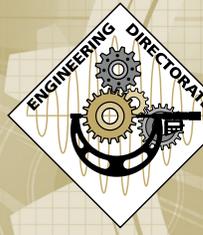


Volume 3, Issue #3
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THE ENGINEERING EDGE

EDGEWOOD CHEMICAL BIOLOGICAL CENTER



ECBC ENGINEERING
Design→Build→Test→Support



WOMEN'S HISTORY MONTH

In honor of National Women's History Month in March, the Engineering Edge has dedicated this month's newsletter issue to recognizing the contributions of females to science, engineering, and the U.S. Armed Forces. In addition to special feature stories that highlight progress women have made in educational and occupational attainment, we are also pleased to include stories and comments that recognize the successes and dynamic narratives of the women working at ECBC.

To access the electronic version of this newsletter visit:
https://cbnet.apgpea.army.mil/engineering/eng_news.html



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This newsletter was published through the Balanced Scorecard.

For article suggestions, questions or comments please contact Ed Bowen at ed.bowen@us.army.mil.



Engineering Strategy Paves Way for Improved Customer Service within the Directorate

Since the Engineering Balanced Scorecard (BSC) strategy development process began in 2005, Engineering Directorate staff has remained engaged because the strategy itself is relevant and accessible. The structure of the strategy calls for continuous efforts to educate individuals about strategic initiatives and these initiatives seek to improve daily operations for the workforce – including a specific initiative to improve customer service.

When Mike DeZearn, BSC Customer Service Bubble Team Leader, first took leadership of the bubble team, it had been dormant for some time.

“Upon joining the team, one of the things I immediately jumpstarted was a survey that had been in process before the team had become inactive,” DeZearn said. “The survey was intended to form a baseline of information about what different Engineering teams were doing to ensure they were providing good customer service.”

DeZearn was able to quickly revive the survey. He requested and obtained the needed overhead funding to have the ECBC Directorate of Program Integration Decision Analysis Team (DAT) review their survey initiative, and administer it to the Engineering Directorate. In April 2010, the DAT developed a 23 question survey that was comprised of multiple choice and open-ended questions.

The survey was approved and administered by the Engineering Directorate (**Continues on page 3**)



Awareness: Women's History Month

Before the 1970's, the topic of women's history was largely missing from general public consciousness. To address this situation, the Education Task Force of the Sonoma County (California) Commission on the Status of Women initiated a "Women's History Week" celebration in 1978 and chose the week of March 8 to coincide with International Women's Day. The next year, leaders from the California group shared their project at a Women's History Institute at Sarah Lawrence College. In 1987, the National Women's History Project petitioned Congress to expand the celebration to the entire month of March. Since then, the National Women's History Month Resolution has been approved every year with bipartisan support in both the House and Senate. For more information about events that honor Women's History Month, please visit: <http://womenshistorymonth.gov/index.html>. 

Women in Science and Engineering Panel Discussion Event Recording Available on SharePoint and CNet

If you were unable to attend the March 2 Women in Science and Engineering Panel Discussion event or are interested in revisiting some of the dialogue, you can access the full recording of speaker Nancy Kammerer and the panel discussion on ECBC's SharePoint and CNet from the Engineering Directorate home page beginning March 14. Panelists at the event included: Suzanne Milchling, Carol Eason, Pam Barrett, Nan Ramsey and Debra Thedford. The event was sponsored by the Engineering Balanced Scorecard Strategy.



On the Cover...

Can you name some of the historical figures pictured on the cover? Try matching the following names with the correct cover picture. Visit Engineering's SharePoint home page for the answers!

Clara Barton	Ruth Benedict	Marie Curie	Gen. Ann E. Dunwoody
Rosalind Franklin	Michelle Obama	Condoleezza Rice	Sojourner Truth

Educational, Occupational Equality Between Men and Women Continues in Science and Engineering Fields: ECBC Workforce Comments on Narrowing Gap

When Maria Sklodowska decided she wanted to continue her education at the collegiate level in 1886, she joined a “floating university,” avoiding detection by the czar’s police in Warsaw by attending night classes at changing locations. Her trek to “Madame Marie Curie,” the famed female physicist-chemist and first person honored with two Nobel Prizes, was a difficult journey, as it was for many of the female scientists and engineers of earlier centuries.

Currie’s work, along with the advancements made by other pioneering female scientists and engineers in the 18th and 19th centuries, began a trend that over 130 years later is beginning to come full circle. The trend toward equality of educational and occupational attainment between women and men continues.

