

# The Buffer Zone

**A**cademic researchers tend to do science in an environment that is conducive to the pursuit of basic knowledge and curiosity-driven research. This atmosphere and its typical scholastic hierarchical structure shape the cultural ethos of academic researchers to a large degree. University research scientists often regard themselves as an elite and nonacademic scientists as poor cousins in the research family.

On the other hand, the industrial research culture is primarily driven by results-oriented corporate goals. In this focused, real-world environment, one's place in the professional hierarchy seems to matter less than practical accomplishments and deadline, financial, and market considerations. The distinct commercial flavor of industrial science runs counter in many ways to the environment in academic laboratories.

There are noted exceptions to this rule—industrial laboratories that are practically indistinguishable from those in the university, and where scientists are judged by the same criteria and publish their results in the same scientific journals as academic researchers. Institutions such as Lucent Technologies' Bell Laboratories, IBM's Thomas J. Watson, Almaden, and Zurich research centers, and the Xerox Palo Alto Research Center primarily carry out fundamental research, often employ former university faculty, and even produce Nobel laureates. However, such places are declining in number as bottom-line concerns push basic research further out of the corporate realm.

Between industry and academia, however, there exist organizations that science-and-technology policy expert Harvey Brooks once called "buffer institutions." Brooks, now Benjamin Peirce Professor of Technology and Public Policy, emeritus, at Harvard's John F. Kennedy School of Government, believes that these organizations play a key

role in "buffering" or facilitating interactions between industry and academia. This role is particularly important because such interactions can contribute to technical advances in both research realms through the informal sharing of scientific information. Information sharing is particularly significant where developments in basic academic research can help improve the more commercialized products

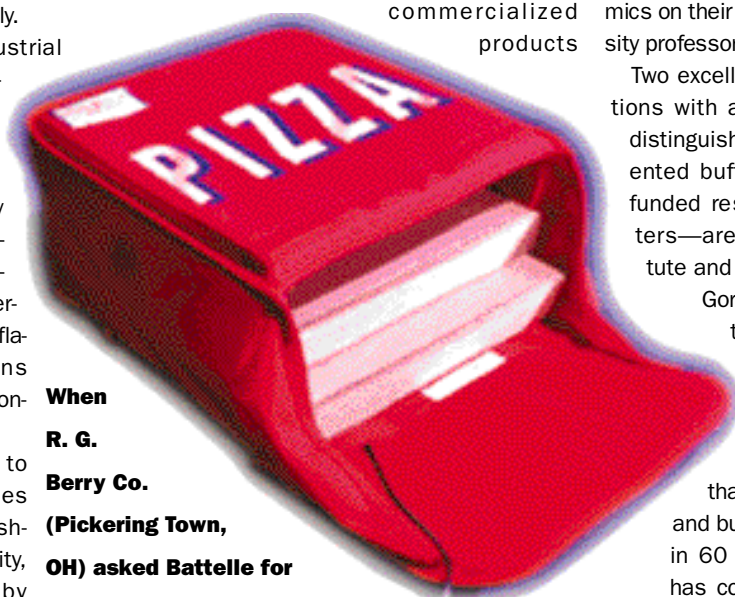
worlds in several ways. For instance, they tend to have a large proportion of Ph.D. scientists, who participate in university conferences, co-author papers with their academic counterparts, and serve as visiting faculty members at universities. These same scientists bring their expertise to bear on the projects they perform for industrial clients. Many buffer institutions have prominent academics on their boards and make use of university professors as consultants.

Two excellent examples of buffer institutions with a strong industrial focus—as distinguished from more government-oriented buffer organizations or federally funded research and development centers—are the Battelle Memorial Institute and SRI International.

Gordon Battelle, an early leader in the American steel industry, founded Battelle Memorial Institute (Columbus, OH) in 1925 as a nonprofit corporation. Today it employs more than 7,000 scientists, engineers, and business experts and has offices in 60 locations worldwide. Battelle has contracts with more than 1,400 companies and government agencies, and its annual volume of business is said to be worth more than \$1 billion.

The institute receives 50 to 100 patents annually. It is divided into three sectors: commercial, government, and national laboratory management. The government division works primarily with federal agencies, while the national laboratory division manages the operations of Brookhaven National Laboratory, the National Renewable Energy Laboratory, and Pacific Northwest National Laboratory under contract to the U. S. Department of Energy. Battelle's commercial business division caters to companies involved in medical products, pulmonary therapeutics, pharmaceuticals, agrochemicals and food systems, automotive technology, and energy products.

Battelle holds a significant place in the annals of American R&D. For instance, while working under contract to Xerox, Battelle



## When

**R. G.**

**Berry Co.**

**(Pickering Town,**

**OH) asked Battelle for**

**help with a pizza box, Gideon**

**Salee designed an enclosable polymeric gel that is heated electrically and then changes phase back to a solid during delivery to maintain temperature.**

in industry. However, the differences in communication styles and the general cultural divide that exists between the two sectors often impede these interactions.

Buffer institutions, in Brooks' view, "translate knowledge into application," in the sense that they pursue academic research findings further downstream in development than universities tend to do. Typically, they do so under contract to a company or government agency. Most operate as nonprofits and usually have their own permanent staff with a career ladder that is more like that of industry than academia.

These organizations form a cultural bridge between corporate and scholarly research

researchers were instrumental in helping to develop the office copier, and they reaped more than 250 patents in the process. Its scientists played a leading role in developing the machine-readable bar codes now used in product manufacturing, distribution, sales checkout, and inventory control. They also helped the U.S. Treasury Department develop the “sandwich” format for fabricating dimes, quarters, and silver dollars.

The institute’s commercial products division has its own facility, which houses what it calls the Breakthrough Center. This center assists customers through all phases of the product cycle by providing them the technical grounding for an initial concept and the business–market orientation needed for a product’s subsequent development, testing, manufacturing, and marketing phases.


Within the commercial division, the product development group helps clients develop innovative technologies with an eye to the bottom line by providing expertise in

market assessments, engineering and industrial design, embedded software, human factors, regulatory strategy if needed, and manufacturing to achieve best unit cost. The commercial division also has the resources to assist customers in identifying appropriate materials, adhesives, coatings, or packaging; benchmarking and testing; using smart products such as sensors, smart cards, and intelligent materials; and with energy systems and information technology.

Another buffer institution, SRI International (Menlo Park, CA), began in 1946 as the Stanford Research Institute, an appendage to Stanford University. It became an independent nonprofit in 1970 and now has two subsidiaries, SRI Consulting and Sarnoff Corporation (formerly RCA Laboratories), and multiple spin-off companies. SRI has a staff of more than 2,700, and it reported revenues of \$362 million for 1997. Approximately half of its clients are industrial, and

the rest are from government.

SRI’s core areas of business are information science and software development, communications technology and systems development, sensors, automation and robots, national security, product design and engineering, chemicals, energy, materials, pharmaceuticals, medical devices, and consulting services for policy and business-related issues. It has specialized facilities and laboratories to support many of these areas, including an automation technology center, a remote site for testing explosives, and a radar research facility.

Independent research organizations such as these—with active ties to the academic research community and to the private sector—can form a key communications link between the two disparate and often incompatible research cultures. As such, they play a vital role in the exchange, dissemination, and advancement of scientific and technological ideas. 

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