

Pittsburgh

Spring 2015

ENGINEER

Quarterly Publication of the Engineers' Society of Western Pennsylvania

Women in Engineering





**Strength, capability, leadership ... Transforming engineering
through the advancement of women**

100 Airside Drive • Moon Township, PA 15108 • 1 (800) 553-1153

Pittsburgh ENGINEER

SPRING 2015

Quarterly Publication of the Engineers' Society of Western Pennsylvania

In this issue...

- 2** Guest Editor Column:
Colleen Layman, P.E.
 - 3** Women Have Found Rewarding Careers in
Westinghouse
 - 5** Women in Energy
 - 8** Women in Manufacturing
 - 10** Applying Asset Management Principles to
Optimize the Management of Your Buried
Infrastructure: Linda Blankenship
 - 12** Women in Infrastructure
 - 16** Women in Bioengineering
 - 17** Women in Sustainability
 - 21** The Greening of Abandoned Coal Mine Refuse
Areas Using Bauxite Residue: Yuling He
 - 22** Engineers Without Borders: Michelle Krynock
 - 24** Women in Civil Engineering
-



PROJECT MANAGEMENT INSTITUTE

- WORLD'S LEADING ASSOCIATION FOR THE PROJECT MANAGEMENT PROFESSION
- GLOBALLY RECOGNIZED CREDENTIALS AND STANDARDS
- PROFESSIONAL DEVELOPMENT AND TRAINING
- NETWORKING AND VOLUNTEER OPPORTUNITIES

Pittsburgh
PMI
pittsburghpmi.org



Project Management
Institute-
Pittsburgh Chapter



ENGINEERS' SOCIETY of WESTERN PENNSYLVANIA

Pittsburgh Engineers' Building
337 Fourth Avenue
Pittsburgh, PA 15222

P:412-261-0710•F:412-261-1606•E:eswp@eswp.com•W:eswp.com

2015 ESWP OFFICERS

President
CHARLES R. TORAN, Jr., Sci-Tek Consultants, Inc.
1st Vice-President
H. DANIEL CESSNA, P.E., PENNDOT District 11-0
2nd Vice-President
ROBERT J. WARD, P.E., ASTORINO/CANNON DESIGN
Secretary
MICHAEL G. BOCK, P.E., Esq., Schnader Harrison Segal & Lewis LLP
Treasurer
TAMMI A. HALAPIN, P.E., Collective Efforts, LLC
Immediate Past President
THOMAS E. DONATELLI, P.E., Michael Baker International

2015 ESWP Directors

MICHELLE S. ANTANTIS, P.E., Duquesne Light Co.
DAVID W. BORNEMAN, P.E., ALCOSAN
GREG E. CERMINARA, P.E., Michael Baker International
MICHAEL P. CRALL, HDR, Inc.
ROBERT B. CZERNIEWSKI, Mascaro Construction, LLP
DEL DOSCH, PJ Dick-Trumbull-Lindy Paving
JOSEPH H. FRANTZ, JR., P.E., Range Resources Corporation
STEVE GAGNON, AVANTech, Inc.
DAVID E. HATHAWAY, JR., United States Steel Corporation
LENN C. HAWKINS, P.E., PMP, U.S. Army Corps of Engineers
JOSEPH W. HOLLO, P.E., CH2M HILL
JOHN W. KOVACS, P.E., PMP, D. GE, Gannett Fleming, Inc.
JADE MOREL, EQT Production Company
JENNIFER M. NOLAN-KREMM, P.E., STV, Inc.
DAMON P. RHODES, P.E., Larson Design Group
JOHN R. SMITH, Ph.D., P.E., Alcoa Inc.
RACHEL STIFFLER, Vector Corrosion Technologies
MARK E. TERRIL, PPG Industries
MARK URBASSIK, P.E., KU Resources, Inc.
AMY L. VELTRI, P.E., BCEE, NGE
JEFFREY M. ZEFFIRO, P.E., R.T. Patterson Company, Inc.

PUBLICATIONS COMMITTEE

The ESWP produces a range of publications as a service to our members and affiliated technical societies. ESWP Publications are supported by an all-volunteer Publications Committee.

Guest Editor

Colleen M. Layman, P.E., HDR, Inc.

Committee Chairs

David W. Borneman, P.E., ALCOSAN

Zach Huth, Huth Technologies, LLC

Committee

Joseph DiFiore, PARSONS

Sandie Egley

Tanya McCoy-Caretti, ARCADIS

Don Nusser, Hatch Mott MacDonald

Donald Olmstead, P.E., P.Eng., Venture Engineering & Construction

John R. Smith, Alcoa, Inc.

Chriss Swaney, Dick Jones Communications

Robert J. Ward, P.E., ASTORINO/CANNON DESIGN

Editor-in-Chief

David A. Teorsky, ESWP

Guest Editor Column

By Colleen Layman, P.E.

As a woman in engineering, I've seen the conversation related to gender diversity in the engineering profession evolve in the past few years. Today's political leaders, university presidents and CEOs alike proclaim both the value of diversity in engineering and the importance of engineering to society in general. And now, it's commonly recognized that the dearth of diversity in engineering is a detriment to our progress as a nation. But why? Diversity in the engineering workplace promotes innovation and problem-solving—because diverse opinions challenge teams to develop unique solutions to a problem.

These days, the conversation isn't so much why gender diversity is important, but "How do we promote gender diversity and grow the pipeline?" But despite this progress in attitude, statistics released by the National Science Foundation (NSF) in 2013 revealed that women earned just 20 percent of engineering degrees that year, and still hold less than 14 percent of all engineering jobs. And this percentage has hardly budged in recent years, regardless of the business sector considered.

When I consider the facts that 1) U.S. economy has a growing need for STEM professionals, especially engineers, and 2) engineering careers typically provide financial stability, I'm left asking, "Why aren't women entering into engineering careers," and "Why do so many end up leaving the profession?"

The University of Wisconsin-Milwaukee's Project on Women Engineers' Retention (POWER) published an eye-opening report in 2012 titled *Stemming the Tide: Why Women Leave Engineering*. The article gave some hard-hitting insight into why women decide to enter, or not to enter, the engineering workforce after college, and why women choose to stay in the field or elect to leave it.

According to the study, factors that influenced women to remain in the engineering profession and stick with their current employer included a positive workplace

climate, supportive mentors and coworkers, perceived recognition of accomplishments, and investment in training and professional development. On the flipside, an absence of one or more of these factors was noted as a deciding factor in the decision to pursue non-engineering fields of employment. As the primary researchers in the POWER study note, the solutions lie in changing "not how women adapt to their work environment, but how companies adapt to a more diverse workforce."

"The lack of women in general, and the lack of women mentors makes engineering a lonely field for women to want to stay in"

A quote published as part of the interviews for the report stuck really stuck with me: "The lack of women in general, and the lack of women mentors makes it [engineering] a lonely field for women to want to stay in."

I've spent the majority of my career working as an engineer in the power generation business—an industry as traditionally male dominated as any. And while I've been fortunate to have more than my fair share of great mentors and sponsors throughout my career, most of them were male. There just haven't been many women higher up on the corporate ladder to be a role model or industry mentor, regardless of my company or position within the organization.

So how do we change this? One of the ways I've combated this void in my own life is through membership in diversity engineering organizations like the Society of Women Engineers (SWE). Participation in SWE has provided me a venue to swap ideas and advice, develop my leadership skills in a constructive and comfortable environment, and find the female role models and mentors I needed to be successful as an engineer and as a leader.

Studies have shown that young women need to see more women engineer role



models to help them visualize what

they can become. When young women have someone to look up to, they know their aspirations are realistic, and it boosts their motivation. Looking to the future, if we expose both girls and boys to not only STEM, but both female and male engineering role models, we'll go a long way in getting the next generation to recognize that engineering isn't just something that "boys do" or "boys are good at." And one fun and engaging way to send that message is through great programs and competitions like FIRST Robotics and Lego League, SWE Wow! That's Engineering!, Girls Who Code, Project Lead the Way, and community STEM outreach activities like those offered at the Carnegie Science Center. With role models of both genders, today's young women will have a better chance of finding an engineer they identify with to look up to, and to inspire their dreams.

The women whose stories you'll be reading in this issue of Pittsburgh Engineer are exactly the type of role models young women in our community need to hear more about. Working on this issue, I was excited to learn about the incredible contributions so many local women are making to society in a wide variety of engineering fields. Here's to you for getting out there and inspiring the next generation of women in engineering.

About the Guest Editor...

Colleen Layman is a Vice President with HDR, Inc. an engineering consulting firm headquartered in Omaha, Neb. with a major transportation and water office located in Pittsburgh, PA. Colleen is the President-Elect of the Society of Women Engineers, a 30,000+ member not-for-profit organization whose mission is to stimulate women to achieve full potential in careers as engineers and leaders, expand the image of the engineering profession as a positive force in improving the quality of life, and demonstrate the value of diversity. Colleen served as the ESWP's IWC General Chair in 2014.

Women Have Found Rewarding Careers in Southwestern Pennsylvania-based Westinghouse Electric Company LLC

Westinghouse has a long history of innovation and engineering excellence. Originating and remaining in southwestern Pennsylvania, Westinghouse designs and builds advanced nuclear plants, nuclear fuel, instrumentation and control systems, and provides numerous services for operating nuclear power plants all over the world. The company also performs decommissioning and dismantling services.

Westinghouse is proud of the company's reputation in engineering, and part of that pride belongs to the company's female technical personnel steering the company's innovation, new nuclear power plant delivery work, and leading and managing technical work from leadership and professional-levels roles.

The first female electrical engineer in the United States was a Westinghouse employee. Hired in 1893, Bertha Lamme worked as a motor designer. With Lamme leading the way, many female engineers and technical professionals have joined Westinghouse and helped to make it a leader in the nuclear industry.

Introduced here are four of the many female engineers who help Westinghouse maintain this leadership status, inspire other female engineers and promote careers in science, technology, engineering and mathematics (STEM) fields by volunteering their time for such programs as "Introduce a Girl to Engineering" and being active members in organizations such as Women in Nuclear and the Society of Women Engineers, among many others



Joni Falascino, vice president of Project Delivery for Westinghouse really believes in what she does, and loves the daily learning experiences that occur in engineering, project management, cultural awareness, safety, and business and commercial acumen. Ms. Falascino currently works in new plant and major projects, where units are being built across the globe. Her organization supports delivering the Westinghouse AP1000® nuclear power plant design for the Sanmen and Haiyang sites in China and the Vogtle and V.C. Summer sites in the U.S., and the Korean APR1400 design for the Barakah site in the United Arab Emirates. She said, "This is an exciting and unique

opportunity at this time in our industry. Imagine being able to say that I was there and my team contributed to the first new generation nuclear power plants that will come on line over the next five years."

Ms. Falascino has also worked in the past on many projects of varying scope and complexity to support nuclear power plants already operating, which is a large part of business at Westinghouse. In her work as an engineer, she has found that there are numerous opportunities to help customers globally with many different products and services, providing diversity in experiences and exposure to tremendous talent at all levels for all employees.

She interfaces with a wide variety of people both inside and outside of the company, at locations all over the world. And Ms. Falascino finds that the people she learns from and the potential she sees in them to develop and become the future of the company is by far what she finds to be the most gratifying aspect of her position at Westinghouse. "I am passionate about connecting with those individuals to reach out and

exceed their expectations, and I am passionate about Westinghouse being here a long time to come, and continuing to have a great reputation in our industry," she said.

Joni Falascino is the Vice President, Project Delivery of New Plant and Major Projects for Westinghouse Electric Company LLC.



