

Reframing the Two-Body Problem in U.S. STEM Departments: Asian Women Faculty Negotiation of Career and Family

Tamara Yakaboski

University of Northern Colorado

***Abstract:** This qualitative study examines the transition of 21 Asian women in the fields of science, technology, engineering, and mathematics (STEM) into faculty positions within a U.S. context. The participant's strategies for negotiating career, family, and childbirth included: 1) the woman functioning as a "tied migrant;" 2) her partner functioning as a "tied migrant" or trailing spouse; or 3) entering into a long distance relationship where both partners pursued their careers separately. This study stresses the need to understand international women faculty's simultaneous balancing of their professional and personal lives within gender and cultural contexts influenced by pregnancy and the role of seniority within marriage.*

Women are not just following their husbands.

They might choose to follow their husbands and husbands choose to follow their wives.

The family unit makes a lot of decisions that may or may not be balanced one way or the other.

(Indian woman engineer)

Tamara Yakaboski is an Associate Professor in the Higher Education & Student Affairs Leadership Department at University of Northern Colorado.

Copyright © 2016 by *The Journal of the Professoriate*, an affiliate of the Center for African American Research and Policy. All Rights Reserved (ISSN 1556-7699)

Introduction

Studies of the “the two-body problem,” which refers to situations involving academic couples trying to find jobs together, often minimize issues of race and ethnicity, but have particularly done so on the issue of national origin (e.g., Didion, 1996; Ferber & Loeb, 1997; Kulis & Sicotte, 2002; Wolf-Wendel, Twombly, & Rice, 2000). This is unfortunate because many institutions of higher education actively seeking to increase female and minority faculty representation in the science, technology, engineering, and mathematics (STEM) fields could benefit from a better understanding of how nationality influences candidate recruitment and retention. Foreign-born women are increasingly migrating to the U.S. to study at universities and to seek employment. In fact, 45% of international students at U.S. institutions are women (*Open Doors*, 2010) and 90% of Asian science and engineering faculty are born outside of the U.S. (National Science Foundation [NSF] Division of Science Resources Statistics, 2007). Of particular significance to this study, in 2006, foreign-born Asian women constituted 3% of doctoral faculty in science and engineering fields, compared to just 1% for Black and Hispanic women (Burrelli, 2009). “Immigrant women professors” may become a “new American academic generation” (Skachkova, 2007, p. 697) if there are increasing work prospects in the STEM fields and if institutions seek to add diversity by hiring minority women (Burrelli, 2008).

Asian born women in STEM fields represent a significant and growing percentage of the faculty in these traditionally male-oriented disciplines (Pillis & Pillis, 2008). It is therefore important that researchers and administrators better understand how these individuals negotiate gender and the intersection of home country cultures within an American cultural context (Aquirre, 2000). Most existing studies of female faculty members combine native-born and immigrant international faculty into a single category, which makes understanding their different experiences difficult (Skachkova, 2007). In addition, because Asian-born female faculty members are also frequently part of an academic couple, or coupled with partners who also hold a Ph.D., partner relationships are an additional factor shaping their experiences (Astin & Milem, 1997; Grant, Kennelly, & Ward, 2000; McNeil & Sher, 1998; Schiebinger, Henderson, & Gilmartin, 2008). Researchers exploring the experiences of international women faculty should consider these issues to properly

understand their experiences at U.S. institutions. Such information may help with recruitment and retention issues, and may also be helpful for improving the experiences of all women faculty members who are negotiating relationships and/or family and academic careers.

This study uses a framework blending Western feminist theoretical perspectives with third world feminism (Mohanty, 1991; Trinh, 1989) to collect and analyze qualitative data from 21 Asian female faculty participants. The goal of the study is to better understand the experiences of international women in U.S. academe, and in particular how partnering relationships with fellow academics or Ph.D. educated individuals influences these experiences. By considering how foreign-born women faculty in STEM fields negotiate among career options while also considering family and partner's careers, this study may help us to better understand the decisions they make regarding faculty positions within the U.S. while also adding to the existing U.S. focused literature on academic couples.

Literature on Academic Couples and STEM

The American professoriate has become more diverse and internationalized as a result of hiring increases in the numbers of foreign-born professionals (Lin, Pearce, & Wang, 2009; Nelson & Rogers, 2005; Skachkova, 2007). Not only do women experience faculty careers differently than men, but when nationality and race become factors (Ferber & Loeb, 1997; Johnsrud, 1995; Perna, 2001; Wolfinger, Mason, & Goulden, 2008; Wolf-Wendel & Ward, 2003), their experiences varied even more. This occurrence was even more pronounced within the traditionally male-dominated fields of STEM (Etzkowitz, Kemelgor, & Uzzi, 2000; Gatta & Trigg, 2001; Olson, 2002; Pillis & Pillis 2008; Valian, 1998; 2006). Two main areas that researchers have extensively examined are the role of gender in the STEM fields' traditionally White male environment (e.g., Etzkowitz et al., 2000; NSF, 2007; Olson, 2002; Pillis & Pillis 2008; Valian, 1998; 2006) and women faculty and family (e.g., Armenti, 2004; Mason & Goulden 2002; Wolfinger et al., 2008), but these research areas have largely ignored international women (Philipsen, 2008; Skachkova, 2007). Marriage, children, and gender all play a role in professional immigration and international women faculty's experiences (Kannankutty & Burrelli, 2007; NSF, 2007; Skachkova, 2007) making it important to examine these intersections.

Background on Dual Academic Couples

While literature on academic couples exists, institutions largely have resisted addressing the intersection of personal and professional life (Wells, 2005) in their hiring practices. This is problematic for institutions and fields seeking to recruit and retain woman, particularly non-white women because they fail to appreciate the unique concerns of academic couples. Of the academic women who marry, many do so with other scientists, engineers, and/or academics. Reasons range from meeting partners during graduate school (Sweet & Moen, 2004) to making a conscious strategic decision to enter into a relationship with someone in a similar demanding academic or scientific discipline (Grant et al., 2000). The range varied from 40% for the general faculty population (Astin & Milem, 1997; Grant et al., 2000; Schiebinger et al., 2008) to as high as 68% in physics (McNeil & Sher, 1998). Research also indicated that 50% of Asian women science and engineering doctorate holders are married to another scientist or engineer and 56.1% have children living in the household (Burrelli, 2009; NSF Division of Science Resources Statistics, 2007).

