Penn State Engineering Mentoring for Internship Excellence (EMIX): ”Generating Strategic Corporate Partnerships to Catalyze Professional Success for Women Engineers”

Ms. Cheryl L. Knobloch, The Pennsylvania State University

CHERYL KNOBLOCH is a ceramic engineer by academic preparation and early technical career. As a higher education professional for more than 20 years, Cheryl initiated her Penn State engineering research role in 1997; her career focus shifted in 2002 through her appointment as director of Penn State Women in Engineering Program. Cheryl directs all aspects of WEP and innovatively steers pre-college outreach, undergraduate retention for 1,700+ women, and professional development for graduate students and alumnae. She has engaged in research investigating the effect of mentoring and retention initiatives on persistence of women in engineering. A seasoned educator, Cheryl teaches multiple courses including two gender-balanced, mechanical engineering design classes. She serves as advisor to the nationally award-winning SWE student chapter, and has been an active WEPAN member since 2002. Most recently, Cheryl’s contributions have been recognized as recipient of Penn State Achieving Woman Award (2018), Zonta Status of Women Award (2017), and Penn State Commission for Women Rosemary Schraer Mentoring Award (2013.)
Penn State Engineering Mentoring for Internship Excellence (EMIX): “Generating Strategic Corporate Partnerships to Catalyze Professional Success for Women Engineers”

Cheryl L. Knobloch, Director, Women in Engineering Program
The Pennsylvania State University

Abstract - Penn State Engineering Mentoring for Internship Excellence (EMIX) initiative features an innovative, new model for collaboration between industry and academia yielding dynamic, multifaceted outcomes and serving multiple stakeholders. Corporate partners strategically generate a pathway for diverse technical talent and optimize likelihood for retention and advancement. Undergraduate students engage in dynamic experiential learning complemented by semester-long professional development.

The overarching EMIX goal is to strategically optimize opportunities for industry partners to recruit, retain and advance diverse technical talent. EMIX initiative is designed to prepare women and underrepresented undergraduate interns for seamless transition to the engineering workplace. Professional development, sponsor research, and industry site visits empower students to optimize measurable impact throughout the internship, and to compete for challenging professional roles and projects.

Penn State Center for Engineering Outreach and Inclusion has engaged over 200 undergraduates with 15 different sponsors utilizing this powerful model. EMIX interns distinguish themselves in the engineering workplace as confident, competitive professionals empowered by soft skills that strategically complement academic preparation. EMIX intern cohorts are overwhelmingly characterized as superior, top performers. Interns excel in technical internships and competitively populate the sponsor workforce with diverse technical talent more likely to excel, to advance, and to be retained.

This paper will describe essential exportable elements in the successful Penn State EMIX model including practitioner timeline, sponsorship development, intern search, applicant screening, professional development, and sponsor site visit. Best practices and lessons learned will be discussed. Finally, Penn State EMIX outcomes and qualitative data will be shared.
Penn State EMIX Overview and Stakeholder Goals

Penn State Engineering Mentoring for Internship Excellence (EMIX) program is a collaborative initiative between the Center for Engineering Outreach and Inclusion and Engineering Career Services. The overarching goal is to strategically optimize opportunities for corporate partners to recruit diverse technical talent. EMIX is designed to prepare women and underrepresented undergraduate interns for seamless transition to the engineering workplace targeting soft skills that strategically complement academic preparation.

EMIX interns are rising sophomores, juniors and seniors with Grade Point Averages (GPA) at, or exceeding, 3.00. Undergraduate engineering students matching multiple sponsor parameters are invited to apply; the most competitive candidates are invited to interview with university representatives from Penn State Center for Engineering Outreach and Inclusion.

Ultimately, the selected EMIX interns engage in weekly professional development throughout spring semester, targeting soft skills and best practices for the technical workplace. Concurrently, interns research the sponsoring company extensively, culminating in a professional presentation. Upon successful completion of semester-long professional preparation, Penn State EMIX interns are empowered to excel in respective sponsor summer internships. Additionally, student interns receive formal academic credit for the internship via satisfactory performance reviews.

