CHARACTERISTICS AND TRENDS IN NORTH AMERICAN RESEARCH PARKS:

21ST CENTURY DIRECTIONS

EXECUTIVE SUMMARY

Battelle
The Business of Innovation

PREPARED BY:
Battelle
Technology Partnership Practice

ASSOCIATION OF UNIVERSITY RESEARCH PARKS

DEVELOPED IN COOPERATION WITH:
Association of University Research Parks

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The Association of University Research Parks is a non-profit organization that promotes "the development and operations of research parks that foster innovation, commercialization and economic competitiveness in a global economy through collaboration among universities, industry, and government."

Battelle is a global leader in science and technology. Headquartered in Columbus, Ohio, it develops and commercializes technology and manages laboratories for customers. Battelle's Technology Partnership Practice includes leading-edge practitioners and analysts who are experienced in conceptualizing and designing research parks built around universities and other research institutions.

EXECUTIVE SUMMARY

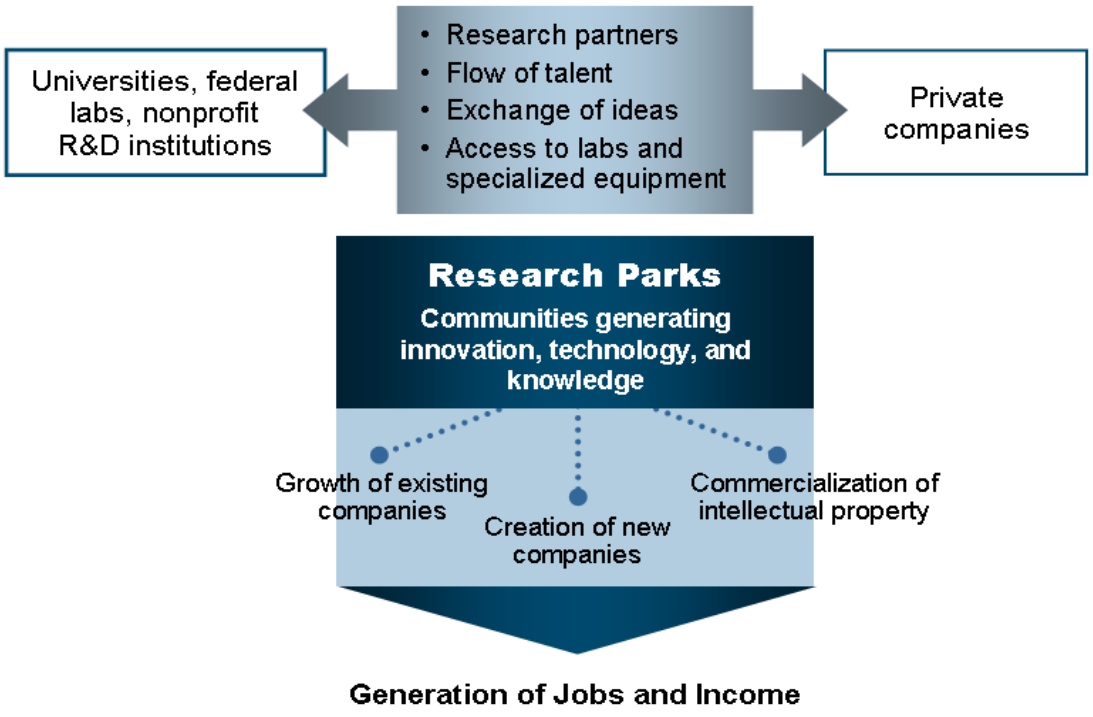
- *University research parks in the United States and Canada encompass more than 47,000 acres and include 124 million square feet of space*
- *At full buildout, these research parks will include 275 million square feet of space*
- *More than 300,000 workers in North America work in a university research park*
- *Every job in a research park generates an average of 2.57 jobs in the economy*

Research parks are emerging as strong sources of entrepreneurship, talent, and economic competitiveness for regions, states, and nations. They have become a key element in the infrastructure supporting the growth of today's knowledge economy. By providing a location in which researchers and companies operate in close proximity, research parks create an environment that fosters collaboration and innovation and promotes the development, transfer, and commercialization of technology (Figure ES-1).

To better understand how research parks are changing and their role as drivers of economic development, Battelle partnered with the Association of University Research Parks (AURP) to conduct a comprehensive assessment of research parks in the United States and Canada. This report presents the findings from a survey of research park directors that requested data on park characteristics, input on trends in university research park development, and data to measure the economic impact of research parks. The survey was sent to 174 university research parks; 134 parks (77 percent overall) responded. Key findings of the survey are discussed below.

A total of 134 North American university research parks responded to the Battelle-AURP survey, resulting in a response rate of 77percent.