One factor affecting the experiences of international women faculty members was that they were likely to partner or marry other faculty who were often in the same or similar discipline (Astin & Milem, 1997; Didion, 1996; Ferber & Loeb, 1997; Kulis & Sicotte, 2002; Schiebinger et al., 2008; Wolf-Wendel et al., 2000; Wolfinger et al., 2008). This pattern emerged during the 1960s and 1970s when, in earlier decades, academic women typically remained unmarried (Ferber & Loeb, 1997; Miller-Loessi & Henderson, 1997). Scholarship on the inequality and discrimination of women in academe in the 1970s confirmed the obstacle of societal expectations framed by traditional roles for women regarding priority of family over career (Freeman, 1977).

Most notable, starting in the 1980s, academic women combined “education and career with marriage and family” (Kulis & Sicotte, 2002, p. 4), which created the ongoing pattern of dual academic career couples. Academic dual hiring increased from 3% of all hires in the 1970s to 13% in the 1990s, with women faculty utilizing and being the recipient of dual hiring practices at higher rates than men (Schiebinger et al., 2008).

A recent survey of 9,000 U.S. faculty found that 40% of women faculty had partners who were also a faculty member compared to only 34% of men (Schiebinger et al., 2008), thus creating a dual academic career couple. Although exact numbers are difficult to isolate, a survey within physics showed that 50% of female physicists are married to other scientists (McNeil & Sher, 1998). Additionally, Asian born women were more likely to have children than White, U.S. born women (NSF Division of Science Resources Statistics, 2007) causing the intersection of career and family to affect these women more due to childbirth and a larger responsibility for childrearing (Olson, 2002). Dual (U.S.) academic couples are likely to negotiate “more egalitarian arrangements” (Astin & Milem, 1997, p. 141); however, Astin and Milem’s research did not address non-Western relationships. More research on international couples is warranted since existing literature has shown that the combination of marriage and children may have a negative impact on women’s ability to obtain a tenure-track position (Ferber & Loeb, 1997; Wolfinger et al., 2008).

Dual Strategies

Dual academic career couples are unique because they work in jobs that require specialized, high level education and training, and face the difficult situation of finding two of these limited positions in a geographical space that allows them to be together while both pursue their careers. Researchers have examined various strategies that involve sharing one academic position or living apart (Didion, 1996; Ferber & Loeb, 1997; Wolf-Wendel et al., 2000; Wolfinger et al., 2008). Large cities or diverse geographical locations often have higher concentrations of women scientists due to an increased number of work opportunities (Kulis & Sicotte, 2002) that allow couples to take positions within a commuting proximity.

Dual academic career couples’ strategies vary based on geographical issues, relationship seniority, children or pregnancy timing, and institutional hiring policies. Kulis and Sicotte (2002) use the terms “trailing spouse” and “tied migrant” to explain how one partner moves away from their doctorate training location to follow the other partner’s career. In their original application of tied migrant, they were not examining individuals who were foreign; however, this study extends their phrase to also include those participants who are indeed

immigrants. Thereby, the phrase “tied migrant” has a dual meaning in this study.

Even though a couple may approach dual careers in a more or less equalitarian way, according to Kulis and Sicotte (2002), the results more often have a negative impact for women:

Regardless of academic achievement, wives in dual-career households are more likely to be the “trailing spouse” or “tied migrant” whose career suffers after a move, or to be the one who is constrained from moving to a more advantageous career destination. (p. 6)

With more women as the tied migrant, it means that women are less likely to be in a tenure-track position (Miller-Loessi & Henderson, 1997; Wolfinger et al., 2008), which makes it difficult to recruit and retain female faculty. The trailing partner instead may find employment as an adjunct, instructor, or administrator (Schiebinger et al., 2008; Wolf-Wendel & Ward, 2003) or leave the field. This pattern’s consequence places women more often than men in positions where they have to prioritize career or family in spite of their education level or academic ability.

A related issue is the traditional pattern of women marrying older men who often have more advanced careers. This pattern was the norm until the 1980s when it began switching to “homogamy” or “marrying those similar in age and education” (Kulis & Sicotte, 2002, p. 5; Schiebinger et al., 2008). When men were the first hired in faculty positions, women were more likely to become the trailing spouse and have their careers suffer as the men stated that their positions were of higher priority. However, when the women were the first hired, the women were likely to be partnered with someone of equal rank or to be the senior ranked person in the relationship (Schiebinger et al., 2008). In this latter situation, women stated that both their own and their partner’s careers have equal status. Academic women overall, regardless of being the first or second hire, reported that they have a more equitable approach towards both careers (Schiebinger et al., 2008).

One strategy for dealing with relationships and academic careers is to long distance commute. While one study showed this was beneficial to

women's careers (Bellas, 1997), this benefit came at the cost of other stresses and dilemmas (Miller-Loessi & Henderson, 1997). The decision to live apart required individuals to temporarily detach from personal relationships in exchange for the best job possible. Etzkowitz et al. (2000) described this behavior as "a man's approach to things" (p. 135) or stereotypical male behavior that would lead to rewards for taking his career seriously. Yet, it is debatable if women are rewarded for prioritizing their career over family responsibilities especially when considering cultural perspectives and gender role expectations. This strategy might be one of the ways women acculturate and try to fit their life requirements into a male model of academe (Rich, 2000; Wolfinger et al., 2008). Although research has explored the nature of dual academic couples in U.S. institutions, there is little known about how similar issues affect academic couples who come to the U.S. from other countries with different cultures.

Methodology

To investigate Asian women faculty's experiences in U.S. higher education, I designed a qualitative study that explored educational and career decisions. Because my focus was on women, I used a feminist theoretical perspective to frame the study. My guiding question concerned the strategies Asian women use to navigate from graduate school to faculty positions in the United States. The perspectives presented in this paper focus on the women's narratives and what was meaningful to them as they interacted within the American university environment.

