Douglas Cochran

Another Kind of Service

Across many professional fields, service is regarded as an important component of professionalism. For those of us who work in academic settings, service stands alongside teaching and research as a pursuit our institutions use to gauge our contribution to their missions. Through most of my engineering career, which began in industry and later brought me to academia, the word "service" generally brought certain activities to mind: working on a committee, helping out with some conference activity or editorial function, or judging in the local science fair. And, of course, reviewing that big pile of ICASSP submissions that always seems to turn up at the busiest time of the year.

In 1999, at a workshop in Illinois (was I serving on the organizing committee for that meeting?), Dennis Healy approached me about the possibility of coming to the Defense Advanced Research Projects Agency (DARPA) to succeed him as program manager for the Applied and Computational Mathematics Program (ACMP). The portfolio of this program contains many of DARPA's research projects in signal processing, image processing, and closely related areas. As we discussed this position, a list of reasons not to apply for it quickly formed in my head. First off, I already had a job. In fact, things were going reasonably well for me at Arizona State University (ASU). I had recently been successful with a couple of new grant proposals and was looking to start two or three new doctoral students to replace some of those who were finishing up. Andreas Spanias and I, together with several of our close colleagues, had

just survived running ICASSP'99, and it looked like I would finally have time to write up some neglected research results for publication. Reconstruction of my house after a major fire had recently been completed, and I wasn't anxious to sell it or rent it out to someone who might ruin the new carpeting. Yes, this was looking like a no-brainer: I'd just tell Dennis how much I appreciated him thinking of me, mumble something about how I might consider it in the future, and then get back to the poster session. But then he started talking about "service." The part I remember was to the effect that our colleagues, including the 100 or so engaged in animated technical discussions around us, depended on having capable people serve in positions that develop new research initiatives, allocate project funding, and represent their interests and the value of their contributions within agencies and other bodies where decisions about allocation of resources are made.

Actually, I thought of several more reasons not to go to DARPA before accepting a position there. And I learned a few more reasons not to undertake this kind of service role in the process of performing it. But, as I return to my academic position at ASU after nearly five years in Washington, DC, I am more convinced than ever of the valuable role this sort of service plays in our profession.

WHAT'S THE JOB?

During my time at DARPA, I had the opportunity to interact with many program officers, program managers, program directors, and individuals with similar job titles at numerous government agencies and a few private foundations. While most of these were people at

agencies in the United States, enough were from other countries to leave me with the impression that substantial similarities exist in the nature of research funding processes in Australia, Canada, Europe, Japan, the United States, and probably elsewhere as well. In some agencies and organizations, positions like this are held by permanent employees. Many use "rotators," people borrowed for one to five years from industry, academia, or government, to staff a substantial fraction of these positions. In all cases of which

In this issue, we are fortunate to have Prof. Douglas Cochran of Arizona State University advise us on the importance of service to our community. He gives us a unique perspective on service following his experience as program manager for the Applied and Computational Mathematics Program at DARPA. Funding and other resources for R&D in signal processing and related areas are managed by program officers in government agencies, private foundations, and industry. People in these positions are also often influential in setting directions and priorities at the foundations of engineering and science. Prof. Cochran discusses the importance of having capable representatives of our profession serve in these roles, both in long-term capacities and as "rotators." He also outlines some of the challenges faced by individuals who choose to undertake these roles and the professional growth that can be realized as a consequence of such service. I encourage you to read this very interesting article and hope it inspires you to serve our profession.

—Arye Nehorai
"Leadership Reflections" Editor

I'm aware, a common feature of this kind of job is the opportunity to meet and work with many people at the leading edge of our profession and the privilege of first-hand exposure to new ideas about which they are most excited.

Beyond certain similarities, however, the day-to-day nature of working in this type of position varies quite a bit. Some agencies and foundations, such as the U.S. National Science Foundation (NSF) and the Australian Research Council, have charters to support excellent research spanning broad areas of science and technology. Others, like DARPA and the European Space Agency, have more of a mission orientation and support projects that contribute to that mission. In all the cases I have observed, though, the job generally entails a blend of administrative, entrepreneurial, and research activities.

Typical administrative functions include coordinating proposal reviews, processing grants and contracts, and managing finances. Oversight of ongoing projects, which may involve program review meetings and site visits, is also important in some cases. The entrepreneurial role involves such tasks as development of new program initiatives, from conception through solicitation, execution, and ultimately transition into practice. This aspect of the job provides an outstanding platform from which to advocate the value of maintaining a healthy R&D funding base for our profession. It also allows one to work closely with people from other areas of engineering and science to realize new opportunities for interdisciplinary programs.

The nature of "research" one can undertake from a position of this kind seems to vary substantially from agency to agency, from country to country, and from person to person. In my own case, it was very difficult to find time while at DARPA to sit down and work on research problems in the way I could in my university job. On the other hand, I believe my own personal corpus of technical knowledge and interests were augmented in ways that would not have come about at the university. As I resume my academic job, I am excited about undertaking a more hands-on research role in areas I have learned about during the past five years in my service position. And I am also looking forward to collaborating with people from a wide spectrum of engineering and science disciplines who I met while at DARPA. It is worth commenting that my own experience does not reflect the only possibility. I have watched, with admiration and a bit of jealousy at times, certain colleagues in similar service roles continue to engage in substantial levels of research activity, in one case even taking a Ph.D. student from start to the finish of an impressive dissertation project!