EMIX initiative practitioner components feature: sponsor acquisition, student intern recruitment and screening, weekly professional development, sponsor site visit, and internship engagement. The EMIX corporate sponsors specifically define intern selection through completion of the EMIX Sponsor Participation Form. Sponsors agree to host a spring site visit and facility tour for the successfully matched interns, assist with housing internship assignments, and provide a competitive intern summer wage.

Sponsor funding for professional development of EMIX interns is calculated by the university team to be a flat fee per student intern. Corporate sponsorship supports weekly professional development, intern and chaperone travel to the sponsor site, funding for student internship academic credit, and project administration. Notably, each corporate sponsor identifies the number of EMIX interns to be sponsored, minimally stipulated to be three engineering undergraduates to one location; several corporate sponsors elect to sponsor five interns each summer.

Former Penn State EMIX interns serve as mentors to incoming students, and showcase professional experiences at College of Engineering networking events and diversity retention initiatives. Ultimately, the EMIX initiative provides technically talented women and underrepresented students with soft skills and strategic career enrichment; thus, superior intern candidates fill sponsor pipelines with diverse talent more likely to excel and to be retained.
Penn State EMIX Initiative Model and Approach

Throughout the last twelve years, Penn State Center for Engineering Outreach and Inclusion has engaged more than 225 undergraduates in this powerful diversity and inclusion initiative.

The EMIX initiative model features four critical stakeholders: undergraduate student interns, corporate sponsors, university professionals, and former EMIX interns. Undergraduate engineering students are the target audience. Students are invited to apply and successful applicants engage in weekly professional development classes throughout spring semester. As student interns progress through the semester-long professional development workshops, they acquire soft skills and professional insight to competitively perform in a professional workplace and empower career success.

Corporate sponsors partner with Penn State and provide engineering summer internships, and department funding per student to offset student professional development and program deliverables. Each sponsor specifically defines intern parameters to augment diversity enhancement in a relevant manner within the respective workplace.

The Penn State Center for Engineering Outreach and Inclusion professional university team steers this initiative. Each professional serves as a Captain to one EMIX sponsor and team of student interns. Captains serve as a responsive liaison to each company, thus streamlining communications and related internship details. Additionally, EMIX Captains accompany the student team on the spring site visit.

Finally, former EMIX interns strategically reconnect with the incoming cohort. They participate in the new intern orientation, specific professional development workshops, and the final EMIX Intern-Sponsor Banquet. Former interns showcase professional development outcomes and exude confidence and professionalism for the new cohort to emulate. Former interns serve as influential ambassadors to diminish student anxiety and to build network within the company before the internship begins.

Students aligned with each respective sponsor work as a team throughout the semester to research the sponsor, network with professionals, and highlight deliverables before ever beginning the actual internship. The soft skills, complemented by technical proficiency, empower students to distinguish themselves as engaged and impactful. This formidable combination catalyzes success and empowers them to deliver beyond the expectations of a typical summer intern. As importantly, the sponsor strategically builds a pipeline of diverse technical talent empowered with keen insight to the company brand, values, and mission.

EMIX interns distinguish themselves; these students are empowered with a depth of understanding about the company, a semester of valued-added soft skills, and an onsite sponsor visit. This young adult has cultivated confidence, established a functional network, and is prepared to succeed. Consequently, the impact of this talented intern is more likely to be significantly measured, and the candidate is more likely to be retained.

"Proceedings of the 2018 CoNECD National Conference"
Copyright 2018
Page 3 of 9
Thus, the Penn State EMIX initiative features strategic goals for multiple stakeholders. Corporate partners choose to participate in EMIX to intentionally augment diversity within their technical workforce. Notably, the university team executes all the tactical work to identify and recruit the student intern cohort. As importantly, EMIX student interns are empowered to exceed expectations upon mastering extraordinary soft skills through weekly professional development.

