Is Going Corporate for You? Coaching vs. Mentoring

A New Strategic Plan for AWIS
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Science in the Corporate World

By Nicole Kresge

One of the decisions many scientists face is whether to work in academia or to get a job in industry. There are many pros and cons to each, and while some women are attracted to the higher salaries and more family-friendly policies of the corporate world, many others prefer the less structured environment that comes with doing research on a university campus. In this issue of AWIS Magazine we’ve assembled several articles with corporate themes in hopes of giving you insight into the world of industry and perhaps even helping you land a corporate job.

To start with, we have some great interviews with women who work at biotech companies including Rashmi Nemade’s discussion with Karen Houseknecht about why she left academia for a position at Pfizer Inc. and Allison Martin’s conversation with Joanne S. Kamens, a project manager at Abbott Labs. Several of our regular columns also have a corporate slant to them. In Career Talk, Jennifer Griffin explores regulatory affairs; in Technology and the Scientist, Sandra C. Ceraulo looks at the Microsoft Office Live Programs for businesses; and in Corporate Corner, Sonya Summerour Clemmons discusses whether or not the grass is really greener in the corporate workplace.

Once you’ve decided that the corporate world is for you, you need to figure out where you want to work. In her article titled, “Today’s Industrial Giants Welcome Women Scientists,” Laura L. Mays Hoopes compares the work environments at Pfizer, Abbott, Merck, Eli Lilly, IBM, and Amgen, and explains what the companies look for in potential employees. She also provides several tips on how to apply for jobs at these companies and what to do if you get an interview.

For those of you who have opted for the academic route, we have two great articles that look at minority students and faculty in the life sciences: Lisa M. Frehill gives us some numbers from a report on strategies to diversify STEM faculty, and Stacy L. Springs and Marissa Braff report on the NSF ADVANCE programs to increase the number, advancement and leadership of women faculty in science, engineering, and mathematics.

Also in this issue, Monica Horvath returns with another installment in her mentoring series, this time looking at the difference between mentoring and coaching and we have a rundown of the Class of 2007 AWIS Fellows.
Debra Rolison

Profiled in Science
Dr. Debra Rolison of the Naval Research Laboratory in Washington D.C. was profiled in the February 9, 2007 issue of Science magazine. Dr. Rolison is a research chemist and head of the Naval Research Laboratory’s Advanced Electrochemical Materials section. She also writes and lectures widely on issues affecting women in science, and is an AWIS Fellow, Class of 2006. The Science article discussed her research on fuel cells as well as her work promoting women in science.

C. Megan Urry to Chair Yale Physics Department
This past January, AWIS Fellow (Class of 2006) C. Megan Urry was named chairwoman of Yale University’s physics department, making her the first woman to hold the post. She arrived at Yale in 2001 as the first tenured woman in the department’s history. Dr. Urry, who studies black holes, is also known for her efforts to raise the number of women and minority students in the physical sciences. She has been instrumental in encouraging Yale students through the Women Faculty Forum mentoring program, and in introducing science to young people in the New Haven area through her participation in the Science Saturdays program.

Shirley Ann Jackson to Receive the Vannevar Bush Award
Dr. Shirley Ann Jackson has been selected to receive the National Science Foundation’s Vannevar Bush Award for a lifetime of achievements in scientific research, education and senior statesman-like contributions to public policy. Jackson also is being recognized for her advocacy on global energy security, and for innovations she implemented as chairwoman of the U.S. Nuclear Regulatory Commission (1995-1999), and for her role in leading an institutional transformation at the nation’s oldest technology university. Currently, Jackson is president of Rensselaer Polytechnic Institute (RPI) and the first African-American woman to receive the Bush award in its 27-year history. She is also an AWIS Fellow, Class of 2004.

Bernice R. Sandler
Honored at Foremothers’ Awards Luncheon
Dr. Bernice R. Sandler was honored on May 11, 2007 at the Foremothers’ Awards Luncheon in Washington D.C. The luncheon honored five women whose lives improved our lives and who broke down barriers before it was fashionable. Dr. Sandler is a Senior Scholar at the Women’s Research and Education Institute in Washington, D.C., where she consults with institutions and others about achieving equity for women and is an Adjunct Associate Professor at Drexel University College of Medicine. She played a major role in the development and passage of Title IX and has been referred to as the “godmother of Title IX.”

France Córdova
Named President of Purdue University
France A. Córdova, who is an AWIS Fellow (Class of 1999) was chosen as the 11th president of Purdue University in early May. Dr. Córdova is an internationally recognized astrophysicist who is chancellor of University of California, Riverside. She has served at Riverside since 2002, coming from the University of California at Santa Barbara where she had been vice chancellor for research and a professor of physics for six years. Before that, she was the youngest person to hold the position of NASA chief scientist, working on projects that included the Hubble Space Telescope. Córdova’s scientific contributions have been in the areas of observational and experimental astrophysics, multi-spectral research on X-ray and gamma ray sources, and space-borne instrumentation.
The Pathways Ahead
By Donna J. Dean

The past six months have been, for me, a delightful convergence of the enthusiasm of young women entering their scientific careers with the intent embodied in AWIS’ creation 36 years ago. My travels to several university campuses across the country and to a number of professional meetings provided superb opportunities for dialog and discussion with young women at undergraduate, graduate, and postdoctoral stages of their training. As a “baby boomer” scientist, who received her training in the late 1960’s and early 1970’s, I rejoice in the significantly larger number of young women whom I now see supporting one another in their academic endeavors and in the wide choice of career pathways before them. I am excited for the future that these young women scientists are creating and for what they will achieve over the next several decades.

It was in the spirit of AWIS founding principles in 1971 that the national Board, with input from our members and chapters, articulated a new strategic vision for AWIS in the next few years (VISION 2010, which you will find in the center of this issue of the AWIS Magazine). With the combined strength of our individual members, our chapters, the national Executive Board, and Executive Director, AWIS is positioned to address issues that still exist for women in science, technology, engineering, and mathematics (STEM) at both the individual level and the organizational level. Yes, progress has been made, but there is more work to be done. Our strong action-oriented intent to advocate, to break-down barriers, and to build capacity provide a context and a framework in which we support the individual scientist as she moves through her career stages.

Academia is the gateway and pathway that we all must traverse in acquiring the requisite professional credentials for our chosen STEM area. However, once through that essential training, an unlimited number of careers lie before us, whether in academia, in industry, in government, or in other public or private sector entities. The network of senior, mid-career, and early career scientists in AWIS is a rich resource for mapping others’ knowledge and experience to our own. We can empower individuals to recognize when a rich opportunity for career growth arises, how to learn from one’s mistakes and missteps, and to check out our own biases and misconceptions. If we select appropriate role models and mentors for ourselves, we can acquire useful advice in our career directions, learn how to mesh our personal values with the demands of the workplace, and know when it is time to move on to the next career step. The network represented by AWIS members and chapters can foster environments where we create opportunities for others, support calculated risk-taking, and share perspectives on how to balance the many parts of our lives.

By articulating a vision of intrinsic involvement of women in STEM at all career stages, AWIS promotes a fuller understanding of the forces that shape our STEM careers. By sharing our challenges with female colleagues, we can clarify external and internal feelings, values, beliefs, and attitudes that can positively (or negatively) influence our career trajectories. For me, the “glass ceiling, sticky floor” analogy works – the “glass ceiling” represents the barriers and obstacles that others create to impede my scientific endeavors, but the “sticky floor” represents those things that I do (or fail to do) when the choices are mine to make.

It is my fervent hope that each member and supporter of AWIS will find a “call to action” embodied in AWIS’ VISION 2010. If we work together, we will accomplish much by AWIS’ 40th anniversary in 2011.
We’re **Moving**
to a New Membership Cycle

By Janet Bandows Koster

Throughout the transition, you’ll continue to receive all your current membership benefits including:

- A subscription to the AWIS Magazine, our exclusive quarterly membership publication.
- Free participation as a protégée or a mentor in MentorNet’s award winning e-mentoring program for academics.
- The option of joining your local community chapter which provides networking and education activities.
- Access to the members-only section of AWIS.ORG, our cutting-edge website full of information about issues, programs, reports and research.
- A growing host of discounts on publications and services including AWIS’ annual Networking Breakfast.

Please know that we appreciate your membership and your patience as we move to a new annual renewal cycle. And, continue to look for new benefits and services as we strive to make your AWIS membership a meaningful experience.

In our on-going initiative to upgrade the benefits of your membership in AWIS, the National Board recently approved a plan to transition the membership year from its current cycle, based on anniversary date (join date), to a membership year based on a fixed calendar year that coincides with our fiscal year, July 1 through June 30.

When fully implemented, dues renewal notices will be mailed to all members on one date in the Spring of each year and dues will be payable by July 1 of each year -- regardless of your original anniversary date. This is necessary in order to have all members successfully migrate to the new renewal cycle. By June 30, 2008 all members will be on the same schedule, with billing occurring each Spring and payment due by July 1.

As you’ll note from the chart below, the new membership scheme starts with July 2007 renewals which get invoiced for the standard annual amount. From August 2007 through December 2007, the dues are reduced by 1/12th of the annual amount for each month. So if your membership renewal is in August, you would be invoiced for 11 months. If your renewal is in September, you would be invoiced 10 months, and so on through December 2007.

In January 2008, we will start invoicing for a membership cycle that extends to June 30, 2009. So, January renewals will be invoiced for 18 months, February for 17 months, and so on to June which will be invoiced for 13 months. All members invoiced between January and June of 2008 will not be invoiced again until July 2009.
Today’s Industrial Giants Welcome Women Scientists

By Laura L. Mays Hoopes

Women welcomed by industry today

Women looking for careers in industry will find open doors to welcome them. There is a cautiously positive business outlook; pharmaceutical companies experienced 8.3% growth in prescription drug sales in 2006, driven by Medicare D, new drugs, and generic drugs. Career recruiters say computer-related positions are plentiful now. AWIS Magazine surveyed six important companies to help you find the right position.

Pfizer Pharmaceutical Company was one of the “Best of the Best” in Fortune magazine in 2005 which recognized the company in Fortune’s “Best Companies to Work For” and other lists. The Scientist also chose Pfizer as one of the best. The Human Rights Campaign Foundation honored it for supporting the gay, lesbian, bisexual and transgender community. For employee development, Training ranked Pfizer third among the top 100.

At Abbott Laboratories, women represent 47% of the workforce. In the last five years, they have filled 53% of their entry level science positions with women. Abbott was mentioned by Science and The Scientist in lists of the “Best Places to Work” in 2006. It ranked tenth in the “50 Best Places to Launch a Career” in Business Week and was named in the top ten of “100 Best Places to Work” by Working Mother.

In 2006, Merck & Co., Inc. was chosen for the “Top 30 Companies for Executive Women” by National Association for Female Executives. It was 18th among the Business Week “Best Places to Launch a Career.” DiversityInc picked Merck among the top 50 companies for diversity. It was called a “great place for black women to work” by Essence. Fortune chose Merck in “Top Employers for Women.” The Scientist cited Merck among the “Top 10 Best Places for Life Scientists to Work.” Working Mother also recognized Merck.

Eli Lilly and Company appeared on Fortune’s list of the “100 Best Companies to Work For” every year from 2004 to 2007. For eleven consecutive years, Lilly has been recognized by Working Mother as one of the best companies for working mothers. It has received numerous similar awards in Europe, Mexico, and South Africa.

In 2006, Working Mother ranked IBM among the top 10 companies. Maria Ferris, Director, Workforce Diversity Programs, received Working Mother’s first “Ted Childs Worklife Excellence Award.” For the fifth time, IBM Australia won a citation for supporting women’s advancement.

Amgen, the world’s largest biotechnology company, has 46% female employees. Amgen was on the Scientist’s 2006 list of “Best Places to Work in Industry.” Fortune named it one of the “100 Best Companies to Work For.” Science ranked the company fourth in their top biotechnology and pharmaceutical companies.

Differences between industry and Academia

Industry offers substantially higher salaries than academia. A company may have branches around the world which offer opportunities for travel. These companies actively seek diversity. Ann W. at Pfizer comments, “This is a place where diversity is embraced as you can see … just by walking around the campus. It is visually and tangibly diverse.”

Industrial research may involve patentable aspects that must be protected before they can be made public. Unfettered creativity is sometimes reserved for group leaders. However, Pfizer’s employee Tracey C. says the most important part of her job is, “The creativity and the constancy of delivering high quality data.” Ability to contribute to a multidisciplinary team is highly valued according to Judy Fisher, Career Development Director, Harvey Mudd College. Industry also emphasizes leadership, says Kerry Martin of Career Development, Pomona College.

Benefits and child-related policies are generally excellent in industry. Lisa Gable says IBM has dependent care funding for both...
children and elders, plus up to three years of childbirth leave. Merck has on-site childcare and child-care-leave of up to 18 months, and offers flex-time, job-sharing, part time, telecommuting, remote work, compressed workweeks or any combination, says Amy SATkovsky. “Merck recognizes that WHAT and HOW our employees accomplish is more important than WHEN or WHERE the work is done,” says Chris Hong, Senior Director, Recruiting, Merck Research Laboratories. Pfizer’s Ann W. comments, “They were willing to work with me to reach my potential while meeting my commitments at home and to the company. I have flexible work arrangements and I make use of the corporate day-care program.” Lisa Gable says IBM has a People Oriented Work Redesign (POWR) process to address flexibility and workload issues. An employee said, “POWR helps to give employees ownership in developing and implementing the solution; no pun intended, but the process is empowering.” Kassebaum says, “Lilly has a generous maternity leave policy and two on site child care centers…the company often can accommodate a very flexible work schedule.”

Many companies’ web sites feature women’s interest groups and mentoring. Gable emphasized that IBM has “Mentoring and Networking initiatives to enhance career growth and potential.”

Online Applications

The human resources department of companies may have few employees these days. They rely on the internet and computer analysis for services that used to be managed personally. It is more important than ever to think through the application process in detail.

The web is the place to research the company, submit a resume, and apply for specific positions. All of the sites are user friendly and respond rapidly to input. On each company’s site (see sidebar), either “Careers” or “Jobs” can be selected. They list the company’s benefits, accolades, diversity, hints for applicants, and jobs. The sites usually let you submit a resume without choosing a position or shop for open positions. You can choose locations, specify full time, part time, or internship, and select the type of work. Positions can be collected into your “cart” and explored further. You can submit your resume to the companies you find attractive. The AWIS “test drive” below will give you an idea what kinds of positions each company has, but those cited may have been filled since March.

On the Pfizer web site, the ‘Job Opportunities’ section states new positions appear frequently. Clicking on “US,” “Research and Development/Research”, and “Full time” delivered three positions: a technical assistant position in CA and two “pharmacovigilance” positions in NJ.

On the Abbott web site, US full time positions at entry level in scientific research and development included an associate statistician in IL, an associate scientist in IL, an assistant chemist/trainee in AZ, and an associate pharmaceutical scientist in IL.

Merck’s web site offers a video, a Podcast, and a section on “How to Prepare for Your Interview.” Under “Search for jobs,” “Experienced,” and “United States” labels were 164 positions, including staff chemist in PA, biochemical engineer in NJ, senior investigator in genetic toxicology in PA, and biometrician in PA. The closest option to ‘entry level’ is university student internships.

The Eli Lilly & Company’s “Job Search” under “Science” and “Experienced” site yielded 115 scientific jobs including a bachelor’s degree tissue culture biologist in CA, a PhD research biologist in CA, a bachelor’s degree women’s health and skeletal medicine liaison in CA, and a PhD project statistician in IN.

IBM’s web site under “View Job Opportunities,” “Full time regular,” “Entry level,” and “All majors” produced 395 positions including a System x IT architect in AR; a software engineer in AZ, and an entry level test engineer in CA.

On Amgen’s web site under “Careers,” positions included an associate clinical research manager in CA, an associate scientist in WA, an associate biostatistical programmer in WA, and an associate lab technician in CA.

Fresh Industry Perspectives

Chris Hong of Merck says, “Along with a science background, Merck looks for candidates who have true passion for scientific excellence and a sincere desire to have an impact on human health.” Merck wants candidates with a strong scientific background and a proven track record of success. Some growth areas are oncology, imaging technology, and cutting-edge research in RNA expression. They also need mathematicians with a strong statistical background or experience in clinical development.

Pfizer’s spokeswoman says, “Our search for new lifesaving and life-enhancing drugs spans hundreds of research areas across multiple disease groups and therapeutic areas—more than any company on the globe. You can achieve what you go after. This is where all new medicines start. It’s where we find new therapies that we can bring to the public and fully contribute to improving worldwide health issues and it’s where we can truly make an impact on people’s lives.”

Jim Kassebaum from Eli Lilly says, “Lilly is consistently looking for top candidates with backgrounds in many areas of biology, chemistry, pharmacy, statistics, pharmaceutical science, toxicology, pathology, etc. A strong technical skill set is always the first attribute that we look for. Then, strong communication skills that can translate into the ability to lead and drive projects as well as foster collaboration with other Lilly colleagues is next.” Lilly’s current focus is development of biomarkers in drug discovery, facilitating personalized medicine. Kassebaum emphasizes that the company’s location in Indianapolis offers a high quality of life accompanied by low expenditures.
Lisa Gable says IBM looks for problem solving ability. They emphasize basic programming skills, debugging, OS platform diversity and technical certifications. IBM also hires employees with math/computer science/engineering degrees into positions like consulting and sales.