Figure ES-1. Research Park Concept



Research Parks in 2007

Overview

University research parks in 2007 encompass more than 47,000 acres and include 124 million square feet of space in 1,833 buildings. While parks report that an average of 86 percent of available space is currently occupied, 94 percent of the parks report that they have room for expansion. At full buildout, of the 35,354 acres projected to be developed, approximately 22,000 (62 percent) are currently developed and less than half of the estimated total square feet (275 million) is currently open. Parks range in size from 2 acres to 7,000 acres, with an average size of 358 acres; half of the parks have 114 or fewer acres, suggesting that a number of very large parks are raising the average.

The typical North American research park is located in a suburban community with a population of less than 500,000. Most parks are operated by university or university-affiliated nonprofits. Tenants are primarily private-sector companies; but, parks also include university and government facilities. University research parks provide a range of business services to their client companies, many through incubators. The typical park has an operating budget of less than $1 million a year, and most parks have limited profitability.

The typical park has 750 employees with employment primarily in the following industry segments—IT industries, drug and pharmaceutical firms, and scientific and engineering service providers—accounting for 45 percent of all university research park jobs. The total employment impact for the 107 parks that provided data on industry employment totaled almost 680,000 jobs. Every job in these research parks generated 2.5 additional jobs in the economy. Battelle estimates the total employment impact of all research parks in the US and Canada to be more than 750,000 jobs.

Table ES-1 presents a profile of a typical North American research park.

Today's Research Parks

Today's research parks differ substantially from the model that emerged in the 1960s and 1970s (Figure ES-2). Most early research parks were first and foremost viewed as real-estate development projects. They were often developed on vacant land in proximity to a university or other research institution and provided an attractive, campus-like setting. It was assumed that firms would be attracted by proximity to the research institution. These parks focused on recruiting operations of primarily large, technology-based companies; but, in reality, the companies that located in the parks usually had few, if any, actual ties to the university.

In the 1990s, research parks began to look for ways to be more attractive to technology companies. Many sought to attract research and development (R&D) facilities that could anchor the park and attract other tenants. They also began to provide incubator space and build multitenant space to accommodate entrepreneurs and smaller, start-up firms.

Key Findings

Today's research parks have become key drivers of regional development. Following are key findings regarding today's research parks.

- **Research parks are placing greater emphasis on supporting incubation and entrepreneurship to grow their future tenant base and less on recruiting.** Of the research park directors responding to the survey, 95 percent indicated that creating an environment that encourages innovation and entrepreneurship is a high priority, with 71 percent indicating it as a very high priority for their park.
- **Research parks are more likely to be targeted to particular niche areas.** To compete in technology development, a region or state must differentiate itself and cultivate and sustain specialized areas of expertise where it can be a world leader. As a result, it has become more common

Table ES-1. Profile of a Typical North American Research Park*

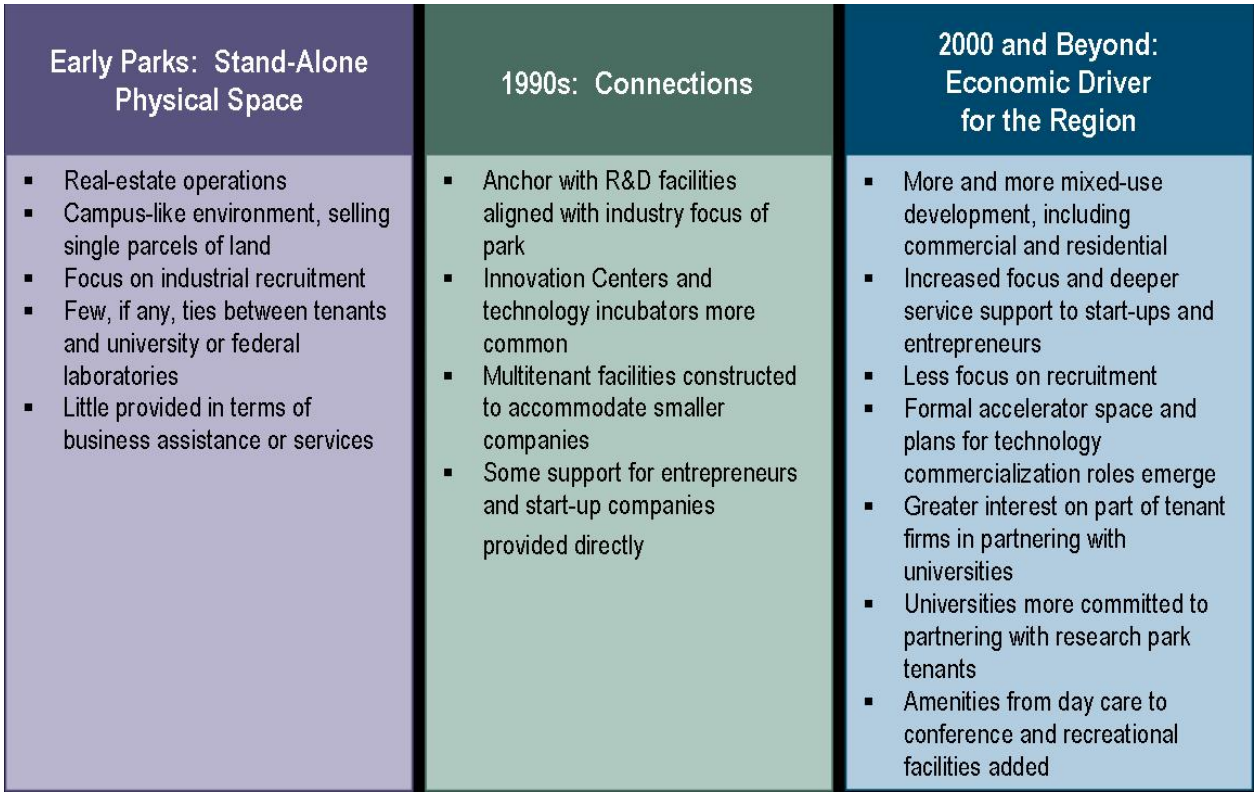
	Typical Research Park
Size	▪ 114 acres ▪ 6 buildings ▪ 314,400 sq. ft. of space, 95% occupied ▪ Only 30% of total estimated sq. ft. at buildout currently developed ▪ 30,000 sq. ft. of incubator space
Location	▪ Suburban community ▪ Less than 500,000 population
Governance	▪ Operated by the university or university-affiliated nonprofit
Tenants	▪ 72% are for-profit companies ▪ 14% are university facilities ▪ 5% are governmental agencies
Employment	▪ Typical park employs 750 ▪ Major industry sectors: IT, drugs and pharmaceuticals, and scientific and engineering service providers
Finances	▪ Less than $1 million per year operating budget ▪ Revenues primarily from park operations but funds also come from universities and state, local, and federal government ▪ Limited or no profitability; 75% of the parks have no retained earnings or retained earnings of less than 10%
Services	▪ Provide a range of business and commercialization assistance services, including ▪ Help in accessing state and other public programs ▪ Linking to or providing sources of capital ▪ Business planning ▪ Marketing and sales strategy advice ▪ Technology and market assessment