Theoretical Framework

My framework blends a Western feminist theoretical perspective with third world feminism (Mohanty, Russo, & Torres, 1991; Trinh, 1989). The phrase "third world" represents not imperialism but is associated with Chandra Mohanty (1991) representation of "new immigrants" to the U.S. where "alliance is a common *context of struggle* rather than color or racial identifications" (p. 7). This blended theory approach permitted me to focus on the intersection of cultures, gender, nationality, race and class, which are all specific to international women living and working in another country. While Western feminism historically has focused on equal rights based around gender, this combination recognized the

relational nature of gender and nationality and acknowledged that international women experience Western higher education institution's patriarchy in more complex ways than U.S. born women of color. Additionally, the framework recognizes that the "politics of "personal life" may be differently defined for middle-class whites and for [third world women]" (Mohanty, 1991, p. 9). I chose this framework to help ensure the Asian women's voices were respected and represented in ways that can empower other women in similar positions and serve as a call to action for higher education institutions and STEM departments to change the masculine culture (Crotty, 1998; Ramazanoglu, 2002).

Site Selection

I recruited 21 participants who were born in Asian countries and who, at the time of the study, were faculty members at two research universities within STEM departments in the same Western state. The participants were from two public research universities both with the same Carnegie classification of very high research activity. While these were a convenient sample, they also were selected so that the role of state and institutional policies on international faculty hiring and dual couple hiring could be considered. Both universities had dual recruiting policies, which the state's board of education supported. Also, both institutions were located in urban environments that provided related job opportunities for themselves or their partners. Both institutions had the highest numbers of international students and scholars in the state (*Open Doors*, 2010) and employed Asian born female faculty. The one other public university in the state did not have any STEM female faculty who met these criteria and the institution was not in the same Carnegie classification.

Participants

I chose participants through convenience and snowball sampling techniques (Denzin, 1997) and first identified participants through public departmental websites after selecting the institutions. Some participants also provided names of other Asian female colleagues whom they knew. This sample represents 21 out of a total 32 identified. Some of these "missing" women were unavailable due to sabbaticals or other conflicting commitments during the study's timeframe.

As shown in Table 1, participants came from China (eight), India (six), Japan (two), and South Korea (five). I wanted a comprehensive representation of all available Asian women so the selection was a full spectrum of career stages: post doctorate (one), lecturer (two), assistant professor (eight), associate professor (six) and professor (four). There were nine in science fields, which included physics and computer science, eight women in engineering related fields, and four in mathematics. Nineteen of the women were married at the time of data collection, one was divorced, and one was single. Twelve women had children under 18 years of age at the time.

Prior to the interviews, I conducted a supporting document analysis of curriculum vitae and used public websites to provide background educational and career information. The interviews were approximately an hour and a half and were all conducted in English in the women's campus offices.

Data Analysis

The purpose of a feminist theoretical framework was to guide the research and analysis and to avoid just "adding women" in but instead to examine problems from the "perspectives of women's experiences" as the indicator of "reality" (Harding, 1987, p. 7). Third world feminism was a reminder to represent the "multiple consciousness" of the women who participated in this research (Mohanty, 1991, p. 36). With each woman's transcription, I contextualized their migration, education, and career stories with how they dealt with family life grounded in the idea that data analysis involves not only retelling but interpretation (Denzin, 1997; Gibbs, 2007).

I coded the data using both a concept-driven approach combined with an open coding approach (Gibbs, 2007; Strauss & Corbin, 1997). Beginning with a preliminary code list based on relevant literature and a feminist theoretical perspective, I then returned to the transcriptions and used a constant comparison method to determine emergent categories and themes. The combined feminist framework revealed experiences of nationality and gender with behaviors of resistance and empowerment.

Limitations

This study has several limitations that should be considered by readers. First, it focuses on the experiences of Asian born woman at particular institutions located in the same state. Although I am not aware of any specific institutional characteristics that make these institutions unique, there may be state level policy or cultural issues that make my participant's experiences different from similar individuals at institutions in other states. This could be especially true for institutions located in more rural regions.

Another limitation is that my participants may have been reluctant to discuss various personal or professional matters with me, or felt it inappropriate to share negative experiences. For example, it is possible that participants may have intentionally presented their partner relationships in the most positive light possible. I did attempt to establish rapport and researcher trustworthiness so that the participants felt comfortable sharing their experiences. This limitation is often a concern for qualitative research and should not limit the importance of the findings.

Readers should also be aware that my participants were limited to women who were successful in migrating to the U.S. for either graduate school or post doctoral work. The voices missing from this study are those who returned home after graduate school by choice or because they were unsuccessful in locating employment, and those who may have stayed in the U.S. but pursued a position in the private sector. This omission, however, offers an opportunity for future longitudinal study by interviewing individuals during graduate school and following them after graduation.

Table 1
Participant Details

| Birth Country | Field | Faculty Status | Marriage Status | Partner Status | Partner Degree | Children |
|---------------|-------------|---------------------|--|---|----------------|----------|
| China | Science | Assistant Professor | Chinese husband | Science faculty, Different university | PhD | yes |
| China | Engineering | Assistant Professor | Chinese husband | Engineering student, Different university | PhD | no |
| China | Engineering | Assistant Professor | Chinese ex-husband, European 2 nd husband | Engineering faculty Industry engineer | PhD PhD | yes |
| China | Science | Assistant Professor | American husband | Science faculty, Same department | PhD | yes |
| China | Engineering | Assistant Professor | Chinese husband | Industry engineer Engineering | PhD | yes |
| China | Science | Assistant Professor | Chinese husband | Science faculty, Same university | PhD | yes |
| India | Engineering | Associate Professor | Indian husband | Industry scientist, Same field | PhD | yes |
| India | Engineering | Associate Professor | Indian husband | Engineering faculty, Same department | PhD | yes |
| India | Engineering | Associate Professor | American husband | Engineering faculty, Same department | PhD | yes |
| India | Science | Professor | Indian husband | Industry engineer, Same field | PhD | yes |

