



Staying in the Game: AIChE Focuses on Women's Retention and Re-Entry in the Workforce

Societal Impact Operating Council hosts special session at the 2014 Annual Meeting, Nov. 17

Early in her chemical engineering career, Gina Miller, then a marketing manager at AT&T, decided to put her technical work on hold to become a full-time at-home mom. That was in 1998. Recently, when Miller became an empty-nester, she sought the challenge and rewards of returning to chemical engineering.

Miller has rejoined the workforce as an applications engineer for the static mixer product line at Sulzer Chemtech in Tulsa, OK. She says she is glad that she chose to re-enter the workforce, and is enjoying learning new technologies and having a career again. But she acknowledges the steep climb — and lack of support — she sometimes encountered in attempting to re-enter the field.

"I had read that there was a shortage of engineers in the workforce," says Miller, "and I was trying to find a program that helped women engineers re-enter the workforce and get back up to speed. I never found such a program."

Women engineers are making an impact in every area of the profession, from the university laboratory to the boardroom. And yet, while women now comprise more than 20% of engineering school graduates, only 11% of practicing engineers are women (1) — this despite decades of academic, governmental, and employer efforts to close the gender gap. Dissatisfaction with workplace culture as it applies to women engineers persists in some quarters. Many women engineers see their career ladders not reaching as high as those of their male counterparts. This perception of the engineering workplace as being unsupportive or inflexible causes some women to leave the practice. Some of them never return.

According to Zenaida Otero Gephardt, an associate professor of chemical engineering at Rowan Univ. and chair of AIChE's Societal Impact Operating Council (SIOC), the retention and re-entry of women engineers is about more than increasing equitability in the workplace. It is key to maintaining the best talent in industry and academia, and even enhances industry's bottom line. What's more, studies indicate that retaining and promoting workforce re-entry of talented women employees yields higher productivity and reduces costs associated with recruitment and employee training.

The underutilization of women's talents, knowledge, skills, experience, and perspective has financial implications for industry and the gross domestic product (GDP) as well. A 2011 report by Goldman Sachs calculated that increasing women's participation in the labor force to the levels of men's would increase U.S. GDP by 9% (2).

"Any large number of highly qualified engineers leaving the workplace is costly, not only to the individuals leaving but to the profession, the industry, and the economy," says Gephardt. "When those leaving are in one class (women), it also results in a decrease in diversity."

To ensure that every AIChE member achieves his or her potential, AIChE and SIOC are addressing the issue of women's career navigation, work/life integration, and professional development with a new initiative entitled Women's Workplace Retention and Re-entry. Dubbed W2R2, the effort will debut with a special workshop at AIChE's 2014 Annual Meeting, Nov. 17, in Atlanta, GA. (See the meeting preview article on pp. 18–19.)

The W2R2 workshop — a collaboration between the SIOC and AIChE's Women's Initiatives Committee (WIC) — is designed to help women take control of their work lives. Attendees will discuss employment strategies and share advice on topics ranging from career change to flexible work schedules to arranging temporary periods away from the workplace. The session will also lay the foundation for an AIChE action plan to support its members on issues related to workplace retention and re-entry.

The session will kick off with a luncheon featuring a keynote talk by Nadya Fouad, Distinguished Professor and Chair of the Univ. of Wisconsin-Milwaukee's Dept. of Educational Psychology and the Center for the Study of the Workplace. Fouad is an internationally recognized expert on employment issues whose studies on career-related decisions, particularly in understanding the work choices of women and under-represented minorities in the engineering workplace, have been widely cited.

Following the keynote speech, Fouad will join a panel discussion that will include AIChE leaders and representatives from several women's and professional organizations, each of whom will discuss how her employer is addressing issues of women's recruitment, retention, and re-entry. Roundtable discussions, led by panelists from SIOC, WIC, and AIChE's Minority Affairs Committee, will give participants a chance to talk about their own experiences.

The W2R2 workshop will conclude with moderated breakout sessions. "The idea," says Gephardt, "is for AIChE members and workshop participants to let the Institute know what they need in terms of support from employers." The feedback received during the workshop will form the basis of new Institute initiatives and future W2R2 programs.

Why women leave

A recent article in *The Atlantic* (3) reported that 43% of highly skilled and qualified women will leave the workplace for some period of time. Only 74% of those women will rejoin the workforce in some capacity, with only 40% returning to full-time employment.