Resume and Interview Strategies


Focus on the fit between you and the job. Fisher suggests tailoring your resume to each position. In the Job Description, underline all the buzz words, usually the nouns and verbs. Put them into your resume. She says, “If they’ve mentioned ‘problem solving,’ make sure a computer search of resumes looking for these words will find yours.” You should also use numbers as much as possible, e.g. percent improvements, numbers of people supervised, or amount of growth. Kassebaum at Eli Lilly adds, “…be very complete regarding skills and experiences. This will help a job seeker be noticed in a resume search.”

Martin urges that you understand your target company’s business. “What is their model of success?” she says. “You can find out from their web site, but also from resources at the career office at your school or your alma mater. There’s definitely a growing trend for college and university career offices to welcome alumnae/i.”

Once you are invited for an interview, “assume you have the qualifications,” Fisher says. Now it is all about fit. Have enthusiasm and self-confidence. Aim to show them you want to work for their company and you are the one they need. Have a positive, can-do attitude. “Dress smartly and professionally, be prepared, give clear and concise answers, speak confidently, be open, honest and most importantly, be yourself,” says Merck’s Chris Hong. Gable at IBM says, “We are looking for people who have a passion for technology and business. We want you to be passionate about what we do, and willing to share your technical skill, energy, and passion with us.”

Decide how you will answer the two most frequent questions interviewers ask: “What have you done that qualifies you for this position?” and, “Why do you want to work for this company?” You may also be asked what you have learned from specific successes or failures, and details of you how you have shown leadership or worked with a team. Jim Kasseebaum at Lilly said you should practice answering “behavioral questions.” For example, you might be asked to describe how you behaved in a situation where you disagreed with your supervisor. For IBM, questions will address your adaptability and ability to handle uncertainty.

It is impressive if your questions show knowledge about the company. Write down questions you still have about the company or the position after you have reviewed the company’s web and other information.

It is a good time to be looking for a position in industry as a woman in science, mathematics, computer science, or engineering. Companies are particularly interested in hiring good women. You need to prepare yourself to show your assets to their best advantage.

Laura L. Mays Hoopes is Halstead-Bent Professor of Biology and Molecular Biology at Pomona College (Claremont, CA). She is active in AWIS and Genome Consortium for Active Teaching, bringing genomics to professors of undergraduate students. She is a Fellow of American Association for the Advancement of Science recognizing research and mentoring of women and minorities.
Selected Industry Web Sites

- **Pfizer Inc.**: [www.pfizer.com/pfizer/main.jsp](http://www.pfizer.com/pfizer/main.jsp)
  - On the left side, choose “Who We Are” and then “Careers”
  - 106,000 employees
  - Drugs include Viagra, Zoloft, Lipitor, Zithromax, Viracept, Chantix

- **Merck & Co, Inc.**: [www.merck.com](http://www.merck.com)
  - On the bar across the top, choose “Careers”
  - 61,500 employees
  - Drugs include Cozaar, Hyzad, Vytorin, Zetia, Zocor, Propecia, Singular, Fosamax

- **Eli Lilly and Company**: [www.lilly.com](http://www.lilly.com)
  - Choose “Careers” from the top bar or under Quick Links on the left, choose “Job Search”
  - 42,600 employees
  - Drugs include Prozac, Serafem, Zyprexa, Gemzar, Evista, Humalog, Cialis

- **Abbott Laboratories**: [www.abbott.com](http://www.abbott.com)
  - On the left side, choose “Careers”
  - 59,735 employees
  - Drugs include Norvir, HUMIRA, Mericia
  - Other products include Similac and Ensure

  - On the right side, choose “Jobs at IBM”
  - 366,345 employees
  - Makes mainframes and servers, storage systems, semiconductors. Produces software.

- **Amgen**: [http://www.amgen.com](http://www.amgen.com)
  - Across the top, choose “Careers”
  - 16,500 employees
  - Drugs include Epogen, Enbrel, Aranesp

Resume Tips

**Effective resumes for industry positions include:**

- Your background and contact information:
  - Full name and mailing address
  - Telephone numbers and email address
  - Education
  - Professional associations, awards, honors

- Work history and qualifications:
  - Employment history starting with most recent
    - Dates of employment
    - Include internships
    - Highlight evidence of teamwork and/or leadership
  - Specific skills and qualifications. Use their buzz words. Examples: computer skills, foreign language competencies, ability to perform sophisticated experiments and/or data analyses.
  - Publications and presentations

- Additional advice:
  - Put name and email address on every page
  - Use a single column and 12 point type
  - Be clear and concise
  - Use bold subject headings that are easy to understand
  - No graphics or strange fonts
  - No attachments

Preparation for an Interview

- Research your potential employer.
  - Web sites
  - Newspaper and magazine articles

- Use the details of the job description.

- Think through how your experience relates to the job.

- Summarize your job-related skills and training.

- Practice explaining why you’re searching for a position.

- Practice describing a major success and a major failure and what you have learned from them.

- Prepare a list of questions about the position.

What to Do During the Interview

- Dress conservatively.

- Be on time.

- Talk about your specific skills; do not assume the resume is enough.

- Be enthusiastic about the position and the company.

- Do not apologize or appear negative about your experience and abilities.

- Ask about details of the position and the interviewer.
  - daily routine
  - place in the organizational structure
  - contact information about interviewer

- Ask about company support of employees.
  - Training opportunities
  - Advancement opportunities
  - Benefits and policies to support women and children
  - Travel and work abroad

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  - Travel and work abroad
Karen Houseknecht’s long-time dream was to be a professor. She did all the right things - she rigorously pursued her Bachelor’s, Master’s and Doctorate Degrees, worked long and hard hours with single-minded focus, and sacrificed significant amounts of personal time. Finally, she realized her vision and became a successful tenure-track assistant professor – complete with grant funding, published papers, and outside collaborations. She had arrived and was ready to pursue all the other things she had put on hold for so long, or so she thought. “The faculty environment was highly competitive and as a result, there was little camaraderie or sense of community. I was one of a few women faculty and the youngest at that,” says Houseknecht. All of these elements made academia much more isolating than Houseknecht had imagined.

So the wheels had been set in motion, and Houseknecht was looking for a change. When a recruiter contacted her about working at Pfizer Inc., she was not sure about leaving academics. “The recruiter convinced me just to go for a visit,” recalls Houseknecht. This visit opened her eyes and for the first time, she saw a ‘people-friendly’ environment, where women were in positions of power, people were promoted during maternity/paternity leaves, and parents could bring their children to work when school or childcare were not available for a given day. This is in stark contrast to many academic institutions where maternity leave for faculty is not a guarantee, but rather given at the discretion of a department chair. “I’ve known women, academic scientists, who have come back to work within a week of giving birth,” observed Houseknecht. In this sense, industry is a breath of fresh air, where the phrase ‘work-life balance’ is commonly discussed. “Work-life balance does not even enter into the discussion in academics,” remarks Houseknecht sadly. Although she did not have children at the time Houseknecht considered making the switch to industry, she could already see how invaluable work-life balance could be with a family. The people-friendly environment along with the beautiful location of Pfizer research headquarters in Connecticut sold Houseknecht, and she decided to give corporate science a chance.

The biggest challenge of her transition to corporate science has been the drastic culture change from academics. “As a faculty member, you really don’t have a boss; you are expected to be an independent, internationally renowned expert. As long as you get funding, you don’t answer to anyone for the day-to-day things. But in industry, there is a corporate hierarchy and relationships with those who supervise you and whom you supervise. These relationships must be nurtured and managed for a productive environment.” Once Houseknecht got her footing in this environment, she enjoyed the cutting edge science that was going on all around her. “Working on teams in the earliest part of drug discovery and pulling people together towards a common goal is exciting and challenging. It has the potential to have a big impact in society!” exclaims Houseknecht. The downside of working in a corporation versus academia is that it is a tough business. “When research sites close or reorganizations happen, there may be a quick impact on peoples’ lives even if it doesn’t affect them directly,” laments Houseknecht. Fortunately, Houseknecht has found a balance that works for her. She works in corporate science while maintaining important interactions with academic institutions via adjunct positions, mentoring and through academic colleagues.

In terms of women’s success, Houseknecht finds that the most challenging aspect of women’s careers in industry is that women with technical backgrounds inevitably hit a barrier, where it is often difficult (or perceived as impossible) to rise in technical management unless they go to another part of the company. “Unfortunately this problem is common in many scientifically

“You can have the best education in the world, but if you don’t have the opportunity to succeed, you cannot be successful.”
driven corporations,” says Houseknecht. If women are to continue succeeding in these environments, more management roles and career paths must be forged in technical areas.

Along with her scientific responsibilities, Houseknecht is involved in numerous organizations that support gender equity, mentoring and outreach for young students, and advocacy for women and children. This is her passion and her own personal mission. Her work in this area is not only allowed at Pfizer, but also supported and encouraged. “We are expected to be leaders,” says Houseknecht proudly.

As a part of her passion, she has served as the Connecticut Educational Equity Issues Chair for the American Association of University Women (AAUW) and recently was elected to the AWIS national board. Her goal as a board member is to broaden AWIS perspectives to include non-academic arenas including corporations, government sectors, and non-profit organizations for women in science. “I want to help change the face of membership,” states Houseknecht. In addition, she wants to keep different views on the table. “Currently, I hear a generational disconnect in women’s dialogue. On the one hand, there are older women who were part of the Women’s Movement and fought hard to give younger women choices and now often do not feel heard or respected; and on the other hand, there are younger women who are less interested in advocacy, who are only interested in career development, and do not understand why older women are angry. Somewhere in between are women in their 40’s who have had different life experiences and whose voices are not heard,” explains Houseknecht. Bringing all these viewpoints to the table can help to foster understanding, bridge the gap, and ensure that all voices are heard.

When asked what gender equity means to her, Houseknecht answers that, “Gender equity is about equal opportunity, not special favors. It’s about being treated like a human being and not being dismissed because of outward attributes. Most importantly, it’s about having opportunities to succeed. You can have the best education in the world, but if you don’t have the opportunity to succeed, you cannot be successful.”

Her vision for the future is for both women and men to have more flexibility to succeed, to be creative with their careers, to be allowed to take a sabbatical and to re-enter science and without it being viewed as a lack of ability. This is the prescription for people in all areas of science. “It’s not about working less, it’s about working smart,” remarks Houseknecht.

The best feature of the current corporate culture is that there are choices – for women, for men, for mothers, for fathers – for people and their lives.

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Rashmi Nemade received her Ph.D. in Molecular Developmental Biology from the Children’s Hospital/University of Cincinnati, went on to do postdoctoral work at the National Institutes of Health, and subsequently worked in Regulatory Affairs. Currently, she is a freelance writer and manages her own biomedical writing company, BioMedText, Inc.
The NSF ADVANCE Program: Promoting Women in Academic Science and Engineering

By Stacy L. Springs and Marissa Braff

The number of women awarded doctoral degrees in science and engineering has increased from 14% to 37% over the last 30 years. However, the representation of women in corresponding academic faculty positions has lagged behind, especially in the most senior positions. For example, as of 2003, 25% of Ph.D. degrees in the physical sciences were awarded to women, while only 6% of full professorships in these fields were held by women. To address the complex issues behind this problem, the National Science Foundation (NSF) launched the ADVANCE program in 2001. The mission of this program is to increase the number, advancement, and leadership of women faculty in science, engineering, and mathematics (SEM) departments. The NSF hopes that these initiatives will increase diversity and create the broadest talent pool possible to support national science and engineering interests. We took a closer look at the NSF’s efforts by focusing on three ADVANCE programs for institutional transformation.

Thus far, the NSF has provided approximately $100 million in grants to those willing to tackle this problem. The largest allocations have come in the form of Institutional Transformation grants. These grants are awarded to universities with outstanding proposals on how to improve the recruitment and retention of women in science and engineering by changing policies, attitudes, and environments at their institutions. In three funding rounds, over 30 applicants from a pool of over 200 have received multi-million dollar, 3- or 5-year grants. The program is structured so that ADVANCE institutions will become exemplars for institutional change at other schools. Thus, a large component of receiving an ADVANCE grant is evaluating strategies and disseminating the results.

“With each iteration of the program, recipients try to learn from the approaches of the previous recipients. As we got our program started we looked to the first-round schools, and as our program matured, we worked with third-round awardees,” said Peggy Layne, the director of Virginia Tech’s ADVANCE program (AdvanceVT). This university took a comprehensive approach, with work on policies as well as with department heads, senior and junior faculty, and graduate students, in an effort to create influence at several steps along the academic career path.

Understanding the Problem
The NSF took note of the 1999 report, “A Study on the Status of Women Faculty in Science at MIT,” and additional studies that followed when nine university presidents met at MIT to discuss the status of women faculty in science and engineering at their institutions. These studies clearly illuminate the reasons women may not pursue or remain in academic careers and focus on mechanisms for change. For instance, when it was discovered that women in science and engineering at the University of Michigan are paid on average 3% to 5% less than their male counterparts, the university made wage adjustments for several women in the following academic year. Other study results, such as those from Princeton University, revealed that negligible or no gender bias exists in salary and space allocation for SEM faculty at that institution.

However, unwelcoming department climates and marginalizing environments are often cited by women who opt out of science careers in academia. Differing degrees of job satisfaction or perceptions about the work environment are often reported by men and women faculty in climate surveys. For instance, at Princeton in 2003, 24% of female faculty in science and engineering noted that their colleagues “occasionally” or “frequently” engaged in unprofessional behavior on gender-related matters, while only 5% of male faculty responded in this way. Likewise, 24% of female faculty felt that their colleagues excluded women, while only 2% of the male faculty responded this way. Such discrepancies in perception highlight the difficulty in addressing the issues that lead to job dissatisfaction and the loss of talented women scientists.

Further, the lack of women in the highest ranks translates to a deficit of role models and mentors for women coming up through the pipeline. Here, remediation in the form of visibility, leadership, and mentoring initiatives can be envisioned. However, disengaging unconscious gender bias in the evaluation of job candidates and tenure track professors is difficult to target and has been shown to exist on the part of both men and women. Surveys have also shown that women are more frequently part of dual career households than their male counterparts and concomitantly the heads of households. As a result, women often experience a significantly greater burden in managing work-life balance.

ADVANCEment Past Barriers and Biases
The major goal of the NSF in creating the ADVANCE program was to increase the recruitment and retention of women in science and engineering departments using a variety of initiatives...
including policy transformation, leadership development, and improvement of department culture.

**Policy Transformation**

Family-friendly policies such as ‘stop the tenure clock,’ dual-career hires, and part-time tenure track positions may help women overcome some of the barriers they face and are areas of focus for many ADVANCE groups. Family-friendly policies can show consideration for the needs of working mothers and nursing mothers by providing on-site childcare options, lactation facilities, and financial assistance for childcare in the form of pre-tax accounts. Many ADVANCE teams have enacted Transitional Support Programs that supplement university leave policies for life-affecting transitions such as birth or adoption of a child, leave for personal or family medical reasons, or care for an elderly parent. Eve Riskin, Director of UW ADVANCE, told us that the University of Washington already has good family friendly policies and thus noted, “Instead, we focus on trying to make chairs and faculty aware of the good policies.”

The AdvanceVT team has worked with policymakers toward implementation of ‘stop the clock’ and flexible work-life policies. As Peggy Layne notes, “we’ve done a lot of work with university policies which are beneficial to both male and female faculty. Some of the programs impact women more than men, but are also available to them. We are taking the perspective that making the work environment a better place for women will make it a better place for everyone.”

**Improving Department Culture**

The first step toward improving department culture is defining the specific changes that need to be made. This is why many SEM departments at the University of Michigan have applied for grants to conduct departmental climate surveys. Much work geared toward changing department culture begins with the head of the department. Thus, ADVANCE teams work with department chairs, coaching them to detect unconscious gender biases and to discourage exclusionary behaviors. The University of Michigan has created a group that works with not only department chairs, but also faculty search committees and administrators involved in hiring processes to increase the probability of a diverse, well-qualified faculty (see http://sitemaker.umich.edu/advance/STRIDE for the University of Michigan’s Strategies and Tactics for Recruiting to Improve Diversity and Excellence Committee website). Many ADVANCE institutions have created faculty retention and recruitment toolkits. These kits spell out the types of unconscious biases that faculty should guard against in evaluating a candidate and provide worksheets for evaluation.

A clever and surprisingly effective method of educating the university community about the subtle issues that impact department culture has been the University of Michigan’s interactive theater program. The Center for Research on Learning and Teaching (CRLT) Players program uses ADVANCE data to construct sketches that depict issues arising during faculty recruit-

ment, tenure review, and mentoring. After the sketch, a facilitator with expertise in these issues leads an interactive discussion between audience members and actors who remain in character. This approach has been highly successful in opening up discussions about the difficult subject matter at hand.

