Using Appreciative Inquiry as a Tool to Instigate Transformational Change in Recruiting and Developing Women Faculty in STEM Disciplines

Jill E. Nemiro, Barbara Hacker, Mary Lucero Ferrel and Ruth Guthrie

California State Polytechnic University, Pomona, USA

ABSTRACT
The intent of Cal Poly Pomona's (CPP) NSF ADVANCE program is to create a university-wide system of recruitment and career development that will enable women faculty in STEM disciplines to be successful and advance into leadership positions. To begin the organizational transformation at CPP, eight Appreciative Inquiry focus groups were held with tenure-track and tenured faculty in the Colleges of Science and Engineering, with the goal of ascertaining current strengths in recruitment and career development efforts for new STEM female faculty at CPP. Findings revealed an array of recruitment strategies utilized to solicit good applicant pools, and career development practices that have assisted female faculty during the tenure and promotion process. Focus group participants also designed useful actions for further improvement of the recruiting and career development efforts for women STEM faculty at CPP. Out of the focus group findings, a variety of best practices for recruiting and developing women faculty in STEM disciplines are suggested.

KEYWORDS
Science; Engineering; Math; Faculty Recruitment; Faculty Career Development; STEM; Women Faculty; Appreciative Inquiry

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INTRODUCTION AND BACKGROUND
The Shortage of Women Faculty in STEM

The Civil Rights Act in 1964 made it unlawful in the US to discriminate against women and minorities in employment practices. However, women still face an uphill battle to achieve equal pay for comparable work, access to a work environment that is free from discrimination or harassment, and which offers family-friendly workplace policies. Women have also faced obstacles in receiving equitable promotional, leadership, and career advancement opportunities, in comparison to their male counterparts. This struggle was reflected in the term 'glass ceiling', coined in the mid-1980s to describe the invisible barriers that hamper the career advancement of women in the American workforce. The path to promotion in corporate America may have appeared to be clear and transparent, but in reality, women seemed to hit a plateau past which they were unable to progress, thus the term 'glass ceiling'. In 1991, the U.S. Department of Labor, based on a study of nine Fortune 500 companies[1], confirmed that women and minorities faced invisible barriers in achieving higher positions within their careers (Giele & Stebbins, 2003).

Since the time of the Civil Rights Act in 1964, much effort has gone into making recruitment, hiring, compensation, and promotional practices more equitable for women. However, even today women are not occupying many leadership roles in corporate America. Fewer than 15 percent of Fortune 500 officers and directors are women. Factors causing women to opt out of a corporate career path include both personal and organizational issues. Women often have to choose between personal responsibilities during their childbearing years, and the responsibilities of a corporate career path. In addition, the corporate culture of many American businesses and a lack of female leadership role models discourage women from seeking out leadership roles in business (Leahy, 2006).

To achieve a balance between personal and professional responsibilities, some women have sought out more flexible career options outside of the corporate career path, such as teaching in community colleges and four-year universities. However, struggles that have faced women in corporate America can be found across American universities as well. For many years, the make-up of faculty in Science, Technology, Engineering, and Math (STEM) disciplines in academia has been primarily male. While many universities are working hard to rectify the lack of diversity within their STEM faculty, these efforts to recruit and retain women faculty have had slow and inconsistent results. The key question remains – why, after such a strong focus on civil rights and shunning discrimination in American employment practices, is there still such a shortage of women in key leadership roles and as faculty in STEM disciplines?

The issue of supply and demand may be part of the problem. Just as graduate business schools have seen far fewer women than men applying to their programs (Leahy, 2006), there is also a shortage of women earning PhDs in STEM disciplines.

This has been referred to as the "pipeline problem." While over half the doctorate degrees in the United States are awarded to women (in fact, the majority of PhDs in social sciences are women), when looking at the percentage of women earning doctorates in STEM disciplines, that number drops considerably. In 2003, in all STEM disciplines, women earned 37.5% of doctoral degrees, however only 17% of engineering and 26.5% of mathematics doctorates were awarded to women. In the physical sciences, women received 26.9% of doctoral degrees; and in earth, atmospheric and ocean sciences, and agricultural sciences only one-third of the doctorates were given to women (National Science Foundation [NSF], 2006). Surely, one of the problems with trying to recruit and retain more women faculty in STEM disciplines is sheer numbers; there are less of them out there to go around.

The pipeline problem, however, cannot be the sole explanation for the shortage of women faculty in STEM disciplines. With respect to recruitment, women faculty in the STEM disciplines are actually under-represented relative to the proportion of women who are currently earning doctorate degrees in these same fields. While 17% of doctoral degrees awarded in engineering in 2003 went to women (NSF, 2006), only 9.5% of full time faculty and instructional staff in engineering are women (Department of Education [DOE], 2004). While 42.9% of science PhDs are women (NSF, 2006), only 22.9% of science faculty are female (DOE, 2004).

So if the pipeline cannot be the sole explanation for the shortage of female STEM faculty, what might be some additional reasons? Just as women in corporate America face issues of choosing between personal and professional needs during childrearing years, insensitive corporate cultures, and a lack of female leadership role models (Leahy, 2006), similar factors are occurring across the STEM departments in American universities as well.

Studies have shown that women faculty in science and engineering take longer to reach tenure and earn promotion than their male counterparts (University of Michigan, 2002). In addition, women of color in academic science and engineering have lower employment rates and salaries at four-year institutions, higher representation at two-year and less prestigious institutions (Brown, 2000), and are less likely than men of any racial/ethnic group or white women to be at the rank of full professor (NSF, 2000). In STEM disciplines, women face additional challenges, as compared to their male colleagues. These challenges include less robust negotiated contracts; less formal mentoring; exclusion from informal mentoring social events; higher service demands, but not necessarily in leadership positions; more reported gender discrimination, particularly in promotion and space allocation; and, more negative departmental work climates (University of Michigan, 2002, 2004).

In sum, clearly the shortage of STEM women faculty is due to lower percentages of women than men earning PhDs in these fields. The ways in which faculty are recruited, retained and developed and the climate or work environment in which they function, however, are also substantial issues to be dealt with in order to increase the numbers of women faculty entering and staying in STEM departments.

The Situation at California State Polytechnic University, Pomona (CPP)
The shortage of women in STEM disciplines is not only seen nationally, but on the CPP campus as well. Though CPP exceeds national averages for representation of female faculty in the STEM disciplines, there is still much need for improvement in representation of women in STEM departments. In 2001, while nationally 13% of tenured faculty in science and engineering were women, at CPP 16% of tenured science and engineering faculty were female. By 2004, this had improved to 19%. In 2001, 42% of tenure-track science and engineering faculty at CPP were female, while nationally, only 26% of tenure-track science and engineering faculty were female. In 2004, the figure for CPP had declined slightly to 39% (Hacker, Hohmann, Nemiro, Sperry & Straney, 2005; Wachs & Nemiro, 2007).