As a project manager in the Engineering Services group at Westinghouse, Marilyn Reeder is able to enjoy two of the aspects she likes most about being an engineer in a large company – change and customer and vendor

interaction. While her natural aptitude for math and science and a desire for a varied career path led her to engineering, the combination of design, production and project engineering experience she gained throughout her career, along with her desire for outside interaction during her normal work led her to project management.

Ms. Reeder has been a project manager for various technical projects for more than 15 years and is a Project Management Professional (PMP) and a Westinghouse PM-3 (Project Manager Level 3 – highest at Westinghouse) Program Manager.

In her current position, Ms. Reeder has managed several new nuclear power plant projects as the integrated project manager for Westinghouse Small Modular Reactor development and the licensing of the AP1000® nuclear power plant in the United Kingdom. Her love of change is evident through her experience in several industries including medical equipment, plastics and commercial nuclear. She has also owned a business, which she established in leadership consulting, concentrating on women's success, especially mid-career.

Ms. Reeder said, “I believe strongly that women are integral to the creative process and should be actively recruited to STEM careers.” As an active member of the Society of Women Engineers, she has been a judge and presenter at many outreach programs including Expanding Your Horizons, the Pittsburgh Regional Science and Engineering Fair, and the Pennsylvania Junior Academy of Sciences. She has also taught in the New Choices/New Options program at Community College of Allegheny County, which encourages displaced homemakers and single mothers to pursue higher paying careers, including engineering and craft apprenticeships.

Marilyn Mikulski Reeder is a Project Manager, Global Instrumentation & Controls Production, for Westinghouse Electric Company LLC



Mary Ann Walsh

In her present engineering work, Mary Ann Walsh supports commercial operating nuclear power plants as they are going through the license renewal process to extend operational years. Specifically, she works on compliance with the U.S. Nuclear Regulatory Agency's requirements through inspection and evaluation activities that pertain specifically to the complex internal components of the reactor vessel. Ms. Walsh has enjoyed a long career at Westinghouse that has included work as an analysis and test engineer. Engineering in general, really appeals to her sense of purpose.

“I especially appreciate that nuclear energy is a clean energy, and that we are a safe industry. Using nuclear energy saves significant carbon dioxide from the air, and as an industry, we have the safest record of any of the energy producers. Engineers do not interact with the public

on the same personal level as a lawyer, doctor or teacher, but engineers do make a difference in the quality of life for everyone,” she said.

Ms. Walsh is an active leader in Society of Women Engineers (SWE), American Nuclear Society (ANS) and Women in Nuclear, serving in various officer roles. She is ardent about sharing her experiences with young girls to encourage them to consider careers in the STEM fields. She leads industry, SWE and ANS in hosting an Engineers' Week activity table at Pittsburgh's Carnegie Science Center, and has served as a judge and in other volunteer roles with a number of organizations reaching out to young people.

She said, “In the U.S., the enrollment in law and medical schools is around 50-percent female; whereas in engineering and computer sciences, female enrollment averages only about 20 percent. I enjoy seeing the imagination of young folks and am encouraged by their excitement, their knowledge and their willingness to learn and improve. My long-term goal is that I might see the day when engineering and science enrollment is 50-percent female. Who knows what advances these future engineers will create?”

Mary Ann Walsh is a Principal Engineer, Reactor Internals Aging Management for Westinghouse Electric Company LLC



Cindy Pezze

As vice president of Global Technology and Development and chief technology officer for Westinghouse, Ms. Pezze is responsible for leading company innovation, new technology development, and creating efficiencies to engineering processes across a global and diverse business. Relative

to the innovation side of her role, Ms. Pezze said, “Innovation that meets short, medium and long term market needs through creative and integrated solutions is imperative to an engineering company's success.”

As an engineer who never enjoyed the spotlight, the willingness to take on new challenges and associated risks has likely been key in Ms. Pezze's success as well. “I've been fortunate in my career to frequently receive assignments to create something new where it didn't exist before. I've always been driven to learn and take the next risk. I've not always succeeded but I think how you handle failure, and success, makes the difference. I've always accepted failure as a step in learning to reach a resolution that works,” she said.

Ms. Pezze's engineering background and education has enabled her to solve multifaceted problems, create integrated solutions and be innovative in support of business goals. Early on, she interfaced directly with utility customers and industry groups and later led teams within the business and industry to solve technically challenging topics. Work experience and executive management training have allowed her to create business strategies and integrate internal and external resources to support new and undefined businesses.

Key elements to Ms. Pezze's current job are to create a vision for the organization and assure that there is structure in place for others to be successful. “The most gratifying experience for me is when the organization succeeds because a team or an individual succeeds in achieving their objectives due to their own hard work and perseverance. I want to energize people to do their best in driving toward results that are aligned with our business strategy. I am gratified by people who feel empowered to make things happen.”

Cindy Pezze is Vice President, Global Technology Development and Chief Technology Officer for Westinghouse Electric Company LLC



Where did your motivation come from to enter the engineering profession?

I don't know if it was motivation for me as much as encouragement. It's tough to know what you want to be when you grow up at a young age, but I knew that I loved math and science. Two of my uncles studied engineering at Kings Point, and one high school summer they suggested I study engineering. My teachers talked about the work ethic required and how difficult it could be, and I was up for the challenge (aka, I wanted to show everyone I can do what I want. I'm stubborn).

Did you have any role models before entering, or during your education and/or career, and why?

My mother has always been my role model. She's a strong, loving, compassionate woman who has always encouraged me that I can do anything I want in life, and because of her, I have always believed that to be true.

What do you enjoy most about your career?

I love getting to work with such a smart, diverse group of people on a daily basis and know that every day I come to work there's an opportunity for me to learn something completely new. And I have practiced that answer, because I have two young daughters at home who frequently ask "Why do you have to go to work today momma?"

What advice do you have for a young woman interested in a similar career?

If I meet a woman who tells me she is considering a career in engineering, I without hesitation suggest she go to school and get the engineering degree. I can't fathom not wanting to BE an engineer with that degree, but I suppose some people don't love it. And for those folks, you still have an engineering degree! Go be a doctor, or a teacher or a

lawyer. Being an engineer teaches you to solve problems, and that's life.

Any skills or courses that you've taken that have turned out more helpful than you originally anticipated?

I love meeting new people, and I intentionally seek out opportunities to do so. In the past, I didn't think of that as a skill as much as a personality trait. Now I realize that my desire to always seek out new acquaintances has opened many doors for me in my career and also brought me many great friendships outside of work.

Open thoughts on women in engineering...

Something I feel is very important in work and in life is to be your authentic self, and as such please do not try to fit into a mold that just isn't you. Guess what...women are not men. We certainly bring skills and insights to the table that are different, and early in your career, that can be very scary. But that doesn't mean you can't sit at the table and let your voice be heard.

Jade Morel is the Engineering Manager-Production, for EQT Production Company.





Jen Yosef

Where did your motivation come from to enter the engineering profession?

As a young child my parents always encouraged my sister and I to be very creative. Instead of spending enormous amounts of time in front of the TV or playing video games; we increased our curiosity in learning and wanting to build and be creative with our toys especially Legos. Neither of my parents are engineers but both my sister and I are, and I think it's because of their encouragement in helping us explore and know the sky's the limit.

What do you enjoy most about your career?

Being able to be creative and have endless opportunities! It's unfortunate that as engineers we are always classified in a box and so many people still don't understand what we do. In my 6.5 years in the oil and gas industry, I have been an engineer designing natural gas pipelines to being a utility inspector on a construction site for 3 months, to working in a refinery designing and fixing problems.

What professional organizations are you actively involved with?

Right now I am the Co-Chair for mentoring for Young professional women in Energy and a member of Women's Energy Network and Women of Williams.

What advice do you have for a young woman interested in a similar career?

Being an engineer is one of the most exciting and rewarding careers. I would advise girls interested in an engineering career to find a woman mentor and ask her to expose you into what engineers do. Attend as many networking events and connect with them on social media – Twitter, LinkedIn, Instagram.

Open thoughts on women in engineering...

Women engineers are still victims of stereotypes and through all my recruiting efforts I see that young girls don't know what we do and most of the time are not even given the opportunity to learn about engineering. Media still portrays engineering as an "unattractive" career and there just aren't enough role models who can prove how diverse we are. For example, one of my biggest hobbies is shopping and I would sleep at Nordstrom's if I could, cause I love fashion! I am an example of diversity – I love an engineering career in the energy industry and shopping. We can't let negative stereotypes deter women from joining this field. Sadly by doing that we missing out on a huge potential of people that can make a difference in this country.

My final advice to young women would be : Always know that nothing is too difficult to learn and accomplish and find a mentor who can help and guide you.

Jen Yosef works for Williams, Northeast Gathering and Processing as a FEED Engineer III

Make an energy-saving upgrade and earn extra cash

FirstEnergy's Pennsylvania utilities are offering cash rebates for energy efficiency upgrades:

- Lighting equipment and controls (indoor and outdoor)
- Variable frequency drives on fans and pumps
- HVAC equipment
- Commercial kitchen equipment
- Custom, new construction or major renovation projects

Learn more about managing the costs of energy efficiency upgrades by visiting energysavePA-business.com, calling **866-554-4430**, or emailing energysavepa@clearesult.com.

The costs of energy efficiency programs are recovered through customer rates in accordance with Pennsylvania Act 129 of 2008. FirstEnergy's Pennsylvania utilities, their parents, subsidiaries, employees, affiliates and agents assume no responsibility for the performance of the equipment or equipment warranty, the quality of the work, labor and/or materials supplied, and/or the acts or omissions of any contractor.

Met-Ed®
Penelec®
Penn Power®
West Penn Power®
FirstEnergy Companies



Rita C. Bowser

Where did your motivation come from to enter the engineering profession?

When I was a little girl, there was a picture and a story in the church's weekly reader on the Shippingport Atomic Power Station. Nuclear power and the space program were kind of neck-and-neck in terms of newness and advancements with technology. And I decided I wanted to be in the most cutting-edge technology so I chose nuclear engineering. I already had a strong aptitude for math so it was a good fit.

Did you have any role models before entering, or during your education and/or career, and why?

One of my hobbies is collecting autobiographies and biographies. Maria Skłodowska-Curie is one of my role models and I have a first edition of the biography her daughter, Eve, wrote about her. Maria Skłodowska-Curie is a timeless role model for women. She worked to travel to France from her Polish homeland to study, as this was the only place that would open a formal academic door to her. She lived meagerly, subsisting as a student and tutor, barely making enough to survive. She was determined and attended university at a time when women were not engaged in scientific pursuits. But she found a way and a place where she could follow her technical dreams. She conducted her research under very frugal conditions as well.

Yet through her efforts, so much good has come. Among her many recognitions, she became the first woman to receive a Nobel Prize and the only one to receive two: in Physics and in Chemistry.

What professional organizations are you actively involved with?

I was on the board of the Pittsburgh section of the American Nuclear Society for the past three years, and I am a patron of the national American Nuclear Society; I am a member of the Institute of Nuclear Materials Management and the Health Physics Society; and have served on the executive board of the Moraine Trails Boy Scout Council. I've been selective about my involvement with professional organizations but I am fairly involved in those I've chosen. I've found that it really broadens your perspective and you think differently than you would otherwise because if you interact only with those you work closely with you don't always challenge your own ideas.

What advice do you have for a young woman interested in a similar career?

Take advantage of programs your school may offer in math and science. Find someone already in your chosen field to mentor you or provide advice (your teachers or professors can help here), and don't give up your dream – it's hard, but worth it.

Open thoughts on women in engineering ...

Get the best education you can, always keep learning and try to find some balance in life.

