



## Mentoring today and into the future

Wendy C. Crone

We are all engaged in mentoring relationships, personally and professionally, and each varies from the others in the duration, depth, and topic. These mentoring relationships are often vital to the learning and decision making of the mentee. In my own case, I can recall the influence of past mentors on my career trajectory, the graduate programs I considered, the balance I sought with personal and professional responsibilities, the productivity and visibility of my research, and the techniques I brought to the classroom in teaching, to name a few.

Mentoring often comes from a wide array of sources; those you would expect (like my graduate advisors or the mentor committee I was assigned as a junior faculty member) and those that might be less obvious (like my fellow junior colleagues

or my next door neighbor). Although I strongly advocate that people develop a constellation of mentors for a range of personal and professional needs, I have structured this article around the canonical senior/junior mentor/mentee dyad, which is the most pervasive type in scientific culture. I will focus on how these key mentoring relationships should change over the course of time.

The most familiar of these dyad mentor/mentee relationships is likely to be the professor/graduate student relationship. This relationship may be more complex than others because it is often one that is convolved with a supervisory role if there is a research assistantship funded by the faculty member. However, I will use this as an initial example because this mentor/mentee relationship usually

lasts for multiple years and may extend beyond the student's degree completion. From experience, we know that these relationships run the gamut, from healthy ones where information and advice is freely exchanged and the students develop the breadth of research expertise they need for their future career, to the unhealthy ones where issues such as absenteeism, domineering behavior, and inability to take constructive criticism significantly hinder the possibility of positive outcomes. However,

even in the healthiest of these relationships, there must be change over time.

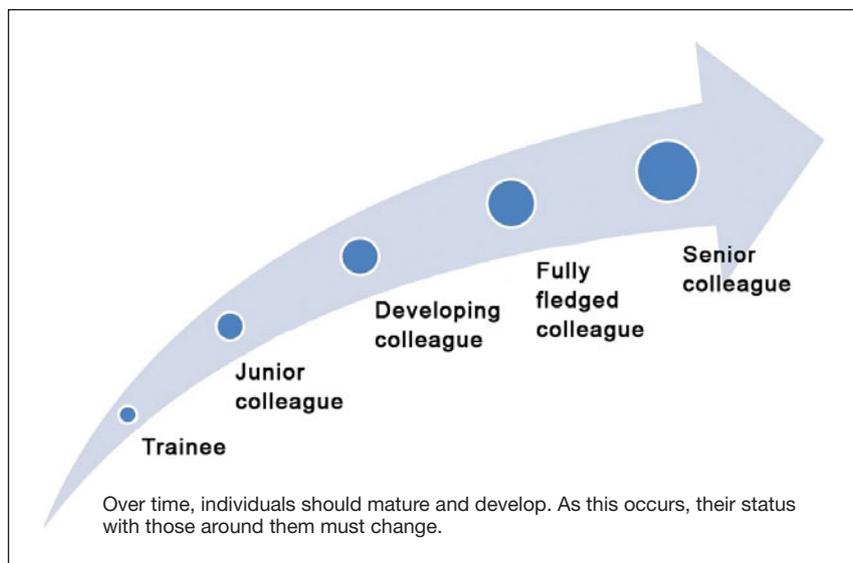
Because one of the main goals of such a mentor/mentee relationship is to help the mentee develop professionally, the scope and flavor of the interactions and advice must change as the mentee begins to establish himself. In other words, as the mentee matures professionally the mentoring exchange must also mature. When things are working well, the graduate student grows into a junior colleague over time. In the ideal, the individual eventually becomes a fully fledged colleague, treated as someone with equal standing. Everyone benefits when this occurs.

An example of a successful long-term mentoring relationship was described to me by a colleague. He is now 20+ years past PhD graduate studies and maintains a long-standing productive collaboration with his former graduate advisor. This situation obviously benefits both individuals, and is a testament to both the mentor's ability to allow the former graduate student to mature into this role and the former graduate student's technical capacity and ability to build expertise in an area complementary to his advisor's. For tenure reasons at most institutions, researchers are expected to differentiate themselves from their advisors—to strike out independently in a new area of research, for example. However, this does not mean that the relationship with the former advisor must end, nor must opportunities for future research collaboration be abandoned. In fact, by establishing himself independently, the junior person is building his own reputation and expertise. The senior person can be a guide in the process as well, pointing out areas of opportunity. This also provides prospects for future collaborative work because both individuals now bring their own distinct expertise to the table. Certainly not every professor/graduate student mentoring relationship will work out this way, but each should be expected to have such a potential. The likelihood of this is greater if the relationship is one that is built on a strong foundation.

Sometimes overlooked is the mentoring needed by our colleagues. People at every level in the professoriate can ben-



Mentoring should be sought from a range of sources. Each relationship may provide different perspectives or mentoring advice on different topics.



efit from mentoring, but certainly those in most obvious need are our junior faculty members. Faculty relationships are truly ones that must stand the test of time. In academia, junior faculty members are likely to spend the rest of their careers within the discipline, often at the same institution. They will become the future leaders in our discipline as well as departments, colleges, research centers, and professional organizations. These individuals can benefit substantially from mentoring because their prior training is unlikely to have given them skills in all the areas of expertise required of our university faculty. Even within the realm of research where their graduate and postdoctoral education has concentrated its training, they often need further mentoring as they become the initiators of their own research agenda, grant writers, advisors to graduate students, and managers of their own research group.