Factors contributing to women's (and some men's) decision to leave their jobs include:

Work styles. The lack of workplace flexibility in some organizations makes it virtually impossible for many women to work full time while also handling familial needs. "People do not need to work standard schedules to be successful contributors. Give them projects with appropriate direction and give them a deadline — that may be all you need to get excellent results," says Gephardt.

Pay disparity and lack of promotion. "If you are earning less than your similarly credentialed male colleagues are earning, while doing the same job, you may not see the workplace as a place that values you," says Gephardt.

AICHE's most recent Salary Survey (*CEP*, June 2013, pp. 12–19) bears out the persistent gender-based pay discrepancy. While at the lower end of the experience spectrum (<11 yr) the median salary of females was slightly higher than that of their male counterparts, among more experienced engineers (11–40 yr), males continued to earn more than females (4).

Child and elder care. Among women who left engineering after working for five years or longer, more than 25% left to devote time to family needs (1).

Workplace climate. "It is still the case in some businesses that when a man takes time from work to see a child's play he is a hero, while a woman who does the same is considered not committed to the work," says Gephardt. Meanwhile, studies show that women engineers who had supportive supervisors and coworkers were less likely to consider leaving their jobs. Women were also less likely to leave engineering when their employer invested in their training, provided opportunities for advancement, and demonstrated that the company valued their contributions (1).

More than one way to work

Underpinning the women's workplace retention and re-entry issue is a traditional workplace that has not fully adapted to the changing needs of today's labor force. "Even the way we speak of working and not working, or leaving the workforce, is enlightening," says Gephardt. She explains that many women who leave paid employment to work at raising families also work part-time jobs or take on volunteer roles — raising funds for local nonprofits, campaigning for public office, and making other contributions to their communities. "They are gaining experience that companies

pay consultants to teach their middle management," says Gephardt. "Yet, we still consider women who work at home in this way as non-workers. They may not be employed for profit-making organizations, but they are working."

One such example is Anne Michelini, a chemical engineer and currently the Global Engineering Manager for DuPont's Packaging and Industrial Polymers businesses in Wilmington, DE. Twenty-one years ago, Michelini decided to set her engineering career aside to devote time to her growing family. In those days, Michelini recalls, requesting time off after the birth of a child, or asking for flexible work hours, were not prevalent practices. However, she says, "I felt strongly that my family was my number one priority and frequent travel demands were making it difficult to parent the way I wanted to."

While she raised her children, Michelini expanded her skills by getting involved in community projects. She helped form a parks and recreation committee and ran successfully for political office. As a member of the local school board, she chaired a building committee on which she was involved in procuring land for construction, obtaining local and state project approvals, and building a new school and expanding four others. "There are a multitude of ways to develop one's skills and make new connections through volunteer work, even while taking time off for childrearing," says Michelini.

Once Michelini's youngest child was in school, she decided that she would have adequate time to be both an effective parent and a working professional. During her eight years out of the paid engineering workforce, Michelini says, "I was always mindful that I would one day return to work, and I kept in touch with my former coworkers and other professionals." Still, in returning to work, she acknowledges "I had to restart my career and re-establish credibility."

Back in the game

Michelini says that employers need to better recognize and appreciate the types of skills and experiences she acquired during unpaid leave. Still, she advises women

LITERATURE CITED

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2. Quast, L., "Causes and Consequences of the Increasing Number of Women in the Workforce," *Forbes Woman*, www.forbes.com (Feb. 14, 2011).
3. Cohen, P., "Women's Employment and the Decline in Marriage are No Longer Related," *The Atlantic*, www.theatlantic.com (Apr. 16, 2014).
4. American Institute of Chemical Engineers, "2013 Salary Survey," *Chem. Eng. Progress*, **109** (6), pp. 12–19 (June 2013).

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WISE ChE Interns Bring Energy to Public Policy

Three chemical engineering students spent a portion of their summer exploring the interface between engineering and public policy as AIChE's 2014 WISE (Washington Internships for Students of Engineering) interns.

Erin Alderink (Univ. of Michigan, Ann Arbor), Sravya Khasnavees (Rutgers Univ., New Brunswick, NJ), and Sam White (Univ. of Michigan, Ann Arbor) spent two months in Washington, DC, broadening their perspectives and contributing to discussions on how engineers impact society. As part of the program, which ran June 1 to Aug. 2, the students prepared and delivered papers on public policy topics based on what they learned in their intern roles.