Table 1 (Cont.)
Participant Details

| Birth Country | Field | Faculty Status | Marriage Status | Partner Status | Partner Degree | Children |
|---------------|-------------|---------------------|---------------------|--------------------------------------|----------------|----------|
| India | Science | Associate Professor | American husband | Science faculty, Same department | PhD | yes |
| India | Mathematics | Professor | American ex-husband | ex-Mathematics faculty | PhD | no |
| Japan | Engineering | Associate Professor | American husband | Industry engineer, Same field | Masters | no |
| Japan | Engineering | Senior Lecturer | Indian husband | Engineering faculty, Same department | PhD | no |
| South Korea | Mathematics | Post doctorate | Korean husband | Industry scientist | PhD | yes |
| South Korea | Mathematics | Assistant Professor | Not married | Not applicable | NA | no |
| South Korea | Science | Professor | Korean husband | Engineering faculty, Same university | PhD | yes |
| South Korea | Mathematics | Lecturer | Korean husband | Engineering faculty, Same university | PhD | no |
| South Korea | Science | Assistant Professor | Korean husband | Industry engineer, Different country | PhD | yes |

Asian Women Faculty and Career Couple Strategies

“My family is totally attached to my own career or it can affect my career as well.” (Chinese, assistant professor, engineering)

The women’s experiences required strategy and negotiation in how they transitioned into faculty and negotiated family life once they decided to pursue academia as their career choice. Since 20 of the participants either met their partners during graduate school or a post doctorate position or migrated to the U.S. together for education and employment, all the

married women in this study were at some point or still are part of a dual academic career couple.

As one female Indian associate professor engineer explained, “it became a question of two people trying to make their lives match and work together.” Another Indian engineer and her spouse, who was also an Indian engineer, both pursued academic positions. For them, this meant that early in their careers they compromised on the geographical location in order to stay together, which was not the norm for the other participants:

It was very clear that neither one of us was not going to pursue our wish to be in academics. ... So, look at big cities or look at multiple places ... We have not taken jobs in two different places. And I think we have been able to work it out so far. It doesn't mean [that] we don't spend a lot of time working away from each other, but we were planning on having a child or family, so at that time we were looking for places that would take both of us.

It took about three years before they were able to both obtain faculty positions at the same university. During that limbo time, they both continued to work in the same city by pursuing post doctorate positions and industry opportunities, although her work was on hold for one year due to pregnancy.

In the transition to faculty positions, the women negotiated career strategies to include marriage and family. The negotiation revealed three main strategies: 1) the woman functioning as a “tied migrant;” 2) her partner functioning as a “tied migrant” or “trailing spouse;” or 3) entering into a long distance relationship where both partners pursued their career separately. Marriage and childbirth strongly influenced which one of these three strategies the women chose. It is important to note that these three strategies apply only to the “successful” women who stayed in academia and did not “opt out” for an industry job, stay at home or return to their home countries. While these strategies are not specific to international women, these findings demonstrate that they share similar concerns but at higher rates due to the increased likelihood of marriage and childbirth compared to American born women faculty.

The Woman as Tied Migrant

Thirteen participants were tied migrants meaning that they followed their partners who were also immigrants to the U.S. Four of those women were Chinese and specifically migrated to the U.S. with or followed their Chinese husbands who moved for graduate school. One Chinese participant explained that women's responsibilities made being the tied migrant part of a compromise that women make because of family obligations and responsibilities:

Women in this study definitely have to put out a lot because you do make a compromise in the family to follow the path and maintain the family life. So, if I say how much between my husband and I. ... I pretty much follow wherever he ends up first. So, you know, it's not completely equal but on the other hand that's the compromise you have to make. (Associate professor, science)

As shown in Table 1, 18 of the women in this study married men with doctorates in STEM. The chance of the women's career suffering was greater when they partnered with older or more established persons. An Indian physics associate professor said:

A lot of women marry people senior to them. So, [if] he's more advanced in his career than she is, then she falls farther and farther behind because his professorship is always more important than her assistant professorship.

A Japanese engineering lecturer whose spouse, an Indian national, was already a tenured faculty member, stated that her geographical location and position were both pre-determined because her husband got a job first and "at this point ... [my] husband has the priority, so where he goes, [I] go." She has been in a lecturer position in engineering for the past eleven years. A South Korean woman, who had migrated to the U.S. with her husband to both pursue doctorates at a university in the Southeast, stated, "When you're married you have to really compromise with your spouse and plus, too, he kind of graduated six months before I graduated and he got the job in the [metropolitan] area. So, I was looking at what would be available for me."

The Indian mathematician who had married (and later divorced) an older American mathematician, said that her geographical location and decision to remain in the U.S. was dictated by that marriage:

I got married when I came to the United States. When I was in [a Midwest state], my then-husband finished his degree and found a job, and in those days [1970s] a wife went with the husband, so I had to change. So, I went to [the same state].

The role of pregnancy. In addition to marriage, the timing of pregnancy influenced a woman's status as a tied migrant. Pregnancy was a reason for one Chinese woman, who married an American science professor, to become a trailing migrant spouse:

That [moving away from her doctoral institution] actually was a personal thing because my husband, we actually, we knew each other in graduate school but he is, like, one or three years ahead of me, so at that time he was ready for the next position. I was not really ready, so he moved to this clinic for a faculty permanent position. I was not ready for a faculty position at that point. I didn't finish my training yet but that's for personal reason, I was pregnant, so I decided I will move with him. (Chinese, assistant professor, science)

As another Chinese woman, who is now an assistant professor, stated:

First, I came to [East coast city] with my husband, I came as J-2, so the spouse of someone. My husband was in the physics department for Ph.D. study. So, I was supposed to start my graduate study in chemistry department, we were in the same building, and by August, I found out I was pregnant, so I gave up Ph.D. study at that point. So, I stayed at home and took care of my first one. So, that was very hard because basically just my husband's student stipend. You know, the three of us, so I stayed, waited basically for 4 and half years, total, took my husband 5 years to get his Ph.D..

Unfortunately for her educational pursuits, that was not the end to the obstacles. After her husband found a post doctorate position five years after her first attempt at her own doctorate, she applied again:

So, before I got [my] admissions letter, I found out I was pregnant again, ..., so I was like, struggle, and thought that I kind of like, don't want to give up both so then, you know, this time I think and actually we were more strong because my husband was a post doc, so very much better than five years ago when he had a student stipend. So, finally, I decided [to] delay one semester, my second daughter was born December 16 and I started my Ph.D. study January 1st.