Penn State EMIX Practitioner Timeline and Milestones

The practitioner timeline features a plethora of critical elements broken into three distinct milestones. Table I depicts a transferable institutional model to seamlessly align with a typical academic year in higher education. The fall semester is dedicated to identifying and selecting undergraduate interns. In spring semester, EMIX student interns engage in weekly professional development, research sponsor particulars, secure summer intern housing, and travel to the sponsor site. Finally, in summer semester, student interns engage in a twelve week technical internship at respective sponsor locations.

| TABLE I |

| EMIX Practitioner Timeline |
| Fall Semester |
| August | EMIX Corporate Sponsorship deadline |
| September | EMIX Student Intern applications received |
| October | EMIX Intern candidate interviews |
| (Conducted by university professional team) |
| November | EMIX Intern selection |
| December | EMIX Intern acceptance and notification |

| Spring Semester |
| January | EMIX Intern Orientation: 2-hour business dinner meeting |
| February - April | EMIX Weekly Professional Development workshops |
| March | EMIX Intern Team Sponsor site visit |
| April | EMIX Intern Capstone Professional Presentations |

| Summer Semester |
| June-August | EMIX Internship at sponsor site |

Notably, acquisition of corporate sponsorship generally begins at least one year in advance. Corporate participation stipulates that each sponsor must commit to a minimum of three interns to one location; several take more. Once a company has committed to hosting and funding at least three EMIX summer interns, the sponsor is provided with documents to guide the characterization of intern talent; this information steers the practitioner search for appropriate student matches. Sponsors define intern parameters including engineering disciplines (majors), years of academic preparation, GPA, and citizenship status. Penn State
EMIX team advocates for placement of women and underrepresented as early as possible in their academic preparation; for example, placement of a rising sophomore is much preferred to that of a rising senior.

Similarly, companies are strongly encouraged to consider students with Grade Point Averages (GPAs) of 2.8 - 3.1. Candidates in this academic window are often overlooked, yet are plentiful. Placement of these students is a strategic enrichment in their professional and personal journeys, and will typically catalyze academic success and likelihood of retention at that company. Further, EMIX professional development, complemented by the summer internship, are significantly impactful on academic retention and career success of diverse candidates.

The institutional practitioner utilizes the corporate feedback to query undergraduate data in an effort to identify students matching the specified parameters with respect to major, citizenship, academic progress, GPA, gender and ethnicity. To ensure ethical practices, sponsors may select a field that directs the intern search to “all males” and “all females.” Ultimately, students who meet the desired parameters are invited to apply.

**EMIX Student Intern Application Process**

Intern applicants provide a personal statement discussing career interests, current resume, recommendation letter from a professor, and employment references. Student applicants are informed in advance that successfully placed candidates need to pass sponsor-initiated drug and background screening. Competitive candidates are invited to participate in an internal professional interview on campus. Notably, sponsors do not interview students; the university professional team screens student applicants.

Successful applicants are matched to each sponsor to identify a best fit aligning student talent with sponsor parameters. Ultimately, the most competitive candidates matching sponsor specifications are each recommended to a single sponsor for final approval; the university team provides the sponsor with the student recommendation letter, resume, and an interview summary. Sponsor approval of the recommended candidate is extremely time sensitive as students continue to field external internship offers throughout the semester.

Once the intern candidate is accepted by the company, the university practitioner swiftly offers the internship to the student with a time sensitive response. The student may elect not to accept the internship at this point in the process; this occasionally occurs if a student has already accepted an internship from the career fair, or if the student was not placed with the company ranked as their first or second preference.

The practitioner goal is to move swiftly and secure these “best fit” matches before another company from the fall career fair does so; the time sensitive nature of this action can be very challenging, particularly since diverse candidates are in high demand. The selected EMIX cohort begins spring semester in sponsor teams of three or more interns supported by a Penn State EMIX Captain.
EMIX Student Intern Orientation

The EMIX professional internship initiative launches at the beginning of spring semester with a two-hour evening orientation for successful participants. During this dinner meeting, the tone is established for the semester-long weekly professional development. Students discuss professional behavior for the semester and review performance expectations. Accordingly, business attire is required for each meeting; casual attire, such as jeans and khakis, is not acceptable. Finally, students review sponsor research project guidelines at the orientation. Notably, former EMIX interns are in attendance and share insight to optimize internship success.