Alderink's paper, "The Federal Role in Fostering an Innovative U.S. Energy Ecosystem: Why R&D Matters," proposes that the adoption of renewable energy (solar, wind, hydro, geothermal) is the key to environmental sustainability and energy security, and that such adoption will require R&D financing through government funding, capital generated by a carbon tax, public-private partnerships, and incentives for using alternative fuels.

Alderink will graduate with a BS in chemical engineering in Dec. 2014, and plans to work for Dow Chemical Co.

Khasnavees' paper, "Natural Gas: The Bridge Fuel," says that larger-scale adoption of alternative fuels is needed to reduce carbon emissions and dependence on foreign oil. Her research recommends that large motor vehicles switch to natural gas, and addresses issues surrounding infrastructure, consumer choice, and hydraulic fracturing.

Khasnavees plans to graduate in Spring 2015 with a BS in chemical engineering and a BA in economics, and plans to work in the energy industry.

White's research paper, "Recommendations for Legislative Actions to Reduce Carbon Emissions in the Electricity Production Sector," focuses on legislative action to reduce carbon emissions in an economical way, including a tax plan to encourage the electricity sector to use more renewables.

White earned his BS in chemical engineering in May 2014, and would like to continue energy-related environmental work.

The WISE interns, along with interns sponsored by other engineering organizations, presented their work on July 31 on Capitol Hill. The interns' research papers are published online in the Sept. 2014 edition of the *WISE Journal of*



▲ AIChE brings undergraduates to Washington, DC, each summer as part of the Washington Internships for Students of Engineering (WISE) program. This year's interns focused on energy policies. Pictured from left to right are: Sravya Khasnavees, Rutgers Univ.; Sam White, Univ. of Michigan; and Erin Alderink, Univ. of Michigan. They presented their research on Capitol Hill on July 31. Photo by Erica Wissolik.

Engineering and Public Policy, available at www.wise-intern.org/journal. The interns are scheduled to present their papers at an Undergraduate Research Forum on Nov. 17, 2014, at AIChE's Annual Meeting and Student Conference in Atlanta, GA.

The WISE program selects undergraduate engineering students to conduct research on public policy issues during the summer in Washington, DC. The students learn about the interactions between the engineering community and the government in matters of public policy, and see how engineers can contribute to decision-making on complex technological matters.

The deadline for 2015 WISE internship applications is Dec. 31, 2014. For details, visit www.aiche.org/ifs/community/overview/students/Washington-internships-students-engineering-wise.

AIChE Election Opens September 16

The July issue of *CEP* featured position statements of president-elect and director candidates for the 2015 AIChE Board. The slate of candidates is listed below, and the candidates' platforms are available on the web at www.aiche.org/election.

Paper ballots were mailed to all AIChE Fellows, Senior Members, and Members on Sept. 2. Voting, including electronic proxy voting, will commence on Sept. 16. All paper ballots and electronic proxies must be received by Oct. 21, 2014.

Election results will be announced in November at AIChE's Annual Meeting in Atlanta, GA, and in the December issue of *CEP*. If you have questions about the election, contact election@aiiche.org.

For President-Elect

Thomas R. Hanley, Auburn Univ. (Auburn, AL)

Gregory N. Stephanopoulos, Massachusetts Institute of Technology (Cambridge, MA)

For Director (four to be elected)

Abdulmohsen D. Almajnoui, Saudi Arabia General Investment Authority (SAGIA; Dhahran, Saudi Arabia)

Richard V. Calabrese, Univ. of Maryland (College Park, MD)

Alan E. Nelson, Dow Chemical Co. (Midland, MI)

John O'Connell, Univ. of Virginia (Charlottesville, VA) (retired)

Timothy O. Odi, Chevron Phillips Chemical Co. (Kingswood, TX)

Anne Skaja Robinson, Tulane Univ. (New Orleans, LA)

Sharon M. Robinson, Oak Ridge National Laboratory (Oak Ridge, TN)