Her spouse served in two post doctorate positions causing the family unit to move twice, thus, making it difficult for her to complete a graduate program. When her spouse accepted a tenure-track position in a small Midwestern town, he asked for a dual appointment. Unfortunately, the receiving department was less than supportive and she experienced a negative career setback:

My husband ma[d]e [the] deal because [it] was a very small town. So, [he told them] "if you want me, you have to ask other department to invite my wife." ... I went for [an] interview and they liked me and they made a verbal offer. Well, I ask[ed] for [some]thing written and they said that since it is a state university they cannot hire [me directly]. They have to do open search next year, they kind of promised me that it was just formality.

Based on the verbal messages, the couple moved their family to this small Midwestern town with the lure of an eventual tenure track position for her. After a year of lecturing and interviewing, the department denied her the position. Due to state and institutional policies, her immediate hiring was prevented and the couple moved to another university. She received a research assistant professor position, but the tenure track position still eluded her. She experienced an eight year delay between her doctorate education and first tenure track faculty position. These experiences led her to take their two daughters and move to a different state from her husband, so she could accept a tenure-track appointment. The cost of pursuing her career was that she maintained responsibility for the children and essentially was raising her daughters as a single parent. Unfortunately, her story of delayed career and inhospitable academic department is not an uncommon narrative.

Another academic scientist couple changed institutions due to negative experiences and a desire for a more accommodating environment towards spouses working together. The Chinese woman stated that:

Actually one of the reasons we left, they [the department] were not very supportive of couples. I think they started to make rules that family members were not allowed in same lab ... They made me go through a lot of unnecessary difficulties, in my opinion, just purely because I'm another faculty's wife and I'm already there, which I saw was not fair but I can't change anything. One thing I can do is move to a different place that is more supportive. (Assistant professor, married to an American scientist, associate professor)

After this negative experience, they accepted academic positions at a new university that was supportive of their dual status and their shared research agenda:

The policy of [our current institution] is very beneficial for the couple to find a place. He actually got the position first and then I didn't have anything lined up until I got here. Then I pursued [a position] just to see whether or not I could and actually they [the department] encouraged and made arrangements for me to find a position [in the same department as tenure track].

Even when universities encourage dual career couple hiring, departmental culture can either support or work against the policies.

The Man as Tied Migrant or Trailing Spouse

Supportive departments. In three situations, the male partner was the tied migrant or trailing spouse. Both terms are used for the men since not all of them were immigrants whereas all of the women in this study were. In these circumstances, the college departments had a chair or dean who was proactive in finding a position for the husbands in order to recruit and retain the women. When one Indian engineer graduated, she accepted an assistant professor position in a neighboring state while her spouse remained behind to finish his doctorate. However, she chose a location that took into consideration her future spouse. After completion of his own postdoctoral training, her fiancée followed her since she had

already started in a tenure track position. Her department was actively involved in finding a position for him to retain her. She explained:

Once I got married, my department chair wanted to know, they had hired me and wanted keep me and they wanted to know what [my husband] was doing and so on and so forth and he [the chair] kind of initiated the whole thing about trying to get him here, like a visiting faculty for a couple of months and then they made it into a position. (Indian, associate professor, engineering married to another engineering professor)

Dual career couple hiring was a priority for her engineering department and the department's efforts made a positive impact in the number of female faculty within that unit. The department retained both through promotion and tenure.

Similarly, a Korean scientist experienced her department's support twice when her husband, a Korean engineer, was in need of an academic position:

We were looking whether we are going to move home [to Korea] or stay here, but we need to find two jobs. That was the goal. And how it happened was a professor here, the assistant director of this school ran into me and said, "send me your resume and your husband is finishing up, so I might be looking and, so send your husband's resume, too." So, we submitted two resumes here and [it] worked out that he got a post doc here and I came here as [an] associate professor. And then, again, we are on the job market again because he finished his post doc, three years track, so we are looking and at which time my dean said, "you are not going anywhere, I want to retain you here" and he's got a job ...and good news, he [just] got a letter that he got promoted to full professor.

These examples support the research on how women's careers lead her partner's when she is further along educationally than he is (Kulis & Sicotte, 2002; Schiebinger et al., 2008). These women's experiences demonstrate the critical role that departmental hiring committees and administrators have in recruiting and retaining women academics. These narratives also express the positive impact on recruitment and retention

when departments and more specifically, an individual with power, considers not only the academic position, but the position of the family unit.

Supportive spouses. In five cases, when the husband was interested in pursuing industry work rather than academic work, the woman's faculty career became priority:

I always wanted to be academic. And my husband actually realized that I wasn't totally thrilled not being able to pursue what I wanted to, so he actually encouraged me to start applying. I said what about our dual career thing and he said you know we will take care of it. So, you know he's been the backbone of all this excess that I've been through. You know without this support I couldn't have done it. He's been so supportive of all that I've done. You know, even giving up his [national industry] position and coming here. So, that's why I said I've had an easy ride. (Indian, associate professor, engineering)

For a Chinese woman who was married to a European born engineer, she also expressed the support of her spouse for her to pursue an academic job while he moved with her and found industry work:

That's another interesting thing about my husband, the moment I accept or got this offer, this department also agreed to look for a job for him. He was [in the industry], so he quit his job and followed me here so that was probably not very normal for guys to do that but he did it and, so he said he trusted we can find something here. So, first year we came here, end up I got the offer and started my job here but somehow he couldn't really get a job in this university, so he finally found [another industry job locally]. So, that was basically it, I would say he sacrificed quite a bit for me.

One Indian science professor shared how supportive her engineering husband has been for her academic career:

There were many points when I could have chosen not to continue with research or gone off in a totally non-academic track but to some extent it's his dream too to keep me in research

because he believes. He's never articulated it that way but I think he believes that when someone has a talent you have to nurture it and, I think, I don't believe [in] myself that I have such a great talent but he believes it.

Another Chinese woman explained how her husband moved for her assistant professor position only to eventually apply for one himself:

After I got the job here, then he had to look for jobs and for the time he was working at [industry]. It was because it was the only choice, so he was actively contacting people here and they happened to have a job opening, so he applied and they like[d] him and [gave] him a job, so it works out nicely. But he does make a lot of effort into this otherwise it wouldn't happen so smoothly.