In India and China there are huge numbers of women participating in engineering and Science, Technical, Engineering and Mathematics (STEM) careers and if we want to compete globally as a nation we cannot forget the 50 percent of us that make up the workforce. Women cannot be afraid of joining

the technical side even if it feels a bit like there are obstacles. Once you get into your career for a while and gain some experience, those obstacles seem to fade into the background.

Rita C. Bowser is Vice President, New Plant Project Advancement, Nuclear Power Plants for Westinghouse Electric Company LLC



Michelle Antantis, P.E.

As a high school student, I really had no idea what an engineer was or did, but I loved math and physics. Fortunately, I listened to the advice of my high school guidance counselor and selected electrical engineering for my major. Through my early college years, I had doubt about my choice of majors. Then, I had an opportunity to co-op with an electric utility for a summer. It was the best summer of my life and I knew from that point forward that I had made the right decision for my future.

Today, I enjoy having a high school student shadow me for a day or an intern to work with over the summer. This allows me to share with them all of the exciting things that make engineering a great career choice. At the end of the day, you get to see projects that you designed come to life, making the world a better place.

Michele Antantis, P.E. is a Transmission Engineering Coordinator with Duquesne Light Company

Young Professional Women in Energy

By Lauren Kwasniewski

In the Pittsburgh region, the energy industry is booming. It is creating jobs across a variety of fields and businesses. Often, women are underrepresented in the energy industry. To combat this trend, Young Professional Women in Energy (YPWE) has made its mission to employ more local women in energy. It does this through education, mentoring, and hosting events to bring professionals together.

Due to her passion for women in energy, Founder and President, Amelia Papapetropoulos, started YPWE. She explains, "When I started, I was one of the few women in the industry, it was intimidating...there was no female leadership. Then, I decided I wanted to help other women like myself and be there to guide them."

The organization started slowly and has grown rapidly since. YPWE has chapters in Pittsburgh and West Virginia and 300+ members. Currently, YPWE is launching a partnership with Junior Achievement of Western Pennsylvania. Together, they will help women realize their love of STEM and energy!

Learn More & Become a Member Today!

Visit www.YPWE.org





Helen Patricia

I am currently the Quality Manager for the Americas Region at Kennametal Inc., a global industrial technology company specializing in material science and innovative custom and standard wear-resistant solutions. Our products and services touch nearly every manufacturing process around the globe from making landing gear for airplanes and fuel-efficient engines for cars to drilling for oil and constructing roads. As our customers seek new materials and technologies to keep pace with industry trends, they want holistic, end-to-end solutions that are proven, yet specific to their operations. We are

Because women make up only about 25% of the manufacturing workforce... identifying women role models through organizations like SWE was invaluable to me.

their partner to provide smart products and solutions to increase their manufacturing capacity of fast and flexible production. We continually innovate and have achieved more than 40% of our sales each year from new products that deliver at least 20% productivity improvement to our customers. Our key technology platforms include pressing, sintering, hot isostatic pressing, metal injection molding, super alloy development, investment casting and coating, cladding and hard facing. Our manufacturing facilities across the globe support these key technologies for

example in the production of carbide end mills, milling cutters, diamond coated drills and specialized cutting tool geometries for metal cutting for transportation, aerospace and general engineering; and wear and corrosion resistant products for the earthworks and energy markets.

My responsibilities include customer support for America's sales crossing both Industrial and Infrastructure businesses, and I am manager of quality systems for Americas manufacturing which includes over 25 facilities in North and South America.

I was drawn to Kennametal early in my career because of their technological strength in materials manufacturing particularly in tungsten powder metallurgy. As a chemical engineer, I applied my skills on process development projects supporting manufacturing facilities in the U.S. and Germany. From there, I was promoted to Manufacturing Manager of Kennametal's metallurgical operations in Latrobe, where I was responsible for managing the workforce, driving process improvements, as well as meeting all of the metallurgical engineering needs of the plant.

I moved into quality assurance over a decade ago and have continued in roles of increasing scope and responsibility. My engineering background has prepared me well for this role which requires disciplined problem solving skills and knowledge of our operations in driving standardization and customer satisfaction with a focus on improved response to customers.

Because women make up only about 25% of the manufacturing workforce even today, I found that identifying women role models through organizations like the Society of Women Engineers was invaluable to me. My passion for encouraging women to pursue engineering and STEM fields has led to a long career as a volunteer in SWE including leadership roles on the board of directors. It is my hope that as a role model I can provide that same inspiration to future generations of women pursuing careers in engineering.

Helen Patricia is the Quality Manager for the Americas Region at Kennametal, Inc.



Dr. Jonell M. Kerkhoff

Where did your motivation come from to enter the engineering profession?

My father was an engineer responsible for plant construction and for manufacturing operations. He positively encouraged me in science and math. I was excited by the engineering work that he talked to me about.

What subjects interested you the most?

Science, especially chemistry and materials science, were my favorite subjects. It has always been fascinating to me to understand how materials perform and chemistry's influencing role.

What advice do you have for a young woman interested in a similar career?

My advice is to go "all-in" and don't hold back. Embrace challenges that come your way as learning opportunities. Ask to be put on teams or work in areas that are of interest to you and where you can have an impact for the company.

Any skills or courses that have turned out more helpful than originally anticipated?

I was fortunate to be an Alcoa-sponsored Fellow in the MIT's Leader of Global Operations Program. With this skill set, I have worked in manufacturing for Alcoa Industrial Chemicals and in developing pilot scale production processes for breakthrough material technologies at Alcoa Technical Center.

Dr. Jonell M. Kerkhoff is the Materials Program R&D Director for Alcoa Technical Center

The 2015 International BRIDGE CONFERENCE

JUNE 8-11, 2015

**DAVID L. LAWRENCE CONVENTION CENTER
PITTSBURGH, PA USA**

**Providing real, valuable and timely presentations for all bridge
industry practitioners on topics including:**

- **Engineering**
- **Construction**
- **Rehabilitation**
- **Foundations**
- **Maintenance**
- **Preservation**
- **Fabrication**
- **Design**
- **Testing**
- **and more!**

**The IBC offers attendees more than 20 Continuing Education Credits
for PG's, PE's, SE's and LS's, plus valuable Ethics Credits!**

www.eswp.com/bridge



Sponsored by the Engineers' Society of Western Pennsylvania

Applying ASSET MANAGEMENT PRINCIPLES to Optimize the Management of Your Buried Infrastructure

By Linda Blankenship

Asset management approaches are becoming widely applied in the United States to optimize the management of water and wastewater infrastructure. In 2002, the U.S. EPA released the Clean Water and Drinking Water Gap Analysis report and began to promote the use of asset management and application of associated strategic asset management concepts such as level of service, life cycle analysis, and business risk exposure. This focus built on the development of asset management elsewhere, with the International Infrastructure Management Manual spearheaded in Australia and New Zealand, and the British Standards Institution's Publicly Available Specification 55 (PAS 55) for asset management in the UK. In the U.S., since 2002, the Water Environment Research Foundation (WERF) and the Water Research Foundation (WaterRF) collaborated extensively on a Strategic Assessment Management research program, with support from the U.S. EPA and other research partners. Leading practices associated with these concepts, case studies of their application and a suite of tools were developed that provides numerous options for utilities looking to apply asset management principles. The results of this research reside in SIMPLE: Sustainable Infrastructure Program Learning Environment which is WERF and WaterRF's Internet-based knowledge platform (<http://simple.werf.org/>). In addition, each research organization has pursued research applicable to drinking water and

wastewater infrastructure, including condition and condition assessment for various types of buried infrastructure assets.

Business risk exposure is a fundamental concept of asset management. The standard business risk exposure uses an equation that calculates a risk score for an asset as follows:

$$\text{Risk} = \text{Probability of failure} \times \text{Consequence of failure}$$

(Note: If there are redundancies or similar mitigating factors in place, they can be applied to adjust the asset risk score. For example, if the pump station has five pumps available and only four are ever required to meet demand, a reduction in the risk of failure can be applied at the pump station level.) Business risk exposure can be

assess leaks or pipe wall thickness, acoustic evaluation for leaks, other types of leak detection and laser-based pipe surface profiling.

Failure of an asset can occur in several distinct ways:

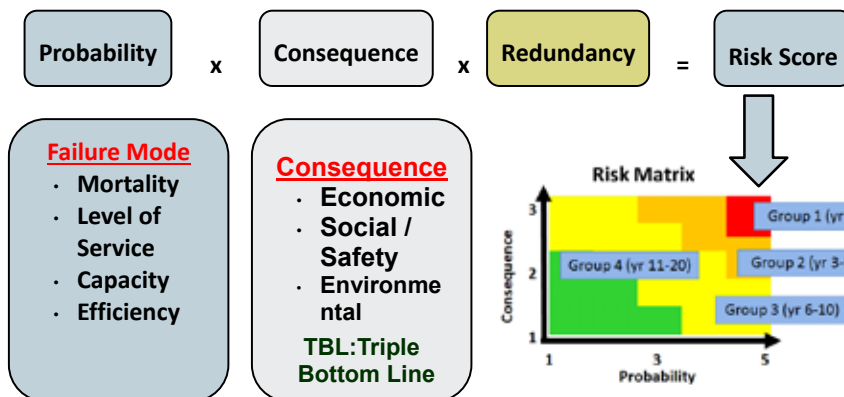
1. Physical failure - the asset collapses
2. Economic failure - the asset continues to function but is uneconomic to keep in service
3. Level of service failure - the asset cannot meet a level of service such as regulatory requirement
4. Capacity failure - the asset cannot meet existing, changing or new demands such as flow or storage volume.

From this concept, it's easy to see that the internal physical condition may only be one component contributing toward

a failure. For pipes, age and material are not always reliable predictors of remaining asset life due to other variations that can have a greater impact such as installation quality, material quality and maintenance. Buried

infrastructure is, in effect, a system underground. It interacts with shifting ground due to freeze/thaw cycles, rising/falling groundwater tables, earthquakes, dynamic loading such as traffic loads and other influences that can affect useful life and therefore needs to be considered.

Consequence of failure takes into consid-



derived for groups and portfolios of assets by appropriately rolling up the individual risk scores.

To understand probability of failure, buried infrastructure can be inspected to better understand its interior condition and performance. Standard techniques include closed circuit television and videoscoping, electromagnetic assessment to

Proud Supporters of Women in Engineering

Contact:
Tanya McCoy-Caretti
tanya.mccoy-caretti@arcadis-us.com

www.arcadis-us.com



The 2015
**Pennsylvania
Brownfields Conference**

May 13-15, 2015
Erie Bayfront Convention Center, Erie, PA

Presented by:



The PA Brownfields Conference is a collaboration between the Engineers' Society of Western Pennsylvania (ESWP) and the Pennsylvania Department of Environmental Protection (PaDEP). This partnership was formed to develop a single brownfields conference for the Commonwealth that consolidates our collective experience, expertise, and resources. NEW FOR 2015! We will recognize the 20-year anniversary of Act 2 legislation as part of the PA Brownfields Conference

Exhibit and Sponsorship opportunities are now available

Learn more at www.eswp.com/brownfields/index.htm

eration proximity of critical facilities and users such as healthcare facilities, other



large users, transportation systems, sensitive receiving waters (especially in the case of sewer systems) and similar factors.

Given the cost of assessing risk, whether the assets are above or below ground, it is especially important that these concepts be used to identify where risks are higher and data is deficient to support additional condition assessment when economically justified.