Although the overall numbers at CPP of women in STEM disciplines surpass the national averages, when the numbers within each of the departments within the Colleges of Science and Engineering are examined, a different picture results. When examining the number of tenured and tenure-track faculty combined in 2004, five of the seven engineering departments had either zero or only one female faculty in their department[2]. Across all the seven departments in the College of Engineering, the total number of faculty was 79, with only 12 of them being women (15.2%). The number of women in the College of Science fares better, with only one out of the seven departments having no female faculty (Geological Sciences – 0 women out of 5 total faculty). All the other six departments had 2 or more female faculty. Across all the seven departments in the College of Science, the total number of faculty was 133, with 39 of them being women (29.3%)[3].

In examining only tenure-track faculty (more recent hires) as of 2004, the percentage of women STEM faculty improves, with a total of 31.6% of tenure-track faculty in the College of Engineering being women (6 out of 19), and 42.1% tenure-track faculty in the College of Science being women (16 out of 38).

Even though the overall numbers of women faculty in STEM disciplines at CPP are encouraging, there is still much need for improvement. To address this shortage of women faculty in STEM disciplines, the University decided to seek a National Science Foundation (NSF) ADVANCE grant as part of an ongoing commitment to improving recruitment, retention, and professional development of women and minority faculty. The NSF has created the ADVANCE Grant initiative with the objective of funding programs to improve retention and promotion rates of women and minority groups in STEM disciplines.

During the preparation of the ADVANCE grant proposal, six focus groups were conducted with tenure-track and tenured faculty, and department chairs and administrators from STEM departments at CPP. The objective of these focus groups was to obtain some initial assessments of the issues facing STEM women faculty on the CPP campus, issues that may be affecting successful retention and promotion. These focus groups were conducted by two faculty members of the Psychology and Sociology Department at CPP, from September, 2004 through March, of 2005. Notes were taken during these focus groups, and a thematic analysis was conducted on the qualitative

data. What emerged was a set of factors that were perceived as having a negative impact on job satisfaction, success at navigating the retention, tenure and promotion (RTP) process, and overall professional development. The factors most frequently mentioned by female participants were workload, work/family conflict, and campus and departmental climates. (A detailed summary of the focus group findings can be found in Wachs & Nemiro, 2007).

Workload
Workload was identified as the single largest barrier to success as a faculty member at CPP, being mentioned by women at all levels (tenure-track, tenured, chairs/administrators). Interestingly, tenured faculty and administrators commented that tenure-track faculty now had higher workloads and less resources than they themselves had when they were pursuing tenure and promotion. In addition to a heavy workload, many of the women reported having to do a disproportionate amount of service, committee work, advising, and general busy work. Unrealistic workloads lead to two negative impacts on the successful career development of these women – the loss of informal mentoring networks and the lack of time to participate in campus and external career development activities. Tenure-track faculty consistently reported that due to increased workloads, they could not participate in a variety of campus or external faculty development programs, and mentoring programs were typically non-existent.

Work-Family Conflict
The amount of work-family conflict mentioned varied depending on the level of support women received from departmental colleagues and chairs. Three major areas emerged in the area of work-family conflict: excessive workload demands encroaching on family time, inconsistent knowledge and application of maternity leave policies by department chairs across STEM departments, and the assigning of undesirable class schedules (e.g., early morning, night, or weekend courses) to faculty with children.

Campus and Departmental Climates
While most of the female faculty who participated in the focus groups lamented excessive workloads, some still reported being happy at CPP, specifically because of the climate on campus and in their respective departments. The specific factors of climate that emerged as indicators of job satisfaction included: degree of individual input faculty had in decisions that impacted them (e.g., class schedules, committee and service assignments, etc.); interpersonal relations between departmental colleagues; sensitivity of departmental colleagues and administrators to women's issues; and, support from administrators in the RTP process. Thus, female faculty who were overall satisfied with their jobs at CPP, even with a high workload, felt they had input in decisions that impacted their work lives; worked with colleagues they enjoyed; saw that colleagues and administrators were sensitive to women's issues; and, felt support from those same administrators in the RTP process. On the other hand, women who reported resentment and dissatisfaction at CPP, on top of workload, shared stories where administrators "simply did not get" how gender bias impacted employment practices, or were assigned service and teaching loads without soliciting or considering their input.

Even in universities like CPP, where the numbers of women faculty in STEM disciplines are encouraging, there are problems that have surfaced in the retention, promotion, and career development for women faculty. CPP realizes that not only does it need to actively recruit and increase the numbers of women faculty in STEM departments, but it also needs to develop and offer supportive climates, and consistent and fair policies in the RTP process, if the university is to retain these valuable women. Thus, once the NSF ADVANCE grant was awarded to CPP in 2006, one of the first objectives was to obtain information from faculty so as to develop a series of best practices for recruiting and developing the careers of STEM women faculty. Ultimately, these best practices would be applicable to other colleges at CPP , to other California State University (CSU) institutions, and to female and male faculty alike. The current paper describes what works well at CPP with respect to faculty recruitment and career development of STEM women faculty on the CPP campus, and what faculty hopes or dreams are for change in these areas as well.

ADVANCE at CPP

CPP submitted a proposal for and was awarded a 5-year NSF ADVANCE grant. The NSF vision for the ADVANCE grant program is to inspire women to leadership in the sciences and engineering. The major goal of the CPP ADVANCE program is to create a university-wide system of recruitment, retention and development that will enable women faculty in STEM disciplines to be successful and to advance to leadership positions. CPP's ADVANCE program has been designed based on the experiences and best practices of prior ADVANCE grantees, and analysis of the unique situation at CPP.

Transformation at CPP relies on a collaborative and participative approach: from collaboration between individual faculty members to collaboration between CPP and other colleges and universities. By adapting a collaborative approach, institutional change is anticipated to take place at all levels – individual, departmental, college, university, and academic community. Given broad campus support and commitment, as well as an effective structure, the CPP ADVANCE program strives to level the path to leadership for numerous female STEM faculty members.

The ADVANCE change effort is conceptionally grounded in a socio-ecological open systems theory approach, which acknowledges that change actions occurring within one unit of an organization (or system) have a ripple effect on other units within an organization (Emery & Trist, 1965). An organization's effectiveness and success depends heavily on how well it can achieve 'good fit' or alignment between the parts or subsystems within the organization. Fit is defined as the extent to which behavioral or organizational requirements and constraints in one part of a system are compatible with those in other parts (Harrison, 2005). Consequently, the CPP ADVANCE change effort focuses on four key organizational subsystems relevant to the advancement of STEM female faculty at CPP – institutional assessment, development, and sustainability; recruitment; career development; and, leadership development. These subsystems form the four core objectives of the CPP ADVANCE grant program, as outlined below.

1. Institutional Assessment, Development and Sustainability – To assess the status of women faculty in the STEM disciplines. To develop institutional practices for attracting, retaining and advancing women faculty in STEM disciplines.

2. Recruitment – To increase the number of women applying for and being hired into STEM faculty positions.

3. Career Development – To enhance the RTP process and programs that will enable women faculty to be successful.

4. Leadership Development – To provide leadership development, networking opportunities, and role models to enable and inspire women to assume greater leadership roles at the university and beyond.