“As a female engineer just entering the workforce I can confidently say that women are gaining momentum in the science and engineering (S&E) fields,” said Akanksha Raja, ECBC Engineering Chemical Engineer.

In the chemical engineering department at Raja’s 2010 alma mater, the University of Maryland Baltimore County, the majority of the professors are female.

“The fact that there exists an engineering department comprised mostly of women shows how the gap between women and men in the science, technology, engineering and mathematics (STEM) fields is decreasing,” Raja said. **(Continues on page 7)**

Engineering Strategy Paves Way for Improved Customer Service **(Continued from page 2)**

leadership to Edgewood and Rock Island personnel in June 2010. After collecting the responses, DAT then reviewed and analyzed the results of the survey and presented them to the Customer Service Bubble Team in July and August 2010.

“The purpose of the survey was to determine the mechanism Engineering teams were using to ensure they were giving good, consistent customer service,” DeZearn said. “If you are able to provide good customer service to the folks who are paying your bills, they will be more willing to provide additional work in the future.”

The Customer Service Bubble Team receives help from Engineering’s Linnette Martinez, Bill Lake, Chika Nzelibe and Jeff Warwick, in addition to members of DAT - Scott Kooistra and John Walther.

“In the survey responses, Engineering employees identified several distinct obstacles that they felt hindered them in being able to provide good customer service,” DeZearn said.

Several of those impediments included: competing priorities, administrative burdens and unclear mission objectives.

As a means to overcome some of these reoccurring obstacles noted by the workforce in the survey, the BSC team is reaching out to Rock Island to learn more about the formal customer service processes utilized in their teams.

“Establishing a formal customer service process, versus an informal process, will be key to bettering, as well as measuring our customer service,” DeZearn said. “I have already reached out to the Point of Contact in Rock Island to initiate the collaboration. Our next steps are to see how they are able to monitor their customer satisfaction, and then refer to their approach to write an Engineering-wide procedure for all of our teams.”

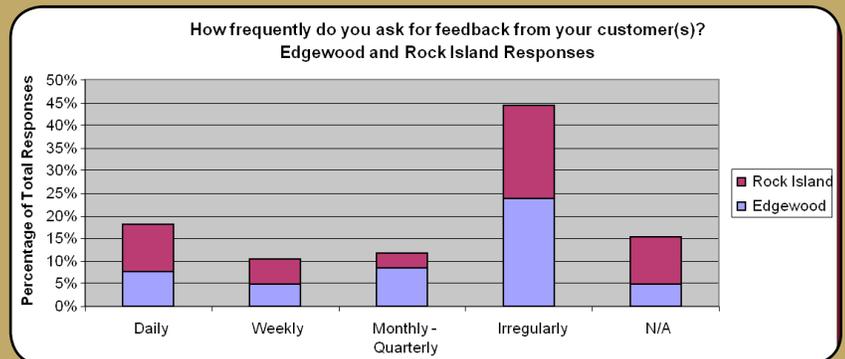
In Rock Island, through their International Organization for Standardization (ISO) 9000 certification, they have established a formal customer feedback system that is a part of their quality management process. ISO customer surveys require face-to-face meetings with the customer, or a telephone call if not local.

According to Nan Ramsey, Engineering Associate Director and ECBC Rock Island Site Manager, maintaining a systematic way of measuring customer service is essential to determine if an organization is getting better or worse.

“We go through our whole metrics system periodically and discuss customer survey results with senior staff at ISO Management Reviews,” Ramsey said. “Supervisors and employees share in the responsibility for the surveys so they can understand the importance of customer service.”

Moving ahead, DeZearn noted that during their collaboration with Rock Island and attempts to model after the formal ISO customer service system, it will be imperative that they do not impact the stringent reviews and scoring system of the ISO 9000 process.

“Rock Island has a great customer service system in place for us to spring board off of and I look forward to working with them,” DeZearn said. There’s a certain personal satisfaction that comes with working on the BSC team, knowing you’ll help leave the organization better than it was.” 



In November, DeZearn had the opportunity to present his team’s survey findings at the Engineering Strategic Management Meeting. Featured here is a chart from his briefing that shows a majority of respondents replied “Irregularly” to the question, “How frequently do you ask for feedback from your customer(s)?”

ECBC ENGINEERING AMERICAN WOMEN

Women in uniform, throughout history...