Student Deliverables: Professional Development, Sponsor Research, Site Visit

Student teams research their respective sponsors throughout the semester to culminate in a professional presentation delivered at the EMIX “Intern-Sponsor Banquet.” Students identify topics relevant to the overall sponsor brand and success including products, processes, technical innovations, strategic initiatives, philanthropic initiatives, global initiatives, Employee Resource Groups, diversity initiatives, and supplemental topics.

Concurrently, the intern cohort is required to participate in weekly one-hour professional development to catalyze a seamless entrance into the workplace. Students are held to very high standards to set the tone, and professional attire is required. Table II depicts professional development subject matter in the EMIX curriculum. These seminars empower, and strategically distinguish, EMIX interns from other technical interns within the same workplace.

**TABLE II**

**Professional Development Subject Matter**

- Time Management Tools
- Optimizing Team Performance & Performance Metrics
- Business and Dining Etiquette Protocol
- Creating Your Brand and Building a Dynamic Technical Resume
- Mastering Professional Communication and Business Meetings
- Understanding Complex Organizations
- Identifying, and Engaging in, Company Culture
- Engineering Ethics to Guide Successful Outcomes in the Workplace
- Successful Navigation of Multigenerational Work Teams
- Engaging Social Networking to Propel Career Success [LinkedIn]
- Business Travel and Preparation
- Leveraging Engineering Library as a Technical Portal for EMIX Sponsor Projects
- Penn State Internship Performance Expectations
- Intern-Sponsor Banquet and Sponsor Research Presentation
- Supplemental topics

“Proceedings of the 2018 CoNECD National Conference”
Copyright 2018
Page 6 of 9
Notably, a three-hour business and dining etiquette workshop is a career catalyst. A professional etiquette consultant provides competitive information identifying business protocol companies deem desirable; business meals and networking receptions are featured. The menu is intentionally speared with a number of difficult to eat food selections, and place settings featuring layers of silverware, plates, and stemware. Students are coached to successfully navigate these scenarios in a professional manner. Former EMIX interns participate in this event and share examples of challenging encounters.

EMIX interns implement newly acquired business and dining etiquette competencies on an overnight sponsor site visit to respective company locations, accompanied by the EMIX Captain. This provides an intentional opportunity to engage in best practices for business travel. The corporate visit agenda features a facility tour, supervisor meetings, and lunch with young professionals. Many site visits include air travel; in more than half of those circumstances, this was the first flight the EMIX student intern had ever taken. The EMIX site visit is crucial to intern professional preparation. Sponsoring companies build agendas to proudly showcase respective work teams, corporate culture, technical products and processes. Students overwhelmingly evaluate this experience as pivotal. The welcoming nature of this action reaps a bountiful reward when the student intern onboards in summer semester; anecdotally, the site visit has proven to catalyze intern training and acclimation to company culture.

The “EMIX Intern-Sponsor Banquet” is hosted in the final week of spring semester. Student intern teams have completed the site visit and are eager to showcase the depth of understanding to each sponsor. As importantly, corporate guests attend this evening showcase to evaluate, and enjoy, team capstone presentations. Students universally exceed the expectations of each sponsor and deliver impressive team PowerPoints illustrating a keen understanding of sponsor success and related initiatives.

**Penn State EMIX Outcomes, Best Practices and Qualitative Data**

Cultivating 225 EMIX interns with 15 sponsors over twelve years has yielded best practices to effectively navigate the challenges inherently present in the complex EMIX initiative. An array of complexities potentially impacts intern success and retention including student housing, transportation, and geographic culture.

Practitioners should be forewarned that it can be a challenge to identify appropriate housing in a safe location that will accept an affordable short-term lease. As importantly, not all internship locations feature public transportation, and many student interns do not have access to a vehicle. It is advised to inquire about transportation during the student interview process to facilitate transportation planning for interns.