METHODS

Management guru Peter Drucker stressed that any successful business change effort must begin by first assessing an organization's current strengths (Drucker, 1986). From Drucker's initial recommendation, an entire approach to organizational change has been developed starting with an examiniation of an organization's "positive core" (Cooperrider & Whitney, 2005). This approach is called Appreciative Inquiry. Appreciative Inquiry (AI) is a process in Organizational Development with the intent of engaging individuals across an organizational system in renewal, change and focused performance. The overriding philosophy behind this approach is to build on what organizations (in this case, departments) are already doing well, rather than trying to pinpoint problem areas and fix what is not working. The AI method generates data by drawing from those involved stories of concrete successes in the particular area under investigation. AI was developed by David Cooperrider of Case Western Reserve University. A typical AI session includes four stages, which focus on:

1. DISCOVER - Identification of organizational processes that work well.

2. DREAM - Envisioning of processes that would work well in the future.

3. DESIGN - Planning and prioritizing processes that would work well.

4. DELIVER - Implementation (execution) of the proposed design.

Appreciative Inquiry (AI) has been defined as 'the study and exploration of what gives life to human systems, at their best' (Whitney & Trosten-Bloom, 2002). In essence, AI is a particular way of asking questions and envisioning the future that fosters positive relationships and builds on the basic goodness in organizations and the practices within them. In so doing, AI enhances an organization's capacity for collaboration and change. AI has been used extensively to foster change in businesses in a variety of sectors, including, health care systems; social profit organizations; educational institutions; communities; local governments; and, religious institutions.

To begin the design of activities to support CPP's ADVANCE grant, a series of Appreciative Inquiry focus groups with faculty in science, engineering and math were conducted. In order to develop talented women in these disciplines, both male and female faculty were asked to participate in the AI sessions, as both can be valuable

sources of input. The overall goal of these focus groups was to ascertain the current strengths of recruiting and career development efforts for new female faculty in these colleges. The basic idea behind this approach is to build recruiting and career development efforts around what is currently working well at CPP in these areas, rather than trying to fix what does not work.

Eight AI focus groups were held with faculty within the Colleges of Engineering and Science. Specifically, the following departments were involved: Aerospace Engineering; Chemical and Materials Engineering; Civil Engineering; Electrical and Computer Engineering; Engineering Technology; Industrial and Manufacturing Engineering; Mechanical Engineering; Biology; Chemistry; Computer Science; Geology; Physics; and, Math and Statistics. All faculty typically available during regular department meeting times (assistant, associate, and full professors) were invited to participate. Part-time faculty were not included as participants because performance expectations and evaluation procedures for part-time faculty differ from tenure and tenure track faculty procedures. Each focus group was scheduled during regular department meeting times when actual faculty meetings were not scheduled for the convenience of faculty members. Another reason why part-time faculty were not solicited as participants is because they are not required to attend departmental faculty meetings. Each focus group lasted approximately one hour. Faculty members were sent electronic invitations to participate in the AI focus groups, from the ADVANCE Project Director (and co-author of this paper). Department administrators (Deans) also encouraged faculty participation in these focus groups. Lunch was served during the focus groups to further induce participation.

Table 1 shows the breakdown of female and male participants that attended each focus group, as compared to the total numbers of women and men faculty within those respective departments. Although faculty participation rate by gender in the focus groups varied widely (from 100% as a high, to 16% as a low), participation was overall higher for female faculty, with 100% of female faculty participating in four (out of the eight) focus groups.

After an initial introduction to the Appreciative Inquiry process, focus group participants were asked to choose whether they wanted to discuss the issue of faculty recruitment or career development. Groups were formed to discuss both faculty recruitment and career development at all eight focus groups. Handouts were given to participants with a series of questions (see Table 2) to guide their discussion. Participants recorded their answers for Discover, Dream, and Design AI stages on flipchart paper. Notes were also taken by AI facilitators (also the paper's authors). Data on the flipchart paper and facilitator notes were typed up, and then qualitatively analyzed by the first author of the paper. A summary of the qualitative analysis is described in the next section.

Table 1. Focus Group Participation Rates by Gender

Focus group number	Department	Total Faculty Female	Total faculty Male	FG participants Female (% of total faculty)	FG participants Male (% of total faculty)
ENG FG 1	Civil engineering	2	13	2 (100%)	7 (54%)
ENG FG 2	Engineering technology; industrial manufacturing; chemical and materials; and aerospace engineering	1	18	1 (100%)	9 (50%)
ENG FG 3	Mechanical engineering	1	14	3^4 (100%)	11 (79%)
ENG FG 4	Electrical computer engineering	6	19	1 (17%)	6 (32%)
SCI FG 1	Biology	10	17	3 (30%)	4 (24%)
SCI FG 2	Chemistry	3	19	3 (100%)	3 (16%)
SCI FG 3	Math and statistics	13	15	6 (46%)	3 (20%)
SCI FG 4	Computer science, geology and physics	5	25	3 (60%)	14 (56%)

Table 2. AI Focus Group Questions

	Recruitment	**Career Development**
Discover	• Describe a time when you felt your department really functioned well in terms of recruiting faculty? What were the circumstances during that time? • Think about the *last* recruitment process undertaken by your department. What did you value most about that recruitment process? Why? • What current departmental recruitment practices work well in achieving a *diverse* candidate pool?	• What at CPP has worked well for your own career development (teaching, scholarship, service, as a leader)? • Describe a time when you were most satisfied in your career at CPP. Why was it rewarding? What worked at CPP to make this so rewarding?

| **Dream** | • Envision your ideal hopes and dreams for faculty recruitment within your department. Answer the question: *Ten years from now, effective recruitment practices that support the selection and retention of quality faculty will include ...*
• What other practices will be needed to: (1) ensure a diverse recruitment pool for the next cycle of recruitment? (2) specifically recruit women of color? | • Envision your ideal hopes and dreams for faculty career development within your department. Answer the question: *Ten years from now, career development support for women (particularly of color) will be demonstrated at CPP by …*
• In the next year, what is *one* change you would make to ensure a better career development process for faculty within your department? |
| **Design** | • Brainstorm and design specific activities and actions to create the department's ideal future for faculty recruitment practices. | • Brainstorm and design specific activities and actions to create the department's ideal future for faculty career development practices. |

RESULTS

Qualitative data analysis began with listing themes generated in the focus groups, by College (Engineering/Science), by AI stage (Discover/Dream/Design), and by issue discussed (Recruitment/Career Development). Then, data was collapsed across both Colleges (Engineering and Science), to generate a list of themes within each AI stage (Discover/Dream/Design) and by each issue discussed (Recruitment/Career Development). Results are described in the next sections.

Faculty Recruitment

Discover Current Strengths in Recruiting

The Discover stage in the AI focus groups asked participants to 'discover' what their department and the university are already currently doing well in the area of faculty recruitment. Collapsing the data across both Colleges (Engineering and Science), themes were generated for current strengths in recruitment, and a summary of those themes follows. (See Appendix A for the actual list of themes generated for current strengths in faculty recruitment practices.)

Faculty shared a variety of recruitment strategies that their departments used to successfully solicit a good applicant pool. First, job position announcements crafted with broadly worded descriptions of minimum and pertinent requirements allowed for more flexibility in the recruitment process. In particular, being flexible in terms of the required experience and/or degree necessary for a position yielded a wider applicant pool. Additionally, by advertising faculty positions early in the academic year (or even better, in summer) and by advertising thoroughly in a variety of recruitment sources (e.g., ads in professional publications and newsletters, using online job tools, and

recruiting at professional conferences), a stronger applicant pool was created.