For the only participant who was married to someone without a Ph.D., the Japanese associate professor expressed that “as long as there's a program [in my field], I can see myself motivated to go anywhere. ... Nothing actually restricts us, so if there is opportunity I can apply if it is positive for my career development.”

Unsupportive departments. Not all women in this study experienced these positive interactions. While interviewing for academic positions after graduate school, one woman Indian engineer received numerous offers while her spouse was interviewing also for engineering positions. Her need for a dual career option ultimately dictated her decision not to take a position at a more prestigious institution. One university told her, “we are hiring you and you alone.” Her institutional selection was made because of the desire to support her husband's career as well as her own. While the more prestigious institution may have offered her greater professional opportunities or financial incentives, the fact that that institution refused to make provisions related to the career of her spouse prevented her from accepting.

Another Chinese science professor described her experience with her first husband, who was American, and ultimately how the marriage failed due to an inability to relocate together and both pursue their careers in science:

He never had an opportunity to come here. Partly because I had no support from the department here or the college here to actually help my spousal relocation. That, in a way, may actually be the first sort of sense of, not intentional, some sort of discrimination part of the female faculty, if I were a male faculty, I believe that if my spouse needed a job coming back here, maybe it would be a different thing. And has something to do with me being female. Maybe I didn't go out and be aggressive. I didn't fight hard enough and that, so in a way through out my training I didn't really sense any sort of difference in gender but I think as I get further up the ladder I started sensing differences but it might just be our particular head of department or circumstance.

Long Distance Relationship Strategy

Although some couples had a more direct pathway to two tenure-track positions, other couples went to separate institutions where each could pursue career advancement. The long distance relationship strategy was a decision to geographically live apart during the early stages of postdoctoral training or a first academic position to minimize negative impact on both careers. Over one-third of the women in this study at some point in their career maintained long distance relationships as a strategy to focus on their career in the manner they desired rather than putting either partner in the position of tied migrant or unemployment.

As stated by one Chinese assistant professor in the study: "I ma[d]e up my mind that my career is also important, but I want [a] family and I also want [a] career." She was unsure if her husband would leave his position to follow her to her university and was unsure of how long they would stay separated since being in a long distance situation as a dual academic career couple presents many uncertainties. Another Chinese dual academic couple had been living in different states for over three years and each hiring season tried to find a new location with two positions.

A common experience for academic couples is difficulty during the job search process to find a shared location for employment:

Well my husband and I were both [same university] Ph.D.'s and we were looking for positions together. Different but both

aerospace, but different specializations, and he was getting offers at different places and faculty positions were something I was interested in, always, but I was getting offers in different places. Different parts of U.S. They were not converging. (Indian, associate professor, engineering)

Some couples initially live apart as a short-term strategy. As stated by one Indian physicist, she and her academic spouse lived apart early in their careers so that later they did not have to make these concessions, but rather, could demand a dual appointment:

It was hard in the beginning, so for our first post docs we got jobs in different cities and we were already married but we took the best jobs we could because that way we are building up our reputations. So, sort of delayed gratification and then three years later we got jobs. We took slightly less good jobs to be in the same city. (Indian, science, associate professor, married to American scientist in the same department)

In order to negotiate a dual career situation, they sacrificed prestige for accommodation. She and her spouse accepted dual career positions later once their careers were established:

So, what we decided was that we could bear some hardship early on and then take the best job that would make a better future, career wise then cash in on that. ...So, we were hired together. That was our condition for coming here.

For women earlier in their careers, there was not the same certainty of how things would work out. One Korean scientist accepted a teaching position in another state while her husband took an engineering job overseas. The living apart strategy required her to function as a single parent in a tenure track position:

But it is hard, this living separately, I have a kid, but when you have two spouses that have two professional careers it's really, really hard to find the job in same place but I think you can work it out.

The role of pregnancy. Pregnancy was one significant influence that changed couples' ability or desire to live apart and in all these situations it was always the woman that became the trailing spouse. For example, a Chinese scientist was not ready to move to the next position but when she became pregnant she moved to where her husband was in a tenure track position. Another example was a Korean mathematician and her partner who had lived apart since 2002. In 2006, she moved closer to him because the geographical distance was too great with a child:

The reason I moved to [another state] is I didn't want to be apart and I decided too, it is very hard to find a job for two persons in [the] U.S. because [the] U.S. is really big cause if I live in Korea, then even though we have a job in other place, it's kind of small country, so you can at least visit every week, or so, but here it's more than three hours drive or flight. So, it is hard to do over one month and since we have a baby, I decided it's not good to live only with mom because I [took] care of my baby for eight months and it [was a] really hard time for me. I worked and my babysitter was home and then [I] ran and take care of my baby and the baby at that time, they don't sleep at night. It's really hard for me. It's important to have a career for me, but it's more important for a child to have a two parent. It is not good for her to have only one. So, I decided to go. (South Korean, mathematics, lecturer)

While the couple previously decided not to sacrifice their careers, the timing of a child altered the career strategy and focus. The couple eventually moved back to South Korea where she pursued an industry job as an engineer.

Pregnancy timing impacted women's careers more than their spouses while putting a strain on the women and their careers. Women face a difficult situation of negotiating family decisions and career decisions simultaneously especially in male-dominated departments and traditional marriages. The implications are not only for the academic couples but also for the departments who risk higher turnover with female faculty due to the need to negotiate career, family, and personal.

Conclusion

The recruitment and retention of STEM women is an important issue in the U.S. and the increasing number of Asian women students and faculty provides an opportunity for male-dominated departments to enhance intellectual, gender, and cultural diversity. Analyzing the perspectives of these STEM women illustrates critical issues that, if addressed, could more effectively attract qualified Asian women who are often part of a dual career couple.

The Asian faculty women in this study developed and continually reassessed their career strategies in accordance with not only career and professional goals but with personal and family influences as well. Careers and personal decisions are not due to cause and effect, but are active decisions that require complex considerations of personal career goals and the needs of family with an intersection of gender and multiple cultures. Multiple influences and forces surround and persistently influence how the women and their families continually negotiate career decisions, choices, and personal life. Research should not limit the examination of career decisions to the American context, but must holistically examine the international faculty's experience.