Women have served with the United States military since 1775. They nursed the ill and wounded, laundered and mended clothing, and cooked for the troops in camp on campaigns; services that did not exist among the uniformed personnel within the Army until the Twentieth Century. Ever since Mary Ludwig Hays McCauley ("Molly Pitcher") replaced her husband when he collapsed at his cannon, women have continually proven that they are an invaluable and essential part of the Army.

"Molly Pitcher" replaces her husband when he collapsed at his cannon in the Battle of Monmouth, New Jersey. (Courtesy of Pennsylvania Gazette)

When America went through a civil war and the world wars of the 20th century, women continued to show their patriotism and their fighting spirit even though they did not receive equal treatment or recognition.



Revolutionary War "camp followers." A large portion of the followers were wives and children of the soldiers who made contributions to the war efforts, whether it was cooking and cleaning for their soldier husbands or by just being there, which helped prevent the soldier husbands from deserting. (Courtesy of the Yorktown Notes)



Being inspected by Rear Admiral Victor Blue on the Washington Monument grounds, Washington, D.C., in 1918. (Courtesy of the U.S. Naval Historical Center)



A Black Women Army Corps Unit in France during World War II. (Courtesy of American Forces Press Service-AFPS)



Rear Admiral Grace Murray Hopper U.S. Navy. Hopper conceptualized the idea of machine-independent programming languages. (Courtesy of the U.S. Navy)



(Above) Navy Women Accepted for Volunteer Emergency Service (WAVES) secure a chain hoist to a radial engine. (Courtesy of AFPS) (Below, on left) Capt. Hortense Boutell, first female Logistics officer. (Courtesy of the U.S. Army Signal Corps)



RECOGNIZES IN UNIFORM



In 1980 the first 120 women were admitted to the U.S. Military Academy.

"There are always challenges with any change to an institution as old as the military; creating a women friendly military was no different," Wenona Vistoso, ECBC Program Assistant for Advanced Technology Demonstration Branch Chief, said. "What I noted during my military career as a non-commissioned officer (NCO) was that over the years, women have come to be given equal promotions based on merit. This is something all military branches can be proud of."

In 1989 over 700 women went to Panama in support of Operation Just Cause. CPT Linda Bray led 30 soldiers of the 988th Military Police company into combat to seize an enemy objective near Panama City. As the first woman to lead troops in battle, Bray's role ignited the debate over the role of women in the Army. In the early 1990s, approximately 24,000 women served in the Persian Gulf War.

"American society has matured a great deal over the last several decades. Like a nation moving from adolescence to adulthood, we have come a long way in our understanding of each other and in valuing the diversity of experience," COL (R) Humberto Galarraga, Engineering's Detection, Decontamination Engineering Division Chief, said.



"There will always be room for improvement, but from my vantage point, the policies that have been put in place to ensure a non-discriminatory, woman and mother friendly, and respectful environment have gone a long way to ensuring a military that I would be proud to have my daughter or granddaughter serve in."

Currently, women serve in 91 percent of all Army occupations and make up about 14 percent of the active Army.

"Throughout my Army career, I have been happy to witness a steady and increasing role of women in leadership positions," Galarraga said. "In today's Army, women occupy every leadership role from a NCO to a 4-star General. In the reality of modern warfare and in a time when the military is stretched thin between two wars and a deepening homeland defense role, we can't afford to turn away talent.

"Dedicated, patriotic, brave, and intelligent people who are willing to risk their lives in service to their country are needed. At the tip of the spear, it doesn't matter what your gender, ethnicity, or background is; what counts is that you are a U.S. soldier and are willing to sacrifice for your country."

From the American Revolutionary War to the present Global War on Terror, women have served a vital role in the U.S. Army and their sacrifices in this noble effort underscore their dedication and willingness to share great sacrifices.

"Wars are not started on battlefields. I think most women are natural leaders and if given the opportunity will play a major role in global peace and the continued evolution of real equality among all nations, religions, genders, and race," Vistoso said.