A major strength in current recruitment practices was the use of proactive or contact-based recruitment techniques. These techniques included asking for referrals from industry contacts, sending job position announcements to PhD granting institutions with a diverse student population, contacting interested alumni, and encouraging applicants from past faculty searches to re-apply.

Another major strength was incorporating into the recruitment process "the personal touch" To do this, some departments prided themselves on hosting candidate dinners with many members of the department faculty, rather than just the search committee chair. Also, providing job candidates with the opportunity to gain a realistic job preview during on-site interviews proved to be beneficial.

For some departments, recruitment has moved from what was once more local, informal and less organized, to a more consistent and organized process, with more timely approval for hiring decisions as well. Some departments also strived to include a more diverse composition of members on job search committees. Additional recruiting strengths included providing assistance and employment opportunities for the job applicant's spouse or partner, and offering the job applicant appropriate service credit i.e. credit for years of teaching prior to employment at CPP, shortening the time until tenure can be obtained.

The climate and philosophy of some departments was also seen as a recruiting strength. Collegial departments, without a 'publish/perish mentality', but rather a flexible attitude with respect to acceptable options for achieving promotion and tenure, and with existing female faculty (especially in Math and Statistics) were viewed as recruitment strengths.

Dream How Faculty Recruiting Can Improve
After discovering what CPP is currently doing well, participants were asked to envision, or 'dream', processes that would work well in the future in the area of faculty recruitment. Once again, collapsing the themes across both Colleges (Engineering and Science), themes were generated for participants' future hopes in the area of faculty recruitment. A summary of those themes follows. (See Appendix B for the actual list of themes generated for faculty dreams in recruitment practices.)

Although proactive, contact-based recruitment was viewed as a strength in the Discover stage, focus group participants still felt more could be done in this area to increase the number of women recruits. Strategies included a more proactive pursuit of industry contacts for referrals; mentoring part-time faculty, with the idea that they would develop into tenure-track faculty; proactive tracking of CPP alumni; networking with women-only sections of professional societies; and, sponsoring current CPP female faculty to hold career days and/or workshops to attract potential recruits. Some focus group participants suggested starting recruitment strategies even earlier in the pipeline, including offering support and financial incentives to current female PhD candidates, mentoring current CPP students to persuade them to pursue PhD degrees,

and offering programs in high school (ages 14-18) to encourage young women to move into academic careers in STEM disciplines.

The need to get applicants that 'fit' in the context of a teaching university was stressed. To do this, a set of tools to communicate and share information with potential job applicants so "they may evaluate us as we do them" were suggested, including: linking electronically to the job announcement sample "attractive" application packs and narratives (or Frequently Asked Questions [FAQs]) on what typical CSU faculty do; crafting a clear statement that describes a department's RTP process; making applicants more aware in the recruitment stage of university resources (e.g., internal grants that support teaching and/or research); and, educating applicants on CPP's diverse student population.

Overall, during the Dream stage, CPP STEM faculty focus groups envisioned a variety of incentives that could attract a larger and more diverse applicant pool, including:
- Competitive salaries (competitive with industry and other similar academic institutions)
- Realistic workload
- Sufficient office and lab space
- Housing assistance
- On-site child care that serves faculty needs
- Consistent family-friendly university policies
- Increased maternity/paternity leave

Design Useful Actions for Improving Faculty Recruitment
In the Design stage, participants were asked to brainstorm specific long-term and short-term activities to achieve the dreams previously generated. Pulling together the data from both Colleges (Engineering and Science), themes of design actions were generated for faculty recruitment, as discussed below. (See Appendix C for the actual list of design themes in recruitment.)

Many of the suggested design actions involved specific ideas for putting into practice the proactive/contact-based recruitment techniques discussed in the Dreaming stage. Categories of themes to encourage proactive recruitment included: developing an organized database of potential recruits; soliciting faculty from other PhD granting institutions to visit and establish relationships with faculty at CPP; obtaining candidate referrals from faculty from other PhD granting institutions; offering opportunities at CPP to STEM graduate and undergraduate students; and, making use of current CPP faculty networks. Additional suggested design actions focused on: maximizing the job candidate's visit to CPP; offering the candidate a realistic and well-rounded preview of the job and surrounding area; and, providing the applicant with clear and consistent information on the strengths of CPP, the job requirements, and the tenure and promotion process. Re-designing a variety of existing university programs (e.g., on-site day care center, spousal/partner placement program, rideshare program) to better serve faculty needs was also proposed. A more detailed summary of the specific proposed actions to accomplish each of the categories of themes follows.

To establish an organized, proactive recruitment system, developing and maintaining a database of potential PhD candidate applicants, and actively recruiting from that database was suggested. In addition, starting the recruitment process early (in the summer), and working to streamline the recruitment approval process were mentioned as potential strategies.

Suggested strategies to establish relationships with faculty from other institutions and to obtain candidate referrals from faculty included: recruiting at professional conferences and meetings; developing a network of visiting professors to come to CPP; encouraging faculty from minority serving institutions (e.g., Historically Black Colleges and Universities [HBCU]) to pursue sabbatical work at CPP; and, treating co-authors on professional publications and grants from other institutions as potential recruits.

To develop awareness in STEM graduate students of the career opportunities at CPP, summer teaching appointments for graduate students in local PhD granting institutions was proposed. To encourage current CPP undergraduate students to pursue graduate work in STEM disciplines, it was suggested that departments make use of current programs to support students pursuing PhD degrees (e.g., CSU Chancellor's Doctoral Incentive Program)[5].

A series of actions were proposed to make use of current CPP STEM faculty networks, including: developing and utilizing contacts in the system-wide CSU women's faculty association; designing more university social events for female faculty to network, exchange ideas, and offer assistance to one another; encouraging current CPP STEM faculty to hold workshops or seminars on academic employment; creating a CPP College of Engineering and/or Science Consulting Firm, to expand industry networks; and, recruiting and mentoring CPP part-time faculty who are currently working full-time in industry. Offering funds and release time for current CPP faculty to be more actively involved in recruitment efforts (e.g., to visit other universities to talk to prospective PhD candidates) was also suggested.

Strategies for maximizing the applicant's visit to CPP during the recruitment process included a series of actions to give the applicant a realistic and well-rounded preview of the job and surrounding area, and to provide the applicant with information on the strengths of CPP. To maximize the applicant's visit to CPP, actions proposed included: bringing job candidates to CPP more than once during the recruitment process; arranging for job candidates to meet with women faculty and staff; and, allotting time and making arrangements for job candidates to visit geographic areas around CPP and facilities that may address their special concerns (e.g., on-site or community daycare centers or local public schools). To sell the strengths of CPP, more proactive public relations efforts were proposed. In addition, documenting and publicizing to job candidates the activities (NSF ADVANCE related and other activities as well) at CPP that have helped women faculty was also suggested.

To properly assess their interest in the position job candidates need clear and transparent information about the job requirements and the tenure and promotion process. Proposed strategies to ensure candidates have access to relevant information

included: electronically linking the job position announcement to a narrative job description (e.g., what a typical work day at CPP is like), to an example of what a good application looks like, and to a series of Frequently Asked Questions (FAQ's) on teaching at CPP. During recruitment applicants should also be provided with clear and transparent information on the RTP requirements. Drafting a faculty handbook and a clear and consistent statement of family-related policies (e.g., policy for supporting temporarily stopping the tenure clock), and providing both to potential job applicants was another suggestion.

