

Reflections on This 100th Anniversary of Marie Curie's Nobel Prize in Chemistry

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ABSTRACT: The anniversary of Marie Curie's Nobel Prize in Chemistry is a time for celebration of her accomplishments and those of other women chemists. It also is a time to take renewed efforts to ensure that everyone has a chance to succeed in science—regardless of race or gender.

KEYWORDS: General Public, Public Understanding/Outreach, Women in Chemistry

The 100th anniversary of Marie Curie's Noble Prize in Chemistry provides an opportunity to reflect on the advances that women have made in the United States in the field of chemistry. Indeed, there are many. No longer is a woman legally excluded from obtaining a Ph.D. in chemistry in the United States. At the undergraduate level, the overall numbers of degrees in chemistry are achieving gender parity. The percentage of women obtaining a doctorate in chemistry is now above 30%. And the "dirty dozen", a name coined in the 1980s to describe the 12 highly ranked chemistry departments in the United States that had no women tenure-track faculty, now all have several.

These numbers are encouraging, although the rise is still glacially slow in populating the higher leadership ranks with women. One only needs a few fingers to count how many women are department chairs in our 50 most active chemistry departments in the United States. But then maybe there's an element of wisdom and self-preservation in that number. Women appear to fare better at our predominately undergraduate institutions, although even there, career advancement can be slower than their male counterparts.

My concerns today, however, go beyond whether we make that 50:50 mark in the faculty ranks in our chemistry departments. I worry more about whether these hallowed halls and laboratories provide a setting that enables the highest scientific productivity for all those who aspire to reach those heights—regardless of their race or gender. There is no doubt that the success in a discovery or scientific investigation is easier to achieve if the road traveled is paved, has sponsors to help guide the way, and a few guardrails to nudge the explorer back on track. The road fraught with potholes, speed bumps, and dense fog is a different story, one that often ends in derailment if the impediments out-persist the most persistent. Scientific research itself comes with its own set of impediments. The ones I refer to have a human side.

■ CURIOUS ABOUT CURIE

I often wonder how a young Marie in her early 20s would fare if she were plunked down in one of our U.S. research-active chemistry departments today. As a foreign female with an odd accent and an intense drive to succeed, would she have the strong mentoring and support around her that would allow her confidence and her brilliance to shine and flourish as it did in the turn

of the last century? It is certainly an interesting question to ponder and there are many biographies to provide insights.

What kind of impediments would Marie find today as a graduate student or young faculty member in one of our departments? A survey of chemistry department chairs of our most research-active chemistry departments attending a recent federally funded workshop on gender equity can provide some insights.¹ One-third of the ~50 chairs that attended the workshop believe that the unwelcoming climate found in many chemistry departments is a very important to moderately important barrier for women's advancement in their faculty careers. Two-thirds indicated that subtle biases against women that build over time contribute to the barriers. Over 50% believe that gender bias in the peer-review process is at least somewhat important in slowing women's career progress. Women chemistry faculty surveyed believe these barriers to be even bigger.²

■ MENTORS FOR MARIE?

Who would have mentored Marie? In my activities with COACH,³ I am constantly surprised at the inadequacy of the mentoring that I find in our field. "Does it really matter if you are first author on a paper?" is a common graduate student question I hear along with many others that make me wonder if these women are being educated in a rabbit hole. At the faculty level,⁴ lack of mentoring is most commonly apparent around the issue of service versus research. It's pretty hard to launch a successful research program while playing the departmental doormat. Wanting to be viewed as a team player, women often are given (and take on) high levels of service at the expense of other responsibilities also required for tenure. Do the chairs see these issues as barrier? You bet they do. In the previously noted workshop, 40% of the chairs believe that lack of mentoring by top people in the field is a moderate to very important barrier to women.¹ One-third of the chairs that attended that workshop believe that heavier teaching and service loads are moderate to very important barriers to the progress of women faculty. For faculty of color, the chairs believe that these factors are even larger impediments.⁵

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What characteristics define a good mentor? Without giving it much thought, we often default to mirroring the mentoring that we received—or didn't receive. More often mentoring takes on a "sink or swim" flavor where a struggling student or faculty member is told just to swim harder. That's not very effective advice if the swimmer doesn't know how deep the water is, sees no land in sight, doesn't know what stroke is most effective, or whether the fin up ahead is a shark or a dolphin. A good mentor is as much of a coach as an advocate, someone who listens, educates, provides insights, shares experiences, can criticize constructively, is supportive and accessible, can foster success in others, and, most importantly, can be trusted. The mentee has responsibilities too, including being willing to ask for help and listen to advice, being honest, staying focused on priorities, providing updates of progress and accomplishments, and expressing gratitude.

■ THE ROAD AHEAD

Assuring that this country continues to stay at the forefront of technology requires us to be aggressively inclusive in our search for talent, regardless of race or gender. Just because your student or the colleague down the hall does not look like you, sound like you, or has body parts pierced that make you wince, does not mean that they do not have the same aspirations as you. Talent and curiosity comes in many forms and we should embrace it all. We need increased education and sincere dialogue in our departments about the traits of a good mentor—mentee relationship and a structure to ensure that mentoring is available for all, not just for the top stars. We also need to be educated on the issues of biases that can cloud our judgments about aptitude and performance, and take steps to minimize these biases in decision-making processes.

So whether we call it leveling the playing field, or leveling the road, it is upon us all as educators to be more proactive in assuring that all who want to study chemistry have the support around them to allow them to achieve their full scientific potential, and possibly be the next Marie—or Miquel—Curie.

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■ REFERENCES

- (1) Greene, J.; Lewis, P.; Richmond, G. L.; Stockard, J. Promoting Gender Equity in Academic Departments: A Study of Department Heads in Top-Ranked Chemistry Departments. *J. Women Minorities Sci. Eng.* **2008**, *14*, 1–27.
- (2) Greene, J.; Lewis, P.; Richmond, G. L.; Stockard, J. Is the Academic Climate Chilly? The Views of Women Academic Chemists. *J. Chem. Educ.* **2010**, *87*, 381–385.
- (3) Home Page for COACH. <http://coach.uoregon.edu/> (accessed Apr 2011).
- (4) Greene, J.; Lewis, P.; Richmond, G. L.; Stockard, J. COACH Career Development Workshops for Science Faculty: Views of the Career Impact on Women Chemists and Chemical Engineers. *J. Chem. Educ.* **2010**, *87*, 386–391.
- (5) Richmond, G. L.; Stockard, J.; Greene, J.; Lewis, P. Changing the Chairs: Impact of Workshop Activities in Assisting Chemistry Department Chairs in Achieving Racial and Ethnic Diversity. *J. Chem. Educ.* **2010**, *88*; DOI: 10.1021/ed100526b.