Underscoring the interest in asset management approaches, in January 2014, the International Organization for Standardization (ISO) published three standards for asset management as follows:

- ISO 55000 - gives an overview and sets out principles and terminology
- ISO 55001 - sets out the requirements of an asset management system
- ISO 55002 - provides additional guidance for applying ISO 55001

ISO 55000, similar to other ISO standards, is essentially a quality system for asset management. ISO 55000 is not specific to water and wastewater utility assets - it is intended to be generic so it applies to any type of physical asset that an organization manages. This ISO standard establishes what the organization must achieve (although not specifically how to do it.) For example, ISO 55000

4.2.1.1 notes, "When establishing or reviewing an asset management system, it is important to ensure that the approach is consistent and aligned with the external and internal contexts of the organization, since these can significantly influence the design and scope of the asset management system."

Within ISO 55001, section 6 sets out the specific requirements related to asset planning. It states that "The organization should ensure that its assets are capable of delivering the required products or services and achieving its organizational objectives." Specific requirements are given in section 6.1 that requires actions to address risk and opportunities for the asset management system and section 6.2 that requires asset management objectives and planning to achieve them. Section 6.2 requires:

-assessing linkages between asset management plans and financial plans to address affordability issues



-use of a risk

ranking process to determine which are the most critical assets

-analysis of life cycle cost including capital, financing and operational costs in the decision-making process.

In short, ISO 55000 is consistent with approaches that have evolved and developed as leading practices for asset management in the water sector - namely, achieving required levels of service (called objectives in ISO 55000), incorporating consideration of risk and applying life cycle cost approaches. These approaches help optimize the management of buried infrastructure assets.



Linda Blankenship is Associate Vice President with ARCADIS US, Inc. where she works with clients on a wide range of utility management initiatives including strategic planning, asset management, leading practices benchmarking, performance measurement, operations optimization, knowledge management and other utility management needs. In addition, Linda has been Principal Investigator or on the project team for numerous research projects on utility management topics including knowledge management, development of the QualServe program, and identification of technology trends for the water sector. She was Principal Investigator and Program Manager for the Water Environment Research Foundation research challenge "Strategic Asset Management Implementation and Communication" developing leading practices, tools and guidance on this topic.

Linda has over 25 years of experience working on a wide variety of drinking water, wastewater, ground water and stormwater issues. In addition to her consulting experience, she has held senior positions managing major infrastructure planning in local government as well as managing regulatory affairs, technical programs and research support in major water industry associations. Linda has a B.A.Sc. in Civil Engineering from the University of Waterloo (Canada), an MBA in International Finance from The American University, Washington, DC and is a licensed professional engineer in the Province of Ontario. She is a Board Certified Environmental Engineer specialist. She is an active member of WEF



Ruthann L. Omer, P.E.

Where did your motivation come from to enter the engineering profession?

From my father, I grew up around Civil Engineering and that is all I knew. Two of my uncles were engineers as well as a cousin. So you could say it was in our blood!

Have you ever participated in a mentoring program as mentor? Thoughts as a mentor?

I was in a mentoring program my whole life starting at the age of 5 at my first municipal meeting with my father. I really believe in mentoring and have been a mentor to many individuals. It is a tremendous opportunity for both the mentor and mentee and I have always felt I received more than I gave.

How has involvement with professional organizations impacted your career?

It has been critical to the enhancement to my career. Early on I belonged to PSPE, ASCE, SWE, LGA and the Engineer's Society of Western PA. All organizations taught me a lot of skills in a very safe environment not to mention the networking. I eventually became President of the local PSPE and the National Society of Women Engineers. SWE was extremely beneficial in the exposure I received to national government and industry.

Open thoughts on women in engineering...

There are amazing opportunities for women in math and science. An engineering degree is a

springboard to anything you want to do. It is not easy and it takes a great deal of work, but the rewards you will receive and give back is definitely well worth it.

Ruthann Omer, P.E. is the President of the Gateway Engineers



Kimberly Kennedy, P.E.

What do you enjoy most about your career?

I most enjoy detailed project design, coordination between all disciplines and working as part of a team. It is interesting to look at projects from different points of view and gain an appreciation for all of the components.

Open thoughts on women in engineering...

Women are invaluable to the engineering field. We often take a different approach to problem solving and team building. I am quite fortunate to have tremendous mentors that continuously take the time to answer my questions and teach through example. Some advice for the young engineers just starting out would be to respect and learn from senior members of the staff. There is nothing quite like experience, and nothing is quite as simple as it appears.

Kimberly Kennedy, P.E. is a Project Manager for HDR Engineering, Inc.



Jan Oliver

Where did your motivation come from to enter the engineering profession?

I was a single mother of a 10 year old daughter, so a stable, good-paying job was essential. Also, I was always interested in construction.

Did you have any role models before entering, or during your education and/or career, and why?

- My father was a hard-working supporter of our family and I did work for him during my education.
- At Point Park College Dr. Dapprich repeatedly told us "It will all come out in the wash." I interpreted those words into I would get through this, if I worked hard.
- I've met so many intelligent people throughout my career at Alcosan that could serve as role models. At this stage of my career, it's my turn to serve in that capacity. I hope in some small way, I can do that for the 50-plus employees that report to me.

Open thoughts on women in engineering...

Don't separate yourself from the pack. You are an engineer, whether a man or woman.

Jan Oliver is the Director of Regional Conveyance at ALCOSAN



Sarah Bolenbaugh, P.E.

Did you have any role models before entering engineering, or during your education and/or career, and why?

I had a manager for most of my career who was a brilliant mentor in a "non-mentoring" sort of way...he had this way of asking simple questions to make me understand the deeper problem. I'm working towards being able to mentor like that.

Were there any courses in post-secondary education that gave you particular challenges? ...any that came "easily" to you?

Physics and biology were always hard for me. Chemistry, especially aquatic chemistry, was easy. Everything always balances in aquatic chemistry. I always find beauty in that. I think that is also why I like dealing with pressurized water systems and hydraulic models. There is always an answer, the water levels and pressures always balance. Well, mostly.

Open thoughts on women in engineering...

In my youth, I always scoffed when people tried to differentiate woman engineers from their male counterparts. That was before I had children. After children, I definitely see a gap, especially when many of your coworkers are the sole breadwinners. It's a huge hit to the ego to have to leave at 5:00 to pick up your kids when your coworkers can burn the midnight oil. My advice, post kids, is to make the job work for your life. If I can't work the hours that others can, I make sure the hours I work are effective and meaningful.

Sarah Bolenbaugh, P.E. is a Senior Project Manager for Hatch Mott MacDonald.

ESWP Member News

More than 75 firms are represented in the Corporate Member program of the Engineers' Society of Western Pennsylvania (ESWP). Memberships are available at 3 levels: Gold, Silver and Bronze. Gold members are entitled to 14 memberships that can be exchanged by employees; Silver, 9; and Bronze, 5 — annual dues are \$2400, \$1700, and \$1000 respectively. In addition, ESWP Corporate Member Firms may add 2 additional individuals in our Under-35 age category at no additional cost. More information can be found at eswp.com. Please contact the ESWP Office (412-261-0710) for additional details.

NEW! For Government Agencies, Corporate and Individual Memberships are available at a 50% discount!

Membership in ESWP comes with a long list of benefits! From our continuing education opportunities earning you Professional Development Hours (PDHs), to the business networking events in our fine dining city club, there is something for everyone in your organization. Also, ESWP is helping the next generation of engineers with student outreach programs, giving you the opportunity to participate in many rewarding programs.

**Welcome New Gold Level
Corporate Member Firm
Parsons**

PARSONS

ESWP Gold Corporate Member Firms

AECOM



i+icon USA
Infrastructure & Industrial Constructors USA

ARCADIS
Infrastructure · Water · Environment · Buildings

gai consultants
transforming ideas into reality

MATRIX NAC

**Michael Baker
INTERNATIONAL**

GATEWAY
On Call. On Time. On Target.

**Orbital
Engineering, Inc.**

HATCH™

**CDM
Smith**

HDR



ESWP Silver Corporate Member Firms

ALCOA

C&E
Civil & Environmental
Consultants, Inc.

KU Resources, Inc.

**amec
foster
wheeler**

CSD
CARNEGIE STRATEGIC DESIGN
ENGINEERS
LLC

**PJ DICK
TRUMBULL
LINDY PAVING**

ASTORINO
Architecture · Engineering · Interior Design · Design Build

**Lennon, Smith, Souleret
Engineering, Inc.**
Civil Engineers and Surveyors

Uhde Corporation

ESWP Bronze Corporate Member Firms



Carnegie Mellon University
College of Engineering



BioEngineering

Today Dr. Xinyan Tracy Cui is exploring one of the most challenging frontiers in medical science – advancing brain-machine interface technology. For example, recent advances at the University of Pittsburgh have enabled patient Jan Scheuermann to control a robotic arm and an F-35 simulator solely with her thoughts. Dr. Cui, who is an associate professor of bioengineering at Pitt's Swanson School of Engineering, is developing improved ways for microelectric devices to interface with the brain and improve life for people with brain injuries.

The ultimate benefits for humanity are incalculable. But then Dr. Cui has always been driven by the impact that engineering has on everyday life, since first growing up in China. "I initially wanted to be a scientist from an early age," Dr. Cui remembers. "In high school at Taiyuan No. 5 High School in Taiyuan City, China, I started to lean toward engineering because I realized how engineers could make things and directly benefit people."

Dr. Cui's passion for engineering and for helping people further evolved while at Tsinghua University in Beijing. With strengths in science and technology, Tsinghua is consistently ranked next to Peking University as the top university in mainland China. During her undergraduate years, Dr. Cui focused on chemical engineering, particularly on polymers, and eventually earned her BE in polymer materials and chemical engineering. Women represented nearly a third of the student body. By the time she was ready to enter graduate school, her focus had begun to shift toward the life sciences.

"Biotechnology and life sciences were hot in China at that time, and I was intrigued with how those fields could feed my in-

terest in helping people," she says. "I like seeing things from different perspectives and had developed an interdisciplinary approach to my research, so I took advantage of the first opportunity to apply in the program.

Eventually Dr. Cui would earn a master of science in biophysics at Tsinghua University, and then a PhD in macromolecular science and engineering at the University of Michigan - Ann Arbor.

Since that time, Dr. Cui has seen her research field rapidly evolve, as well as opportunities for girls and women in STEM, which she feels are greater than when she was a young girl in China, as well as a Ph.D. candidate in the U.S. Today, Dr. Cui's research at Pitt focuses on the interactions between neural tissue and smart biomaterials, an expertise grounded in her chemical engineering background and one that has the potential to benefit people with neurological disorders. Last

Unlike when I was in high school or college, there are many more programs...that are focused to create better STEM opportunities for young girls, beginning at kindergarten and continuing through college

year, she and her Neural Tissue Engineering lab group (engineering.pitt.edu/cui) were awarded a five-year, \$2.9 million grant from the National Institutes of Health to improve the microelectrode arrays that connect a human brain to a machine. These implants can cause the immune system to respond and inflame the neurological tissue, weakening the interface. Dr. Cui's research is exploring the



Dr. Xinyan Tracy Cui

use of biochemical to mask the electrodes and protect both the interface and the neurological tissue from the immune system.

In some ways, Dr. Cui sees this ability to impact human life at such a small scale in many ways reflects the ability of her and other women engineers to help the next generation of young women succeed as engineers.

"Unlike when I was in high school or college, there are many more programs, especially in the U.S. that are focused to create better STEM opportunities for young girls, beginning at kindergarten and continuing through college," she says. "Today there are also more women engineers, especially within bioengineering and related fields, who can serve as role models and encourage students to move into stem.

"I think the boundaries between the disciplines are blurring and have been blurred, to the point where we as engineers are no longer simply creating things, but we're healing and improving the human body itself. As a woman and as a mother, it's a natural inclination to help and heal your family. As engineers, we can help the entire human family."