Long term goals for university programs that would encourage recruitment of STEM female faculty included developing an effective spousal/partner placement program, redesigning the current on-site day care center to better serve faculty needs, and designing a flexible rideshare program.

Career Development

Discover Current Strengths in Career Development
During the Discover stage, faculty were asked to "discover" what their department and the university are already currently doing well in the area of career development. Collapsing the data across both Colleges (Engineering and Science), themes were generated for current strengths in career development, and a summary follows. (See Appendix D for the actual list of strengths in current career development practices for CPP faculty.)

Across the eight focus groups, there was much consensus with respect to university resources that aid faculty in developing their careers. Those resources include: the CPP Faculty Center for Professional Development; various internal grants, release time opportunities, support from the CPP Office of Research and Sponsored Programs; university service and external service opportunities; and, SMART classrooms (classrooms that are equipped with multimedia components to enhance instruction and learning) and available technology. At the departmental level, those departments that offered collegial, supportive environments and departmental leadership, combined with opportunities for mentoring and collaborating with colleagues on research, were viewed as strong in assisting with faculty career development. For women faculty, the existence of female departmental faculty and the incorporation of family-friendly departmental policies (e.g., not scheduling departmental meetings in the late afternoon or evening, flexibility with respect to scheduling, allowing for "stopping the tenure clock," etc.) were key strengths. In addition, a variety of factors were shared that led to career satisfaction including autonomy in professional activities; the ability to teach in areas of interest; satisfaction in working with students; flexible schedule; and, opportunities to work in local industry.

Dream How Career Development Can Improve
Faculty were also asked to dream about what activities would work well in the future in the area of career development. Once again, collapsing the themes across both Colleges (Engineering and Science), themes were generated for participants' future dreams in the areas of career development. What follows is a summary of the hopes

for future career development practices for CPP faculty. (See Appendix E for the actual list of themes generated with respect to dreams for faculty career development practices at CPP.)

Many of the same factors mentioned as dreams in faculty recruitment were repeated in career development, including a manageable and equitable workload; competitive and equitable salaries; competitive start-up packages; and, sufficient lab and office space. If one word can summarize many of the improvements for career development, it is MORE of what faculty already have, more internal grants, more release time, and more sabbatical opportunities.

Mentoring emerged as a pronounced dream for faculty career development. Faculty felt a need for formal mentoring (e.g., assign a senior faculty mentor to each new tenure-track faculty member). In particular, more mentoring for tenure-track, junior faculty from their senior level colleagues in completing RTP documents was suggested. Mentoring could also emerge from a more active and extensive faculty orientation program, and additional support and encouragement of female faculty wanting to seek campus leadership positions.

The caliber of current students also worked its way into the dreams for faculty career development. Being able to recruit higher quality and better prepared students, expanding graduate programs, incorporating more active use of online and hybrid courses, and building stronger ties with industry were all seen as ways to assist in faculty career development.

Finding ways to increase the sense of 'community' at CPP was also a key dream. Faculty saw the need to shift from a commuter university where students come to CPP only for class and then leave, to a university with students who live either on-site or in the surrounding community. Offering more on-site social activities and events was also seen as a way to further develop a sense of community on the university.

Improvement in faculty morale and level of engagement, and better faculty/administration relations were key hopes for the future. Having a department with active and engaged faculty was viewed as a key factor to develop junior faculty. Unfortunately, a feeling of "no voter power" even in the context of shared governance has led to what was referred to by some as "dispirited faculty." More alignment between faculty and administrators' expectations is needed. Faculty also wanted to limit the number of administrative initiatives at the university which added to current faculty workload, and to transfer some of faculty service requirements to other CPP support staff (e.g., advertising, assessment efforts, fundraising, etc.).

Additional dreams included university support for housing and a child care center that better serves faculty needs.

Design Useful Actions for Career Development
In the Design stage, participants were asked to brainstorm specific long-term and short-term activities to achieve the career development dreams previously generated.

Pulling together the data from both Colleges (Engineering and Science), themes of design actions were generated for career development. (See Appendix F for the actual list of themes generated outlining design actions for career development practices for CPP faculty.)

Categories of design actions to assist with faculty career development centered in the following areas: higher quality students, teaching methods and instructional technology; faculty mentoring and networking; departmental climate, workload, salary, resources and support; and, family friendly and health/wellness policies and facilities. A summary of the proposed actions within each of the categories follows.

To obtain higher quality students, faculty suggested designing and offering more graduate programs, and accepting and sponsoring full-time international students (who might also function as research and teaching assistants). To improve teaching methods, faculty suggested benchmarking and sharing ideas with their colleagues in other departments and/or colleges, and developing long-range plans of course offerings to give faculty plenty of time for course development. Additional ideas for improving overall teaching included: providing readers/graders for large-section courses and reconfiguring all classrooms into SMART classrooms, with a layout that better suits instructional needs (e.g., move the computer screen out of the way of black boards; have a mixture of white and black boards; reconfigure seating arrangements to encourage student discussion).

Developing an active, formal mentoring program for junior and tenure track female faculty (with release time offered for senior faculty mentors and junior faculty mentees) was suggested as a strategy to help junior faculty with both moving effectively through the tenure and promotion process and with course preparation. Strategies to encourage university-wide networking among female faculty included: designing a workable communication system between junior female faculty cohorts and upper level administrators (e.g., yearly lunches); developing opportunities for junior female faculty to become involved on university-level committees, and as a result, develop contacts in other departments and colleges; and, offering quarterly "get-together" lunches for female faculty to share ideas and strategies on work/family balance, etc. In addition to the development of formal mentoring and networking systems, creating supportive and nurturing departmental climates that treat junior faculty with dignity and respect was a key action proposed to further faculty career development.

Once again, modifications in workload, salary, and internal resources and support emerged as important areas for change. Devising a more manageable workload balance between teaching, research and service was viewed as essential. For example, one female faculty member echoed the sentiment expressed throughout the eight focus groups, when she shared, "there is way too much to do all the time." The need to benchmark with other institutions and industry and to provide competitive faculty salaries and start-up packages was stressed. Actions to improve internal funding resources and university support included: designing a rational and fair internal funding programs (e.g., give each faculty member a set amount of yearly funding and

let the individual faculty member decide how to spend it); offering additional release time and sabbatical opportunities for junior faculty; providing editorial support and administrative/secretarial staff for faculty professional activities; and, bringing professional development opportunities to faculty at CPP, instead of having to travel to conferences.

To support faculty with families, offering family-friendly accommodations (e.g., parking accommodations, on-site family room), and developing a child care center to support faculty needs were suggested. Specific actions that would help ensure the child care center better support faculty needs included: offering transportation for school age students to and from the university; having drop-off hours (e.g., for faculty members who come to CPP for a one-hour meeting); and, offering flexible summer day care (with drop off as needed). To support health and wellness needs, providing an accessible faculty lounge and faculty wellness center were suggested.