Departmental Transformation Grants provide support for departmental climate studies, salary compensation, course buy-outs for faculty with excessive service loads, or money to bolster visibility of women by bringing in accomplished senior women as speakers. At Virginia Tech, a distinguished lecture series for visiting women researchers and scholars that offers higher visibility for women in science has been put in place. In addition, research seed grants have been made available to women in the science and engineering communities who apply for and compete internally for funds allocated from the NSF grant.

The NSF ADVANCE program focuses exclusively on women in science; however many underrepresented minorities are absent at not only the upper levels of science and engineering departments, but all along the pipeline. Peggy Layne of AdvanceVT noted, “We are currently looking at how the things that we’ve done through ADVANCE could be applied to other underrepresented minorities.” Women in departments outside of science and engineering have taken note of ADVANCE initiatives and activities. At the University of Washington, Eve Riskin pointed out that most women understand the differences in the numbers between SEM and other fields. Further, the UW campus has additional groups that provide support for women, such as the medical school’s Program for Diversity & Career Development and the Presidential Advisory Committee on Women. While the NSF has directed its funding to science and engineering departments, many programs like the one at Virginia Tech have tried to open up as many activities as possible to departments across the university, and some universities have funded the extension of successful ADVANCE programs to other departments.

**Leadership Development**

Methods for encouraging scientific and university leadership are a major initiative of most ADVANCE institutions. For instance, Advance at Virginia Tech started a Leadership Development program where women take part in a 360-degree evaluation process. Participants detail how they perceive their strengths and weaknesses and gather the same information from their department chair, colleagues, and others. Then, they work with a psychology professor whose expertise in leadership development allows them to put together an individualized development plan to meet their goals. AdvanceVT also organizes workshops where female faculty can meet university leaders such as the Provost, Vice President for Research, and Dean of the Graduate School in an informal setting. Here they can ask about the skills required...
for entering university leadership, the challenges associated with such positions, and the paths taken by these individuals. “Women who have achieved the rank of full professor may not have considered the next step in their career development,” Peggy Layne noted. “This gives them both exposure to current leaders and different perspectives on leadership in general. In addition, this has provided women across campus with an opportunity to meet each other and develop networks and collaborations outside of their own departments.”

In addition to providing quarterly leadership workshops, UW ADVANCE hosts a monthly Mentoring-for-Leadership lunch series for SEM women faculty. Since the program’s inception in 2003, over 40 female academic leaders have discussed their career paths, the career-related obstacles they have encountered and overcome, work/life balancing strategies, and the benefits and challenges of holding positions of leadership. The informal nature of the program facilitates networking and community building, encourages women to view themselves in leadership positions, and provides incentives for women to advance in their careers by identifying with other women’s successes and trials. UW ADVANCE Program/Research Manager Joyce Yen noted, “Our women faculty have said this program has made leadership more accessible to them, helped them feel more connected at UW, and changed their perceptions of leadership.”

Assessment
With the small numbers of participants involved, meaningful statistics on recruitment and retention are difficult to compile in fewer than 5 years, and qualitative goals like changing department culture are even more difficult to assess. Thus, how can the successes of ADVANCE initiatives be measured? To monitor progress, the NSF has designated specific indicators including time to tenure, attrition, gender/rank/department, salary, space allocation, startup packages, number of female endowed chairs, number of women in leadership positions, number of women interviewing, and number of offers made to women. ADVANCE programs report data to the NSF, which independently assesses progress through site visits. Most institutions publish results on their websites for use internally and externally.

Some highlights of measurable progress from first-round institutions include increases in SEM tenure-track hires in science and engineering at the University of Michigan (from 14% to 34% during ADVANCE years) and nine women with departmental chair appointments. The University of Washington reports a 12% improvement in the number of tenure-track and tenured women faculty, with women comprising 41.7% of the SEM new hires in 2004-2005. Further, the University of Washington recently adopted and institutionalized the ADVANCE-based Transitional Support Program campus-wide.

After the Funding Expires
Many wonder what will happen at ADVANCE institutions after the NSF funding expires. “Clearly the NSF’s intent was that the universities would keep up some focus on these issues,” said Peggy Layne. AdvanceVT is in its last two years of funding and looking very closely at which programs and activities can be continued after the grant funding ends. “The university is committed to continuing some aspects of the program; however, it’s not clear how many dollars are going to be available. We’re reviewing all the activities and evaluating which ones are having the greatest impact and are the most important to sustain.”

Some first-round institutions like the University of Washington and University of Wisconsin received follow-up grants from the NSF to expand implementation of some of their individual activities, and the University of Michigan recently made a commitment to fund ADVANCE programs through 2011. However, most ADVANCE institutions continue to develop strategies for continuing their initiatives. As Eve Riskin of UW ADVANCE notes, “The biggest challenge for us now is finding permanent funding for the staff and the program.”

References
1. NSF, Division of Science Resource Statistics. For more information go to: http://nsf.gov/statistics/
3. More information can be found at: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5383&from=fund

Stacy Springs is a freelance science writer living in Boston, Massachusetts.

Marissa Braff is completing a postdoctoral research fellowship in the Division of Infectious Disease at Children's Hospital and Regional Medical Center in Seattle, Washington. She serves on the board of the AWIS-Seattle Chapter as Programs Co-Chair.
Conversations with AWIS Members
By Allison M. Martin

Conversations with Joanne S. Kamens
As a project manager in one of the most well known and highly regarded companies in the healthcare industry, Joanne S. Kamens knows a lot about biology, genetics and immunology. But what drives her work is not only the satisfaction she gets from solving scientific puzzles for Abbott Labs, but also her keen interest in fostering relationships both within her field as well as across professional boundaries. AWIS had the chance to catch up with Dr. Kamens to discuss the importance of mentorship and what she is doing to make science as engaging to others as it has been for herself.

Early Interest
“I knew I loved biology from tenth grade, or even earlier,” Kamens wrote in an e-mail to the author. “I had a nutty, but inspiring biology teacher and I was totally turned on by genetics.” At that time, it was typical for young women who were interested and talented in the sciences to pursue an M. D. degree, which is what Kamens originally set out to do. But the lure of the lab soon called to her, and within months Kamens had switched her major from pre-med to straight biology, working under the mentorship of her undergraduate lab’s director. That first lab experience set the bar as to how Kamens would approach her work in the years to come. “[The lab director] was patient, and the entire lab was open and collaborative,” Kamens recalled.

After graduating from the University of Pennsylvania with her biology degree, Kamens moved to Boston to begin her graduate studies at the Harvard Division of Medical Sciences. Kamens was thrilled with the myriad choices that Harvard offered her in terms of labs and areas of specialty. She felt inspired by her classmates and colleagues, and perhaps most of all by her graduate advisor, Dr. Roger Brent, who taught her how to critically assess data and evaluate others’ work, lessons that Kamens found very helpful. “When you’re a grad student, you’re grinding away at the bench and you get very short-sighted,” Kamens commented. “Roger always saw the big picture and was constantly bringing it back to the work – how does the work fit into the science.” Brent was a young advisor in a small lab, so he was often visiting Kamens and her colleagues and talking to them about their work, an attitude that Kamens feels was a great benefit. Brent also helped Kamens land her job at BASF Bioresearch Corporation (later acquired by Abbott Labs) after completing her education.

Building Relationships in the “Real World”
Because of her strong role models early on, it was important to Kamens that she give back to the sciences, not only through her lab work, but through social and professional networking as well. When she joined BASF, there were only a handful of women working for the company, out of roughly eighty employees. As the company grew, many of those women left for various reasons, both personal and professional. Soon, it dawned on Kamens that she was in a striking minority. “One day I was sitting around in my fifth meeting of the week, and [I realized] I hadn’t seen a woman in, like, five days!” she recalled. So Kamens and another female employee formed a women’s group within the company, organizing lunches and other mentoring and community-building events in order to foster the longevity of women in the labs. “I am a big proponent of mentoring, and I see that we all need different mentors for different reasons!” Kamens said.

An internal networking system already in place, Kamens then turned her attention to the scientific community as a whole. As she puts it, her realization of the very few women in her company was like a light bulb going off in her head, and she began to get more involved with changing those demographics. One of her notable accomplishments? Co-founding the Massachusetts AWIS chapter, alongside Kristin O’Brien. Under Kamens’ leadership as chapter president, the group has grown to 120 members, with events scheduled not only in Boston, where the chapter is centralized, but in Worcester and Amherst as well.

Besides mentorship activities, Kamens builds bridges even between different companies and labs. She has worked at the same institution (albeit under different corporate ownership) for her entire professional career, and has thus had a chance to foster meaningful collaborations within industry. Some of her favorite work has been the result of partnerships between academia and industry – a winning relationship, as far as Kamens is concerned. “Early on at BASF I was involved in some academic research collaborations cloning genes,” Kamens said, “and that’s really fun, because we have resources that academics don’t have – money, equipment, et cetera. If they have the ideas, then we can get together and do some exciting work, but these kind of partner-
ships haven't been happening in the last eight years or so as much as they should.”

Today, Kamens is a group leader in molecular biology at Abbott, focusing on immune and inflammatory disease, which she loves because her field is so valuable and impacts so many people. Though she absolutely loves the science and the learning she experiences everyday, she also gets a good deal of satisfaction out of tweaking the way we do science interpersonally. She has been on her company’s inclusion council, and has also worked with the human resources department on diversity programs. “I am mostly a leader in advocating for change,” Kamens mused. “We need to make the workplace more diverse and accepting of different work styles. I don’t think we want to train all women to be like men or all minorities to be like Caucasians. The workplace in the United States needs to allow for differences and allow research to benefit from vastly different work styles and models.”

If Kamens is any indication of the future, our labs will be in good hands.

Choosing a Career in Medical Technology

While completing her bachelor’s degree at Indiana University in 1959, Lafuze excelled in her math and science courses, prompting her advisor to encourage Lafuze to go to medical school. At that time, however, only two percent of medical students in the nation were women. “The required grade point averages for women were higher, and it was not a welcoming environment for women,” Lafuze recalled. The related field of medical technology, however, was more positive toward women, and also academically challenging. Upon graduating, Lafuze worked as a lab tech and eventually became a registered medical technologist (today called a clinical laboratory scientist). Working in this avenue of patient care opened Lafuze’s eyes to how medicine worked on a daily basis. “I learned about patient care and how hospitals work, I learned about different illnesses and what people who have them endure,” Lafuze said. “I learned to value life.”

After working for several years, Lafuze chose to return to school, and after earning her Masters degree in physiology from Ball State University, she returned to IU to complete her Ph.D. in physiology – only the fourth woman in the history of the university to enroll in that program. But she didn’t stay away from hospital life in the process; she decided to complete clinical research for her postdoctoral fellowship, working on pediatric hematology and oncology with Dr. Robert Baehner.

Teaching – And Then Some!

Today, Lafuze works as a professor for Indiana University and is based primarily at the school’s Richmond campus (IU East), though today’s multimedia communications technology enables her to actually teach classes at seven different IU campuses, and she travels among them from time to time. Not only does she complete medical research on mental illness and mental health services, but Lafuze also serves as a section editor of the Journal of Scholarship of Teaching and Learning and is the co-director of the Women and Gender Studies Program at her campus site. She is also the president of the Indiana chapter of AWIS! With all of these activities on her plate, Lafuze has learned the value of perseverance. “My swim coach, Jim Clark, taught me to ‘keep kicking’ when I was tired and discouraged, and promised me when I turned for the last lap of the race that I would ‘make it home,’” Lafuze recalled. “I have developed patient persistence. I owe that to Coach Clark.”

Outlasting the Competition

When asked about her recipe for success, Lafuze says there are two main components to making it in science: total dedication and impossibly hard work. As she sees it, the field of medical sciences is challenging enough as it is without the added gender barriers that have managed to persist into the twenty-first century. Glass ceilings and Good Old Boy systems thrive in schools of medicine, and until those systems are debunked, perseverance remains a critical quality for women to possess. “I chatted with my diving instructor, Raymond Klitzke, at a recent reunion of our swim team,” Lafuze related. “He has done very well in the Masters Swimming and Diving Championships, and he told me with a twinkle in his eye and great smile that, ‘It is all a matter of outlasting the competition.’ I have survived well. I have met opportunities with optimism. I have not tried to move walls that will not budge, but have worked my way around the obstacles with patient persistence.” Lafuze’s determination and doggedness has made her an inspiration for colleagues and students alike, and her goals for the future are simply to continue to make a difference where she can. No doubt, she will succeed.

Allison M. Martin recently received her Master of Science degree in Science and Technology Studies from Virginia Polytechnic Institute and State University, where she completed research on science and technology journalism, as well as aerospace and astronomy history. Today she works as an educator at the Brookfield Zoo outside Chicago. She is also the Deputy Editor of AWIS Magazine. Contact her at allison_meredith2004@yahoo.com.
The numbers of women and underrepresented minorities (URM) among science, technology, engineering and mathematics (STEM) doctoral recipients and faculty have increased over the past thirty years, but there is still far to go towards parity, especially for URM (defined as African American, Latino, and Native American students). As NIH funding has expanded and the biotechnology industry has grown over the past twenty years, demand for life sciences doctoral degree holders has increased. Here, “life sciences” includes the biological, agricultural and health/medical sciences.

The accompanying chart shows that women are actually overrepresented among bachelors and masters degree recipients in the life sciences when compared to their proportion of the U.S. 18-24 year-old population. Women are approaching parity at the doctoral level, and their representation among postdocs and junior faculty in the life sciences is nearly on par with their representation among doctoral recipients. The major hurdle that remains for women doctorate holders in the life sciences is the “leap” to senior faculty status.

URM, on the other hand, are still very much underrepresented at all levels of the life sciences pipeline. Whereas URM account for 31% of the U.S. 18-24 year old population, they account for 13.5% of bachelors recipients in the life sciences, and less than 10% of those at every other stage of the pipeline. There are so few URM among faculty members that, in order to report their presence and protect survey respondents’ confidentiality, the National Science Foundation must aggregate all faculty ranks, as shown in the chart.

The accompanying pie chart looks more closely at the faculty in biological and agricultural sciences, two of the broad fields that comprise the life sciences category shown above. In this chart, we see that nearly three-fourths of the faculty members are white males (45.4%) or females (27.8%). Asian males and females comprise about one in five faculty members in biological and agricultural sciences. However, URM account for a mere 6.5% of all doctoral-degreed faculty members in these fields.

The data shown here are available in a new presentation titled “Effective Strategies to Diversify STEM Faculty,” created with funding from the National Science Foundation Program for Research on Gender in Science and Engineering. The grant’s Principal Investigators (Lisa M. Frehill, Elba Serrano, and Mary O’Connell), all of New Mexico State University, brought together a diverse group of forty deans, department chairs/heads, and senior science and engineering faculty to develop the PowerPoint presentation, the Dean’s Guide to Diversity, the Department Chair’s/Head’s Guide to Diversity. The collaborators sought to engage “not the usual suspects” in this work so that the materials that were developed would feature the “voice” of faculty and academic administrators who have actually implemented and worked with the practices suggested by others.

The CD is available upon request from the Commission on Professionals in Science and Technology (info@cpst.org), and PowerPoint slides describing the aforementioned guide can be downloaded from http://diversefaculty.nmsu.edu.

Lisa Frehill is the Executive Director of the Commission on Professionals in Science and Technology (CPST). She holds a doctoral degree in sociology with a minor in systems engineering from the University of Arizona and a bachelor’s degree in industrial engineering from General Motors Institute (now Kettering University). Prior to coming to CPST, Dr. Frehill was an Associate Professor of Sociology at New Mexico State University (NMSU). She was also the Program Director and Principal Investigator of that institution’s National Science Foundation-funded ADVANCE: Institutional Transformation award and served for a year at the University of California at Irvine as the ADVANCE Program Director.
Scientists working as part of a large, corporate team will one day inevitably find themselves at a group-building retreat where they are asked to complete Myers-Briggs personality profile tests. A striking result of this exercise is that although there is much variety in work modalities, such as the visionary idea generators versus the meticulous project-finishers, a common trait of the most successful scientists is an astute management of their own strengths and weaknesses. For some of these lucky individuals, this self-awareness may have crystallized naturally. But many scientists, even individuals already entrenched in the corporate world, require help in goal definition, prioritization, strength assessment, and plan development in order to attain the greatest efficacy in their professional lives. At one time or another all scientists have found mentors along their career paths. However, there is another personal development paradigm that can be highly effective, although it is deployed in an entirely different fashion. Professional coaching is a service where a coach and a client collaborate to develop a highly-individualized program for increasing job performance and reaching career goals.

Coaching vs. Mentoring – The Basics
A quick investigation into the distinctions between mentoring and coaching will reveal that this is a highly debated topic. Some individuals feel as if the two terms are to be used synonymously, whereas others see them as completely separate paradigms. But a closer examination reveals numerous important distinctions.