A Sustainable Future in Engineering



“As engineers we have an obligation to deeply consider the environmental impacts of our designs, and act on those considerations. We can no longer only consider the financial impacts of projects, but must also include triple bottom line accounting of the environment, equity, and economics. No sector is better prepared to take on sustainable development than engineers as we have the ability to tackle pressing issues with quantitative metrics and innovative solutions. My hope is that one day we will no longer need to consider or label sustainable design, we will simply be creating good design.”

From an early age Melissa Bilec has been passionate about environmental issues. Solving such problems on a grand scale is never easy, but human innovation would lead the way and in the process, help to encourage the next generation of women engineers.

Dr. Bilec is a triple alumna of the University of Pittsburgh, having earned her bachelor of science (magna cum laude), master of science, and PhD in civil and environmental engineering at the Swanson School of Engineering. And just as life comes full circle, today she is associate professor in the same department where she once was a student. Dr. Bilec also serves as assistant director for education and outreach at Pitt’s Mascaro Center for Sustainable Innovation, where she engages the Center in community outreach programs and develops sustainable engineering programs for K-12 education.

“The environment has always resonated with me, and truly has helped to shape my life, my career and my interactions

with students and the community,” Dr. Bilec says. “In seventh grade I wrote a paper on deforestation and that really helped to kick-start things. But I would eventually learn that being interested in just environmental issues isn’t enough if you want to actually solve environmental problems.”

Dr. Bilec says that at Elizabeth Forward High School, despite the small school, several of her classmates also pursued careers in science and engineering. As her knowledge of the environment grew, especially when it came to solving problems on such a grand scale, engineering would help to provide solutions.

“When you are young and passionate about something you think that you can solve the world’s problems. It’s something we all experience at some point,” she says. “And then you realize that you need something a little more than passion. You need an education in a field where you can apply those passions to solve problems. After a time I realized that engi-

neering would give me greater ability to approach and tackle problems at a scale I was interested in.”

While an undergraduate at Pitt, Melissa says that the number of women in her civil engineering program was relatively small at around seven percent, and she still remains friends with her fellow women engineers, all of whom have successful careers. “We weren’t studying to be ‘women engineers;’ we were studying engineering. We bonded over the homework sets, lengthy lab assignments, and life...”

Dr. Bilec also credits Pitt and later, the Mascaro Center, for helping her to take full advantage of the opportunities that sustainable research presented to her as a student, a faculty member, and co-director.

“My professional decisions paralleled my personal decisions, and everything just simply seemed to fall into place at Pitt,” she says. “Jack Mascaro through his support of sustainable engineering and the Mascaro Center was instrumental in sup-

porting my career and research; Radisav Vidic [chair of the Department of Civil and Environmental Engineering] was truly helpful to me by providing my first opportunity in academia.”

Dr. Bilec’s research group, Sustainability and Green Design (SGD), relies on a multidisciplinary approach to facilitate research in seven areas: sustainable health-care, energy and biofuels, green buildings, life-cycle assessment, sustainable products, water-energy symbiosis, and sustainable construction. And just like the Mascaro Center, the SGD group doesn’t limit their work to the Swanson School, but engages students across the university as well as Pittsburgh neighborhoods and schools, especially in lower-income neighborhoods.

“Solving grand challenges in non-traditional settings... requires today’s engineers to help children and young adults learn how engineering can help to create sustainable solutions to global problems”

Some of these include programs at Manchester Academic Charter School, where MCSI helped MACS sixth, seventh, and eighth grade students create an award-winning sustainable food system as part of the annual Future City Competition in Pittsburgh. In collaboration with Penn State University, Penn State Center, and the Kingsley Association, Dr. Bilec’s students completed a unique service-based learning course through which Pitt students conducted energy assessments in the Larimer community. Dr. Bilec’s Design for the Environment Course served as a pilot site for PSU’s National Energy Leadership Corp (NELC) project to train and mobilize students to conduct free home energy assessments with the goal of reducing home energy use along with promoting parallel learning of the students and homeowners. The semester culminated in a community symposium at Kingsley where students presented their final reports and individually discussed low-cost energy saving opportunities with the homeowners.

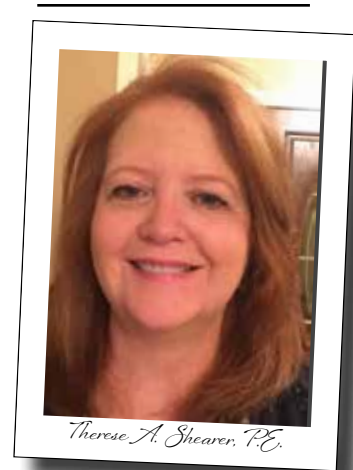
In 2012, Dr. Bilec and colleagues at Magee-Womens Hospital published groundbreaking research to improve both natural and cesarean childbirth utilizing Life Cycle Assessment (LCA). The study, “Life cycle assessment perspectives on delivering an infant in the US,” published in Science of the Total Environment, is the first of its kind to develop a more sustainable approach to infant birth by evaluating heating, ventilation, and air-conditioning system in the hospital (HVAC), lighting, machines, surgical instruments, and disposable custom packs (such as patient gowns and toiletries), including the sterilization, decontamination, and waste segregation of disposable materials. Their research is now focused on reducing the carbon footprint of other medical procedures, such as hysterectomies.

Dr. Bilec says that solving grand challenges in non-traditional settings, such as the environmental impact of healthcare, requires today’s engineers to help children and young adults learn how engineering can help to create sustainable solutions to global problems.

“I think some of the challenges we face in our profession is to help extremely talented and bright students find new and exciting ways to expand their creativity, and not rely simply on answers in a textbook,” she explains. “It’s important for us to provide context so that they understand these grand challenges and find innovative solutions, because we’re literally writing the textbooks on sustainability as we speak.

“We need to do a better job at encouraging more young people across the board to enter STEM fields”

“That means that we need to do a better job at encouraging more young people across the board to enter STEM fields. Just like when I was in my undergraduate years, we need to help them see themselves not as a woman engineer or an African American engineer, but as a global engineer who can help to make the world a better place.”



Where did your motivation come from to enter the engineering profession?

As the first member of my family to contemplate education after graduating high school, I never considered engineering as an option. Those were different times and engineering wasn’t something the guidance counselors suggested to a female. As a result of a comment from my art teacher, I headed toward drafting and eventually ended up as an engineer. I should note that math was always my favorite subject and physics was a close second.

Have you ever participated in a mentoring program as a mentor? Thoughts as a mentor?

I am active in the PA e-mentoring program for a couple years now. The program is provided to high schools and matches a student to a mentor. It does not require a lot of time but seems to be a good source of information for students. At the very least they are hearing from someone that has been there. ...thoughts as a mentor? The PA e-mentor programs tries to get the student to think outside the box and evaluate their interests in terms of a career. Too many times students do not give enough consideration to aligning their strengths with career aspirations. It takes more than wanting to be an engineer or architect. I try to get the student to understand the effort and aptitude required, as well as what a particular job actually involves on a daily basis.

What advice do you have for a young woman interested in a similar career?

Fortunately with the present-day STEM initiatives women are more likely to consider engineering as an option, and I would advise young women to seriously consider it. The opportunities within engineering range from design, construction, project management, LEED Building or even as a stepping

stone to medical school. Once given the opportunity to explore the coursework and its many subjects, you can certainly find your own niche. If your chosen field is engineering, don't stop until you obtain your Professional Engineer's License or other accreditation that indicates you are a professional. Then the sky is the limit for your career.

Therese A. Shearer, P.E. is a Senior Project Manager with Hill International



Jen Landau

What subjects interested you the most while in school, before entering college?

In high school, I was always good at math and science. My two favorite classes were physics and calculus. Not to belittle my love for literature, but I always knew that a STEM based education was the way to go. I come from a long line of engineers: my father held his Ph.D. in Mechanical Engineering; his father (my grandfather) was also a Mechanical Engineer; and my uncle was a Petroleum Engineer. So when it came down to choosing a profession, I knew engineering is what I would study. Then it came down to figuring out what that actually meant and what I would actually do for a living.

Any skills or courses that you've taken that have turned out more helpful than you originally anticipated?

The thing I love most about engineering, specifically related to construction, is that it is an ever-evolving discipline. There is no end to the learning. Things are always changing, new ideas, processes, and technology that can be incorporated into our practice. In my career, I've seen technology explode. The advent of computers, cell phones, electronic document transferring, and BIM (building information modeling)

keeps everyone on their toes. Green construction, sustainability, and LEED are now becoming the norms in construction. I received my LEED Green Associate certificate in 2011 and I am trying to be more active with the Green Building Alliance. I love where our industry is headed and am excited to be a part of it.

Open thoughts on women in engineering...

It is a great honor to be invited to author an article for a magazine that is celebrating women in engineering in Pittsburgh. If even just one young woman reads this issue and is inspired to go into engineering—a normally male dominated field—ESWP has accomplished a major achievement. The world needs more women in engineering fields.

Jennifer P. Landau is a LEED Green Associate Project Manager with the Landau Building Company and Marks-Landau Construction, LLC



Kaitlin Zettl

What do you enjoy most about your career?

Being at the forefront of innovation. Energy Management and Sustainability are really exciting fields to be in right now, and PNC is always ahead of the curve. Energy efficiency technology and green building practices are constantly evolving, keeping you on your toes and hungry for the next breakthrough. Every day presents a new challenge or discovery. I particularly enjoy the flexibility of my work, being able to work both in the field and in the office. It is the perfect balance of data investigation and real-world applications. I have wonderful coworkers whose vision, dedication and humor inspires me to think beyond what is possible and find excitement in even the smallest achievements.

What advice do you have for a young woman interested in a similar career?

Do something you love and do not limit yourself. There are so many opportunities out there, take advantage of what comes your way and do not be afraid of paving your own path. Find a good balance between your work and personal life. Your work is your art, but what you make of your life is the true masterpiece. Find opportunities to push yourself outside of your comfort zone. Volunteer! Make use of your time and talents to help out those in need. Study abroad! Travel! Experiencing other cultures through travel opens your eyes to the both the beauty and challenges of the great world around us. Not everyone may have the opportunity, but if you do, embrace it! Travel allows you to shape your own perspective of the world, develop important skills you never knew you had, and my favorite, eat the most delicious and interesting food you could ever imagine.

Kaitlin Zettl is an Energy Analyst with PNC Realty Services



Aurora Sharrard, Ph.D.

Where did your motivation come from to enter the engineering profession?

I've always been good at math, so had childhood aspirations to be a math teacher, mathematician, statistician, and economist (in that order). However, all of those career choices were before I knew what an engineer was. When I was a high school junior, thanks to a paid, one-week summer internship at the University of Nebraska-Lincoln, I realized that engineers are the ones who make things work. After that, there was no turning back because I had seen how I could apply my knowledge for greater good.

What advice do you have for a young woman interested in a similar career?

- Work hard, challenge expectations, and do good.
- Be passionate. Know what you're good at (and do that), but also find something in work (and life) that you can be passionate about. When you're enthusiastic about something, that excitement is infectious—and a big motivator for others.
- Take the leap. Even if you have to start out taking a job that you think just “pays the bills,” don't give up your dream and do what you know you need to do. However, don't be too stringent on criteria for your dream job. Even though the job might not have the title of “Sustainability Coordinator” or “VP of Innovation,” if you're working for a company that you believe in—or, even more importantly, believes in you—then you're in the right place.
- You don't know if you don't ask. There are so many things in this world that you might assume the answer is “No,” for, but you don't know if you don't ask. This could apply to doing an independent study, negotiating your salary, or asking someone to commit to something big. If you expect someone to make the “right” decision, you have to first, ask them to, and second, give them the information they need to do so. Ask the question; don't assume the answer.
- Leverage your network. Through your family, friends, fellow students, and friends of friends, you have a great network that probably stretches around the globe. If you're not already reaching out to people in that network to find out more about them, what they do, how they might be able to help you take your next step, or how they might be a good future collaborator, you're not doing yourself or them justice.