In the early years, mentoring should come from a range of sources but one source must be the junior member's department. Because having a key senior/junior faculty mentor/mentee relationship is so pivotal for career success, at least one senior faculty member within the department must invest time in mentoring in order to guide the junior faculty member's early development. The challenge is that this type of mentoring dyad, when done right, might actually require sacrifices of the mentor; certainly in terms of time commitments, but also

in terms of prioritizing the best interests of the junior person. This might mean encouraging a bright fellowship student to work with the junior faculty member rather than recruiting her for the mentor's own research group. Or, it may mean taking on additional service responsibilities to protect the junior faculty member's time. This type of assistance may be critical in the first year or two, but here again the relationship must change with time. As the individual grows in her new role, builds expertise in a range of areas, and finds her voice within the department and discipline, a less sheltering and more collegial relationship should be nurtured. The junior colleague must soon become a fully fledged colleague, treated as an equal and allowed to have opinions of her own.

How do the mentor and mentee get to this point? The ingredients include mutual respect, good communication (not just technical communication, but also communication about goals), and appreciation for the other's professional needs. This is predicated on there being a good match between the mentor and mentee to start with—not just in disciplinary interests, but also in personalities and expectations. It is usually the first months that set the path for success.

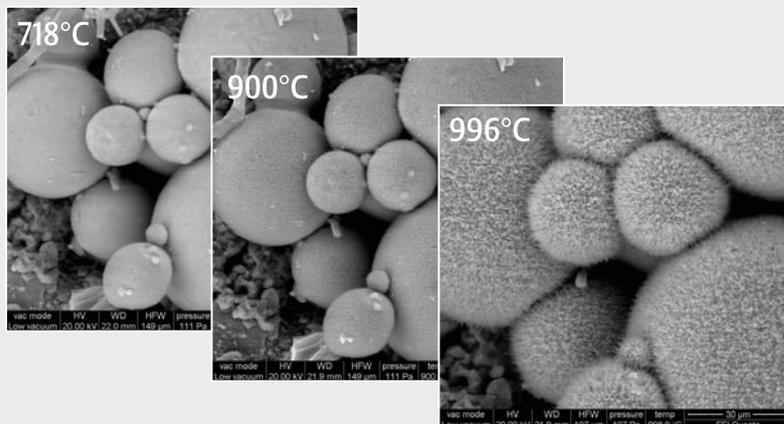
Early in the mentoring relationship, more formality may be necessary to facilitate the mentoring process. Some even go so far as to develop a written agreement. Such practices are common

in some industries and often occur in the context of a review with one's manager. However, a mentoring relationship outside of one's immediate supervisor might also benefit from being clear at the outset concerning the expectations held by each person and what goals are being worked toward. Even in informal mentoring relationships, both parties must develop a sense for the other's expectations. This may come in the form of determining what purpose an individual conversation might have, or in discussing the level of confidentiality expected. If the mentoring extends beyond a single conversation, the pair may also want to discuss how frequently the meetings should occur, what type of feedback is most effective, and the needs of the individuals involved. The mentee may be looking for constructive feedback on writing or assistance in developing professional networks, for instance. The mentor might want to aid junior members of their field, connect with a new colleague in a more meaningful way, invest in the future of their department or discipline, or pass along the good mentoring they received earlier in their career.

Many mentors cite personal fulfillment as the main reason they mentor, but the benefits can go beyond altruism. The mentoring relationship can build into a mutually beneficial partnership. Although I dwelled on the examples of the professor/graduate student relationship and junior/senior faculty colleagues, the basic elements I discussed are relevant to a range of relationships both in industry and academia. Over time, the best of these relationships will end with equals.

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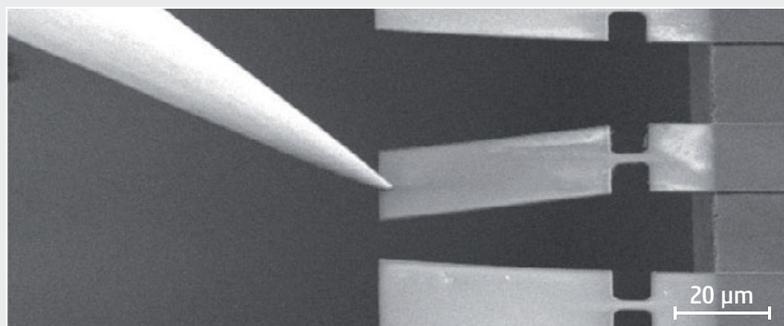
# *in situ* NanoProcesses



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## Heating effects

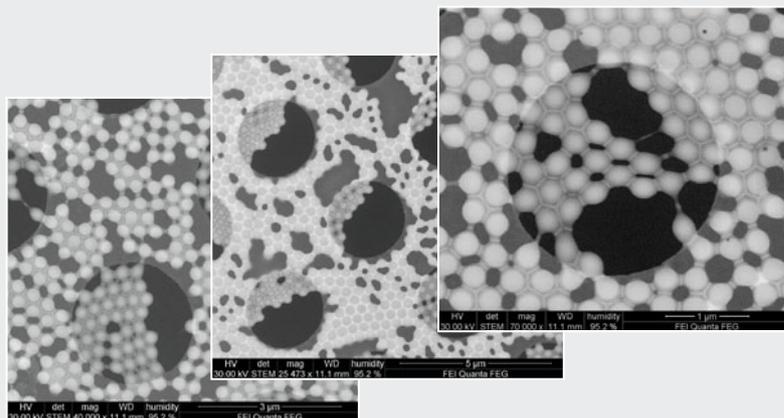
*in situ* heating of metal spheres allows monitoring of surface morphology development



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