“While mentors may use coaching techniques and coaches may provide mentoring in some situations, coaching and mentoring are not the same thing”

Lois Zachary, a consultant with Leadership Development Services (http://www.leadservs.com), gives a Mentor’s perspective on the difference between mentoring and coaching in her book, The Mentor’s Guide. “Coaching is always part of mentoring, but coaching does not always involve mentoring. Coaching within the context of a mentoring relationship has to do with the skill of helping an individual fill a particular knowledge gap by learning how to do things more effectively.” Coaches seem to agree. “While mentors may use coaching techniques and coaches may provide mentoring in some situations, coaching and mentoring are not the same thing,” asserts seasoned management coach and consultant, Moira F. Breen.

Breen earned a Master’s degree in biochemical pharmacology and embarked on a 15 year career in research and development in the pharmaceutical industry, which included international positions with GlaxoSmithKline. Knowing all too well the demands that scientists face in both their professional and personal lives, Moira created a coaching consultancy to aid individuals with career transition and management and leadership development (http://www.mfbreen.com). While she views mentoring as either a volunteer activity or part of a strong interpersonal relationship between two individuals at different career crossroads, coaching is uniquely an occupation. “Coaches receive training in techniques and processes designed to support the development of others, and they have chosen this work. Although it is still a relatively young profession, standards have been developed and are being adopted quite rapidly to protect clients and ensure the quality of coaching clients receive.” Bodies such as the International Coach Federation (http://www.coachfederation.org/ICF) draft guidelines, devise codes of ethics, and develop certifications and other credentialing metrics for professional coaches.

While coaching comes with the aspects of accreditation, mentoring is unique in that the mentor and protégé often share vocations and therefore can advantageously discuss very specific, technical issues pertinent to their common field. Often there is a master and apprentice relationship, and this phenomenon does not have a regular counterpart in coaching. A coach is not ‘senior’ to the client, and in fact, it is not even necessary that both individuals come from the same field. Breen states, “It is not necessary for the coach to have carried out the specific role and responsibilities that the client performs or wishes to develop because coaches are not training their clients. My clients have included lawyers, dentists, veterinarians, architects, and directors of nonprofit organizations, not only those in senior management roles in the pharmaceutical industry similar to my own experience.”

That being said, Breen does concur that many clients choose coaches with ties to their own field since they may be familiar with the work conditions and can provide expertise based on their own experiences. This is the point where coaching may overlap with mentoring and consequently create confusion in distinguishing these two tools. Breen clarifies, “A coach may ap-
propriately provide these services to a client but they are not strictly ‘coaching,’ and the coach should be aware that they are stepping out of that role to meet a different need.” Breen explains that coaches do not use their own journeys as a starting point for client development, but instead work with the client to elicit creative strategies to meet their goals. Mentoring, in comparison, draws more heavily on a mentor’s experiences given that the career path being discussed is usually shared by both participants. This dissection of these two career development models underscores their complementary natures, for each fulfills different needs.

Embracing New Communication Paradigms
Most would agree that the information technology age has created new communication challenges in a scientist’s life, particularly in the area of balancing home versus work. But the silver lining in this cloud is that such advances have also allowed scientists to take advantage of new mentoring and coaching models that would not have existed ten years ago. Private chat rooms, email, VoIP (voice over internet protocol), video conferencing, and an explosive volume of Web 2.0 tools provide new methods for the coach and client to connect and therefore give scientists across the globe greater access to coaching opportunities.

“Face to face communication presents most people with just as many challenges and risks, and goes wrong just as frequently.”

Serial entrepreneur, Jane Chin, Ph.D., knows this quite well. She leverages a “one-person microbusiness” strategy to reach a wide range of scientific professionals and deploys a series of Web sites (including http://www janechin.com and http://www.phdcareerclinic.com) to support each niche. Chin’s journeys have taken her to bench science, pharmaceutical sales, pharmaceutical medical affairs, and then eventually to medical science liaison positions with several companies. She is the wizard behind the Medical Science Liaison (MSL) Institute (http://www.mslinstitute.com), and has a particular interest in helping shape MSL programs and individual MSL effectiveness. She asserts, “I really don’t think these communication methods are responsible for creating new needs for those seeking coaching today versus 10 or 15 years ago. More professionals are seeking coaching now because they are competing in a fast-paced, technologically-connected world, and professionals find that they need to continually focus on learning and development to thrive in today’s job market. Having an email and telephone coaching option allows professionals to have greater flexibility to schedule time for their personal development.”

The availability of this technology makes effective communication more important than ever. Since one’s work environment may now extend beyond local or regional milieus into the national and even global realms, many on-site meetings are replaced by new communication methods that present unique challenges. Video conferences, for example, can be hampered by satellite glitches and sound feedback as well as the fact that individuals are usually not accustomed to seeing themselves on video. During teleconferences, body language is not available as a cue and new protocols of “faceless” etiquette must be learned to avoid confusing cross talk. But this isn’t to say that today’s scientists don’t still have just as many issues with face-to-face communication as they did in less technologically rich times. Having grown up in the West Indies and worked in several countries, Breen is acutely aware of how the intricacies of communication are highly shaped by culture. Even “company culture” can vary dramatically, leaving professionals who lack naturally strong skills in rough waters, especially as business increasingly traverses international borders. She affirms, “Face to face communication presents most people with just as many challenges and risks, and goes wrong just as frequently. Communicating effectively is one of the most important skills in any role which involves interaction with others…the larger and more complex the organization, the greater the potential for complexity in culture.”

This need to embrace new communication paradigms, however, is one area where mentoring and coaching find firm common ground. Although mentoring is traditionally performed in person and associated with some element of on-the-job training, new models have arisen that embrace all that internet technology has to offer. For example, MentorNet, the E-Mentoring Network for Diversity in Engineering and Science (http://www.MentorNet.net), seeks to pair mentors and protégés regardless of geographical constraints. MentorNet’s One-on-One programs match protégés from well over 100 participating campuses and affiliated partners to counterparts in industry, government laboratories, and higher education. MentorNet’s mission is to further the progress of women and other underrepresented groups in scientific and technical fields through the use of a dynamic, technology-supported mentoring network. Participants work through an email-based curriculum that prompts advice and discussion for individuals in early phases of their careers. Although some participants may choose to take phone calls or even meet in person, MentorNet provides scientists greater accessibility to the advice and experience of a national network of established scientists, which is only possible given the borderless nature of the internet.
Developing Priorities

Although the information age has created a multitude of gadgets to remind scientists to nurse their workloads, priority management is a challenge regardless of the decade. Mentors can uniquely provide knowledge and domain-specific suggestions, but a coach attacks the problem in a different yet complementary manner. Breen discloses, “I help clients on moving towards completing the things that are important to them instead of the things that are not. I help clients develop strategies to handle anything they decide to handle but nothing that is highly specific to keeping up with advances of knowledge in their field.” In other words, coaches concentrate more on eliciting what is really important to the client and assigning priorities in that manner.

In defining one’s priorities, Chin asserts that a coach can help blast through procrastination by getting to the root of a client’s problem—overcoming fear. “People may not always be attuned to how fear drives their indecision, even though they may hear about fear all the time. When a client comes to me and says, ‘I have a problem with procrastination,’ I find after discussing further, there is fear hiding behind the procrastination…. The problem is that either we may not always be aware of the ‘right’ prioritization best-aligned with our values, or, we know, but we are held back by fear.” Chin emphasizes that prioritization can be a very difficult task and is not merely a matter of acting tactically to define a ‘to-do’ list bracketed by time and resources. Scientists must think strategically in prioritizing in order to meet career goals. “This is where I’ve found coaches to be very helpful. I’ve personally worked with coaches as sounding boards for strategic input and for holding me accountable to the tactical output.”

Mentoring vs. Coaching – It’s Not Either/Or

Although coaching and mentoring have many areas of overlap, their modes of execution are quite distinct. Coaching services seek to elicit one’s priorities and goals through a series of self-discovery exercises, and the coach should not a priori have a set opinion on what those goals and priorities should be. Mentoring, on the other hand, is a process whereby the advice and direction given to the protégé should take advantage of the mentor’s own experiences. Another key difference between the two is that while a mentor/protégé pair almost always work within the same general field, coaches and clients can sometimes operate most effectively without this commonality. Such an arrangement forces the client to leave the comfort zone of shared technical ground, which as a result may elicit careershaping strategies and tactics that may not have been apparent if both individuals utilized the same domain of knowledge. But ultimately, the ball is in the court of the driven professional to decide whether one’s path could benefit from professional coaching as a complement to the myriad mentoring relationships that are built over a career.

Monica Horvath is a Research Analyst in Computerized Patient Safety Initiatives at Duke Health Technology Solutions in Durham, North Carolina. She recently completed her postdoctoral training at the National Institute of Environmental Health Sciences in computational biology and continues to serve as the co-chairperson for Marketing and Public Relations for the National Postdoctoral Association.
Launched in 1996 as part of the organization’s 25th anniversary celebration, the AWIS Fellows Program recognizes and honors women and men who have demonstrated exemplary commitment to creating opportunities and breaking down barriers for women in science, technology, engineering, and mathematics (STEM).

Since the program’s inception, 119 women and men have been honored.

The 10 men and women of the Class of 2007 were recognized at the AWIS Award Ceremony, held in conjunction with the Annual Meeting of the American Association for the Advancement of Science (AAAS) in San Francisco this February. We are very pleased to welcome and honor the following new members of the Class of 2007:

Ben Barres, M.D., Ph.D. is a Professor of Neurobiology at Stanford University. Dr. Barres, a pioneer in the development of novel methods for the purification and culture of neurons and glial cells, has been Associate Chair of the Neurobiology Department at Stanford University School of Medicine since 2004. In addition to receiving many research and teaching awards, Dr. Barres has gained international recognition for his public views and commentary regarding the difficulties facing women in science and for his criticism of acts that create an unwelcoming environment for women in academia.

Jeannette Elizabeth Brown is an educational consultant with an M.S. in organic chemistry from the University of Minnesota. She was one of the first African American women chemists working in the pharmaceutical industry. As a Fellow with the Chemical Heritage Foundation, she developed a project on the history of African American women chemists. The project, a multimedia program and Web site for students aged 9 to 14, included activities relating to the work of women chemists and workshops that enabled students, especially girls, to interact with contemporary African American women chemists.
**Susan L. Forsburg**, Ph.D. is a Professor of Molecular & Computational Biology at the University of Southern California, where her research focuses on DNA replication and chromosome dynamics in fission yeast. She has received numerous awards, including the ASCB junior faculty career award, a Stohlman Scholar Award from the Leukemia & Lymphoma Society, and the Research Scholar Award from the American Cancer Society. Dr. Forsburg is an active member of the Women in Cell Biology Committee, and serves as their liaison to AWIS. She created the Women in Biology Internet Launch Pages, a popular web site that covers career advice and chilly climate issues (http://www.womenbio.net).

**Jong-on Hahm**, Ph.D. is Research Professor in the Elizabeth J. Somers Women’s Leadership Program at George Washington University, as well as Distinguished Senior Fellow in the School of Public Policy at George Mason University. From 1998 to 2005, Dr. Hahm was Director of the Committee on Women in Science and Engineering at the National Academies. She served on President Clinton’s Interagency Council on Women Working Group on Science and Technology. Dr. Hahm holds a Ph.D. in Neuroscience from the Massachusetts Institute of Technology, M.A. from American University, and B.Sc. from McGill University.

**Patricia B. Hyer**, Ph.D. received her bachelor’s degree summa cum laude from Hillsdale College in Michigan, two master’s degrees (in French and in Adult and Continuing Education) from the University of Michigan, and her Ph.D. in Educational Policy Studies from Virginia Tech, where she has been the Associate Provost for Academic Administration since 1994. Her current role in the Provost’s Office is focused on faculty personnel issues, policy and governance, and diversity efforts. She is also co-Principal Investigator on Virginia Tech’s NSF ADVANCE Grant for Institutional Transformation to advance women in science. In 2004, Dr. Hyer was selected Woman of the Decade for her contributions to women at Virginia Tech.

**Elizabeth Ivey**, Ph.D. is the Immediate Past President of the Association for Women in Science. Dr. Ivey graduated from Simmons College and started graduate studies in Physics at Harvard University. She completed her graduate studies at the University of Massachusetts, earning a Ph.D. in Mechanical Engineering and moving to a tenure-track position in Physics at Smith College. Three years after earning tenure, she was awarded the Louise Wolff Kahn chaired professorship in Physics. She chaired the Physics department and was Associate Dean of Faculty at Smith before moving to Macalester College in 1990 to serve as Provost. In 1995, Dr. Ivey became Provost at the University of Hartford.

*Continued on page 29 ▶▶▶*
OUR VISION

We envision a day when women will participate fully in science, technology, engineering, and mathematics as manifested through equal opportunity, pay equity, and recognition commensurate with their accomplishments.

OUR MISSION

AWIS is a national advocacy organization championing the interests of women in science, technology, engineering, and mathematics across all disciplines and employment sectors. By breaking down barriers and creating opportunities, AWIS strives to ensure that women in these fields can achieve their full potential.
INTRODUCTION

Strategic planning is crucial for our organization in today’s complex and changing environment. While there is a renewed focus on science and technology education and employment, many barriers to learning and advancement remain — particularly for women and ethnic minorities.

Moreover, there are external factors influencing the ability of AWIS to effect change including increased competition for financial support, a growing diversity of member needs and interests, and a changing political landscape.

The annual strategic thinking and planning session of the AWIS National Board of Directors was held on November 4, 2006. The stated objectives of this session were:

- Ask and start answering tough questions about role and relevance.
- Consider mission and vision.
- Discuss brand strategy, positions, and messaging.

Following reaffirmation of the vision and core ideology, the group discussed the need to develop mechanisms and processes through which the strategic plan can be effectively integrated into the overall operations of AWIS, namely that the plan:

1. Address the right issues and initiatives to be undertaken;
2. Provide focus;
3. Be achievable within the resource constraints of AWIS;
4. Map directly to the work of the organization at all levels (Board, committees, staff, chapters, and individual members) and to the annual budget.

The planning process continued into the new year and culminated in a review by the full Board at the February 17-18, 2007 meeting in San Francisco.

This strategic plan articulates three comprehensive strategic directions that will enable AWIS to proactively represent women across all disciplines and employment sectors. It provides the “ABCs” that will have a lasting and positive impact on AWIS, on women in STEM, and on the science community in general.

STRATEGIC DIRECTIONS

Strategic Direction A: Advocacy

AWIS is an advocate for initiatives that improve the status of women in science, technology, engineering, and mathematics (STEM). It is a leader in developing improved public programs and employment policies for women in STEM.

Strategic Direction B: Breaking Down Barriers

AWIS leverages its position as a multi-disciplinary organization to mobilize action on common issues facing women in STEM at all stages of their careers.

Strategic Direction C: Capacity Building

AWIS enhances the future of the U.S. science and technology enterprise by supporting the career advancement of a key national resource: the women in STEM.

STRATEGIC GOALS AND OBJECTIVES

Goal A1: Advocate on behalf of all women in STEM

Objectives:

- AWIS believes that women in STEM are prevented from reaching their full potential, not because they are less able or less willing, but because of barriers that exist in scientific workplaces. We will carry this message to Congress, to the media, and to employers by
  - Increasing the interaction with national legislative bodies and federal agencies
  - Developing mechanisms to increase participation and representation of AWIS members in advocacy initiatives
  - Strengthening current partnerships and developing new alliances to leverage effectiveness
- Advocate for the retention and advancement of women in scientific leadership positions in industry, non-profit organizations and academia
- Promote gender specific data collection by national, state, and private entities
- Advocate for STEM institutions and corporations to develop policies that increase gender representation on boards, conference programs, and committees
- Develop and provide public policy statements on subjects including Title IX, funding for programs targeted toward increasing women and minority representation in science, and the need for family friendly policies


O U R  H I S T O R Y

Empowered by the growing feminist movement, 80 women from different disciplines and institutions came together in April 1971 to address the systemic discrimination and career barriers they faced as female scientists. The Association for Women in Science (AWIS) was founded to address these inequities and their impact on America’s scientific and technological workforce. Early successes included the legislative efforts which led to the enactment of Title IX and court cases which stopped the improper awarding of grants and traineeships at the National Institutes of Health and the Department of Health, Education, and Welfare.

In the last 30 years, the numbers and proportion of women obtaining science and engineering degrees has dramatically increased. In the life sciences, women now outnumber men in both undergraduate and graduate programs. Yet, women and minority scientists and engineers in the STEM workforce still earn less money than their male colleagues. They obtain fewer of the top jobs, and continue to feel marginalized, undervalued, and less respected. Many find their careers derailed by subtle discrimination or the uneven burden typically born by women trying to balance family and work. Success is often less a question of ability than how well one handles the cumulative effects of bias and an unfriendly academic or job climate.

We retain a sense of urgency about our mission today as women continue to make dramatic educational progress but still remain severely underrepresented in academic, corporate, and government leadership positions.

O U R  A U D I E N C E

As the only all-inclusive multidisciplinary organization supporting women in STEM, AWIS is a non-profit membership organization headquartered in Washington DC with 48 chapters throughout the United States. Chapters are vital to enhancing the membership experience.