Aurora Sharrard, Ph.D., LEED AP BD+C is the Vice President of Innovation for the Green Building Alliance



Tammi A. Halapin, P.E.

What do you enjoy most about your career?

There are many things I enjoy about my career. With respect to being an engineer (the first part of my career), I love facing a problem and identifying solutions, in many different aspects. The field of engineering is ever changing mostly due to technology advancements. This results in always learning new things or new ways to solve problems. Each project is different. Each solution is different. Each day is different with engineering.

If you didn't enter the engineering profession, what other career choices might have interested you?

If I hadn't become an engineer, believe it or not, I probably would have become an accountant or an interior designer.

What advice do you have for a young woman interested in a similar career?

Advice for young women interested in a civil or environmental engineering career...be ready to work hard and prove yourself. When I became an engineer 30 years ago, the field was dominated by male engineers and it was difficult to advance as a woman. For most of my career (until I became a business owner and therefore my own boss) I felt that I had to work harder than many of my male co-workers and even then often did not get the same recognition (in the paycheck or in position advancements). I think things have been changing. Women engineers are being more recognized for their strong attention to details, being team players, and knowing the importance of the soft skills of engineering. More women seem to be reaching high positions in corporations, or like me, becoming owners of engineering firms. My advice is for more women to keep entering the field of engineering.

Tammi Halapin is one of the principals and owners of Collective Efforts, LLC, a women-owned civil and environmental engineering firm



Yuling He

Where did your motivation come from to enter the engineering profession?

I have always been interested in science ever since I was a kid. I liked to learn how everything is developed, how they change and what we can do with it. I chose environmental engineering in college because I became more interested in exploring how to balance giving and receiving between the nature and human being and what we can do to make our existence more sustainable.

What do you enjoy most about your career?

Research consists a big part of my work, but what excites me about this work is that at ATC, we do research for direct application, it is very rewarding to see the technologies we developed here return value to the company by improving our manufacturing processes and making Alcoa more sustainable.

If you didn't enter the engineering profession, what other career choices might have interested you?

I would probably pursue a career as a musician. Music brings joy and relaxation to me outside of work. I actually had the opportunity to choose between science and art in high school. I'm sure it would also be an exciting journey if I had chosen art over science.

Yuling He is a Senior Engineer, Environmental Science and Sustainable Technology, Alcoa Technical Center, Alcoa Inc.

The **GREENING** of ABANDONED COAL MINE REFUSE AREAS Using Bauxite Residue

By Yuling He

All across the country, states face the challenge of what to do with abandoned coal mine sites, many of which have been out of operation for decades. These sites are unable to support plant life because of the highly acidic pH level of the material that is left after mining, which is often referred to as coal refuse.

In Pennsylvania, for example, there are at least 250,000 acres of government-owned land with acid mine runoff issues that require remediation. The potential hazards of improperly reclaimed refuse include acid contamination of surface and ground waters, erosion and sedimentation into nearby water bodies, spontaneous combustion, and damage from landslides.

Many of the problems associated with coal refuse piles can be reduced significantly with the maintenance of a viable vegetation cover. Robust vegetation can reduce water and oxygen movement down into the fill, thereby limiting the production of acidic water while reducing sediment losses and stabilizing the pile surface. The building and maintaining of permanent vegetation on refuse piles, however, is complicated by physical, mineralogical, and chemical factors.

Bauxite residue – a byproduct from the aluminum refining process – provides a sustainable solution to this environmental issue.

Bauxite residue's base pH range of 10-12 can act to neutralize the acidic coal refuse material. Additionally, it contains clay-based material that helps to support vegetative growth when mixed with the coal refuse.

Starting in 2005, Alcoa partnered with the Pennsylvania Department of Environmental Protection (PADEP) to demonstrate the beneficial use of bauxite residue as an alternative for reclaiming acidic coal refuse. A five-year pilot scale testing at Mather Mine

in Pennsylvania showed that bauxite residue neutralized the ground of the test plot. This allowed for vegetation to begin growing one month after seeding and be sustained with no additional fertilizers or maintenance required. Further information on this approach to reclaim acidic coal refuse piles is given at: [https://www.alcoa.com/sustainability/en/case_](https://www.alcoa.com/sustainability/en/case_studies/2010_USA_mather_mine.asp)

[studies/2010_USA_mather_mine.asp](https://www.alcoa.com/sustainability/en/case_studies/2010_USA_mather_mine.asp)

Due to the success at Mather Mine, PADEP granted Alcoa a Beneficial Use permit and there is a full-scale deployment planned in 2015 for the 100-acre coal mine refuse site at West Newton, PA. The project is set to last 18 months, with Alcoa providing all the material. The intent is to further demonstrate a viable, sustainable and green solution for coal refuse mine reclamation.



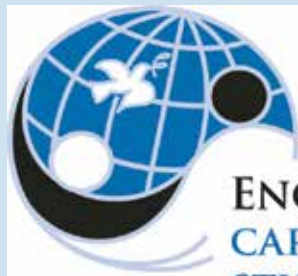
Bauxite residue for acidic coal refuse pile reclamation demonstration at Mather Mine (PA)

About the author...

Yuling He is a Senior Environmental Engineer in the Environmental Science and Sustainable Technology group located at the Alcoa Technical Center (ATC) in New Kensington, PA. She is responsible for developing and deploying technologies for sustainable management of water, air and industrial by-products. Yuling joined Alcoa in 2012 as an intern. She was responsible for the evaluation of an engineered wetland pilot system for industrial water treatment at a plant location. Since being hired as a full-time employee at ATC, Yuling continues to work on the development and commercialization of Alcoa environmental technologies like the Natural Engineered Wastewater Treatment (NEWTTM) system, the In-Duct Scrubber air pollution control system and beneficial reuse of Alcoa's process by-products.

Yuling is originally from China. She came to the US in 2009 for her Master's in Environmental Engineering from the SUNY College of Environmental Science and Forestry.





ENGINEERS WITHOUT BORDERS-USA CARNEGIE MELLON UNIVERSITY STUDENT CHAPTER

The Carnegie Mellon University Engineers Without Borders chapter (EWB) is one of many university chapters across the country which provide engineering solutions to problems in the developing world. The Carnegie Mellon chapter also works to ensure students interested in improving welfare through technology are provided the resources needed to do so. The chapter manages several projects, varying in scope and location at any one time. The projects run from small local service projects, such as cleaning a park in Mt. Washington, to large international projects, like implementing a 5.3kW photovoltaic solar energy system in Rampur, India. In between, the chapter has facilitated research in sustainable technologies. Even among these research projects, content varies from literature reviews of the state of electronic waste to the multiple-year development of a machine to turn waste plastic bottles into roofing material. Among this wide variety of projects, the theme remains the same: the chapter engages college engineering students to find solutions that meet the triple bottom line of environmental, social, and economic sustainability primarily for the developing world.



EWB Travel Team members inspecting completed photovoltaic system on Symbiosis Public School in Rampur, India

Keeping in the spirit of sustainability, the usage of college students also provides multiple co-benefits. On a basic economic level, having students volunteer their time means that the cost of the projects are artificially low, making it more

affordable for the people who need them. Additionally, engaging young people in the process of finding solutions for the developing world works to simultaneously teach them the skills needed to perform real-world engineering and inspire them to use those skills to improve the welfare of those in need. When working in direct contact with their partnering communities, the members are given endless opportunities to learn and experience cultures they may otherwise never have known.

The skills taught by Engineers Without Borders go far beyond simply applying math and science. Student members work on all levels of the chapter's structure, and all the multitudes of tasks required to run the chapter falls on the students. The chapter has two faculty members who advise the chapter by providing the wisdom gained by

working with the chapter for longer than any student member. Additionally, each project has a professional mentor to provide guidance in design and construction while providing quality control. Other than these roles, the chapter is run by students. There is a chapter executive who makes long-term decisions, coordinates the different projects, runs the fundraising and public relations events, handles the finances and plans lectures and other learning opportunities for the general body. For each project, there is a student project lead and often student-run committees. The lead performs the tasks typical of a professional project manager, including coordinating project scope, budget, schedule and human resources. Then, there is a large general body (40-60 students depending on the time of year) which does the work specific to each project. This structure allows students the chance to be as involved as they want to be while still being able to handle the normal stresses of college life. It also provides many leadership opportunities for those that really want to engage and get the most out of the organization.



EWB Members gathering data required for the design of a boardwalk through a marshy area of Emerald View Park, in Mt. Washington

While working on these projects, students get many opportunities to learn all the "soft skills" that classes may not provide. Doing the day-to-day work efficiently requires being able to communicate with other students, professors, engineers, community leaders, and the general public.

Students often get the

chance to practice their public speaking not just to other students and their professors, but to professionals of all types and the general public. Often, several of these categories include internationals who do not speak English. Thus, the members learn to effectively communicate across languages and across educational levels.

The members that get involved in the fundraising and finance gain even more valuable experiences. The budgeting and fundraising for all projects (which can range between \$100 and \$50,000) are done by students who will surely have a greater appreciation for the estimating, logistics, and other skills that may not be part of their future careers. All of this means that EWB members are well prepared for the professional world.

While it is true that many members receive these individual skills and experiences, the chapter as a whole is very project-oriented. The above benefits are often seen as simply the by-product of running the

chapter effectively. Even the experience of traveling to the community is not considered a “reward” for their hard work. Often, only a few of the members who worked on the project are selected for the travel team based on the skill set required to complete their tasks. All of the members are committed to ensuring that the promises they make to their partnering communities and organizations are fulfilled. Each



EWB Travel Team members fusing plastic bottles together for roofing material while brainstorming portions of roof design during field test trip

project provides real benefit to the world. The tangible outcomes are part of what attracts students to the organization, and yet many are unable to travel to the other countries to see it for themselves. For them, it is enough to know that the work got done and that the people they are serving are happier for it. In this way, the members of EWB find a truly selfless way of embracing the CMU motto, “my heart is in the work.” In addition to providing valuable engineering work to those in need, EWB-CMU is providing the world with future engineers not only prepared to join the professional world, but inspired to change it.

More about the CMU EWB Chapter...

The Carnegie Mellon University Chapter was established 6 years ago. Since then, it has been involved in numerous projects, at home and abroad. The chapter operates with an average of 50 active members each year. The chapter has a new international project involving energy and lighting in Nyadire, Zimbabwe. They are also working with the Pittsburgh Professional and University of Pittsburgh chapter of EWB to provide a water distribution system to the Curingue and latrines for the Tingo Pucará in Ecuador. They are also partnering with the Reuse Everything Institute, Inc. (REII) to design a process to efficiently turn waste plastic bottles into roofing material for the developing world. Also in partnership with REII, they are working to find ways of making agricultural waste from coffee plantations into profitable and sustainable products. They also have a team designing artificial intelligence software and hardware for more efficient solar panels for homes. For more details and to learn how to support the chapter, please visit <http://www.contrib.andrew.cmu.edu/~ewbcmul>

For more information about Engineers Without Borders at Carnegie Mellon University, visit <http://www.contrib.andrew.cmu.edu/~ewbcmul>

For more information about the national organization, EWB-USA, visit <http://www.ewb-usa.org/>

About the author...

Michelle Krynock is a senior undergraduate at Carnegie Mellon University with a double major in Civil and Environmental Engineering and Engineering and Public Policy. She became the lead for Project Symbiosis, a solar panel project in India, in January 2012. She performed as the chapter co-president with her good friend Michelle Cousté from January 2013 to 2014 and then as the sole president from January 2014 to January 2015. During that time, she helped lead the organization in expanding operations and membership. Upon graduation this May, she hopes to work as an environmental engineer in training.