During the early career stage of faculty work, the life changes of marriage and childbirth influenced the women to continually re-negotiate and shift career strategies. Seniority in professional life strongly impacted which partner would be the first hire or leading spouse. Women's shift from marrying older men points to a changing pattern in who serves as the "tied migrant" or trailing spouse. When institutions and departments fail to accommodate academic couples, they miss not only potential contributions and the opportunity to increase intellectual diversity, but also both gender and cultural diversity as well.

The literature on international female faculty is minimal; yet, their numbers are increasing each year and their presence in STEM departments serves to improve the numbers of women and the diversity in STEM fields. As colleges and universities try to increase their numbers of female faculty, they are turning to international graduate students and scholars. If this population is to be successful, it is important to examine their experiences not only as Asians, but also as international women to address issues of recruitment and retention.

Implications

As a recent study on the masculine and authoritarian nature of engineering schools pointed out, it is critical to change the culture of masculine fields and for policy makers and administrators to make change beyond attempting to “add women in” (Pillis & Pillis, 2008). STEM continues to place women on the outside of the culture; however, this research stresses the importance of dual hiring if departments truly are interested in diversifying faculty and recruiting and retaining women faculty.

The influence of family on choice further demonstrates the need for researchers and administrators to examine all areas of a woman’s life rather than separating career from personal choices especially since it impacts recruitment, attrition, and retention. Research and policy should reframe the two-body problem as a two-body opportunity. A part of these women’s success is due to the role that institutions and departments played in supporting dual academic couple hiring as a part of family-friendly policies. Although research has explored American women faculty, this study shows that Asian women face similar issues of family and career negotiation but it is even more critical for the international population. The strict role that age played in career decisions demonstrates a potential difference between U.S. and Asian born women.

Higher education institutions should examine “archaic anti-nepotism policies that have barred academic partners from working in the same department or institution” (Kulis & Sicotte, 2002, p. 26). If women faculty meet their future partners in graduate school and often in the same departments, then universities need to remove nepotism concerns otherwise they will continue to lose qualified academic couples. Moving beyond just removing anti-nepotism, family-friendly policies should be the goal if departments and institutions truly wish to recruit and retain women and their academic partners. The existence of family-friendly policies demonstrates that departments are not dealing with individuals but rather academic couples and their family unit. Without supportive policies and a family-friendly culture or environment in place STEM will continue to experience low numbers of women.

Three studies in particular offer suggestions on crafting dual policies that this research supports with an interest towards extending the

conversation to international faculty. Wolf-Wendel et al., (2000) posit questions for institutions to consider on the tangible and intangible costs of not having couple hiring policies. Schiebinger et al. (2008) suggest centralizing a dual career program office to facilitate and coordinate with departments on couple recruitment. They also suggest that universities need to allow departments enough flexibility to waive open searches in order to go forward with partner hiring. The American Council on Education's (2005) report, *An agenda for excellence: Creating flexibility in tenure-track faculty careers*, recommends creating flexibility in faculty positions and decisions from the recruitment stage through promotion and tenure stage so that policies are family-friendly and that life decisions do not penalize work ones.

However, having dual policies in place is not enough to create an environment that is family-friendly. As Wolf-Wendel et al. (2000) point out in their study on dual hiring policies and practices that stating there is a policy is different than actually doing something to make it happen. However, having a written policy known to current faculty and administrators does create a positive climate of awareness (Schiebinger et al., 2008) and assists in narrowing negative feedback from existing faculty. A written policy can then be advertised which helps make an institution more welcoming. Institutions need a cultural change so that women and their partners do not face penalties for requesting or using dual-couple policies. As demonstrated in the relationships of long distance, women who become pregnant move unless their departments are willing to recruit and hire their partners. Without attention to how women's biological reproduction timing overlaps with graduate school and the tenure process, departments will continue to have high attrition rates for women. This issue becomes even more critical in STEM fields that lack both diversity of color and gender.

Finally, as is the nature of qualitative research, this study does not attempt to generalize but rather to disseminate these women's career stories so that higher education department chairs, hiring committees and administrators can better understand their experiences. These narratives can help in the recruitment and retention of a more diverse faculty for STEM by establishing not only the need for family focused policies but also the role of the family in academic decisions. Power is regained and the goal of raising consciousness is completed by writing and sharing women's stories (Mohanty et al., 1991).

References

- American Council on Education. (2005). *An agenda for excellence: Creating flexibility in tenure-track faculty careers*. Westport, CT: Greenwood.
- Aquirre, A. (2000). *Women and minority faculty in the academic workplace: Recruitment, retention and academic culture*. ASHE-ERIC Higher Education Report Volume 27, Number 6. San Francisco, CA: Jossey-Bass.
- Armenti, C. (2004). May babies and posttenure babies: Maternal decisions of women professors. *The Review of Higher Education*, 27(2), 211-231.
- Astin, H. S., & Milem, J. F. (1997). The status of academic couples in U. S. institutions. In M. A. Ferber & J. W. Loeb (Eds.), *Academic couples: Problems and promises* (pp. 128-155). Urbana, IL: University of Illinois Press.
- Bellas, M. L. (1997). The scholarly productivity of academic couples. In M. A. Ferber & J. W. Loeb (Eds.), *Academic couples: Problems and promises* (pp. 156-181). Urbana, IL: University of Illinois Press.
- Burrelli, J. (2008). *Thirty-three years of women in S&E faculty positions*. "Infobrief", Science Resources Statistics, National Science Foundation, 08-308. Retrieved from www.nsf.gov/statistics/infbrief/nsf08308/
- Burrelli, J. (2009, October 27). Women of color in STEM education and employment. Presentation at CEOSE Mini-symposium on Women of Color in STEM. Arlington, VA: National Science Foundation.
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: Sage Publications.
- Denzin, N. K. (1997). *Interpretive ethnography*. London, UK: Sage Publications.

Didion, C. J. (1996). Dual-careers and shared positions: Adjusting university policy to accommodate academic couples. *Journal of College Science Teaching*, 26(2), 123-123.

Etzkowitz, H., Kemelgor, G., & Uzzi, B. (2000). *Athena unbound: The advancement of women in science and technology*. Cambridge, MA: Cambridge UP.