Historically, the majority of AWIS members were college and university faculty in the life sciences. That dynamic is rapidly changing. A growing

Goal A2: Increase public and private support for women in STEM

Objectives:
- Increase and enhance the association’s web and media presence
- Promote relevant research and establishment of accessible data bases
- Identify women in STEM to serve as spokespersons

Goal B1: Promote implementation of workplace and educational best practices

Objectives:
- Compile and disseminate comprehensive best practices for industry, government, academia, and nonprofit organizations to use in attracting, retaining and promoting women in STEM
- Partner with diverse institutions and organization seeking to implement best practices
- Facilitate opportunities for continuing information exchange about emerging best practices

Goal B2: Strengthen connections among women across STEM disciplines and work sectors

Objectives:
- Build membership in AWIS
- Build chapters that provide value to AWIS members
- For both AWIS national and chapters, develop opportunities for cross-discipline and cross-sector networking
- Build collaborations with professionals, leaders of organizations, and supporters of women in STEM

Goal C1: Increase the number of women in STEM

Objectives:
- Communicate that STEM has great opportunities for women
- Identify opportunities to apply best practices to the retention of women in STEM

Goal C2: Increase the number of women in STEM who assume leadership roles at the national, local and institutional levels

Objectives:
- Promote leadership skills and professional development by serving as a resource (i.e. mentoring and networking)
- Increase the nomination, recognition, and recommendation of women in STEM for leadership roles and prestigious awards
association for women in science

strategic next steps

articulating the goals and objectives is just the first step in our planning process. words must be put into action and an implementation plan must be created.

an implementation plan outlines the specific actions to be taken and designates responsibility and timelines for accomplishment. awis must be strategic, selecting only those activities that will move the association dramatically, yet steadily, toward our goals. and, priorities must match resources.

to that end, the national board of awis must also focus on developing organizational capacity. we must build and strengthen the fiscal health of the entire association through improving infrastructure and operational efficiencies; staff and volunteer competencies, and management and governance capabilities.

to accomplish this, we must increase revenues from both philanthropic and non-philanthropic sources (foundations, government, corporate sponsorships, business opportunities) and we must improve tangible member benefits for awis members and increase member involvement in national and local activities.

we know we cannot do this alone. the awis membership, chapters, and elected officers must work as a team and strive to engage new stakeholders and partners from other professional societies, governmental agencies, and corporate america.

we will know we have achieved success when women participate fully in science, technology, engineering, and mathematics as manifested through equal opportunity, pay equity, and recognition commensurate with their accomplishments.

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constituency is employed in the private sector — in such industries as pharmaceutical, biotech, engineering, and computer technology. others work in government and the non-profit sector in “non-traditional” careers such as science writing and public policy. a growing number of graduate students and retirees add to the diversification of our membership.

this diversity is both a strength and a challenge for awis. on one hand, it permits members in different disciplines to find a common home. that, in turn, provides opportunities for cooperation across areas of specialization and employment sectors. on the other hand, the special interests and experience of our members makes it challenging to define a single value proposition.

our work

awis is governed by a national board of directors that is elected by the membership. the ten members include the president, the immediate past president or president-elect, the secretary, the treasurer and six councilors.

the board employs an executive director who is responsible for the day-to-day management of the national office located in washington dc. the traditional activities of awis have included the publication of the awis magazine, research projects, advocacy and equity programs.

a critical part of our work is advocating for institutional change by promoting policies that increase women’s representation in leadership positions and by fostering a positive public image of women in stem. initiatives cut across education, employment, and the general issues facing the science community in the u.s. such as research and program funding.

our chapters are crucial to maintaining and building support for these national initiatives. additionally, participation at the grassroots level provides members with hands-on opportunities to network, participate in educational programs, and enjoy community outreach initiatives. in partnership, the local chapters and the national office continue to make important differences in the personal and professional lives of individual members and the stem community at large.
the formation and evolution of galaxies, and the cosmological role of galaxy interactions. Dr. Knezek is currently serving her fourth term as chair of the American Astronomical Society’s Committee on the Status of Women in Astronomy, and has organized numerous sessions on issues of concern to female scientists at the bi-annual AAS meetings.

Margaret Murnane, Ph.D. is a Fellow of JILA, a research institute focusing on the physical sciences. A Professor of Physics and of Electrical and Computer Engineering at the University of Colorado, her research involves ultrafast optical science and lasers. She received her B.S. and M.S. degrees from University College Cork, Ireland, and a Ph.D. in Physics from the University of California at Berkeley. In 2000, Dr. Murnane was awarded a John D. and Catherine T. MacArthur Fellowship. She chaired the American Physical Society’s Committee on the Status of Women, ran the Climate for Women in Physics site visit program and is the author of “Best Practices for Recruiting and Retaining Women in Physics.”

Kathy Olsen, Ph.D. is Deputy Director of the National Science Foundation. She joined NSF from the Office of Science and Technology Policy in the Executive Office of the President, where she was the Associate Director and Deputy Director for Science, responsible for overseeing science and education policy. Prior to the OSTP post, she served as the Chief Scientist at the National Aeronautics and Space Administration. Dr. Olsen has a Ph.D. in Neuroscience from the University of California Irvine, did postdoctoral work at Harvard, and held a faculty position at State University of New York (SUNY) Stony Brook before starting government service as Acting Deputy Director of Integrative Biology and Neuroscience at the National Science Foundation.

Susan Staffin Metz is the Senior Advisor for the Center for Innovation in Engineering and Science Education at Stevens Institute of Technology, a position she assumed in 2004. For more than 25 years, Ms. Staffin Metz has worked to increase the participation of women in engineering and science. As the founding Executive Director of the Lore-El Center for Women in Engineering and Science at Stevens, she developed and implemented pre-college and college level programs to increase the representation of women in STEM fields at Stevens and nationally. In 1990, she co-founded the Women in Engineering Programs & Advocates Network (WEPAN).

AWIS Executive Director Janet Bandows Koster can be contacted at koster@awis.org
The Expanding and Diverse Scientific Workplace
– A Panel Discussion

By Mary Alice Yund

The expanding scope of science and its applications is generating new ways to use scientific expertise and new career opportunities for scientists. Using science and technology to create a society of sustainable well-being - the theme of the 2007 American Association for the Advancement of Science (AAAS) meeting - requires that scientists move into new roles. Today most women in science work outside academia. Much of the advancement for women in the scientific workplace is the direct result of the diversification and expansion of the uses of science: dynamic fields with less hierarchical and established organizational structures can provide women flexible and diverse career paths. The AWIS Networking Breakfast and Panel Discussion at the 2007 AAAS meeting in San Francisco offered insights and advice about establishing and building careers in “The Expanding and Diverse Scientific Workplace.” The program featured a panel discussion among six Bay Area women moderated by Carol Muller of Mentornet.

The Keynote Address
The tale told by keynote speaker, Dr. Cynthia Robbins-Roth, described a common theme, making several career changes based on what seemed like the best option available at the time and no long range plan. She moved from academia without regret, taking a chance as a scientist in a biotech startup, Genentech. She left that position, answered an ad in Science, and was hired to do business development at another biotech company, California Biotechnology. Although nervous about her qualifications, she started an internal newsletter, the RR report, for business and science colleagues, teaching herself to write non-technically, and discovered she liked it. When office politics, something for which she still had no affinity, led to the firing of the management team, outplacement counseling, the advice of a VC investor in the company, and the reality of a six month old baby, lead her to eschew a conventional job and become a journalist and consultant. She founded BioVenture View (she is a principal in BioVenture consultants), BioPeople, and was recruited to help start BioWorld. Robbins-Roth learned several lessons: First, serendipity is important in science and in your career path. Second, lose the fear of failure. Change has risks. Look at the worst possible outcome, realize that you can survive and go for it. And lastly, ‘credentials’ are not always required. This is hard for scientists to internalize because we are credentialed as scientists by our specific experience and technical expertise. “In the rest of the world, it is ‘Show me you can do it – and you can do it’”, says Robbins-Roth. Being trained in research, you can do research anywhere, not just at the bench. And you can probably out think a lot of people. Robbins-Roth concludes, “It is amazing what we can do if forced out of our comfort zones.”

The following panel discussion provided an outstanding opportunity to hear about women’s successes and trials as they told their stories of career choices.

The Panel Discussion
Carol Muller (Ph.D., President and CEO, Mentornet, San Jose, CA) opened the panel discussion by pointing out that while an expanding and diverse scientific workplace needs new skill sets and understanding, educational institutions have been slow to change. Learning is typically compartmental-
ized with little overlap between business, law, computer expertise, and a scientific specialty. Mentoring can provide students and others with information and options about careers outside academia. She also noted that although a Ph.D. is usually required to be a ‘scientist’ in biology and other academic disciplines, in engineering, mathematics, and computer science the holder of a baccalaureate or masters degree is a fully qualified professional.

Grace E. Colon (Ph.D., Senior Director, Commercial Strategy, Gilead Sciences, Inc., Foster City, CA) studied engineering because both her grandfathers in Puerto Rico were engineers. She developed a passion for being at the bench while in a work study position at the University of Pennsylvania. At MIT she did chemical engineering and decided on a bench position in industry. She was then drawn away, taking an irresistible position with McKinsey & Company. Dealing with finance in healthcare and the exhausting 80 hour work week was not a long term career position, but she learned a lot. She moved on and accepted an offer from a client to do strategic planning, but wanted to get into biotech. So she moved to Gilead where she uses both her financial experience and scientific expertise. Most of her work is communicating and collaborating with concern for safety - always the highest priority in drug development - and fiscal discipline, the efficient use of resources. “Having a science background can give you credibility and lead to more successful business alliances,” Colon said.

Phyllis Gardner (M.D., Professor of Medicine, Stanford University School of Medicine, Stanford, CA) is a successful, but reluctant, medical academic with a “hybrid life and career.” She earned her M.D., joined the Stanford faculty in 1984, “did the tenure track thing,” wrote textbooks, and had two children. “It was uphill all the time,” Gardner remembers. In 1994, on sabatical, she did strategic planning for a start up company. On leave from Stanford, she served as VP of Research for Alza Corp. in Palo Alto. The learning curve had a steep slope, but she loved it. She was maintaining her lab at Stanford while on leave, but Stanford said in essence: fish or cut bait. She decided to go back to Stanford as Senior Associate Dean, a position in which she was miserable. In 2003, she returned to the tenured faculty full time. She serves on boards, started a company and is an adjunct partner in a start up firm. She has “taken a cow path,” not a charted career path. In these multiple roles, or any role, she gives this advice, “You cannot cheat. You need in depth knowledge. It helps at the interface to the next thing you do. Learn all you can, contribute, and jump off when bored.” She adds, “You have a long career life. You don’t have to do everything all at once.”

Karen Talmadge (Ph.D., Chief Scientific Officer and Executive Vice President, Kyphon, Inc. Sunnyvale, CA) has had a “random career where each experience added to the next.” As a graduate student at Harvard in the 1970s she was asked to lead interactions between Harvard and the Cambridge community concerned about recombinant DNA. She attended community events and science fairs and testified before the city council. While doing research, she continued to think about this political experience and decided to go to law school. She loved law school at Columbia, but suddenly realized that practicing law would be like an ongoing game of Trivial Pursuit; while science is like Star Trek, boldly going where no one had gone before. She left law school and later moved to California Biotechnology as a scientist, where she was a colleague of Robbins-Roth. She then took a patent liaison role part time, but it was really two fulltime jobs with involvement in business development. Having a daughter with diabetes, she wanted to be closer to home. Someone suggested she start a company, then she saw a paper about a new technology that inspired her. It took three difficult years to raise the money because the technology would require changing the practice of medicine. Her company, Kyphon, had $400M in revenue last year. By her assessment, a Ph.D. is exactly the right training for the business side of a technical company. It teaches you to be objective and rigorous, critical of yourself and others, and to develop some skills in public speaking. If you are truly interested in the business side and don’t want to follow the science route, get an MBA and use those networking contacts to make the transition. Talmadge is excited by the opportunities for women in science on the business side, but also somewhat discouraged about the acceptance of women in diverse roles.

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Mary Lou Zoback (Ph.D., Senior Research Scientist, Emerita, USGS Earthquake Hazards Team, Menlo Park, CA, now at Risk Management Solutions) had been at the USGS for nearly thirty years, a contrast with the other panelists. She had participated in and led several important projects, most recently a study of the San Andreas and other California faults. Three to four years ago she started working with local groups preparing for Centennial events commemorating the 1906 quake. She was leading a science program but found she could not separate the science from the impact a major earthquake with predictable characteristics would have. “You can always do more research,” Zoback feels. “But for California we know the consequences of major quakes and what we need to do. We need the political will to do it.” She retired from the USGS in August 2006, and is now at Risk Management Solutions showing local companies in Silicon Valley and other vulnerable areas of the Bay Area the USGS catastrophe models of earthquakes and their effects at specific locations (available online). “If you can build the case that expenditures for earthquake retrofitting and contingencies make business sense, companies will make the decision to do so,” says Zoback. These leaders will be models for others and, the hope is, that will lead to standards and political action to lessen business and personal losses in the inevitable quakes.

Maureen C. Whalen (Ph.D., Research Leader, Crop Improvement and Utilization Unit, Agriculture Research Service, USDA, Albany, CA) has had a career path much “influenced by life forces.” With an infant son, she went to a small college, where she learned the work was somewhat different, but the demands just as high, as at a research university. Her husband had followed her to the east coast, but she later followed him back west, where she has been Professor of Plant Pathology at San Francisco State University (SFSU). She recently has taken leave from SFSU and joined the USDA where she now leads a team of scientists in eight different units investigating crop improvement and development of new crops. The USDA has research projects in facilities around the country. As with most research, it is not easy to get funding to do some projects of interest and promise, but the USDA has many opportunities for plant scientists in areas of potential impact.

The Take-home Message
The program also included a presentation by Dr. Doe Sun Na (President, Korea Science Foundation) on “Development of Women’s Leadership in Science - Experience from Korea.” Women in science in Korea have made great progress in a short time, in large part due to institutions and processes Dr. Na has initiated. Her personal career path has required overcoming many unwritten rules and conventions about the role of women in a traditional society. Accompanying her husband to the US allowed her to step outside the system and earn a Ph.D. in the US and start a family there. She then secured a position at the Korean Institute for Science and Technology on returning to Korea, something few women could do. Excluded from the men’s network, she concentrated on scientific meetings, becoming secretary and managing editor for the scientific journal of the Korea Science Foundation in 1993. She became President of the Foundation in 2005, the first woman to hold each position. Realizing that networks for women were crucial, she founded the Women’s Bioscience Forum in 2001 and the Korean Federation of Women’s Science and Technology Associations, a federation of 16 organizations, in 2003. The results have been many more women leaders in institutions and improved research productivity as well as inspiration for young scientists and influence on policymakers. (The slides from Dr. Na’s presentation are on the AWIS web site.) Her take home message: Together we can and will make change.

Mary Alice Yund (Ph.D.) is chair of the group that organized this symposium for AWIS and the committee that coordinates fund raising and other joint activities of the Northern California Chapters of AWIS. She teaches biological science for UC Berkeley Extension and Summer Session.
Big Things Come from Thinking Small: Valerie Sheares-Ashby

By Carmen Drahler

With the flip of a switch, the strange-looking turntable started spinning a small disk. This turntable’s arm was equipped with a small steel ball instead of a needle, and it was held in place atop the disk by a weight. After “playing” one disk for 100,000 cycles, taking up almost the entire day, Valerie Sheares-Ashby and her students examined the whole setup intensively. The disk had a wear track from where the ball dragged over it, and the surface of the ball itself was worn away. She set aside the ball and disk for more tests. “I wish I had collected my records,” Sheares-Ashby confessed, while we discussed how her device reminded me of the record players that were once ubiquitous in American living rooms. She’s not planning to replace iPods with this device, which is designed to wear down the disks on purpose. Rather, she has a collaboration with Surya Mallapragada, a professor at Iowa State’s chemical engineering department who is interested in finding better materials for replacement hip joints. Besides, she loves the iPod her sister just bought for her.

Valerie Sheares-Ashby is an associate professor in the chemistry department at the University of North Carolina (UNC), Chapel Hill. Her research group designs and produces novel polymers and polymer composites. She moved to UNC three years ago from Iowa State University, taking a sabbatical at Robert Langer’s MIT labs in between. That experience allowed her to turn a new page in her research and switch her focus from polymers for high temperature and pressure applications to biomaterials. Her approach for developing new materials has proven adaptable to many different challenges. “Most of my former students have gone on to jobs in industry,” Sheares-Ashby says. “They have done very well and are comfortable designing whatever is asked of them.”

Sheares-Ashby calls her lab’s research philosophy “the structure-property approach.” She says, “If you’ve ever put together a puzzle, you can relate to this work.” The elements on the periodic table are diverse, and combining elements in different patterns produces functional groups with distinct properties. The low surface energy in the fluorine-containing functional groups in Teflon is one example. The chemical structures of functional groups influence the bulk properties of materials. Understanding that concept, along with knowledge of chemical reactivity, is the key to designing new polymers. This knowledge tells researchers which polymer-making reactions are compatible with the fundamental units, called monomers, they are developing. The method builds a polymer from the bottom up and can be slow, Sheares-Ashby acknowledges, but there are unique advantages to her system as well. “You are totally in control of changing your material at any point,” she emphasizes.