DISCUSSION
The dreams and design actions suggested for more successful faculty recruitment and career development of women STEM faculty discussed in the AI focus groups have been echoed as important at other institutions receiving ADVANCE grants as well (e.g., University of Michigan, 2002, 2004). In this section, the findings from the AI focus groups at CPP are synthesized into a series of best practices in faculty recruitment and career development – practices that CPP is striving to implement within the university. It is our hope that these best practices will influence change in higher education to ease the burdens of women and minority faculty in STEM domains.

Best Practices in Faculty Recruitment
In searching for and recruiting STEM women, it is first important to *know the target applicant*. Faculty in the AI focus groups suggested that a successful recruiting strategy was to carve out a broadly-worded job description, yet also make the wording specific enough to attract candidates that will 'fit' both the job requirements and the university itself. At CPP, ensuring that STEM candidates 'fit' with the focus of a teaching institution is essential. Knowing the target applicant involves having a thorough understanding of <u>what</u> expertise the candidate should have, and <u>where</u> to find those candidates – specific universities, industries, or research laboratories that might have diverse individuals with that particular expertise.

In the AI focus groups, faculty discovered what their current departmental and university strengths were with respect to faculty recruitment and career development. A second best practice, then, in the area of faculty recruitment is to *know yourself* – know what one's specific department, the university, and the surrounding community have to offer potential job candidates. As the AI focus group findings illustrated, even though CPP may not offer faculty high salaries (comparable to industry), other incentives made faculty satisfied with their careers at CPP (e.g., flexibility in scheduling, autonomy, the ability to teach in one's area of interest, good interpersonal departmental relations, etc.). Having a good understanding of what other incentives, tangible or intangible, one's department has to offer, in lieu of a high salary, is essential. In addition to knowing what incentives one's department has to offer, an

understanding of the unique factors of the university (e.g., CPP's focus on teaching and the polytechnic, learn-by-doing mission) and surrounding community (Southern California's mild climate, access to variety of outdoor activities) are useful in the recruiting process.

A major finding from the focus groups with respect to faculty recruitment was the emphasis on using proactive and contact-based recruitment. In doing so, the third best practice in searching and recruiting for women STEM faculty is to *create an active, rather than passive, search*. Becoming familiar with academic institutions that produce high-quality women candidates in one's discipline, and aggressively recruiting at those institutions, is key. Successful search efforts involve developing personal connections or networks of individuals with expertise in the discipline one is recruiting in. Typically, academic faculty searches have been somewhat passive, with departments posting a job announcement in professional organization newsletters, journals, and sometimes recruiting at professional conferences. Search committees then screen and recruit applicants from pools of applicants who have sent in application packs as a result of those job postings. Once the position is filled, job applicant packs are typically disposed of. However, active searches imply that departments are <u>continually</u> looking for potential applicants and scanning the environment for prospective candidates, even when no specific position is currently available. Active search techniques may involve creating a network of industry and academic contacts one may contact when a position becomes available; establishing long-term relationships with academic institutions that grant PhDs within one's departmental field; sponsoring and hosting visits to CPP for doctoral students; and, actively developing a list of part-timers that may later be recruited from for full-time position openings. Thus, academic institutions need to break the standard practice of merely posting a job announcement and responding to only those job applicants that respond to those advertisements. As the focus group findings suggested, more proactive and contact-based strategies are needed.

Best Practices in Career Development
The AI focus group findings surfaced a series of strategies for improving the career development of women STEM faculty at CPP. To improve the retention, tenure and promotion rates of women in STEM disciplines, the first best practice would be to *develop organizational systems that create an awareness of and confront ways in which being a women remains salient in the type and quantity of work assigned.* Certainly, CPP has taken a huge step as an organization in achieving this awareness by applying for, receiving, and currently implementing the objectives of the ADVANCE grant. But awareness needs to be integrated at every level of the organization, and in every STEM department as well. Carving out time to train department chairs, faculty search committees, and RTP committee members on how their cognitive biases may impact the recruitment and career advancement of women in STEM disciplines is essential.

Women often experience a sense of isolation in their male-dominated STEM departments. To combat this, a second career development best practice is to actively *develop opportunities for women faculty to mentor and network with one another*. Senior faculty need to learn how to effectively mentor junior, tenure-track faculty and

make time to do so. Workloads for newly hired, tenure-track faculty need to be reasonable, so the same junior faculty have the time to benefit from these mentoring and networking opportunities.

A third best practice for career development is *crafting out equitable and standardized (consistently implemented) family-friendly policies*. Family-friendly policies such as maternity/paternity leave, tenure clock stoppage, and flexible hours, must be prioritized to retain female STEM faculty.

Fourth, universities need to *realize the importance of allotting time and funding for the development of the organization's human resources*. Even in the current economic downturn, time and resources for faculty development cannot be sacrificed. Support for the types of experiences and activities that allow faculty to have time to develop themselves as teachers and scholars is essential for successful career development.

A fifth best practice is to actively *jumpstart the career advancement of STEM women faculty into leadership positions*. Administrators should be actively developing women to take on the positions of departmental chair, associate dean, dean, etc. Women in these leadership positions may not only create more positive change within their own departments and colleges, but can be viewed by others across the university as female leadership role models, encouraging other women to pursue leadership positions.

CONCLUSION

Since the NSF ADVANCE grant was awarded to CPP in 2006, the representation of women among new hires in STEM disciplines has increased from 13% (in 2006) to 42% (in 2007). This growth was largely due to 10 new female faculty hires in the Colleges of Agriculture and Science. The College of Engineering did not hire any female faculty in 2007. In fact, of its 17 faculty hires from 2004-2007, only one was a woman. In 2008, there was continued growth (40%) of female hires, attributed to the influence ADVANCE had on the hiring of two new female faculty members in the College of Engineering. Unfortunately, due to budget cuts and a hiring freeze across the university, the Colleges of Agriculture and Science had no new hires in 2008.

Recruitment initiatives sponsored by ADVANCE have included offering workshops and mini-grants to departments interested in improving their search committee and recruiting practices; the development of a handbook for search committees; efforts to pursue partnerships with minority serving institutions; and, more recently, the ADVANCE Distinguished Post-Doctoral and Doctoral Student Seminars. The goal of this program has been to invite talented women in STEM disciplines who are currently attending PhD programs or are Post-Docs to CPP to give departmental seminars. In doing so, an awareness of CPP as a potential place of employment is developed in the invited seminar speakers.

With regards to faculty career development, several initiatives have been implemented since acquisition of the NSF ADVANCE at CPP. These efforts have been in the areas of mentoring, professional development, and leadership development. A mentoring program was developed and implemented in 2008. The structure of the program

includes both mentoring pairs (mentor and mentee) and mentoring circles (small groups of female faculty). Mentoring pairs meet as often as the mentor and mentee wish. Interactions between mentor pairs include: reviewing one another's writings (e.g., tenure and promotion packages, sabbatical applications, drafts of grant proposals, and professional publications); reviewing each other's course syllabi; visiting each other's classrooms and/or labs; and, attending ADVANCE sponsored professional development events. To document progress, mentoring pairs complete a brief quarterly report, and an annual evaluation form. Mentoring circles are held once per quarter, and involve a sharing of ideas in an informal setting, usually during a lunch meeting. Another informal mentoring initiative implemented was called JavaNet, which featured weekly coffee and conversation for women faculty in STEM disciplines.