S. Shariq Yosufzai, Chevron Corp. (San Francisco, CA)

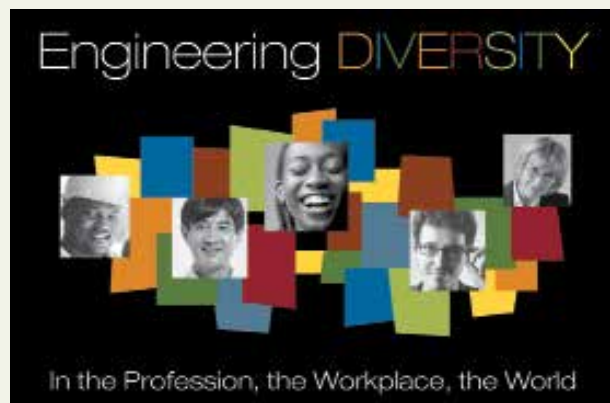
AICHE Gala Will Promote a Diverse Profession

A multifaceted and culturally integrated chemical engineering profession will be the uniting objective of AIChE leaders and the heads of companies in the chemical process industries and beyond when they join together at the Institute's 2014 Gala. This year's fundraising event, to be held Friday, Dec. 5, at the Grand Hyatt Hotel in New York, NY, will shine a light on organizations that have found strength in diversity. Funds raised during the gala will underwrite AIChE's continued efforts to promote diversity in the chemical engineering workforce — through support for the Institute's student activities in the developing world; K–12 and public outreach; initiatives conducted by its Minority Affairs and Women's Initiatives committees, local sections, and student chapters; and in innumerable other ways.

Among the gala's highlights, the event will honor Raj L. Gupta, Chairman of Avantor Performance Materials and Senior Advisor at New Mountain Capital; Ryan M. Lance, Chairman and CEO of ConocoPhillips; and Patricia A. Woertz, Chairman and CEO of Archer Daniels Midland Co. These company leaders will be recognized for exemplifying a personal commitment to a diverse culture in their companies and practices.

Selma Mededovic Thagard, Chair of AIChE's Women's Initiatives Committee (WIC), says that by working to ensure a diverse engineering workforce, AIChE and its leaders are striving for more than simply a more equitable and inclusive working environment. "A diversity of perspectives and life experience sparks imagination and creativity, which propels quality engineering," she says. Zenaida Otero Gephardt, Chair of AIChE's Societal Impact Operating Council, adds that diversity in the workplace is necessary for the success of businesses today, and will be essential as engineers work together to take on the challenges of the future. "It is gratifying that many of AIChE's industrial partners have a strong commitment to diversity," she says.

The 2014 AIChE Gala will be co-chaired by James L. Hambrick, Chairman, President and CEO of Lubrizol, along with John Y.



Televantos, Partner at Arsenal Capital Partners; S. Shariq Yosufzai, Vice President for Global Diversity, Ombuds, and University Affairs at Chevron; Karen A. Fletcher, Vice President for Engineering, Facilities Services, and Real Estate, and Chief Engineer at DuPont; and Todd A. Werp, Senior Vice President of Research and Development at Archer Daniels Midland Co.

Each fall, AIChE holds an awards gala that recognizes leaders from a variety of industries whose careers exemplify excellence in advancing chemical engineering. The gala strengthens AIChE's connection with industry leaders and builds support for important initiatives AIChE is undertaking on behalf of its members and the chemical engineering profession.

Last year's fundraising gala, held Nov. 21, 2013, in New York City, raised \$400,000 to support the expansion of ethics training for chemical engineering undergraduates, as well as to support lifelong-learning opportunities for professional engineers.

Read more about the 2014 AIChE Gala at www.aiche.org/gala.

CUSSLER IS NAMED 66TH INSTITUTE LECTURER

Edward L. Cussler, Distinguished Institute Professor in the Dept. of Chemical and Materials Engineering at the Univ. of Minnesota, has been selected to deliver AIChE's 66th Institute Lecture. He will present his talk, "The Future of the Lecture," on Wednesday, Nov. 19, 2014, at 11:15 am, during the 2014 AIChE Annual Meeting in Atlanta, GA. In his address, Cussler will reflect on changes and challenges faced by the university education system, and discuss new methods of delivering effective teaching to today's engineering students.

Cussler joined the Univ. of Minnesota faculty in 1980 after 13 years teaching at Carnegie Mellon Univ. He is the author of more than 240 articles and five books, including *Diffusion* and *Chemical Product Design*.

A Fellow of AIChE, Cussler served as the Institute's president in 1994, and is a past recipient of AIChE's Allan P. Colburn Award for Excellence in Publications and

Warren K. Lewis Award for Chemical Engineering Education. Other honors include the Separations Science Award from the American Chemical Society, the Merryfield Design Award from the American Society for Engineering Education, and honorary doctorate degrees from the Universities of Lund (Sweden) and Nancy (France). Cussler is also a Fellow of the American Association for the Advancement of Science and a member of the National Academy of Engineering.

