to an in-person meeting for individual mentoring.

Although the mean rating of mentors of their knowledge of the overall project was only 3 (range 2-5), they felt this did not directly impact their mentoring session since it was on a topic in which they had expertise. Most felt that the leadership had provided them with adequate information to prepare for the session, although one suggested sending more background information on mentees before the session such as their department, university, rank and year of service. All mentors indicated that they would volunteer to be a mentor after the grant ended even if no

stipend were available for leading a session, but they felt that the upper administration needed to commit resources for an individual to organize the mentoring and also institutionalize other activities of the grant that promote retention. They also commented that tracking the career trajectories of individuals who attended the mentoring sessions would be interesting to see if they remained in the CSU system and moved up to leadership positions.

Conclusions:

The speed mentoring activity that connects faculty from across the CSU system for topic discussions in a virtual environment fills a need for Women and FB/FT foreign faculty and is appreciated by participants. The structure of the speed mentoring activity allows for cross campus collaboration in a casual and supportive way. It is clear from the feedback from participants that this kind of mentoring is needed. With less than half of the participants indicating that they have mentors already and lecturers reporting no mentors at all, along with the low number of women faculty in the senior faculty ranks, this speed mentoring allows individuals to develop robust support networks with people from similar backgrounds. Eighty-three percent of the participants are women and approximately 79% are FB/FT. This contrasts with engineering faculty as a whole who are overwhelmingly male with many US trained. The participants are also primarily Assistant or Associate level faculty. Unfortunately, very few URM faculty participated in these sessions. The individuals who participate are overwhelmingly satisfied with the activity with nearly 90% feeling the event broadened their network. In addition, the interviews with mentors indicated they would volunteer again for this event. In the future, surveys will be conducted in order to measure the extent to which this program impacted the advancement and job satisfaction of women engineering faculty, particularly URM women.

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