am writing this article from a different perspective than that of my colleagues, namely, viewing technology transfer from university to industry. While I am now the director of an industrial research lab, many of my views were formed during my academic years, while establishing industrial affiliates programs at two universities, and benefiting from industrial support for my reward.

A set of guiding principles for effective university to-industry tech transfer has emerged from these experiences and from many discussions with colleagues in industry and academia. Briefly, these principles are:

- Tech transfer is a contact sport. People, not papers, transfer technology. This means that faculty members and their industrial counterparts need to get to know one another by visiting, by giving talks, and by in-depth discussion of technical issues. Graduate students spending a summer at an industrial lab facilitate immediate tech transfer. Once there is a relationship with the graduate student, he or she can help with detailed questions about a piece of research work—having done the implementation or knowing who did. Then, too, graduate students may be hired permanently by the industrial lab, effecting the ultimate form of tech transfer!

- Relationships between professors and industrial researchers must be built and nurtured over time. This argues against the one-year “feel good” funding agreements (from which many of us have benefited) wherein a company, sometimes at the instigation of senior management, awards funding to Professor X at well-known University Y. The problem is there may be no one at the working level in the industrial lab who is motivated to interact with Professor X. On the other hand, such arrangements can lead to more substantive relationships.

- In contrast to the one-year, top-down initiated research project, I believe in multiyear, bottom-up initiated research. This is because tech transfer is a grassroots effort—it requires buy-in and active participation from those who are in the trenches, namely, the faculty and graduate students at the universities and the researchers and developers in industry. This buy-in comes with a research agenda that is jointly developed and based on a true mutual understand-
ing of what is expected of each partner.

• Professors and graduate students will benefit by understanding the sponsoring company’s strategies for taking their idea and moving it into a larger context and (potentially) into a product. While journal and conference papers are an important “coin of the realm” in academia, so too is demonstrating the real-world impact of one’s research ideas by seeing them implemented within a product. As well, academicians do derive considerable self-satisfaction from “shipping” a product. So, their motivation will be enhanced if they understand the strategy. Furthermore, professors and graduate students sometimes have only a partial understanding of the complex process of turning a research prototype into a product. By fully understanding the product development cycle, academicians will gain a more realistic view of their roles in the process.

• Similarly, industry researchers, managers, and engineers will benefit from understanding exactly what to expect—and not to expect—from their university partners. Some companies expect product-quality code, documentation, and test plans as part of a research project. It is the rare academician who has both the expertise and motivation to produce products (at least not in their professorial role—the entrepreneurial spirit is alive and well among professors, and many a research prototype has been converted into a product by a professor’s start-up company).

• While tech transfer must be a grassroots effort, it requires support from the top, to counterbalance the risks inherent in establishing research collaboration with a university. After all, the results may not be what was expected, or the transfer strategy may fail, or the people may not work well together, or, or, or, or, . . . .The risks are borne by the group or person that establishes the relationship. Tech transfer takes time, but over and over again I see a staff member being asked to take a risk by establishing and supervising a university relationship without being given any time: “Yes, of course you should work with Professor Smith at State University—but please remember that our release deadline is coming up in three months.” Or, a group manager has to decide whether to spend project money on a research project or on the additional staff member who is needed to meet a deadline. The risks are ameliorated by top management support for and recognition of the individuals, and by having a separate source of funding for the research projects.

• Develop the proof of concept prototype using the sponsor’s hardware and software. This allows the sponsor’s staff to experiment easily with the prototype, making it more real and immediate, more approachable. Yes, we all know that a prototype will be completely rewritten by the time it finds its way into a product, but a mandatory initial rewrite represents a big investment before the company can readily begin their own process of experimentation, enhancement, and hardening.

How should we define successful technology transfer?

Foley: By the extent to which the research affects the success of a product in the marketplace. This is a very pragmatic answer based on the belief that the most important measure of success is impact.

Kuchinsky: Ultimately, success should be measured by the bottom-line dollar value of products and new businesses enabled by the technology that is transferred. Contributions that result in internal cost savings or in the dissemination of useful ideas are also important, but I have observed them to have a lower priority to our partners in product groups.

Scholtz: Research that either leads to a product that is directly successful or to the creation of a new market based on that technology. That means someone can see the benefit of the product or, if not, at least the product demonstrates the benefit of the technology.

Johnson: The bottom line is that the product organization feels that it is better off as a result of input from the research organization. Anything that achieves that result is a successful technology transfer. For example, a product organization may receive:

• A prototype that can be refined into a promising product.
• An idea for a promising product.
• Technology or ideas that enhance an existing product.
• Feedback that a project it is working on is headed for failure.
• Input that helps it design a better product, but isn’t itself a product.
• Practices that make its operations more efficient.