To professionally develop women faculty as teachers and scholars, starting in 2007 the ADVANCE grant, in collaboration with the CPP Office of Research and Graduate Studies, began offering stipends to a number of female faculty as Provost Teacher-Scholar recipients. The program provides tenured and tenure-track faculty with support to assist their development as strong teacher-scholars. Faculty recipients work with university experts to develop a career plan that will enhance their ability to produce more scholarly work in the form of journal articles and proposals for external funding while simultaneously developing their skills as teachers. In 2007, the ADVANCE grant sponsored five female Provost Teacher-Scholar recipients at CPP (two of which were from the College of Engineering, one from Computer Science, one from Psychology, and another from Geography and Anthropology). In 2008, the CPP ADVANCE grant sponsored two additional female Provost Teacher-Scholar recipients (one from Human Nutrition and Food Science, and the other from Education.) In addition, a variety of professional development activities and events have been sponsored by the ADVANCE grant, including writing circles for RTP candidates, workshops for RTP committees, faculty reading circles to explore issues in education while promoting collegial relations, and brown bag lunch sessions featuring faculty speakers on issues of career development and work-life balance.

To enhance leadership development of women faculty, the ADVANCE grant sponsored a series of panel discussions on leadership and advancement in STEM fields, and a colloquium series that brought to the university leaders in education and/or industry to discuss challenges and concerns to advancing in STEM disciplines. Mentoring efforts, discussed above, have also assisted with leadership development. ADVANCE has also sponsored several female faculty ADVANCE Scholars positions. These ADVANCE scholars were given release time to develop expertise in one of the following areas – recruitment, leadership, career development, mentoring, or assessment. More recently, the ADVANCE grant has created a new Associates role for interested STEM faculty. Associates attend ADVANCE associates meetings, disseminate ADVANCE information in their departments, participate in ADVANCE activities, assist in developing departmental recruitment plans, and select Post-Doc and Doctoral Student Seminar speakers for their departments.

Real institutional change cannot occur without top administrative support. To ensure this high-level support of ADVANCE grant efforts, ADVANCE holds monthly meetings

with all Associates, and with all STEM department chairs. An ADVANCE Executive Committee also meets monthly, which includes all co-PIs on the ADVANCE Grant, two of which are the Deans for the Colleges of Science and Engineering, and other selected university administrators and faculty.

As one of only six polytechnic universities in the country, CPP has the capacity to recruit and professionally develop the careers of a significant number of women faculty in STEM disciplines. Additionally, CPP is committed to overcoming the barriers that have prevented female faculty from advancing in science and engineering in the past. Through the actions discussed in this paper, some proposed and some currently being implemented, it is clear that CPP has made positive strides in conquering some of these barriers. However, long-term transformational change will require continual and sustained monitoring and assessment of the actions being taken. As each action is taken, the university needs to take the time to evaluate and assess what recruitment and career development best practices worked, and which could be improved on. Out of these evaluation and assessment efforts, are the seeds for growth and improvement leading to potentially even more successful change in the future.

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[1] The Fortune 500 is an annual list compiled and published by Fortune magazine, which ranks the top 500 highest-revenue United States companies.

[2] Aerospace Engineering - 0 women out of 8 total faculty; Chemical and Materials Engineering – 1 woman out of 5 total faculty; Engineering Technology – 0 women out of 8 total faculty; Industrial and Manufacturing – 1 woman out of 8 total faculty; and Mechanical Engineering – 1 woman out of 13 total faculty.

[3] Biological Sciences – 10 women out of 34 total faculty; Chemistry – 5 women out of 23 total faculty; Computer Science – 4 women out of 17 total faculty; Geological Sciences – 0 women out of 5 total faculty; Mathematics – 15 women out of 36 total faculty; Physics – 3 women out of 16 total faculty; and the Center for Education and Equity in Mathematics, Science and Technology (CEEMaST) – 2 women out of 2 total faculty.

[4] The Mechanical Engineering Department at Cal Poly Pomona (CPP) currently has one female faculty member, who did participate in ENG FG 3. The other two women who participated in this focus group were from other CPP STEM departments.

[5] The purpose of the CSU Chancellor's Doctoral Incentive Program is to increase the number of individuals who complete the doctorate and who may be interested in potentially applying and competing for future CSU instructional faculty positions. The program seeks to accomplish this goal by providing financial aid in the form of loans to doctoral students with the motivation, skills, and experience needed to teach the diverse student body in the CSU. Individuals who are selected to participate in the program may borrow up to $10,000 annually to a limit of $30,000 over a five-year period while enrolled in full-time doctoral study. If the participant obtains a full-time instructional faculty position in the CSU, the loan principal and interest are "forgiven" at the rate of 20% for each year of service. After five years of full-time CSU faculty service, the entire loan amount can be forgiven. Source: http://www.calstate.edu/HRAdm/pdf2008/HR2008-17.pdf.

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APPENDICES

Appendix A. Discover Themes: Current Recruitment Practice Strengths

- Recruiting applicant pool:
  — Advertise thoroughly
  — Start early
  — Proactive/contact-based recruitment techniques – industry referrals, notices to minority institutions, alumni, applicants from past searches
  — Recruit at professional conferences
  — Personal touch – phone calls, follow-up
- Job position requirements/information:
  — Flexibility of position requirements (with regards to experience and/or degree)
  — Broadening of wording in position announcement
- Overall recruitment process – Consistent, organized, speeded up approval process
- Search committees - Diverse member composition
- Candidate visits:
  — Realistic job preview during on-site interview
  — Personal touch: candidate dinners
- Strengths/benefits of CPP and Department
  — Collegial department
  — No publish/perish mentality
  — Flexibility of career path and RTP acceptable options
  — Existing female faculty
  — Flexible with "two-body" (applicant and spouse/partner) problem (Los Angeles area has opportunities for spousal employment)
  — Service credit

Appendix B. Dream Themes: Recruitment

- Proactive pre-search recruiting techniques:
  — Pursue industry contacts for referrals
  — Mentor part-time faculty
  — Offer support to female Ph.D. candidates
  — Mentor current CPP students
  — Track CPP alumni
  — Increase number of women in STEM from earlier age (programs in high school)
  — Have CPP female faculty hold career days/workshops
  — Network with women chapters in professional societies
- Factors to attract candidates:
  — Higher, more competitive salaries
  — Realistic workload (lower teaching load; better balance between teaching, research, service)
  — Sufficient office and lab space
  — Assistance with housing
  — On-site Child Center Facility that better serves faculty needs
  — Family-friendly university policies and support (e.g., ability to stop tenure clock for two years; increased maternity leave)
  — Engaged/optimistic current STEM faculty
- Overall recruitment process:
  — Emphasize getting applicants that "fit" in a teaching university
  — Ensure alignment of university with department recruiting goals
  — Provide realistic job preview
- Job position requirements/information:
  — Craft specific job description
  — Provide sample "attractive" application packs
  — Clearly communicate to applicant information on RTP process
  — Provide information on available internal grants
  — Educate applicant on CPP's diverse student population