(Top) The Persian Gulf War demonstrated to the American public the capabilities of the country's servicewomen. Several years after the war, Congress lifted the ban on women serving as crew members on combat aircraft and combat vessels. (Courtesy of the U.S. Air Force)

(Middle Row) Currently, women serve in 91 percent of all Army occupations and make up about 14 percent of the active Army. (Photos courtesy of the U.S. Air Force and U.S. Navy)

(Above Left) First Lt. Keri Lynn Schubert is the first woman Marine selected for naval flight officer duty in the F/A-18D Hornet. (Photo by Petty Officer 2nd Class Davis Rush, USN)

(Above Right) General Ann E. Dunwoody, Commanding General, U.S. Army Materiel Command. The first woman in U.S. military history to achieve a four-star officer grade. "I have never considered myself anything but a Soldier. I recognize that with this selection, some will view me as a trailblazer, but it's important that we remember the generations of women, whose dedication, commitment and quality of service helped open the doors of opportunity for us today." (Courtesy of army.mil)

Building Business with Strategy: A conversation with Meg Hower, JSAM Joint Strike Fighter, Lead Engineer



The Engineering Edge talks with Meg Hower to understand why she chose to participate in Engineering's strategic planning process.

Engineering Edge: How did you first hear about Engineering's Balanced Scorecard (BSC)?

Meg Hower: I initially heard about the BSC from several people at ECBC that I was friends with who were involved in the strategy. I was approached by some of them in the very beginning when they first announced the planning effort and

they wrote me into a couple of the initiatives.

EE: What BSC initiative are you currently working on?

MH: The one I'm working on right now is the P3 initiative, which is Developing Leaders. I work with Allen Swim, the initiative lead, and Genna Rowe. At this point we are working with results from a survey we got back from the workforce that looked at our leadership strengths and weaknesses at the Center. According to the survey results, participants scored leadership highest in the area of "Customer Satisfaction." However, based off of the team's research this was an area where leaders had taken the least amount of training. Additionally, survey participants scored leaders low in the area of "Leadership," but according to the training data, this was an area where numerous individuals had completed training. So we are looking at that information to try and come up with a possible approach to changes for leadership training.

EE: What are the main goals your initiative is trying to reach?

MH: The primary goal of the Developing Leaders initiative is basically what it says - to develop leaders. To start, we first came up with a definition of what a well-rounded leader is and identified several categories where an individual should maintain a high performance level to be a good leader. Next, we looked at what we did at the Center in the past to develop good leaders.

Recently our focus has been on leadership training. We are matching up the information we found in the results of the survey in terms of leadership training to see if there can be any improvements there.

EE: What inspired you to get involved?

MH: I thought my involvement in the Engineering strategy would provide a good opportunity to get outside of "the bubble" and to see what else was going on within the Center.

EE: What has been the most rewarding part of working on the BSC?

MH: I think the most rewarding part is seeing firsthand the amount of management buy-in there has been in the entire strategic planning process. I have been working on the BSC for a long time and so I've had the privilege to work with a lot of different groups at ECBC; we've always received great support from leadership. ⚙️

ECBC-RI Obtains Greater Efficiency and Productivity in Defense Spending: Second in a series of Value Engineering articles

Members of the Edgewood Chemical Biological Center-Rock Island's (ECBC-RI) Engineering Directorate enjoy telling the story of how useful Value Engineering (VE) can be, helping others realize the effectiveness of the program to bring about efficiency improvements. The Engineering Edge is working with the ECBC-RI team responsible for the technical management of VE to tell the story in a series of three installments. In this month's issue, ECBC-RI demonstrates how these VE applications can directly support the implementation of efficiency and productivity initiatives identified in the Under Secretary of Defense for Acquisition, Technology, and Logistics, 14 September 2010 Memo, addressing Better Buying Power: Guidance for Obtaining Greater Efficiency and Productivity in Defense Spending.

The VE program can directly support efficiency and productivity initiatives identified in the Under Secretary of Defense for Acquisition, Technology, and Logistics 14 September 2010 Memo addressing Better Buying Power: Guidance for Obtaining Greater Efficiency and Productivity in Defense Spending. The objectives of the Army Materiel Command VE program are to obtain total value improvement of Army system acquisitions, operations, support, procedures, supplies and services. VE objectives are accomplished by:

- Reducing overall cost
- Improving quality and schedules
- Simplifying Army materiel/systems to provide operational and logistics support improvements

MANDATE AFFORDABILITY

The first VE-associated initiative is to Mandate Affordability as a requirement in developing a system. This requires a systems engineering tradeoff analysis to determine how cost varies as the major design parameters and time to complete are varied. This analysis would allow decisions to be made about how the system could be made less expensive without loss of any important capabilities. Value Engineering methodology provides a systematic/organized approach to make just such analyses, resulting in reduced costs while still maintaining essential functions.