April 25, 2015, 6–8:00pm

The Engineers Without Borders University of Pittsburgh Student Chapter Presents: Water for Tapagém Fundraiser

Pittsburgh Glass Center, 5472 Penn Avenue Pittsburgh PA 15206

Tickets \$50

Please join the Engineers Without Borders University of Pittsburgh Student Chapter for an evening at the Pittsburgh Glass Center. The evening will include ongoing live glass blowing demonstrations, self-guided tours of glass exhibits, raffles, Brazilian appetizers, and cash bar. All proceeds will benefit our Water Treatment Project in Tapagém Brazil

The goal of our project is to develop a sustainable water treatment system that will provide safe drinking water to the 250 community members and enable them to have a better quality of life. For more information or to make reservations visit our website www.pittewb.wordpress.com.

Carnegie Mellon University College of Engineering

www.engineering.cmu.edu

The College of Engineering congratulates the Carnegie Mellon University (CMU) Student Chapter of Society of Women Engineers (SWE) for their incredible accomplishments for 2014-2015.
We are very proud of you!

NATIONAL SWE — OUTSTANDING COLLEGIATE SECTION GOLD AWARD

(Carnegie Mellon's third consecutive win!)

REGION G ACHIEVING COLLEGIATE SECTION (GOLD LEVEL)

(Carnegie Mellon's second consecutive win!)

2015 REGION G ASPIRING PROGRAMMING AWARD FOR PROFESSIONAL DEVELOPMENT

(honor earned for creating the Technical Opportunities Conference, the largest job fair on Carnegie Mellon's campus)



By Cheryl Moon-Sirianni

During my senior year at Penn State University, I was standing in my apartment when my uncle who was a Civil Engineer working for a consulting firm told me that he would never hire a woman engineer. I was on the verge of graduating and became very worried as to what my future would hold when my own family member didn't think there was a place in the world for a female Civil Engineer. Well luckily for me, I soon found out that there were, and still are, a lot of wonderful opportunities for female engineers and nepotism was not a prerequisite for those jobs. Although there may have been many men at that time who had similar beliefs as my uncle, I was happy to discover there were many others who thought the engineering workplace was a perfect place for a woman.

I didn't start out my education knowing exactly what I wanted to "be when I grew up" but I did have a strong aptitude in the math and science curriculum in high school and I especially enjoyed problem solving. It was easy to determine that I should probably avoid anything having to do with the arts or English and go into one of the science or math fields (even before they were labeled STEM) when most of my art projects looked more like blobs than anything relatively artistic. I also struggled mightily to find any type of symbolism in Billy Budd, Hamlet or any type of literature because I was too busy searching for the logic.

At PSU, I started out studying Petroleum Engineering but that career choice was short lived when I decided that I just couldn't find the fascination in the glaciation of the rock formations that the rest of the class could. After my freshman year I had the pleasure of having a summer internship with the Pennsylvania Department of Transportation (PennDOT) Dis-

trict 10 where I had the opportunity to act as an inspector on the Kittanning Bridge rehabilitation project. I was easily smitten to be part of such an exciting project which was creating a huge improvement to the entire community. I think it was then that I realized that Civil Engineering was a pretty cool career choice where you could really make a difference that affected not only you and your family but also the traveling public and the community. Ok, I admit my nineteen year old self was probably not that introspective but I did find the Civil Engineering classes to be

"The engineer's goal is to blend all of the ideas into one successful project that can satisfy the technical requirements but also enhance the contextual features of the project"

more interesting and I further bolstered my choice with two other summer internships working on similar exciting infrastructure improvement projects.

I guess PennDOT must have seen something in me that they liked as I was hired in a permanent position right after graduating from PSU. After 28 plus years into my career, having the opportunity to work on so many fascinating projects, I am still confident that I made the right choice. These projects have not only provided incredible engineering challenges but also provided major improvements to the ailing infrastructure, to the regional economic development, and most importantly to the safety of the traveling public. And my career at PennDOT was not stymied at all by my gender. I had a variety of promotions along the way until I became one of the first females promoted to Assistant District Executives in the state over ten years ago.



What truly intrigued me and guided me in the Civil Engineering direction, was the public service aspect and throughout my years that also provided me the most gratification. During my tenure at PennDOT, I have worked on hundreds of public infrastructure improvement projects and have been responsible for billions of dollars of transportation funding. Some of the projects that I have had the pleasure of working on are regionally significant including the SR 28 rehabilitation project, the Boulevard of the Allies Gateway to Oakland project and the West End Improvement project to just name a few that solved long standing traffic problems and improved major portals into the City of Pittsburgh. These projects, as is true with many civil engineering projects, involve assistance from a myriad of other professional fields including environmental, landscape architecture, artists and many other stakeholders. Ultimately, the engineer's goal is to blend all of the ideas into one successful project that can satisfy the technical requirements but also enhance the contextual features of the project. Achieving these goals while staying under budget and on schedule is a very difficult challenge, but once complete, these complex projects are always the most gratifying. And what really makes you proud is when the older couple living in the house along the Boulevard invites you in and shares their tomatoes with you just because you listened and figured out a way to fix the dangerous sidewalk in front of their house.

Not being completely certain as to what I wanted to do the rest of my life also made Civil Engineering a good fit for me because there are so many different

disciplines available. I had a structure emphasis in college because I found those classes to be relatively easy to understand and grasp (and I use the term “relatively” loosely). The most difficult class for me in college was Engineering Dynamics, mainly because my brain seems to grasp statics easier than dynamics. I interned as a construction inspector during the summer months and then when I took a permanent position I chose to work in the office in the design unit. At the time, as a woman, I found that it was easier to gain respect through hard work in the Design Unit than field work because in the late 1980’s the construction personnel were not as accepting or respectful to the women in the field as they are today. Even though it is significantly better than 30 years ago, there still seems to be a bigger gender gap in the construction field than many of the other disciplines.

Although engineering could never be considered an easy career, I have found that managing people is the most challenging aspect and regrettably you are not taught in high school or college how to be an effective manager. As I advanced in my career, I became more removed from the down and dirty technical engineering and was forced to learn what “managing people” truly meant. I had many high level math, science and engineering classes that prepared me well for the technical work, and I fine-tuned those skills working on designs early in my career allowing me to pass the professional engineering exam. The problem was during school or early in my career, I never had any type of classes that taught me how to deal with basic management skills and concepts including conflict resolution, resource balancing, or negotiating. At PennDOT, I was provided some short training courses, but what I think was most educational was watching and learning from others whom I thought were good managers and trying to emulate them as much as I could. Another problem I found as a member of the newer generation (at that time) was there were no female engineers available to mentor me. There are definite differences between how men and women manage, not that one gender is necessarily better than the other because every manager has varying skill sets, talents, weaknesses and strengths,

but it would have been helpful to have the opportunity to evaluate and learn from both genders. I hope the next wave of engineering managers, especially the females, are able to experience a broader range of management styles to learn from as they move through their respective careers.

Lastly and probably most importantly, the best part of my career has been the people that I have had the privilege to work with who have significantly contributed to making my career as pleasurable and satisfying as it has been. Often people lump the engineering profession into one consisting solely of introverted people lacking skills of communicating, socializing or being strong team members and leaders. I have found the exact opposite to be true. Of course, there are those folks that you will find in all professions that prefer to sit at their computers most of the day but throughout my career I have watched many of the best and brightest folks from government, consulting firms, and industry consisting of various disciplines put their heads together to come up with solutions to problems that are extremely complex and sometimes seemingly impossible to solve. These amazing people have worked endless hours trying to repair bridges and roadways after floods and landslides; worked many long nights adjacent to speeding traffic to ensure the traveling public was not inconvenienced; stood in freezing water to inspect bridges; figured out how to maintain four lanes of traffic when you are between a hillside, railroad tracks and a river; stretched small amounts of money to pave dozens of miles of roadway when the potholes were winning the battle; and determined how to detour a hundred thousand cars a day to make necessary repairs through a heavily traveled tunnel...among the many, many other problems that occur and are solved on a daily basis. As I said earlier, I became an engineer because I enjoy challenges and problem solving and every day in this business there is a new and different challenge, I am just fortunate that there is a wonderful group of professionals that I get to collaborate with to help me solve the problems...that is what truly makes my job rewarding and special! And for my Uncle...I think PennDOT was pretty smart hiring this female engineer.



Cathy Bazán-Arias, Ph.D., P.E.

Norma Catherine “Cathy” Bazán-Arias, PhD, PE, FASCE is a senior civil engineer at Di-Gioia, Gray & Associates, LLC. Her area of expertise is geo-structural engineering, the branch of civil engineering addressing analysis and design of foundations, retaining systems, and soil-structure interaction analyses.

By the age of 12, Dr. Bazán-Arias had lived in México, Perú and the USA. From her teens forth, she became involved in the growing Latino community in Pittsburgh. Her participation has included various offices through the Latin American Cultural Union (LACU), Pittsburgh International Student Organization (PISO), Pennsylvania Statewide Latino Coalition (PSLC), Governor’s Advisory Commission on Latino Affairs (GACLA), Latino Health Advocacy Leadership (LHAL) Program, United States Conference of Catholic Bishops’ National Advisory Council (USCCB NAC), WQED advisory board, American Cancer Society Board of Directors – Greater Pittsburgh Unit, and the Latin American and Caribbean Heritage Room Committee at the University of Pittsburgh.

Professionally, Dr. Bazán-Arias has held, and continues to hold, several offices through the American Society of Civil Engineers (ASCE). Her most recent appointments have been to the national Board of Direction (BOD) and the Pittsburgh Section where she currently is President-Elect (2014-2015). She is a member of the Society of Hispanic Professional Engineers of Southwestern Pennsylvania (SHPE-WPA), Chi Epsilon (Civil Engineering Honor Society), Tau Beta Pi (Engineering Honor Society) and a past-graduate of INROADS-Pittsburgh. She has also been a columnist for Civil Connection e-newsletter, editor for Geo-Strata Magazine, and lectured at Norwich University for their online Master in Civil Engineering degree program and at Carnegie-Mellon University for their undergraduate program the structural analysis class.

Dr. Bazán-Arias has various honors including ASCE’s Diversity Champion Award, Young Civil Engineer Award, and fellowship at ASCE. She was most recently recognized as part of ASCE’s Civil Engineering & Women’s History celebration on March 8th, 2014.



Sara Hansel, P.E.

Where did your motivation come from to enter the engineering profession?

My inspiration and motivation to become a construction engineer was my father. He is a heavy highway construction superintendent and exposed me to construction at an early age. Even now when I'm working on a design or a problem I will call him up to bounce off ideas or discuss potential issues.

What do you enjoy most about your career?

I most enjoy the daily challenges and that everyday is a different one! Being out in the field, high up on a girder during inclement weather is a physical challenge. Solving problems and coming up with innovative and cost effective designs is a mental challenge. Finally having the patience to coordinate between multiple subcontractors and state and local agencies can be a challenge to anyone's sanity.

What advice do you have for a young woman interested in a similar career?

Work hard. It may take you longer to gain the respect of many of the craft workers (and even some of your coworkers), however once you have it being a woman can be an advantage. Sometimes women can be more aware of the social and emotional aspects of a jobsite which helps to build working relationships. Take care not to be exploitive, but utilize

these relationships to fullest to move the project along and keep the day-to-day job running smoothly.

What does it mean to you to be a professional engineer?

The first word I think of when I hear "professional engineer" is responsibility. With this honor comes a tremendous amount of responsibility – for the welfare and safety of others, for the financial and scheduling impacts of different projects, and the responsibility to uphold the respect that this title has earned throughout history.

