5.5 NSF ERC Program Support for Industrial Liaison

The National Science Foundation is a catalytic partner in each ERC. It selects experimental situations to leverage federal resources with those from industry and other private sources in targeted technology development. This section summarizes the best practices of ERCs in using the NSF relationship to fulfill the industrial liaison function.

5.5.1 Importance of NSF Imprimatur to ERCs

The NSF imprimatur lends credibility to a center. In addition, the opportunity to leverage industrial funds with NSF funds is attractive to sponsors. The tie to NSF also lends support to the centerâ€™s pursuit of long-term or basic research. The ERC has an NSF-funded management and operations infrastructure that makes the difference between a mere collection of faculty and a cross-disciplinary center with an ambitious mission. In a center that is in start-up mode, the NSF connection is especially critical. Some ERCs report that, without the NSF leveraging, they would not exist. Others, after NSF support has lapsed, are testing the NSF imprimatur as â€œgraduatedâ€• ERCs. The great majority (over 80%) find that they do maintain reasonable industrial support from the established membership, based on their track record and reputation, although in many cases the nature of the relationship changes, as does the configuration of the membership.

5.5.2 NSF Support for Industrial Liaison

An ERC is expected to have an active, long-term partnership with industry and practitioners in planning, research, and education so as to achieve a more effective flow of knowledge into innovation and to help the ERC produce a new breed of engineers. Since the circumstances for each ERC vary greatly, the methods of achieving this expectation are very different. However, there are many similarities across the ERCs, as well as lessons each can learn from the others. Consequently, NSF has created periodic forums in which ERCs can draw on the knowledge and experiences of others. Those of most value to the ERC Industrial Liaison officer are:

- ILO closed sessions and breakout sessions before and during the NSF ERC Program meeting (now held every other year, usually in late November);
- NSF-sponsored ILO retreats organized by the ILOs to focus on topical issues of importance to active ERCs;
- Monthly ILO Working Group web conferences organized by NSF to disseminate information of use to the ILOs and gain feedback from the ILOs regarding program policies and operational procedures; and
- ILO consultancy visits to train new ILOs (generally in the first 18 months after a new ERC is established).

The biennial Program meetings are intended to bring together key people involved in the industrial liaison function from new, existing, and graduated ERCs to promote cross-fertilization, establish networks of contacts, share experiences and insights, and open channels of communication. The consultancy is a team of experienced ILOs who visit new ERCs and ERCs with new ILOs to provide personalized guidance and insight into establishing more effective industry collaboration and technology transfer.

5.5.3 NSF Program Director Role in Industrial Liaison

To foster an appropriate ERC environment and provide a personal line of communication, NSF assigns each active ERC a Program Director (PD). PDs provide guidance to ERCs based on experience from other situations and technologies. They also play a vital role in communicating the ERC culture and philosophy to industrial members. The following suggestions are provided as ways to build a trusted partnership between NSF, industry, and the ERC:

- Invite the PD to industry meetings, perhaps via electronic means, to communicate the NSF ERC culture and philosophies;
- Encourage industry to communicate directly with the PD if there are pressing issues, both positive and

negative; and
- Although preparing the industry SWOT analysis is typically a closed-door activity, the PD should be invited to help focus the discussion. This is especially important in the early years of an ERC. Depending on the circumstances, the PD might be invited to provide a few remarks at the beginning and then leave, or to remain as an observer or facilitator.

5.5.4 NSF as Evangelist and Shepherd

The ERC Program is a new paradigm for academia, with two new strategies. One strategy is to create a large, multidisciplinary, coordinated research center, where professors from numerous fields collaborate to address complex problems from a systems perspective, under the leadership of a Center Director. This strategy is substantially different from the traditional academic model, in which professors work independently on isolated issues and collaborate only on an ad-hoc basis. The second strategy is to operate as an ongoing partnership with industry and innovation partners, ultimately to attain a state of financial self-sufficiency (that is, independence from NSF core ERC funding). This strategy also differs from the traditional model, in which only a small fraction of professors collaborate with industry on an individual basisâ€”not as part of centers with strategically integrated research and education programsâ€”and often only for defined periods and projects, not on an ongoing basis.

The ERC paradigm is innovative and has already provided many benefits to the nation. Still, since the ERC Program challenges the traditional academic culture and traditional views of university-industry collaboration and innovation partnerships, some faculty in the departments and even in the center may be resistant to aspects of the program. Such resistance can be burdensome to a Center Director and the other members of the leadership team. Even among those not directly resistant, time is required to change their outlooks and get them to subscribe to the ERC concept. Over time, however, the ERCs have had a cumulative impact on academic engineering in the US that has softened this resistanceâ€”part of the â€œculture changeâ€• envisioned in the original founding of the Program.

NSF serves a vital role as evangelist and shepherd of the ERC concept for both the faculty and industrial participants. The Foundation helps sell the ERC model not only at the beginning of the center, but on a continuing basis, as new participants are added. It helps guide participants away from old ideas and paradigms, toward the current best practices of a strong ERC. Critical assessment of the centerâ€™s progress is crucial to this role, as is the firm but gentle use of the shepherdâ€™s staff.

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