DRIVE PRODUCTIVITY GROWTH

The second initiative drives productivity growth through "Will Cost/Should Cost" management and eliminates redundancy within Warfighter portfolios. This is accomplished by scrubbing costs to identify unneeded cost and continuing this decline over time. In addition, this is a classic value decision that cannot be made by looking at the program in isolation...but by looking at the entire warfighting portfolio. Value Engineering procedures are flexible. The VE tools can provide a systemic/organized approach to analyze cost reduction without sacrificing essential functions can be used at a component-level (isolation) or at a system-level (portfolio) to identify redundancies and potential unneeded costs.

The AMC VE program is designed to support these initiatives and other critical cost cutting and efficiency initiatives. Value Engineering has great potential to assist the Army in meeting increasingly stringent budget challenges. The next article will address Value Engineering Change Proposals (VECP), which create a win-win situation for the government and contractors for improving Department of Defense supplies and or equipment. ⚙️

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Edge Photos of the Month

In honor of their outstanding work in support of the Engineering strategy, Engineering Director AJay Thornton and Engineering Directorate Chief of the Strategic Planning and Business Operations Branch Ed Bowen presented several individuals with Balanced Scorecard (BSC) Awards on Monday, January 24. Award recipients included Engineering's Nancy Waltman, Debbie Brooks-Harris and David Vincitore of the Packaging Branch.

The three each received the "Hot Shot" award for demonstrating innovative thinking and a commitment to shaping the future of Engineering through the BSC.

BSC Award nomination forms can be downloaded online from the Engineering BSC Intranet and SharePoint sites at: <https://cbnet.apgea.army.mil/engineering>. Forms are accepted on a rolling basis.

Women in Science and Engineering (Continued from page 3)

As a newcomer to the ECBC Engineering workforce, Raja represents one of the more than 8 million women currently employed in S&E fields in the U.S. Since 1966, the number of women receiving bachelor's degrees in S&E in the U.S. has increased almost every year. Undergraduate women began reaching parity with men in the early 1980s as societal barriers to female scholarship fell away.

"When I graduated from college in 1980 the percent of women from my university that graduated in engineering or science was about 18 percent," Bill Klein, Engineering Associate Director said. "When looking at the number of people hired at ECBC since 2000, the percentage of female new hires is 32 percent. As more women graduate with S&E degrees, more women enter those career fields – and we've seen that growth here at ECBC as well."

From 1950 to 2000, employment in U.S. S&E occupations grew from fewer than 200,000 to approximately 4.8 million workers. The average annual growth rate of 6.7% contrasts with a 1.6% annual average growth rate for total employment. This contrast reveals the increased importance of STEM knowledge and as Associate Director and ECBC Rock Island Site Manager Nan Ramsey says, the pressing need for the inclusion of women in S&E fields.

"If we encourage them to pursue undergraduate and/or graduate study in these areas, it will ultimately increase the number of women who will take up leadership positions in the science and engineering fields," Ramsey said.

Sharing her perspective on the leveling educational field, Engineering Special Projects Branch Chief Genna Rowe said that the participation of women in S&E fields has changed significantly over the last 10 to 20 years.

"When I started my undergraduate degree, I was in the minority in the math and science classes. By the time I started taking my graduate courses, the classes were fairly even," Rowe said. "Since 2001 until now, I have seen many smart and talented women join the S&E workforce here at ECBC and work their way up to leadership positions."

In 2009, the evolution toward educational equality between the genders marked a significant milestone. For the first time, more women than men in the United States received doctoral degrees, representing the culmination of decades of change in the status of women at colleges nationwide. Of the doctoral degrees awarded in the 2008-09 academic year, 28,962 went to women and 28,469 to men, according to an annual enrollment report from the Council of Graduate Schools, based in Washington.

However, according to the enrollment report, when considering the STEM doctoral degrees awarded, men still earned a majority of the mathematics and the physical sciences degrees and earned 80 percent of engineering doctorates.

"More women are going to school for STEM related careers, but not enough," Ramsey said. "I've seen a lot more women entering into senior leadership positions, and the sciences are one of those areas. The glass ceiling has dropped away in many respects, but we still need to encourage more and more women to get involved in the STEM fields."

Overall, women and girls make up 51 percent of the U.S. population and the United States Department of Labor estimates that the U.S. labor force is expected to increase by 12.8 million persons between 2006 and 2016, with about 6.3 million – or close to 49 percent – being women. But women have not conquered every corridor of the ivory tower.