Ferber, M. A., & Loeb, J. W. (Eds.). (1997). *Academic couples: Problems and promises*. Urbana, IL: University of Illinois Press.

Freeman, B. C. (1977). Faculty women in the American university: Up the down staircase. *Higher Education*, (6)2, 165-188.

Gatta, M., & Trigg, M. (2001). *Bridging the gap: Gender equity in science, engineering and technology*. Rutgers University, NJ: Report for the Center for Women and Work.

Gibbs, G. (2007). *Analyzing qualitative data*. London, UK: Sage Publications.

Grant, L., Kennelly, I., & Ward, K. B. (2000). Revisiting the gender, marriage, and parenthood puzzle in scientific careers. *Women's Studies Quarterly*, 28(1/2), 62-85.

Harding, S. (1987). Introduction: Is there a feminist method? In S. Harding (Ed.), *Feminism & Methodology* (pp. 1-14). Bloomington, IN: Indiana University Press.

Johnsrud, L. K. (1995). Korean academic women: Multiple roles, multiple challenges. *Higher Education*, 30(1), 17-35.

Kannankutty, N., & Burrelli, J. (2007). *Why did they come to the United States? A profile of immigrant scientists and engineers*. Infobrief: National Science Foundation, NSF 07-324.

Kulis, S., & Sicotte, D. (2002). Women scientists in academia: Geographically constrained to big cities, college clusters, or the coasts? *Research in Higher Education*, 43, 1-30.

Lin, Z., Pearce, R., & Wang, W. (2009). Imported talents: Demographic characteristics, achievement and job satisfaction of foreign born full time faculty in four-year American colleges. *Higher Education, 57*, 703-721.

Mason, M. A., & Goulden, M. (2002). Do babies matter?: The effect of family formation on the lifelong careers of academic men and women. *Academe, 88*, 21-27.

McNeil, L., & Sher, M. (1998). *Dual-science-career couples: Survey results*. Manuscript. Retrieved from <http://www.physics.wm.edu/~sher/survey.pdf>

Miller-Loessi, M. A., & Henderson, D. (1997). Changes in American society: The context for academic couples. In M. A. Ferber & J. W. Loeb (Eds.), *Academic couples: Problems and promises* (pp. 25-43). Urbana, IL: University of Illinois Press.

Mohanty, C. T. (1991). Cartographies of struggle: Third world women and the politics of feminism. In C. T. Mohanty, A. Russo, & L. Torres (Eds.), *Third world women and the politics of feminism* (pp. 1-47). Bloomington, IN: Indiana University Press.

Mohanty, C. T., Russo, A., & Torres, L. (1991). *Third world women and the politics of feminism*. Bloomington, IN: Indiana University Press.

National Science Foundation, Division of Science Resources Statistics. (2007). *Women, minorities and persons with disabilities in science and engineering: 2007*. NSF 07-315: Arlington, Virginia. Retrieved from <http://www.nsf.gov/statistics/wmpd>

Nelson, D. J., & Rogers, D. C. (2005). A national analysis of diversity in science and engineering faculties at research universities. Norman, OK: Diversity in Science Association. Retrieved from <http://cheminfo.chem.ou.edu/~djn/diversity/briefings/Diversity%20Report%20Final.pdf>

Olson, K. (2002). Who has tenure? Gender differences in science and engineering academia. *Journal of Women and Minorities in Science and Engineering, 8*(3&4), 347-362.

Open Doors. (2010). *Open Doors 2010: Fact sheets by U.S. State*. New York, NY: Institute of International Education.

Perna, L. W. (2001). The relationship between family responsibilities and employment status among college and university faculty. *Journal of Higher Education*, 72, 584-611.

Philipsen, M. I. (2008). *Challenges of the faculty career for women: Success & sacrifice*. San Francisco, CA: Jossey-Bass.

Pillis, E., & Pillis, L. (2008). Are engineering schools masculine and authoritarian? The mission statements say yes. *Journal of Diversity in Higher Education*, 1(1), 33-44.

Ramazanoglu, C. (2002). *Feminist methodology: Challenges and choices*. Thousand Oaks, CA: Sage.

Rich, A. (2000). Toward a woman-centered university. In J. Glazer-Raymo, B. K. Townsend, & B. Ropers-Huilman (Eds.), *Women in American higher education: A feminist perspective* (pp. 3-15). Boston, MA: Pearson Custom Publishing.

Schiebinger, L., Henderson, A. D., & Gilmartin, S. K. (2008). *Dual-career academic couples: What universities need to know*. Palo Alto, CA: Michelle R. Clayman Institute for Gender Research, Stanford University. Retrieved from <http://www.stanford.edu/group/gender/Publications/index.html>

Skachkova, P. (2007). Academic careers of immigrant women professors in the U.S. *Higher Education*, 53(6), 697-738.

Strauss, A. L., & Corbin, J. (1997). *Grounded theory in practice*. London, UK: Sage Publications.

Sweet, S., & Moen, P. (2004). Coworking as a career strategy: Implications for the work and family lives of university employees. *Innovative Higher Education*, 28(4), 255-272.

Trinh, T. M. (1989). *Women, native other*. Bloomington, IN: Indiana University Press.

Valian, V. (1998). *Why so slow? The advancement of women*. Cambridge, MA: M.I.T. Press.

Valian, V. (2006). Women at the top in science - and elsewhere. In S. Ceci & W. Williams (Eds.), *Why aren't more women in science?* (pp. 27-37). Washington, DC: American Psychological Association Press.

Wells, J. (2005). Beyond the joint hire: Options and strategies for academic couples. *Modern Language Studies*, 35, 68-73.

Wolfinger, N. H., Mason, M. A., & Goulden, M. (2008). Problems in the pipeline: Gender, marriage, and fertility in the ivory tower. *The Journal of Higher Education*, 79(4), 388-405.

Wolf-Wendel, L. E., Twombly, S., & Rice, S. (2000). Dual-career couples: Keeping them together. *The Journal of Higher Education*, 71(3), 291-321.

Wolf-Wendel, L., & Ward, K. (2003). Future prospects for women faculty: Negotiating work and family. In B. Ropers-Huilman (Ed.), *Gendered futures in higher education: Critical perspectives for change* (pp. 111-134). Albany, NY: State University of New York Press.