Sara Hansel, P.E. is a Construction Engineer with Brayman Construction Corporation.



Lenna Hawkins, P.E.

Where did your motivation come from to enter the engineering profession?

My parents. My father is a retired bricklayer and father of four girls. He often would use us as extra hands when working on projects around the house. He sectioned off a corner of his work bench and supplied it with small tools such a vise, hammer, hand drill etc. He also kept a pile of scrap wood nearby so we could construct our own creations. He showed

me that you can do anything. My mother also played an important role. She was always taking things apart while my father was at work and putting them back together before he got home, like the toaster and the vacuum cleaner. She took the mystery out of everyday objects. She encouraged me to go into engineering after she read a book given to her by her schoolteacher mother on engineering as a career. It upset her that one of the first sentences read..."Why your son should be an engineer..."

What do you enjoy most about your career?

Everything! The fast pace, the challenge of the crisis of the day, and definitely the diversity of people are what get me moving every morning. I like never living the same day twice and getting satisfaction in seeing things get done.

I've been around a long time. In my early days I saw seen women engineers strive to be recognized by getting advanced degrees and their professional license. However I really like what I am seeing now which is women changing the engineering stereotype of an engineer with broken glasses and a pocket protector. No longer are hard technical skills enough to be a great engineer. The soft skills of communication and working in teams and are just as important. It is a strength in which I am seeing many women excel.

Lenna Hawkins is the Principal Deputy District Engineer for Planning, Programs and Project Management for the Pittsburgh District, U.S. Army Corps of Engineers.



Linda Kaplan, P.E.

Where did your motivation come from to enter the engineering profession?

I always liked math in school, but wanted something practical. I knew that I wanted a college program that I would come out of as a respected professional able to get a job. And I didn't want to be a doctor.

What do you enjoy most about your career?

I enjoy the problem solving, the way in which no two projects are the same and you have to figure out how to apply engineering basics in combination to get a solution – in my case to ensure a safe bridge or structure.

What advice do you have for a young woman interested in a similar career?

Go for it! Yes, it's still a male dominated field, but if you look there are lots of excellent female (and male) mentors who will be happy to help you out. Professional societies are a great place to start.

Linda M. Kaplan, P.E. is a Bridge Engineer with Gannett Fleming, Inc.



Massy Paul

Where did your motivation come from to enter the engineering profession?

I was born in Shiraz, Iran in a family where education was number one priority. As a child, I always had a natural inclination towards math and science. As it came time to evaluate my career opportunities, I chose to embark in a field that took advantage of these skills, but also wanted to seek a profession in which I could make a difference and at the same time would allow me to be somewhat be a trail blazer.. I decided engineering was both a logical and natural field and it met all my personal interests.

Any skills or courses that you've taken that have turned out more helpful than you originally anticipated?

In 1978 I came to the United States to study Engineering at the University of Pittsburgh.

My plan was to return to Iran after I finished my studies. But in 1979, the revolution in Iran began and my life changed forever. At this time, my parents told me I was never to return home, and I didn't and I still have not...

Open thoughts on women in engineering...

As a leader of a company, I personally feel that I am living the American Dream and I am therefore very sensitive and aware of my social responsibilities. I believe it is my time to "pay it forward," whether through support of local communities, employment or mentorship.

Massy Paul is President of Monaloh Basin Engineers

Where did your motivation come from to enter the engineering profession?

Growing up I did not know what engineering was or what an engineer did. I think my motivation to become an engineer was my love for solving problems. Solving problems growing up entailed tearing apart electronics to see how they worked (I was grounded many times), figuring out how to plug in a video game system when my parents were busy (luckily I did not electrocute myself), or building Legos when all they had were the town sets and the castle themes. Looking back at my past, it is really not a surprise that I would be an engineer, though my path to be an engineer was a bit different.

What subjects interested you the most while in school, before entering college?

My math and science classes were my favorite classes growing up. I was the crazy student always looking forward to both my math and science classes and helping out my friends who needed the extra help on their math assignments. Yes, I was the nerdy kid sitting in the back of the classroom. I always knew I would be going into the sciences growing up, but did not realize I would stumble into engineering as my chosen profession.

Were there any courses in your primary or secondary education that gave you particular challenges? ...any that came "easily" to you?

English and writing were my worst subjects mainly because I found the subject matter boring and pointless. Completely opposite on how I would dive into my Physics class and try to learn as much as I could on a subject. Keeping focused on the readings and report writing was a challenge for me. My mind would easily wonder into 'where did I leave off on my video game' or something else. Little did I know how important writing and conveying my ideas to an audience would be later in my life...hard lesson learned.

If you didn't enter the engineering profession, what other career choices might have interested you?

If I never changed careers right before the start of grad school, I would probably be an astrophysics professor at some university. I have always enjoyed astronomy and when I was accepted into the astrophysics graduate program at the University of Pittsburgh, I was ready to being start my journey

as a researcher. I had no idea that this was not a common career path in Physics. Luckily during a meeting with my future professors, I found out I would most likely be a professor. Knowing I hated the idea of being a professor, I thanked the Physics department at Pitt for the opportunity to study with them and I ran across the road to the engineering school, never to look back.

What professional organizations are you actively involved with?

Currently I am chapter president of the Pittsburgh Chapter of PSPE, and a member of the Engineers' Society of Western PA Board of Directors. I am also an active member in ASCE and ASHE.

What advice do you have for a young woman interested in a similar career?

I encourage young women if they enjoy math, science and solving problems, than a career in engineer may just be for you. You do not need to be the best at math or science. We as engineers invent and build things that improve lives every day. Many students do not realize all the areas engineers are in or do!

How has involvement with professional organizations impacted your career?

The people and the connections I have made through my involvement in professional organizations have been invaluable. By joining and getting involved I have been able to confront one of my biggest fears – public speaking.

Jennifer M. Nolan-Kremm, P.E. is a Highway Engineer for STV Incorporated



Jennifer Nolan-Kremm, P.E.





Certified MBE





Civil, Environmental, and Geotechnical Engineering

• Site Civil Design	• Permitting and Compliance
• Water Resources Engineering	• Geotechnical Investigations
• Engineering Hydraulics and Hydrology	• Slope Stability, Settlement, & Mine Subsidence Analysis
• Environmental Site Assessment & Remediation	• Transportation Engineering
• NEPA Assessments & Environmental Studies	• Construction Materials Testing

Pittsburgh • (412) 371-4460
Philadelphia • (267) 702-2028

www.scitekanswers.com

March of Dimes Announces Honorees for 5th Annual Transportation, Building & Constructions Awards

The West Penn Division March of Dimes is pleased to announce the honorees for the 2015 Transportation, Building & Construction Awards. This year marks the 5th anniversary of this annual event honoring the leaders and architecture from both public and private sectors of transportation, building and construction industries. Over the last five years, more than \$500,000 has been raised for the March of Dimes mission to improve the health of babies.

This year's honorees are:

- Labor Leader of the Year – Mr. Michael Dunleavy, Business Manager – I.B.E.W Local 5
- Transportation Project of the Year – Route 28 East Ohio Street Improvement Project, PennDOT
- Building Project of the Year – AHN Health + Wellness Pavilion, Allegheny Health Network
- Special Projects Award – Shale Development at Pittsburgh International Airport, Allegheny County Airport Authority & CONSOL Energy

The March of Dimes Transportation, Building & Construction Awards Luncheon will be held on Wednesday, June 17th at the Westin Convention Center with a reception at 11:30 a.m. and a luncheon at 12:30 p.m. The event is expected to draw over 500 attendees while raising important funds for the March of Dimes.

Sponsors of this year's Transportation, Building & Construction Luncheon include: International Brotherhood of Electrical Workers Local 5, Operating Engineers Local 66, Michael Baker International, CONSOL Energy, HDR, AECOM, Buchanan Ingersoll & Rooney, CDR Maguire, Hill International, Pennoni Associates Inc., Rhea Engineers & Consultants Inc., UPMC Health Plan. KDKA-AM, Trib Total Media and Pittsburgh Magazine are the event's media partners.

For additional information, contact Michele Frennier, State Director of Communications, at 412-965-6014, or Courtney Cassat, Community Director, at 724-816-6592

A Process Engineering Solutions Company

Venture Engineering & Construction is Pittsburgh's premiere process engineering firm.



Venture is ranked #6 by Inc. Magazine in 2012.



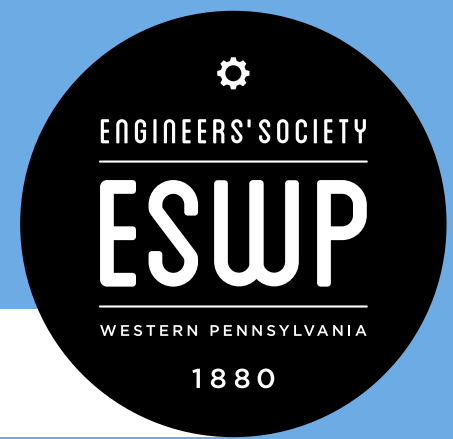
Markets

~ Energy/Power	~ Packaging
~ Chemicals	~ Commercial
~ Industrial	~ Institutional
~ Steel/Metals	~ Coatings
~ Water/Wastewater Treatment	~ Mineral Processing
	~ Oil & Gas

www.VentureEngr.com
info@ventureenr.com
 (412) 231-5890





Why ESWP?

Dining Facilities

- Lunch Served M-F
- Reservations not required
- Quality and Value

Banquets & Meetings

- Breakfast, Lunch or Dinner by reservation
- Full Audio Visual capabilities
- Wi-fi enabled
- Company meeting and training facility

Continuing Education

- International Water Conference®
- International Bridge Conference®
- PA Brownfields Conference
- Webinars
- Program Luncheons & Breakfasts

Events

- Annual Awards Banquet
- Golf Outing
- Mothers Day Buffet
- Christmas Buffet
- President's Reception

STEM Outreach

- Future City Pittsburgh
- Design Lives Here
- ACE Mentoring
- ASSET
- Chain Reaction Contraption

For Engineers...

- Multi-discipline
- More than 400 different firms
- More than 850 members

...and “non-Engineers”

Associate members from healthcare, finance, law, insurance, government

Affiliates

Home to more than 30 different technical & professional organizations, providing administrative support services

Publications

- Pittsburgh ENGINEER Magazine
- Monthly eTC newsletter
- Website
- Social Media

Networking

- Monthly Program Events
- Social media
- Business Development Opportunities

To learn more about the ways that an ESWP membership can help you grow, personally and professionally, visit eswp.com, or contact us at 412-261-0710, or by e-mail at eswp@eswp.com.

Membership is affordable and a great value.



ENGINEERS' SOCIETY
of
WESTERN PENNSYLVANIA

Ten things you may not know about your Engineers' Society...

Members can enjoy lunch in the Vault... it's available by reservation.

Founded in 1880 in the offices of the Pittsburgh City Engineer.

1880
...that's right—1880!



We're on Twitter, Face Book and Linked-In... Find us (and like us!)

Proud sponsor of the new ARCH mural



See it at Pittsburgh Int'l Airport



Sponsor of "Renaissance" given to Allegheny County in 1980, now on display at the entrance to the Pittsburgh International Airport



Want to pay your bill online?
Visit eswp.com



Wi-Fi available throughout the Engineers' Building



We're 850 members...that's almost 100 members more than a decade ago!

WE'VE GOT A NEW LOGO AND WE AREN'T AFRAID TO USE IT!



ENGINEERS' SOCIETY
of
WESTERN PENNSYLVANIA

Engineers Society of Western PA
Pittsburgh Engineers Building
337 Fourth Avenue
Pittsburgh, PA 15222