The next turntable test gives different results. The disk doesn’t look nearly as worn as the last one. What’s more, the steel ball looks almost good as new. Everything is inspected up close using a scanning electron microscope, which has much higher magnification than a light microscope and is specially designed to give a 3D image of a material’s surface. This picture gives a sense of the depth of the wear, and whether the disk’s material stays intact, Sheares-Ashby explains. “Our goal is to create a material that would wear less while maintaining biocompatibility,” she says. In other words, this disk, made from a polymer-quasicrystal composite, looks pretty promising as a potential replacement hip joint.

Sheares-Ashby started working on polymer-quasicrystal composites when she was an assistant professor at Iowa State. Her initial inspiration was a 1996 lecture about quasicrystals by Pat Thiel, then Director of the Department of Energy’s Ames Lab Materials Chemistry program. Quasicrystals are aluminum alloys with unique patterns of atoms in their structure, arrangements that confer several useful properties. Quasicrystals are intrinsically low-wear and low-abrasion, yet are extremely hard. These properties, along with their potential low cost, make quasicrystals promising coatings for auto parts and cookware. However, quasicrystals are also brittle, and the difficulties involved in processing them prevent widespread industrial use. Sheares-Ashby, a polymer chemist by training, wants to blend quasicrystals into established materials as filler. That move can simultaneously improve the strength properties of the polymer while providing a more straightforward way of processing quasicrystals.

Fillers are nothing new in polymer chemistry. They are regularly added for many purposes, like reducing the cost of plastics. The quasicrystal filler is a success; it significantly enhances the mechanical strength of every polymer tested, and the polymer composites are just as biocompatible as polymer alone, something very important in a potential hip replacement. Passing the turntable experiment, called a pin-on-disk wear test, is also crucial. In a hip replacement, a metal ball rotates in a polymer socket, and there is heavy wear on the polymer due to the constant friction. There are still many more tests to perform before polymer-quasicrystal hip replacements become commercially viable, but Sheares-Ashby’s work is laying a strong foundation.

The quasicrystal composite project was a departure from Sheares-Ashby’s roots. Originally, her group conceived materials from the ground up, but the quasicrystal project required working with well-established polymers to fine-tune their properties. However, once at UNC, she quickly jumped back into designing new poly-
mers. During her sabbatical in the Langer group, she read about the chemical structures of the fundamental building blocks, the monomers, in common biodegradable materials. Most research groups used monomers with nonpolar functional groups and a specific set of linkers to hold the monomers together. The resulting polymers suffered from a few drawbacks. For example, they were rigid due to the crystals that grew into spaces between the polymer chains upon cooling. This kind of material was notoriously difficult to work with in biological applications that required flexibility. Other scientists had somewhat overcome these obstacles with blends of materials called copolymers, but Sheares-Ashby still saw room for improvement. “As a chemist, I began to consider using polar functional groups on the monomer units to get enhanced properties.”

Her group worked on modifying FDA-approved materials with polar functional groups that might render them useful for a new application, while preserving the material’s biocompatible and biodegradable properties. The goal was to produce something with mechanical properties more closely resembling those of body tissues. Ideally, Sheares-Ashby wanted the final product to be tunable, so that changing part of the structure would allow tight control over certain properties, such as the time it takes for the polymer to biodegrade. Using polymers similar to those already sanctioned by the FDA was a logical starting point for the new materials’ design.

By changing the chemistry she used to make her polymers, Sheares-Ashby obtained very versatile biodegradable polyesters. “In this method we have two reactants coming together instead of one, giving us two handles for varying the properties of the materials at a fundamental level,” she explained. “With these materials we can now replicate the plasticity of an artery or the rigidity of cartilage or tendons, which is a variation in this property over several orders of magnitude.”

But that’s not all these polyesters can do. “If you want to hear about cool pictures, these make really cool pictures,” Sheares-Ashby says. A glance at a recent publication from her lab shows a set of images that look like microscopic LEGO bricks. Some of the blocky patterns are small enough to fit on the head of a pin.

Patterned materials with tiny, nanometer scale grooves could be used to direct growth for things like nerve cells, where alignment is very important, Sheares-Ashby explained. One goal in this field would be to use a biocompatible, biodegradable material to make the grooves, so that after the cells had grown, the surface would degrade away. She first became interested in this problem when her collaborators in the Mallapragada group described inconveniences with patterning some rigid biodegradable materials. “It’s a neat idea, but hard in practice, because you’re trying to pattern something intrinsically brittle,” Sheares-Ashby said.

However, her new polyesters are up to the task. The precursors are like syrup, not at all rigid, and easy to pour onto a surface, where they get stamped with a pre-patterned “mold” surface. Then, the precursors get cross-linked with the mold still in place, and after removing the mold minutes later, the patterned biodegradable material stays behind. The cross-links confer elasticity, allowing the polymer to bounce back into place if it’s deformed. “It’s the only technique I know of that produces uniform nanometer particles and surface structures in that timeframe,” she says.

Sometime in the next five years, Sheares-Ashby will be taking a highly coveted sabbatical, part of a recent teaching award from UNC. “My last sabbatical changed our group completely,” Sheares-Ashby says, noting the shift in her research focus. “That’s what I think a sabbatical is for.” This opinion sets the bar pretty high for wherever she decides to go next. Her current plan is to work with a group that can teach her about more sophisticated biological tests for her most promising materials, because those are the next steps to take on the path to viable industrial applications.

“The game’s always changing,” Sheares-Ashby says. That may be, but it looks like she’s keeping up pretty well.

Where to learn more:
- Valerie Sheares-Ashby’s group Web page: http://www.chem.unc.edu/people/faculty/asbyvs/vsaindex.htm
- Robert Langer’s group at MIT: http://web.mit.edu/langerlab/
- Quasicrystal Research at Iowa State: http://www.quasi.iastate.edu/
- Defense Science Study Group: Sheares-Ashby consulted for the military for two years in this unique program that allowed her to see the inner workings of military technology. She even helped refuel an F-18 fighter jet in midair: http://dssg.ida.org/

Highlights:
- Valerie Sheares-Ashby designs new materials by carefully considering the effects of the chemical structure of her monomers on the bulk properties of a polymer. Her research group has switched its focus from high performance polymers to biomaterials.
- Sheares-Ashby’s group designed a promising material for hip replacements by blending well-known polymers with quasicrystals, which are aluminum alloys with distinct properties. The new materials are strong, wear-resistant and biocompatible.
- Her group has more recently used a different type of polymerization chemistry to access a new type of biodegradable, biocompatible material. The new polymers may someday be used to direct growth for nerve cells.

Other Researchers in Polymer Design:
- Karen Wooley: http://wooleyweb.chemistry.wustl.edu/
- Paula Hammond: http://web.mit.edu/hammond/lab/

Carmen Drahl is a graduate student in chemistry at Princeton University. She can be contacted at carmendrahl@gmail.com
Regulatory Affairs: A Little-Known Career with Enormous Potential

By Jennifer Griffin

A Primer in Regulatory Affairs

If you ask a young child—or even a young graduate student—if they are interested in a career in regulatory affairs, you will likely be met with a blank stare. Although many of us reap the benefits of standardized, quality-controlled medications and diagnostic tools, few of us understand the important role that regulatory affairs (RA) plays in this process. After all, without RA specialists, the entire health care industry would be less organized, less efficient, and less directed.

The RA profession encompasses the entire lifespan of a health care product, from the earliest stages of clinical research and development to the submission and review process, to launch and post-marketing follow-up. In this field, the definition of a health care product ranges from pharmaceutical drugs, medical instruments, diagnostic devices and nutrition to veterinary tools and cosmetics. With such an enormous scope, it is impossible to fully appreciate the profession from a single career profile. In order to best acknowledge the breadth of RA, I discussed this career with Dr. Sherry Keramidas, who has served for more than a decade as executive director of the Regulatory Affairs Professionals Society (RAPS). As RAPS CEO, Keramidas spearheads interactions among RA professionals worldwide, and she has been instrumental in promoting global awareness about regulatory affairs. Her career has been fruitful and diverse, and includes positions such as executive director of the American College of Dentists, associate executive vice president of the American Physical Therapy Association, and scientific director of the Cystic Fibrosis Foundation. Her deep appreciation for regulatory affairs makes her an ideal resource for information about establishing a career in this dynamic and exciting field.

Skills and Training to Get You Started

RA professionals regularly interact with scientists, government officials, medical specialists, and the public. Consequently, it is imperative that they have excellent oral and written communication skills, and they must be able to tailor their information to their audience. In addition, Keramidas advises that it will be important for you to demonstrate your aptitude to “blend science policy and business management.” Prior experience supervising groups, negotiating, and delegating responsibility will highlight your business side and can significantly boost your résumé. For instance, you may find that having worked in management or administration, even in a non-science-based company, can improve your chances of employment in this field. Alternatively, you can strengthen your marketability by volunteering, interning or enrolling in related coursework to better prepare you for an occupation in RA.

As far as academic training goes, RA professionals have been traditionally diverse, entering the field with a variety of masters, doctoral or professional degrees and with backgrounds in science, technology, engineering, business or law. However, the training regimens of aspiring regulatory specialists may be shifting toward homogeneity: formal graduate programs in RA are now well-established in schools across the country, and graduates precisely trained for a regulatory position are emerging. Moreover, RAPS instituted an examination-based certification in 1991, and since then, many RA professionals have earned this distinction. As this occupation becomes widely recognized, RA applicants may need to prepare for more stringent training and experience requirements.

In a field that is evolving as rapidly as regulatory affairs, continued education is critical. Internal policies and procedures are regularly amended, and certified RA professionals must pass a re-certification test every three years. In addition, specialists in RA commonly interact on a global level, so knowledge of policies and procedures around the world is a must. Of the regulatory specialists employed across the nation, says Keramidas, “approximately 80 to 85 percent become involved in international markets.” With this in mind, you might even consider brushing up on your foreign language skills.

The Strategic Way to Break into Regulatory Affairs

In most fields, entry-level positions are the easiest to obtain. However, Keramidas cautions that the process of entering the RA profession may be the greatest obstacle you will face during your entire career. In part, this is because “regulatory affairs is not an undergraduate profession.” Instead, people generally transition to a career in regulatory affairs from other positions in academia, government or industry. The key is to find employment in an organization that recognizes, RA applicants may need to prepare for more stringent training and experience requirements.

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ry affairs known among your superiors. That way, the next time your organization plans to submit a new drug or medical technique for review, they may be more inclined to train you for the position, rather than hire someone with no prior knowledge about the company. This type of indirect path to a regulatory career is a very common strategy. In fact, Keramidas took such a path: after graduating from Purdue with a Ph.D. in neuroscience, she began the transition “from the bench to Congressional reporting,” as a consultant in research program evaluation, planning, and policy at the National Institutes of Health.

Once You’re Employed: an Entry-Level Snapshot
As a new hire, Keramidas says, most of your time will consist of “talking with staff about development and testing of products and preparation for submission to a regulatory agency.” If the product in question is released, the regulatory specialist then must “verify that labels on the product are correct, make sure manufacturing is going well, and confirm product quality.” In a typical day, you can expect to spend “a small fraction of time on finance, internal business, legalities and compliance,” but your greatest time and effort will be spent “interfacing with the agency.” At this point in your career, you will need to master the policies and procedures of regulatory affairs, as well as basic business and legal skills. This knowledge, when integrated with your scientific training, will prepare you well for a future in regulatory affairs.

Moving Ahead as a Regulatory Specialist
There is a high demand for professionals in upper-level RA positions across the nation, so once you earn a position in regulatory affairs, opportunities for advancement abound. For the best chance at advancement, take this advice from Keramidas: “If you’re good, and you learn quickly, then you should ask for additional training. Web-based learning and distance education. Learn as much as possible about the regulatory profession, specifically by talking with people in different areas of the company.” If you follow these guidelines, you should have no problem accelerating your career. “On average,” Keramidas says, “coordinators often will have about three years of regulatory experience, and after about eight years, you may be promoted to manager.”

RA scientists are concerned with the efficient distribution of quality health care products around the world. Although a relatively young profession, awareness about regulatory affairs is growing, and many opportunities exist in the field. If working to shape the direction and future of public health appeals to you, then regulatory affairs may be your ideal career.

Jennifer Griffin is a science writer and editor for The Scientific Consulting Group in Gaithersburg, MD. She earned a Master of Arts in Molecular Biology from Princeton University and a Bachelor of Science in Cell Biology and Biochemistry from Bucknell University. She can be contacted at jensgriffin@gmail.com.
Outreach in Science, Mathematics and Engineering

By David F. Brakke

Many campuses, businesses and industries offer programs designed to bring excitement and enthusiasm about science, mathematics and engineering to K-12 school groups, presumably at critical stages in the students’ development. Some programs target middle school students, while others may include high school students in summer research programs or address underrepresented groups in science. Some argue that improvement in science and mathematics education must occur at all grade levels, including pre-K and K, as there may be critical stages when students or groups of students may lose interest and the pipeline leaks as a result.

For any college, university or business concern, it would be difficult to run a comprehensive program that includes a full range of activities for K-12 students, teacher preparation and professional development for in-service teachers. Businesses usually offer specific programs or provide financial support for certain activities. Campuses may have organized programs, but rarely are they comprehensive. Generally, they are conducted by individuals or small groups without coordination, with minimal funding and lacking broader recognition. In addition, they may rely on a single facility, such as a planetarium or museum. Generally little or no assessment is done. Often programs are run for short periods of time and do not become an ongoing resource to K-12 teachers. Outreach can be an effective means of enhancing interest in science, mathematics and engineering; however, these deficiencies must be addressed if we are to provide the kind of attention to improving science and mathematics education needed to respond to the recent wave of reports on innovation and the scientific and technological workforce.

Examples of successful efforts may be helpful in illustrating the possibilities for outreach to K-12 schools. A recent Education Forum in Science describes the Young Scientist Program at Washington University in St. Louis (Beck et al., 2006). For the past 15 years, graduate and medical student volunteers have brought 165 students from nearby high schools into biomedical laboratories for summer internships. Most of the students have disadvantaged backgrounds. Volunteers associated with the program have developed teaching teams to lead interactive, inquiry-based programs in high school science classes and after-school programs. Equipment and supplies for the exercises are provided. More recently, the program has expanded to include three to six teachers per year, providing summer experiences in both research and curriculum development. The benefits from this coherent and coordinated program are many and given the program’s attention to assessment, they can be examined critically. Of obvious interest are student gains from elements of the program: teaching teams reach the largest numbers of students, but student gains increase even further from involvement in the more intensive activities associated with summer research. This program serves as a model of a successful, targeted program involving volunteers, with demonstrated benefits to students, volunteers and faculty.

Another model approach in outreach to K-12 schools is coordinated by the American Physical Society, American Association of Physics Teachers, and the American Institute of Physics, with funding from the National Science Foundation and the American Physical Society. Recognizing the need for well-trained physics teachers, the Physics Teacher Education Coalition (PhysTEC) aims to increase the number of highly qualified high school physics teachers and improve the quality of K-8 physical science teacher education, while also working to involve physics departments in the preparation of teachers. PhysTEC has worked with several universities, and its project sites have shown, on average, a doubling in physics and physical science teachers graduated. Essential elements in these thriving programs include active recruiting, physics content courses that model instructional methods that could be used in a K-12 classroom, and mentoring of prospective and new teachers by a master teacher or teacher in residence, with the mentoring continuing into their first years in the classroom. Additional elements proving successful have been learning assistants – students who have done well in an introductory course and are brought back to work with students in subsequent sections – and teacher advisory groups, which can serve many functions as a network, while also developing strong connections that can help build pipelines of students into a campus. The advantages of a program sponsored in association with a professional society are many, especially in sharing best practices among project sites. For further information on the program, visit www.phystec.org.

The museum world is changing and providing new opportunities for outreach and dissemination. Rather than being a
fixed place to visit, museums are becoming much more involved in preparing materials and making exhibits and other information available online. Coalitions are being developed among museums, business and industry, K-12 schools, and college campuses, greatly expanding the resources that any single group might provide. When based on true partnerships rather than loose relationships, the benefits to education can be significant. With the development of online resources, additional opportunities arise that allow us to go beyond the restrictions of physical location or the number of field trips that might be funded.

With these examples and thoughts, imagine what an individual college or university might do in reaching out to K-12 schools. Campuses are located in communities, however there is often little connection between the two despite their physical proximity. Depending on location, a campus may have a variety of potential partners locally or even regionally, such as museums, nature centers and planetariums; however, formal linkages among these entities are relatively rare even though they serve the same community. All too often, colleges and universities have a few outreach activities associated with one part of a campus or tied to a particular facility and then other disconnected activities scattered around the campus. I have visited many schools where you see elementary student groups visiting one particular location, but never the rest of the college or university. Outreach is sectored.