Appendix C. Design Themes: Recruitment Activities

- Close financial gap between teaching and other options so as to be able to recruit in academia.
- Utilize flexible position requirements with regards to professional experience requirements and/or degree needed (e.g., offer appointments to faculty while they are in graduate school).
- Seek out applicant referrals from industry and Ph.D. granting institutions.
- Develop a network of visiting professors from other universities to come to CPP.
- Have Historically Black Colleges and Universities (HBCU) faculty do sabbaticals at Cal Poly.
- Offer summer teaching appointments for graduate students in local Ph.D. granting institutions.
- Develop and maintain a proactive, effective database/list of potential Ph.D. candidate applicants, and recruit from this list.
- Make use of programs to encourage CPP students to pursue a Ph.D. (e.g., CSU Chancellor's Doctoral Incentive Program).
- Recruit and mentor CPP part-time faculty currently working full-time in industry.
- Treat co-authors as potential recruits.
- Recruit at professional conferences and meetings.
- Develop and utilize contacts in a system-wide CSU women's faculty association.
- Electronically link the job position announcement to: (1) a narrative job description (typical work day), (2) an example of what a good application looks like, and (3) a series of FAQ's on teaching at CPP.
- Have CPP faculty hold mentoring/workshops/seminars on academic employment.
- Develop CPP College of Engineering and/or Science Department Consulting Firm (so that faculty can enhance their salaries; also offer students good hands-on experience). Adapt teaching schedules so that Fridays could be devoted to consulting and/or research and Monday through Thursday to teaching.
- Make pathways to promotion (RTP) clear in the recruitment process.
- Engage in proactive public relations to educate community about what makes the CPP programs stand out.
- Offer funds and release time for CPP faculty involved in recruitment efforts (e.g., to visit other universities to talk to prospective Ph.D. candidates).
- Start recruitment process early (summer) and work to streamline recruitment approval process.
- Draft a faculty handbook.
- Draft a contract with clear (and consistent across the CSU system) language for supporting temporarily stopping the tenure clock.
- Design more social events for women faculty to network, exchange

ideas, and offer assistance to one another.
- Document and publicize the legacy of activities at CPP that have helped women faculty so can convince women candidates of support.
- Communicate that there is no publish/perish focus more clearly in the recruitment process.
- Bring candidates to CPP more than once (two site visits, one for search committee assessment, one for candidate assessment).
- Have potential candidates meet with staff and faculty of various ethnicity and gender (e.g., lunch meetings with women administrators).
- Arrange for candidates to see geographic areas in the community surrounding CPP.
- Allot time during job candidate visits to address their special concerns (e.g., visit daycare center or local public school).
- Develop a spousal placement program.
- Create an on-site day care center that better serves faculty needs.
- Design a more flexible rideshare program.

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Appendix D. Discover Themes: Current Career Development Strengths

- University resources:
  — CPP Faculty Center for Professional Development
  — Internal grants
  — Release time opportunities
  — CPP Office of Research and Sponsored Programs support
  — University service and external service opportunities
  — SMART classrooms/available technology
- Department strengths:
  — Colleagues: collegial, supportive, mentoring with teaching, opportunities to collaborate with on research
  — Strong departmental leadership
  — Family-friendly policies
  — Existing female faculty
- Individual motivators:
  — Flexible schedule
  — Autonomy in professional activities
  — Ability to teach in areas of interest
  — Satisfaction working with students
  — Opportunities to work in local industry

Appendix E. Dream Themes: Career Development

- Higher quality, better prepared students (lower student/faculty ratio; smaller class sizes)
- Manageable workload:
  - Lower teaching load
  - Limit number of administrative initiatives on campus
  - Equitable assignment of service work and transfer some faculty service requirements to other CPP specialist staff (e.g., advertising, assessment)
- Increased sense of community; shift from a "commuter university" where students come to CPP only for class and then leave, to a university with students who live either in university housing or in the surrounding community; offer more social activities and events at CPP.
- Active/engaged faculty
- Competitive salaries; automatic equity and market adjustments
- Competitive start-up packages
- Sufficient laboratory space
- Equipment and technology upgrades; more technical support staff
- More internal grants
- More flexible release time opportunities (and develop transparent criteria to assess who is awarded and receives release time).
- Expanded sabbatical opportunities (e.g., pre-tenured sabbatical year to develop research and teaching)
- More university support for housing (in family-oriented neighborhoods, good school districts)
- More extensive faculty orientation
- Supporting and encouraging more female faculty/women of color to seek leadership positions.
- Closer relationship with industry
- More online and hybrid courses
- Assign a mentor for each tenure-track faculty member.
- Establish system-wide policy on spousal hires
- Expanded graduate programs
- Child care center to meet faculty needs
- Align faculty and administrators' expectations (current feeling of "no voter power" even though there is shared governance, leads to dispirited faculty)
- More support for junior faculty in completing RTP documents (perhaps have junior faculty submit documents every two years, rather than every year, and have them work more closely with a senior faculty mentor)

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Appendix F. Design Themes: Career Development Activities

- Develop an active, formal mentoring program for junior and tenure track female faculty (with release time for senior mentors and junior mentees) where senior faculty can help junior faculty with RTP and course preparation.
- Benchmark with faculty in other departments and/or colleges to improve teaching methods.
- Establish and design more graduate programs.
- Accept and sponsor full-time International students (have them help in teaching and running labs).
- Provide readers/graders for large-section courses.
- Reconfigure all classrooms into SMART classrooms. Also, reconfigure classrooms to better suit instructional needs (e.g., move the computer screen out of the way of black boards; have a mixture of white and black boards; reconfigure seating arrangements to encourage student discussion).
- Develop opportunities for junior faculty to become involved on university-level committees (to develop contacts in other departments and colleges).
- Develop an overall more nurturing environment (that treats junior faculty with dignity and respect).
- Devise a more manageable workload balance between teaching, research and service. (One female faculty shared there is "way too much to do all the time.")
- Benchmark and provide standard start-up packages.
- Benchmark and offer competitive faculty salaries/develop market demand evaluation system (to ensure market equity in pay).
- Offer more opportunities for junior faculty release time, sabbatical and difference-in-pay leaves.
- Design rational/fair internal funding programs (e.g., give each faculty member a set amount of yearly funding and let the individual faculty member decide how to spend it).
- Shift structural and equipment costs from the Department to the College and University, to free up Department funds for faculty support.
- Provide editorial support and administrative/secretarial staff for faculty professional activities (other than grant writing).
- Develop long-range plan of course offerings (so faculty can have plenty of time for preparation).
- Offer family-friendly accommodations (e.g., parking accommodations, family room).
- Provide an accessible faculty lounge.
- Build a wellness center specifically for faculty.
- Develop better on-site Child Care Facility to support faculty needs. Some specific requirements: (1) Transportation for school age students to and from CPP; (2) Drop-off hours (e.g., for faculty members who come to the university for a one-hour meeting); (3) More flexible summer day care (can drop off as needed).

- Bring professional development opportunities to faculty at CPP (instead of having to travel to conferences).
- Design a workable communication system between junior faculty cohorts and upper level administrators (e.g., yearly lunches).
- Quarterly "get-together" lunches for female faculty to share ideas and strategies on work/family balance, etc.

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