Beneath these summative statistics lies what Harvard sociologists Yu Xie and Kimberlee Shauman refer to as "stubborn exceptions." In their book "Women in Science: Career Processes and Outcomes" published in 2003, Xie and Shauman address the trend known as the "leaking science pipeline," a metaphor used to refer to the collective loss of women along the STEM-related career path. Women represent a large part of the talent pool for S&E, but many data sources indicate that they are more likely than men to "leak" out of the pipeline in the sciences before obtaining a tenured position at a college or university.

Based on the pipeline metaphor, assuming a STEM career begins in middle and secondary school science and mathematics **(Continues on page 8)**

Check out the special ECBC Women's History Month blog series in March...

In March, ECBC is featuring a special Women's History Month blog series on the official ECBC blog site. Visit <http://edgewoodchembio.blogspot.com/> throughout the month of March to read entries from various female ECBC employees, sharing why they joined the science and engineering (S&E) fields, their draw to the Department of Army, challenges they faced, successes they've celebrated and lessons they've learned as women in the S&E workforce. Take a peek at what's to come...



MEG HOWER

"I remember sitting down to begin introductions and noticing that not only was I the only female in attendance, but I was also the only person not in fatigues and had to be the youngest by maybe 20 years. I felt like there was a giant red arrow hanging above me pointing out that 'one of these things is not like the other!'"



LEANNE CHACON

"I definitely think more and more women are entering the science and engineering field. ... If women are looking to grow into leadership positions, my recommendation is to speak up, work hard, take as much training as you can, get involved in various projects, introduce yourself to others, and always be friendly and professional."



AKANKSHA RAJA

"Even at a young age I knew that I liked working with my hands. As I got older I realized engineering was the way for me to develop new things while using my hands. In high school I had a wonderful chemistry teacher that intrigued my passion for chemistry. Now I had two fields that I really enjoyed, I figured why not combine the two."



AMANDA DUBBS

"I chose to work for the Department of Army because the job as a biologist sounded interesting and cutting edge. I would have the opportunity to be on the forefront of science. After interviewing with the deputy director, I realized that the mission of protecting the Warfighter was one that I wanted to embrace."



MARY HUBBARD

"I am cautious to place myself into the 'women engineer' box. I am an engineer, period. ... The more we continue to ask or wonder if we are being treated the same, the more we open the door to being treated differently. You have to be confident in your engineering skills, raise relevant issues and do the job at hand."

Women in Science and Engineering (Continued from 7)

classes, the path continues through the natural educational transitions with a student's intentions to major in a STEM subject in college, followed by attending graduate school, receiving a masters and Ph.D., attaining postdoctoral placements, and progressing through formal academic careers as a scientist, engineer or professor.

A recent report by the National Research Council of the National Academy of Sciences confirmed that women who receive Ph.D.s in the sciences were less likely than men to seek academic research positions and they were more likely to drop out before attaining tenure if they did take on a faculty post.

"The leaking pipeline portrays the cumulative loss of women along the way without specifying the mechanisms that propel the loss," Xie and Shauman assert in their book.

Instead, the authors propose a "life course" perspective to explain the attrition.

"The life course perspective proposes that life transitions are interdependent across education, family, and work domains and that later transitions are contingent on, but not determined by, earlier transitions. Hence, the science pipeline does not operate in a social vacuum," the authors state.

Despite the "leaky pipeline," female representation in S&E positions at the doctoral level continues to increase. Based on the National Science Board's 2008 Science and Engineering Indicators report, women are a higher proportion of nonacademic S&E occupations at the doctoral level, increasing from about 23% in 1990 to 31% in 2005.

Additionally, anecdotal evidence from women like ECBC's Raja, Ramsey, Rowe and the many other female scientists and engineers in the Center continues to speak to the optimism and practical strides taken to close both the educational and occupational attainment gaps between men and women.

"There have certainly been challenges I have had to face in this field. Other than the challenges of becoming a mother while developing a career, there were other professional challenges," Rowe said. "In my earlier years at ECBC, I found it very difficult for my opinions to be heard and my ideas to be taken seriously. I learned the hard way that I had to make sure to speak up, without being asked, when I had something of value to add. I learned very quickly that if I spoke with confidence, and if I spoke up loud enough, I was eventually heard."

Madame Curie and the many other female scientists and engineers of earlier centuries certainly paved a path for current generations to lead the way over the past 100-plus years. And as Raja says, the coming generations of women S&E leaders continue to blaze a trail.

"I believe the changes we are seeing in the S&E workforce are due to more women becoming independent and realizing that maintaining their independence requires them to acquire a good education," Raja said. 