SOME PROS AND CONS

As mentioned above, I view service of this kind as essential to the vitality of our profession. This, in my mind, is the paramount reason for considering it. At a more individual level, such service also provides opportunities for professional growth in several directions, including development of skills that may qualify one for new career avenues. Beyond these things, the job can be fun—at least it was for me at times. Colleagues and friends phone or come by to talk about what is exciting them. There may be chances to visit labs and other facilities, perhaps to witness breakthrough experiments first-hand. Such opportunities arise in connection with the importance of people in these positions being informed about the state-of-the-art. And there is a certain satisfaction to seeing one's own views about important R&D directions reflected in small ways within our community and massively leveraged by the community's innovative ability and creative talent.

I have already listed a few reasons that one might be dissuaded from considering a service position like this, most of which have to do with disruption of personal and professional life. And, well, the job's not always fun. There are, of course, the usual things that make our jobs less than bliss: deadlines, travel, etc. Specific to this kind of position, whether it is managing a major European Union research initiative or a small internal R&D (IR&D) fund in a company, is that there never seems to be enough money to adequately support all the good ideas proposed. So people have to be turned down. A lot of people, actually, some of whom are friends and close colleagues. Sometimes even ongoing projects have to be terminated. Most people accept negative outcomes graciously, understanding that limitations of the system necessitate such rejection, that proposal evaluation is usually undertaken by panels rather than individuals, and that high-level budgeting priorities flow down to affect individual projects. But some get pretty mad. A few former program officers have even told me they have encountered especially harsh anonymous peer reviews of papers and proposals after returning to the research mainstream. Maybe there is some truth to this, though I prefer to think of the profession in a more altruistic light.

So, at an individual level, the case for serving in this type of job, while having some compelling points, is not exactly a slam dunk. Yet I believe the fact that our profession needs capable people in these positions is indisputable. And success at the larger scale depends on success at the individual level. I propose that it might be time for the IEEE Signal Processing Society to consider what we can do to help encourage our membership to represent us in this way.

INSTITUTIONAL ENABLERS AND BENEFITS

Convincing an individual to consider undertaking a service role of this magnitude is often only half the battle. In the case of rotators, there is generally a home institution that has to cooperate in the process.

ASU was particularly gracious in accommodating my interest in taking on a temporary, though not short-term, position away from campus. My department chair, Steve Goodnick, and dean, Peter Crouch, were both supportive in making the internal arrangements, some of which were without direct precedent at ASU. They also took an active interest in keeping my ties

with the university strong while I was away. I would like to believe their willingness to loan me out to the U.S. federal government for such a long period will prove to be worthwhile from an institutional standpoint. Certainly, I feel some confidence in coaching ASU colleagues, especially younger faculty members, through the intricacies of obtaining research funding from U.S. government agencies. As I resume work at the university, it is clear that the administration has viewed my time in Washington, DC, as an investment that will enhance the institution's experience and skill base.

While it is too early to tell whether ASU's investment will pay dividends, I would encourage colleagues in influential positions to be supportive of capable people taking such service roles. This is important both for the good of the profession and as a vehicle for strengthening your own organization's base of experience and skills. Agencies that use rotators, in particular, generally have well-developed mechanisms to accommodate temporary arrangements with a

minimum of bureaucratic pain (and, occasionally, some modest benefits) to the rotator's home institution.

I suppose I would be remiss if I did not mention the possibility that the people loaned out in this way won't come back. My experience suggests that the probability of this happening is directly influenced by the relationship maintained with the home institution during the rotation period. Even if the person ultimately does not return, efforts on the part of the home institution to keep up ties can be worthwhile; people who give it a try often find the role of program officer suits them well and end up taking this kind of job under a longer-term arrangement.

THE PITCH

As a closing note, although my departure from DARPA leaves the mathematics program in the very capable hands of Carey Schwartz and Ben Mann, I don't think either of them would claim to have the same signal processing and control systems interests that I do. In fact, over the past year or so, Carey, Ben,

and I have actively sought someone on the theoretical end of signal processing, or perhaps in information theory or control science, to succeed me in ACMP. To this end, I have engaged many colleagues in the same sort of conversation Dennis Healy broached with me in that 1999 workshop in Illinois. And the response was usually about the same: "Well, I already have a job. And my research is going pretty well right now—I just got two new grants from NSF. And the kids wouldn't want to change schools this year. But maybe in a few years . . ." Naturally, I play the "service" card. But it hasn't worked. Yet. I am indebted to Arye Nehorai for the opportunity to play that card in this forum, not just on behalf of the DARPA ACMP, but also in the broader interests of our profession, which has an ongoing and worldwide need for capable people to undertake this kind of service.

AUTHOR

Douglas Cochran holds Ph.D. and M.S. degrees in applied mathematics from Harvard University as well as degrees in mathematics from the University of California at San Diego and the Massachusetts Institute of Technology. He is on the faculty in electrical engineering and mathematics at Arizona State University and is currently serving as assistant dean for research in the Ira A. Fulton School of Engineering. Between October 2000 and June 2005, he was program manager for Applied and Computational Mathematics in the DARPA Defense Sciences Office. He was general cochair of ICASSP'99 and cochair of the first U.S.-Australia Workshop on Defense Applications of Signal Processing (DASP'97). He was an associate editor for *IEEE Transactions on Signal Processing*. He spent a year as a visiting scientist at the Australian Defence Science and Technology Organisation. Prior to joining the Arizona State University faculty in 1989, he was senior scientist at BBN Technologies. [SP]