Lastly, it can be a challenge to attract a young professional to a very rural geographic location unless the company plans to orchestrate weekend activities. It is not necessary that the location be urban, but undergraduate interns generally value the opportunity to explore and enjoy experiences with other young professionals. If this is not possible, the
practitioner is advised to take this into consideration when interviewing candidates. Consider matching young professionals with an affinity for urban culture to an analogous corporate location.

EMIX university practitioners work closely with sponsors to optimize retention and yield. Student assessment and qualitative feedback highlights best practices that resonate with young technical professionals. As an example, a former EMIX participant changed her engineering discipline upon return to school following the internship, but the company still welcomed her back for a returning internship. As a result, she still works full-time for the same company after many years, and continues to advance her career within that company.

Providing layers of “go to” professionals is a practice valued by millennials. A long-standing EMIX sponsor with consistently successful intern recruitment and retention, provides mentors and “connectors.” Student interns report that these multiple touch points promote a tone for a very inclusive culture; this practice has universally yielded positive internship experiences and measurably favorable outcomes for all stakeholders.

EMIX alumnae provide qualitative data that can be evaluated to quantify capture in some circumstances. Notably, throughout the last twelve years, EMIX participants have a 100% graduation rate in engineering and computer science. Remarkably, EMIX alumnae are already on the elite C-suite executive trajectory in a defense company, and former sponsor.

As importantly, numerous Penn State EMIX alumnae have made strategic choices in their respective companies to become leaders and to augment technical talents through advanced degrees and professional licensure. Thus, soft skills are an intentional and strategic career catalyst. Consequently, by virtue of empowering students to succeed in a technical experience, they are more likely to consider advancement well beyond what they may have otherwise. This qualitative data is directly related to the confidence cultivated through the numerous deliverables in the EMIX initiative.

Conclusions

Over the last twelve years, Penn State has partnered with fifteen different sponsors in more than 20 different locations across the United States. Recruitment and retention outcomes were optimized in circumstances where sponsors elected to send two teams of three students for placement in two different corporate locations. The most successful sponsors have also rotated successful, returning EMIX interns through different company locations and business sectors resulting in optimal retention.

The Penn State EMIX initiative positively impacts sponsor recruitment of diverse technical talent, and career acceleration of engineering interns, as evidenced by the qualitative feedback from student participants and corporate sponsors. The EMIX initiative generates positive outcomes for undergraduate student interns. Consequently, students’ future careers are empowered by soft skills and professional savvy to catalyze measurable impact and propel career advancement.
Acknowledgements

The Penn State EMIX initiative is a collaborative effort between the Penn State Center for Engineering Outreach and Inclusion and Engineering Career Services. Funding throughout the last twelve years has been made possible with support provided by corporate sponsors including Air Products and Chemicals, ArcelorMittal, Alcoa, BAE Systems, Danaher, Harris RF Communications, Liberty Mutual, Northrop Grumman, Nucor, Rockwell Automation, Siemens, Sunoco, Turner Construction, Westinghouse and Xerox.

References Cited


CHERYL KNOBLOCH is a ceramic engineer by academic preparation and early technical career. As a higher education professional for more than 20 years, Cheryl initiated her Penn State engineering research role in 1997; her career focus shifted in 2002 through her appointment as director of Penn State Women in Engineering Program. Cheryl directs all aspects of WEP and innovatively steers pre-college outreach, undergraduate retention for 1,700+ women, and professional development for graduate students and alumnae. She has engaged in research investigating the effect of mentoring and retention initiatives on persistence of women in engineering. A seasoned educator, Cheryl teaches multiple courses including two gender-balanced, mechanical engineering design classes. She serves as advisor to the nationally award-winning SWE student chapter, and has been an active WEPAN member since 2002. Most recently, Cheryl's contributions have been recognized as recipient of Penn State Achieving Woman Award (2018), Zonta Status of Women Award (2017), and Penn State Commission for Women Rosemary Schraer Mentoring Award (2013.)