Imagine a different scenario where a college makes a commitment to provide for the preparation of teachers, educational opportunities for K-12 students, and professional development opportunities for in-service teachers. Some might respond saying we already do that through a college or department of education, or through other activities. However, rarely do we see an entire campus involved as it should be. Re-engaging physics departments in the preparation of physical science teachers is an important focus of PhysTEC. More broadly, the same emphasis should be expected across science, mathematics, engineering and other disciplines. A hospital could be a partner in programs for middle school students on careers in the health professions. An industry might have trained engineers who could be involved in programs such as MATHCOUNTS or other mentoring or educational programs for teachers. The most desirable circumstance would be for a partnership between a K-12 school system and a campus with people- and information-flow in both directions. In many cases, the institution of higher education might take the lead in organizing groups and developing a constellation of partners.

Making a commitment to the improvement of K-12 science and mathematics education (and beyond) is an essential first step for any institution of higher education. The second step must be in providing support, both financial and in personnel. Volunteers do wonderful things but can also benefit from a broader framework. While volunteer programs can be sustained, they often rely on single individuals. The Washington University experience demonstrates that ongoing commitment, a budget slightly more than $50,000 and a full-time coordinator can produce results over a longer time period. Recognizing the importance of the work in improving K-12 education, campuses should be called on to establish centers or offices designed to foster and coordinate outreach activities. Higher education has much to bring to K-12 education, if we only can organize ourselves, take the time to establish strong partnerships and provide direct support for this important effort. Rhetoric is needed, but support and recognition for faculty and staff for the important work to be done in improving K-12 education is essential.

References

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Are Free Microsoft Office Live Programs and Services for You?

By Sandra C. Ceraulo

Microsoft may offer its free clients additional business and Internet services, and that they may be collecting potential paying clients for those additional services now. However, for now, all of the Web services needed to have a business Web site are free through MS Office Live Basics, open to the public, and a great place to experiment with Web design for business.

Two showcase Web sites that use the Office Live suite of programs are Sequoia Lodge (www.sequoialodge.net) in Kernville, California, and the Northwest Chiropractic Center (www.nwchiropracticcenter.com) in Kirkland, Washington.

Is MS Office Live for You?

There are some questions to ask yourself before you decide to go with the Office Live suite of programs and services:

1) Is your site a business Web site? The free Web site creation software uses a series of templates from which you, the Web designer, must choose. The templates are meant for businesses such as restaurants, small health care providers and computer services providers. The templates could be used for other purposes, but it wouldn't be easy. If you really want a free way to make a site for a hobby such as researching genealogy, you will be disappointed. If, however, you would like to design a standard type of business Web site, you will find several possible combinations of templates and images at your disposal.

2) Do you want to host an existing Web site? The Office Live suite allows you to create your own Web site and use free domain name registration and Web site hosting, but elements from the Office Live software cannot be used elsewhere. Moreover, it is not obvious how to use your own Web site with Office Live. Clearly, Microsoft has assumed that you will want to use their software to design your own Web site. This is unfortunate, as many businesses consider their Web sites part of their corporate image package and want it to match other corporate products such as business cards, stationery and brochures.

What You Get for Free

Typically, domain name registration involves becoming responsible for a World Wide Web address, such as www.sandraceraulo.com, and costs run between $10 and $25 per year, depending on the seller. Web site creation involves hiring a company to make a Web site for you or doing it yourself using software such as Adobe's Dreamweaver, and runs from several hundred to several thousand dollars. Web site hosting involves storing your Web site on a server connected to the Internet at a hosting company and runs from $38 to $250 a year, depending on hosting company. MS Office Live Basics gives you all three of the above – domain name registration, form-based built-in Web site creation software, and Web site hosting – for free. The service is unique in offering free Web site hosting, usually available only through Web site hosting companies, in addition to free domain name registration and Web site creation software.

Now, you may be thinking that there must be a catch. Of course, MS Office Live offers higher levels of service for monthly fees. The Office Live Essentials package costs $19.95 a month, while the Office Live Premium runs $39.95 per month, and obviously Microsoft wants to attract customers to those packages. In addition, it is possible that in the future...
3) Will you want to transfer your Web site to another host? Traditionally, it has been very difficult to transfer hosting services from one hosting company to another. Web site hosting is a highly competitive business, and companies do not want to lose customers. Whether it will be difficult to transfer Web site hosting from MS Office Live to another company, if you choose to do so, remains to be seen.

4) Do you want to give your credit card number to Microsoft? The Office Live Basics services are free, but Microsoft requires a credit card number and allows only one set of free services per credit card. According to Microsoft, this prevents a few people from abusing the free Web services.

5) Do you want your site to be a creative wonder? MS Office Live templates can be rather dull. In trying to please the masses of business owners, Microsoft has kept the color schemes and images uninteresting or neutral. Thus, a site made with MS Office Live form-based software won’t “wow” you with its creativity.

6) Do you want to learn Web business skills transferable to other companies? MS Office Live uses its own system and terminology. You invest time in learning it, and, if you choose to transfer your domain name to another company, the skills you learned won’t transfer easily. If you already have Web business set-up skills, you’ll have to learn to use the Office Live system.

7) Are you and your customers Internet Explorer and Windows users? MS Office Live is from Microsoft, so, as you might guess, it works best with Windows Operating Systems and an Internet Explorer browser.

Other Reputable Web Hosting Companies

These companies offer Web site hosting at reasonable rates. Domain names may be registered through all of these companies as well.

- **Doteasy** ([www.doteasy.com](http://www.doteasy.com)). Doteasy is a Canadian company that charges $25 per year for domain name registration but then gives a basic 100 MB of Web hosting services for free (see the $0 Web hosting package).

- **ReadyHosting** ([www.readyhosting.com](http://www.readyhosting.com)). ReadyHosting, a Massachusetts-based company, charges $99 per year for One Plan Windows hosting. This includes “24/7 customer-focused” support and 100 GB of Web hosting space. ReadyHosting is known for its quick technical customer support available over the phone.

- **Go Daddy** ([www.godaddy.com](http://www.godaddy.com)). Go Daddy, an Arizona-based company, offers hosting plans with 5 GB of Web hosting space starting from $3.19 per month.
"Dr. Clemmons, would I be better off finishing my Ph.D. and then going into industry or is academia where I should stay?" This is just one of many kinds of questions I often get asked over and over again as I travel around the nation. It seems as if my work as a scientific business development professional and as a keynote speaker on a variety of topics ranging from "how to retain minorities in science," to "how to balance family and your career" to topics related to "how can industry or academia increase the number of underrepresented Ph.D.'s in the STEM fields?" is of interest to many graduate and undergraduate students. Sure, the options are many and everyone should create their own path and have ownership of their career. However, what excites me may not excite you regardless of how glamorous it may look. Truth is, what looks glamorous always takes a long time to achieve. In my mind, the career issue is a personal question that is as easy as asking yourself "what makes me happy?" For some odd reason, the simplicity of asking one's self "what makes you happy," escapes many academic and corporate hopefuls. However, to end up in the right place, that is certainly where you must begin your lifelong journey:

Who am I and what do I like to do?
In my own career journey, I decided to try to keep a hand in academia, industry and government relations. To this day, I perform services in all of these sectors through my grueling, but worthwhile paid work life and through my robust volunteer work life. Everything that I take on is a direct challenge to my inner self because I want to leave the world a better place than I found it. For me, it was easy to mix a little government and public policy work along with scientific writing and mentoring commitments into my already busy career because I truly care about every project that I am a part of. Most important, I did not place limits on myself in terms of my career goals. For me, the reward has been that I am extremely happy in my career because I am doing what I love. I help build biotech companies as a part of management teams in need of a corporate development person or strategic marketing guru to help get them off the ground. Also, fundraising is fun for me because of the different people I get to meet along the way and the friendships that are formed for the long-term in nature. There are many reasons that I write scientific and advice columns as well. I enjoy helping others find their north, so I must ask you:

What floats YOUR boat?
Where is the green grass?

It is well known that finding a tenure-track position in the STEM fields at a top tier school is no easy feat. The number of positions is limited and the numbers of applicants for these few positions seem to go up every year! The situation can be quite discouraging to young Ph.D. candidates and postdoctoral fellows. That being said, it is my contention that if you have done all of the homework necessary to make the solid choice of academia, then this is where you should put all of your energy and focus. The same holds true for corporate America and in other positions. There are definite pluses and minuses in each career. If you take the time to find out what is required to snag what you may consider to be a coveted position early in your career, then go for it! Do not wait. Let the green grass grow under your own two feet! I have found that people say they want something in particular, like a tenure track position at a Research I institution or a management job at a biotech company, but have no clue how to get there. Figuring out what is required to do whatever it is that "floats
your boat” requires some upfront planning and far too often I run into students who have not even done this basic work for themselves. I find this astounding since we are all scientists at heart and supposedly follow the scientific method of problem solving. What is it about us science types that makes us wait to focus on the end game (your career) too late? Correct that and you won’t have to worry if the grass is greener, you will be living your dream, and happiness will be something that is not so elusive after all.

No Comparisons Needed
Of course, a generic direct comparison of academic, corporate, government, and other jobs open to Ph.D. scientists can be done and has been done. The metrics used will not be customized to you though, so it won’t be quite that easy to figure it out. The real question of “is the grass greener?” is one that can only be answered by you – the individual. I recommend trying a few “paths” along the way to your Ph.D. starting as an undergraduate who chooses to work in a lab in his or her “spare” time, and/or you may read profusely to stay on top of future career options and concomitant educational requirements, and trust me when I tell you that nothing beats finding a good mentor. If you learn enough about yourself in this journey called life, then you will surely know where the grass is green because you will have created the picture and the green grass will be right there under your feet! □

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“Maybe I AM the queen of Sheba,” says a stressed woman scientist trying to fight low self-esteem, as quoted in Ellen Daniell’s book, Every Other Thursday. If you are the Queen of Sheba, Daniell’s Group would contend, you must believe in yourself and act in your own best interests. Her Group, in existence for twenty-five years, is concerned with “the power of NOT trying to go it alone.” It is a professional support mechanism, meeting every other Thursday to promote discussion and resolution of career issues.

Daniell began as a molecular biologist at the University of California, Berkeley, but has evolved into a full-time writer. In her book, she describes the psychological theories on which the Group was based, its history, and vignettes about how several individual participants have benefited from the Group’s process. She also gives suggestions for people who would like to form a group for themselves. She recommends this group method for anyone who is in the minority at work.

The isolation of women in science is legendary. On the book’s jacket, Rita Colwell states, “This is an excellent book. I wish I had had a copy to read when I started my career.” Colwell’s career has been stellar: she was the first woman director of the National Science Foundation, and she also directed the Biotechnology Institute, a major program at the University of Maryland. How could this book have helped in her professional life? Her comment shows that even a luminary such as Colwell was hard-pressed to get good scientific career advice.

Daniell’s Thursday Group uses methods of Radical Psychiatry to provide support in facing the everyday decisions and crises of a professional life in science. This discipline originated in the 1960s with the goal of empowering individuals who were being treated for psychological disturbances. The people who started Daniell’s Thursday Group described it as a professional problem-solving group to empower beleaguered young scientists. The method has worked particularly well for women, although men are not excluded. Famous molecular biologist Keith Yamamoto once was a member. He and Christine Guthrie invited Daniell to join. But after he was tenured, he did not continue his membership. The book argues, and few would disagree, that affirmations and shared experiences are greatly needed in scientific careers but are not readily available.

Daniell was an Assistant Professor at the University of California, Berkeley, when she joined the Thursday Group. In her book, she shares her experiences as a member of the Group. First she outlines how the Group of seven women helped her prepare for her tenure evaluation. Then she describes the Group’s actions during and after her unexpected tenure rejection. The help continued as she took a year to do research in a new field and then struggled with self-image issues about becoming an administrator at a biotechnology company. Finally, she explains how the Group...
helped her think through her options and decide to become a full-time writer.

Daniell also describes some of the crises faced by her colleagues in the Group, including members of the National Academy of Sciences, university professors, and one highly successful full-time researcher. It is clear that the members of the Thursday Group keep up morale by sharing results of alternative courses of action and supporting each other’s decisions.

Because of the societal mythos that men are self-reliant while women are dependent, women in science have tended to go to the opposite extreme. They often have found that nobody was looking to mentor or befriend them, and they, in turn, have not asked for any mentoring or help. As a result, women in science rarely have enjoyed true collegiality at work. In contrast, men, despite being stereotyped as “self-reliant,” typically have developed extensive mentoring relationships and friendships. Such camaraderie has eluded women, who have been unable to break into the “old boys’ network.” Thus, Daniell’s Thursday Group constitutes an “old girls’ network” for its participants. Clearly, they have become friends and have connected with each other in a deep and meaningful way.

Daniell describes some of the details of the Group’s processes with the understanding that her readers may want to form similar groups. The Group acts in a somewhat stylized way involving time limits, taking turns, and maintaining rules that govern the types of comments allowed. These procedures are designed to keep discussion on target, to let everyone have a chance to get help, and to prevent negative input. The Group does not give advice, help members manage their time, or “solve their problems for them.” Rather, it provides a sounding board where members can share their common experiences, their approaches, and why they think that those approaches succeeded or failed. Sharing experiences is fair game and encouraged, but specific advice such as “you should insist on a full review and report it to the higher administration” is not. When Group members have an issue, they ask for a certain amount of time for discussion of their situation or problem. As they talk and others share their similar experiences, each woman eventually develops her own ideas on how to address her situation. Each person who requests time has an opportunity to talk and receive feedback. Each session ends with a period of “strokes” or compliments on career progress, personal thoughts, or appearance.

You may have concluded that this book is depressing, preachy, or solidly boring, but it is not. It deals with people’s difficult life choices, so it has drama. Further, there is much humor in the approaches the Group uses. The members concoct “to don’t lists” to help them keep from saying “yes” to work overloads. They use the term “premorse” for being sorry for something they have not done yet. The Group also identifies “pigs,” or misconceptions with implied “put-downs.” Pigs are unstated but can have a strong influence. For example, the Frog Pig (misnamed from “Fraud Pig” but retained because it was funny) is the perception that a woman is a fraud and does not really belong. This Frog Pig led one professor to want to tell a student, who had told the professor that she was a great role model, that her life was falling apart. But she did not; instead, she described this Frog Pig to the Group.

Many women in the Group have unspoken feelings that they are frauds, and that if they were found out for their real abilities, they would be dismissed. They expect a “Fly, all is discovered,” at work daily. Many women in science share the feeling, and have asked themselves, in a tone of doubt, “Can I really do this job? Do they think I have abilities/training/experience that I don’t have?” When the Group detects this kind of thinking, they chime in with “Frog Pig.” To overcome this “pig,” some kind of affirmation is elicited. The Queen of Sheba affirmation quoted at the beginning of this review is one that a Group member found effective.

Daniell explains that one of the best aspects of the Group is that the members do not “solve problems” for each other. When people give us advice or tell us what to do, we find it annoying rather than helpful. Instead, the Group provides examples of how certain strategies have worked for others in the past. If someone resigned from academia and moved into full-time research, did she miss students? What did she value about the experience? Would she do it again? What would happen if she wanted to return to academia? Could she do it? Would it be hard? This sort of input, the real-life experiences of others with certain actions that one might take, fills a void in the knowledge base of the Group women.

Once a Thursday Group member makes a decision, or, in their parlance, takes on a “contract” to move in a particular direction, the focus is on support, not repair. At subsequent meetings, Group members report on the progress of “contracts” they have undertaken. They support each other through every difficult time.

I heartily recommend this book. It has pathos, humor, and a good take-home lesson; what more could you want? I predict that when you read it, you probably will want to start such a group yourself.

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BOOK REVIEW

Women in STEM Careers
By Margaret Reilly

In scientific, technical, engineering, and mathematics (STEM) careers, women continue to be significantly outnumbered by men. Reasons for this remain elusive. Remarks of former Harvard President Lawrence H. Summers in January of 2005 called fresh attention to this situation. He implied that women are less successful in STEM careers because they are innately less capable than men in these areas. Several recent books have explored various aspects of this topic.

Women in these male-dominated fields often have made significant contributions. Out of the Shadows presents 40 women physicists who did just that between 1876 and 1976. The stories of these women’s lives are fascinating. Some examples: Rosalyn Yalow pioneered the use of radioisotope tracers in biomedical research and diagnosis. She and collaborator Solomon Berson were candidates for a Nobel Prize, but this ended with Berson’s sudden death (the Nobel Prize is not given posthumously). Yalow reorganized their laboratory and continued her work in nuclear medicine. Five years later she was awarded a Nobel Prize in Physiology or Medicine. Astronomer Vera Rubin’s observations of the motion of stars and gases provided extensive information on the characteristics of galaxies. She was the first woman allowed to use the Palomar Observatory, at a time when “due to limited facilities, it is not possible to accept applications [for telescope time] from women,” and was the first woman in more than 160 years to receive the Gold Medal of the Royal Astronomical Society. Marguerite Catherine Perey, a protégée of Marie Curie, discovered francium, the rarest and least stable of the naturally occurring elements. At age 29, with “just” a technical school education, she succeeded “where many experienced chemists had previously failed.”