He earned his BE from Yale Univ. and his MS and PhD in chemical engineering from the Univ. of Wisconsin-Madison.



CLARK RECEIVES SBE'S BAILEY AWARD

Douglas S. Clark, Dean of the College of Chemistry and Professor of Chemical and Biomolecular Engineering at the Univ. of California, Berkeley, will receive AIChE's Society for Biological Engineering's (SBE) James E. Bailey Award. Endowed by Cytos Biotechnology and named in honor of biotechnology pioneer Jay Bailey, the award will be given at the 2014 AIChE Annual Meeting in Atlanta, GA, where Clark will present the Bailey Award Lecture on Tuesday, Nov. 18, at 6:00 pm.

In his lecture entitled "A Personal Perspective on Biotechnology's Progress in a Golden Era (and How Jay Bailey Saw it Coming)," Clark — who was a student of Bailey's at the California Institute of Technology — will discuss how the molecular biology approaches innovated in Bailey's lab have formed the foundation for his own research, which encompasses biocatalysis, protein engineering, and cellular engineering for applications ranging from drug discovery to biofuel production.

A member of the Berkeley faculty since 1986, Clark is also the Co-Director of the Synthetic Biology Institute and a Faculty Scientist at Lawrence Berkeley National Laboratory, and he holds the endowed G. N. Lewis Chair. He has published over 230 articles, and has 26 patents and patent applications. He serves as Editor-in-Chief of *Biotechnology and Bioengineering*, and is on the editorial boards of *Enzyme and Microbial Technology* and *Extremophiles*.

Clark is a Fellow of the American Association for the Advancement of Science and the American Institute of Medical and Biomedical Engineers. He earned his PhD in chemical engineering from CalTech and holds a BS in chemistry from the Univ. of Vermont.

More information about the Bailey Award is available at www.aiche.org/SBE/community/awards.

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to take stock of those new skills developed during career breaks — dealing with difficult people, project management, time management, public speaking, etc. "Reassess your skill set," she says. "You might find you are more marketable than you thought."

Gina Miller, for her part, encourages women engineers to negotiate for more flexible workplace options if they want or need such flexibility. "It can be difficult to do, but it is a smart move if you want to keep yourself in the game," she says.

Micheleni adds that such workplace flexibility "is a corporate advantage as well as a retention tool. The investment required to bring re-entering employees back 'up to speed' is much less than the training and risk involved in hiring new employees," she says.

Organizers of AIChE's W2R2 initiative assert that the competitiveness of today's employers depends on their ability to accommodate the changing needs of the workforce. Ultimately, women must take responsibility for advancing that change, as well as their own roles in engineering and technology. "Women must work together with their employers to create the kind of workforce infrastructure that will allow them to reach their potential and make much-needed contributions to a global society facing some significant challenges," says Gephardt.

"This will require system-level solutions — but the solutions must be achieved," she says, adding that W2R2 is a crucial step in the right direction for women chemical engineers and society. "We simply cannot afford to exclude the contributions women engineers can and want to make."

To find out more about the W2R2 workshop, or to contribute to future collaborations, contact either of the workshop co-chairs, Selma Mededovic (smededov@clarkson.edu) or Zenaida Otero Gephardt (gephardtzo@rowan.edu).

In Memoriam

Randal E. Bailey, 94, Albuquerque, NM

Weldon E. Chollett, 85, Columbus, TX

Mario T. Cichelli, 93, Hockessin, DE

Glenn H. Dale, 91, Bartlesville, OK

Robert Frummerman, 90, Pittsburgh, PA

Harold W. Hebermehl, 82, Tulsa, OK

Ralph W. Helwig, 98, Berlin, MD

Alfred G. Hoerrner, 87, Warren, NJ

Roy N. Levitch, 74, Dallas, TX

Robert E. Luken, 86, La Grange, KY

Chandu S. Mansharamani, 85, Clinton Twp, MI

Irwin B. Margiloff*, 83, Duarte, CA

Thomas A. Reiter, 86, Dallas, TX

Matthew B. Riordan, 97, Escondido, CA

Donald C. Seeley, 86, Verona, NJ

Curtiss C. Wallin, 94, Wheaton, IL

* AIChE Fellow