Credit for women’s discoveries often was given to men. Marietta Blau was instrumental in developing photographic emulsion techniques to measure particle tracks. When her advancing age and failing health presented a last chance for a Nobel Prize, it was learned that the prize for this work had already been awarded to Cecil Powell in 1950. Lise Meitner performed the major work on nuclear fission before she was forced to flee Nazi persecution. Her colleague Otto Hahn received the Nobel Prize in Chemistry in 1944 for this work, with no mention of Meitner. To his credit, Pierre Curie refused to accept the Nobel Prize in Physics in 1903 unless Marie was also included. Yet their Nobel lecture was given by Pierre while Marie was seated in the audience. All of the women included in Out of the Shadows encountered some form of gender discrimination, yet they persevered because of their dedication to their work, and many of them realized that they were paving the way for further participation by women.

Many of the women profiled in Out of the Shadows successfully combined career and family obligations. Many had children. Dorothy Crowfoot Hodgkin, awarded the Nobel Prize in Chemistry in 1964 for her use of x-ray crystallography to examine the struc-

Out of the Shadows: Contributions of Twentieth-Century Women to Physics.


titure of many biochemical substances, raised three children despite her severe chronic rheumatoid arthritis. When Marie Curie’s daughters were infants, she bathed them every day. They were preteens when Pierre was killed in a traffic accident. Rosalyn Yalow had two children and was “as compulsive as a mother and homemaker as she was as a scientist, completely dedicated to both.”

In the academic world, gender inequities often are found among the faculty in STEM fields. For example, the number of doctoral degrees in chemistry awarded to women has increased over many years, yet the percentage of women on chemistry faculties at top-ranked universities remains disproportionately low. Are Women Achieving Equity in Chemistry? attempts to determine factors that contribute to this inequity. One such factor is the quality and quantity of mentoring women receive. The book notes that a mentor must be “advisor, teacher, role model and friend.” Mentoring takes the student through the entire academic experience and continues into the world of work. Mentors teach students how to do independent research and to plan career goals. They provide advice on graduate programs and postdoctoral positions, and assist in finding employment opportunities. Good mentoring greatly increases the probability that a woman will complete her graduate studies.

Women often prefer female mentors. Given the dearth of female faculty in chemistry programs, some women have no opportunity at all for mentoring. Multilevel mentoring “in which postdoctoral students mentor graduate students who in turn mentor undergraduates” is proposed as a remedy for this deficit.

Why Aren’t More Women in Science? also seeks reasons for the lack of women in STEM careers. Is it nature or nurture? Evidence supporting both facets of that question is presented. In favor of “nurture” is a series of studies to determine whether intellectual ability is an immutable “gift.” It was noted that the “bright” girls in a group of fifth graders had difficulty learning new information when it was prefaced with confusing but unrelated material. These girls normally earned better grades than the boys in most subjects. It seemed as though they lost confidence in their abilities when confronted with material they found difficult to understand. Conversely, the boys presented with the confusing introductory material did better in learning the new information. Previous studies had suggested that students who view intellectual ability as an unchangeable “gift” tend to “give up” when faced with challenges, while students who feel that intellectual ability can be expanded meet challenges with willingness to work at conquering them. To test this hypothesis, a cohort of junior high school students (“a time of challenge for many students, a time of declining grades, and a time when the gender difference in math often emerges”) was divided into two groups. One group was taught about the plasticity of the brain, where new neuronal connections are made as learning occurs and new skills are acquired. The control group received instruction in new skills, but no mention of the “expandable nature of intellectual ability.” In the first group, girls whose math grades had been falling began to earn grades almost as high as the boys. In the control group, the girls’ grades continued to decline until they were much lower than those of the boys.

A second “experiment” supported the importance of teaching students that intellectual ability can be acquired. A geometry lesson was presented to two groups of adolescents with similar academic achievement. For one group, the originators of the concepts (Euclid and Bernhard Riemann) were presented as persons who had worked hard and long to achieve their successes. For the second group, these same mathematicians were described as geniuses with innate abilities that led to their successes. After the geometry lesson, all of the students were given a test to “measure their math ability.” In the first group, who saw that math ability can be gained, the girls did as well as the boys on the test. In the second group, taught that math ability is a “gift,” the girls scored far below the boys in the class. These studies suggest that girls should hear that learning abilities can be developed, rather than getting the stereotyped message that girls are not good at math and science.

Out of the Shadows documents that women can be successful in STEM careers. Why Aren’t More Women in Science? presents evidence that some innate differences between males and females may predispose boys and men to success in STEM careers, and perhaps these cannot be changed. What can be changed are external factors that make STEM careers seem unappealing and unattainable to all but the most gifted and determined women. Are Women Achieving Equity in Chemistry? and Why Aren’t More Women in Science? provide insights to making STEM careers more attractive and attainable for women.
Sowing Seeds of Change
Rewind to Fall 2006: a handful of female scientists at the Kansas Department of Health and Environment gathers for professional development discussions. Meeting in small groups of twos and threes, several recall positive experiences with AWIS. Thus, a new chapter buds.

Soon e-mails bounce back and forth with colleagues at the Kansas Water Office, Washburn University and the National Oceanic and Atmospheric Administration (NOAA) to gauge local interest—and what an interest! Very quickly an outstanding and enthusiastic core group assembles. In January 2007, Sunflower AWIS officially blooms as the third Kansas chapter, joining the University of Kansas in Lawrence (Ad Astra) and Kansas State University in Manhattan (Flint Hills).

Leadership & Organization
Sunflower’s formal executive board at present includes five elected offices with plans to incorporate a steering committee and chairs for Community Outreach, Membership Development, Program Meeting Planning, Brown-Bag Lunch Planning and Publicity. Government agency scientists and university faculty comprises our current membership. In the future we hope to attract members from the private sector, K-12, and healthcare fields. We clearly assert that membership is open to all women and men who support the mission of AWIS.

Goals
Chapter goals include professional development, networking, and community outreach. With four of our members involved in coordinating a Science, Technology, Engineering and Math workshop, outreach will be an exciting part of our activities. The Fall 2007 event, hosted and funded by Washburn University and NOAA, will be geared toward Topeka middle-school girls. Sunflower AWIS will provide presenters and womanpower to help make it a success. In addition to outreach, Sunflower will alternate evening program meetings with brown-bag lunches on a monthly basis. Our goal in chapter meetings is to provide venues for informal mentoring and continuing education.

Program Kick-Off!
Fast forward to January 18, 2007: roughly thirty people meet at a local restaurant for our first dinner and program. AWIS enthusiasts included scientists and engineers from two state agencies, one federal agency, a university, a hospital and the local school district; great conversation flowed throughout dinner.

Our inaugural guest speaker, Dr. Beth Montelone, current Flint Hills AWIS President and Professor of Biology at Kansas State University (KSU), serves as Associate Dean for Research of the College of Arts and Sciences. She is a leader in the ADVANCE Program: a $3.5 million, five-year NSF-granted program aimed at increasing the participation and advancement of women in STEM disciplines on campus. She also coordinates the Girls Researching Our World (GROW) program in Manhattan, which encourages girls’ interest in science and math by inviting participation in hands-on workshops at the KSU campus.

Her talk that night — “Balancing the Equation: Increasing the Participation of Girls and Women in Science, Technology, Engineering and Mathematics” — presented current and historical...
CHAPTER NEWS

Maryland

Laurel Haak Receives Bethesda Chapter’s Excellence in Mentoring Award

The AWIS Bethesda (Maryland) Chapter was proud to present this year’s Excellence in Mentoring Award to Laurel (“Laure”) Haak, Ph.D., currently a Program Manager at Discovery Logic, Inc. The annual award recognized Laure’s significant contributions to mentoring young women and men in science and was given on April 17th, at one of the Chapter’s regularly scheduled seminars. As one nominator stated, “Some people are born to be mentors… Laure has put to good use her energy, wisdom, intelligence, and charm, being instrumental in shaping a new, friendlier environment for women and men at an early stage in their careers.”

Prior to working at Discovery Logic, Laure was a Program Officer at the National Academies, where her interest in training and workforce issues were made clear through the reports she helped produce, including, “Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic S&E” and “Policy Implications of International Graduate Students and Postdoctoral Scholars in the US.”

Laure received her B.S. and M.S. in Biology from Stanford University and was the recipient of a pre-doctoral NIH NRSA, earning her Ph.D. in Neuroscience in 1997 from Stanford. As a graduate student, she was a member of the Stanford-AWIS Mentoring Project planning committee and also served as an undergraduate advisor. From California, Laure went to NIH, having been awarded an NAS Research Associateship to investigate intracellular calcium dynamics in oligodendrocytes. After NIH, she joined the staff at AAAS and was Editor of the Postdoc Network, a division of Science’s Next Wave, a position she left to join the NAS.

Laure’s commitment to women in science has been reflected by a number of activities. She served as President and newsletter editor for Women in Neuroscience, and was a member of the Society for Neuroscience Committee for the Development of Women’s Careers. Laure also serves on the Biophysical Society Early Careers Committee, and was an advisor and mentor for the National Postdoctoral Association. In the words of one of the scientists whose lives Laure has touched, “People like Laure, who transform their passions into lifelong careers and always succeed in helping others along the way, deserve to be recognized, applauded… and followed!”

For more about the AWIS Bethesda Chapter Excellence in Mentoring Award, or to view past recipients, please visit our website: http://www.awisbethesda.org/

A HUGE Thank-you!!!

Our first meeting was very successful, and we look forward to attracting a diverse and active membership. Sunflower AWIS would like to extend a big THANK YOU to Dr. Montelone, as well as to the National AWIS staff, for helping us get off to an excellent start!

Submitted by Liz Smith, Environmental Scientist Kansas Department of Health and Environment
ASSOCIATION FOR WOMEN IN SCIENCE  MEMBERSHIP APPLICATION FORM

Membership in National AWIS includes a subscription to the quarterly AWIS Magazine, the bi-monthly e-newsletter Washington Wire, discounts on publications and the opportunity to join a local AWIS chapter. Chapter membership provides local networking opportunities and educational activities. All chapter members must be members of National AWIS. Note that chapter dues do not cover National membership dues. You can find a listing of local chapters and chapter dues at http://www.awis.org/about/chapters.html. The fair market value of a one-year subscription to the AWIS Magazine is $24 and is covered in your annual dues payment.

MEMBERSHIP CATEGORIES AND DUES (Membership year is July 1-June 30)

- Regular $65
- Sustaining $150
- Patron $500
- Benefactor $1,000
- Student/Retired $25
- Library $75
- Corporate (http://www.awis.org/about/corpbenefits.html)
- Institutional (http://www.awis.org/about/instbenefits.html)
- New Member
- Renewing Member

PAYMENT INFORMATION

Your AWIS Membership May Be Tax Deductible: Tax ID 23-7221574

Portions of your AWIS membership may be deductible under Section 162 of the U.S. Internal Revenue Service Code. Please consult your financial advisor.

The AWIS Educational Foundation, founded in 1974, offers monetary awards to predoctoral and undergraduate students in science and engineering. The foundation relies on donations to make these awards. All donations are tax-deductible to the extent allowable by law. Please take this opportunity to help a woman student in science. For information on the Educational Foundation please visit: www.awis.org/about/edfound.html

National dues payment $_______

Chapter dues payment (visit www.awis.org for rates) $_______

Chapter Name _______________________

Contribution to National $_______

Contribution to Chapter $_______

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These optional questions and the information in the Member Profile assist AWIS in applying for grants and awards. They are treated as confidential and not made available elsewhere, nor are they criteria for membership. For more information on our privacy policy, visit www.awis.org.

Age Group:

- 18-22
- 23-29
- 30-39
- 40-49
- 50-59
- 60+

Gender:

- Female
- Male

Race/Ethnicity: (check all that apply)

- African American
- American Indian or Alaskan Native
- Asian or Pacific Islander
- Hispanic
- White
- Other_______

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11240 Waples Mill Road, Suite 200
Fairfax, VA 22030

Association for Women in Science Spring 2007
### Member Profile

**Send Mail to:**
- [ ] Home
- [ ] Professional

**Send E-mail to:**
- [ ] Home
- [ ] Professional

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- Phone (include area code)

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- Phone (include area code)

- Email

- Web Page

#### Current General Field:

- [ ] Agricultural Science
- [ ] Chemistry
- [ ] Engineering
- [ ] Physical Sciences
- [ ] Behavioral Science
- [ ] Computer Science
- [ ] Mathematics
- [ ] Social Sciences
- [ ] Biological Science
- [ ] Earth, Atmospheric & Ocean Sciences
- [ ] Medical Sciences
- [ ] Other: ________________________________

#### Specific Field: ________________________________

#### Field of Degree, if different: ________________________________

#### Employment Status:

- [ ] F/T
- [ ] P/T
- [ ] Student
- [ ] Postdoc
- [ ] Retired

#### Sector of Employment:

- [ ] Academia – Higher Ed
- [ ] Academia – K-12
- [ ] Industry/Business
- [ ] Government/Public
- [ ] Other: ________________________________

#### Professional Responsibilities:

- [ ] Research
- [ ] Sales/Marketing
- [ ] Student
- [ ] Teaching
- [ ] Policy/Regulatory
- [ ] Administrative
- [ ] Other: ________________________________

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You can apply, renew, or upgrade online at:

[WWW.AWIS.ORG/ABOUT/JOIN.HTML](http://WWW.AWIS.ORG/ABOUT/JOIN.HTML)
NSF’s Directorate for Geosciences seeks candidates for the position of Section Head, Ocean Section, Division of Ocean Sciences (OCE). The Division supports basic research and education to further the understanding of all aspects of the global oceans and their interactions with the earth and the atmosphere. The division also offers opportunities to participate in global change research programs and other focus programs. Information about the Division’s activities may be found at website: [http://www.nsf.gov/geo/oce/about.jsp](http://www.nsf.gov/geo/oce/about.jsp).

Appointment to this Senior Executive Service position may be on a one-to-three year limited term basis, with a salary range of $111,676 to $154,600. Alternatively, the incumbent may be assigned under the Intergovernmental Personnel Act (IPA) provisions.


Applicants may also obtain the announcements by contacting Executive Personnel Staff at 703-292-8755 (Hearing impaired individuals may call TDD 703-292-8044).

Applications must be received by July 2, 2007.

NSF is an Equal Opportunity Employer.

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**Courses, Meetings, and Workshops at The Jackson Laboratory**

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- **Surgical Techniques in the Laboratory Mouse**
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- **Phenotyping Mouse Models of Human Lung Disease**
- **The Laboratory Mouse in the Development of New Therapeutic Approaches to the Treatment of Neurological Disease**
- **Genomic and Proteomic Approaches to Complex Heart, Lung and Blood Diseases**

**Frontiers in Microscopy II: Imaging Foom Single Molecules to Whole Organisms and Its Application**

- **Modeling Human Metabolic Syndrome and Type 2 Diabetes in Rodents**
- **Short Course in Medical and Experimental Mammalian Genetics**
- **Short Course on Complex Trait Analysis**
- **Short Course on Experimental Genetics of the Laboratory Mouse in Cancer Research**
- **Methods in Human Embryonic Stem Cell Research**
- **Workshop on the Pathology of Mouse Models for Human Disease**

[www.jax.org/courses/coursesandconferences@jax.org](http://www.jax.org/courses/coursesandconferences@jax.org)
Assistant/Associate Professors  
Department of Genetics and Complex Diseases  
HARVARD UNIVERSITY

The Department of Genetics and Complex Diseases (GCD) at the Harvard School of Public Health (HSPH) invites applications for tenure-track positions at the level of assistant professor. Exceptional associate professor candidates will also be considered. GCD is a major new initiative in the basic sciences in the HSPH Division of Biological Sciences.

Through integrative programs in biology and genetics, the GCD group seeks to generate basic research insights related to complex human diseases. Current areas of research include nutrient sensing, protein translation and degradation, nuclear hormone receptor signaling, secretion and vesicular transport, oxidative and genotoxic stress response, DNA repair of oxidative damage, tumor metabolism, and regulation of carbohydrate, lipid, and energy homeostasis. Successful applicants will hold a PhD and/or MD degree and will have a record of outstanding productivity in an area that complements the existing research and training goals of the department. The candidate should possess the ability to work collaboratively with other scientists and the scholarly qualities required to mentor doctoral students in the graduate program in the Division of Biological Sciences. Generous start-up packages and state-of-the-art research facilities will be available.

GCD has particular interest in recruiting individuals with research interests in the following areas:

- Aging in model organisms, including mice
- Organelle biology and dysfunction, particularly mitochondria or endoplasmic reticulum
- Control of protein synthesis, folding, and degradation
- Mechanisms of signal processing and integration, especially in the context of energy and nutrient sensing, fluxes and homeostasis
- Tumor metabolism
- Inflammatory and stress responses with emphasis on chronic metabolic or degenerative diseases
- Integrated physiology and genetics of complex diseases using cellular or mouse models; for example, neurological degeneration with metabolic dysfunction as an underlying feature

Please send a letter of application, including a statement of current and future research interests, curriculum vitae, sample publications, and the names of three references to the following address. Applicants should ask their three references to write independently to this address.

Chair, GCD Search, c/o Julie Gound, Department of Genetics & Complex Diseases  
655 Huntington Avenue, Building II, 107, Boston, MA 02115

The Harvard School of Public Health is committed to increasing the representation of women and minorities in its faculty, and encourages applications from such candidates.