*Data cited for typical parks are based on median for all research parks responding to the survey.

Research Parks Are Succeeding in Incubating and Growing Companies

- Nearly 800 firms graduated from park incubators in the past 5 years
- About one-quarter of these graduates remain in the park
- Only 13 percent failed
- Less than 10 percent left the region

Figure ES-2. Evolution of Research Park Model



for research parks to focus on identified technology areas or industry clusters.

- **Research parks are being viewed more as an expression of commitment to economic development.** Two-thirds of respondents indicated closer involvement by university leadership and more emphasis on university involvement in the past 5 to 10 years.
- **Park directors report that the primary reason why tenants locate in a university research park is to access a skilled workforce, including students.** Eighty-five percent of the respondents indicated that access to a skilled workforce was of high or very high importance to tenants.
- **University research parks use various mechanisms to foster university-industry relationships.** The most effective include having partnership-developer staff or others charged with relationship building between industry and departments, availability of university core user facilities open to industry, human resource matching programs such as internships and co-ops, and access to university research labs and university technology transfer and commercialization offices.

University Research Parks of the Future

A new model—strategically planned mixed-use campus expansions—is emerging that includes space for academic and industrial uses. These mixed-use campus developments are designed to create an innovative environment with a free and frequent exchange of information between academic researchers and their industry counterparts. Key features of these mixed-use developments include the following:

- Substantial space for significant future research growth
- Planned multitenant facilities to house researchers and companies

- Housing and other amenities attractive to young faculty, postdocs, and graduate students
- Flexible development options, some led by universities and others led by developers.

Amenities will be an important offering of future research parks. On-site amenities, such as restaurants and retail stores, are considered important in attracting innovation employees. Three-quarters of the respondents indicated a greater emphasis on amenities within the park now than 5 to 10 years ago; yet, the number of parks reporting such development was fairly small. This may be because parks have not yet been able to incorporate amenities or are having difficulty finding the financing to develop them. But, in the future, parks will likely need to include such developments.

The Future of Research Park Development

- A new model—strategically planned mixed-use campus expansions that include space for academic and industrial uses—emerges
- On-site amenities are critical to attract innovation employees
- Research parks serve as an effective tool to spur urban revitalization
- Research parks are used to leverage assets of non-university R&D organizations
- Research parks become leaders in sustainable design
- Research parks embrace global focus

Research parks are being developed in urban areas as a component of neighborhood revitalization plans, such as the park under development adjacent to Johns Hopkins University in Baltimore; the Center of Research, Technology and Entrepreneurial Exchange (CORTEX) in St. Louis; and Piedmont Triad Research Park in Winston-Salem. But, nearly half the respondents indicated that they did not think there was more emphasis on parks being built as part of a revitalization effort rather than as a greenfield development.

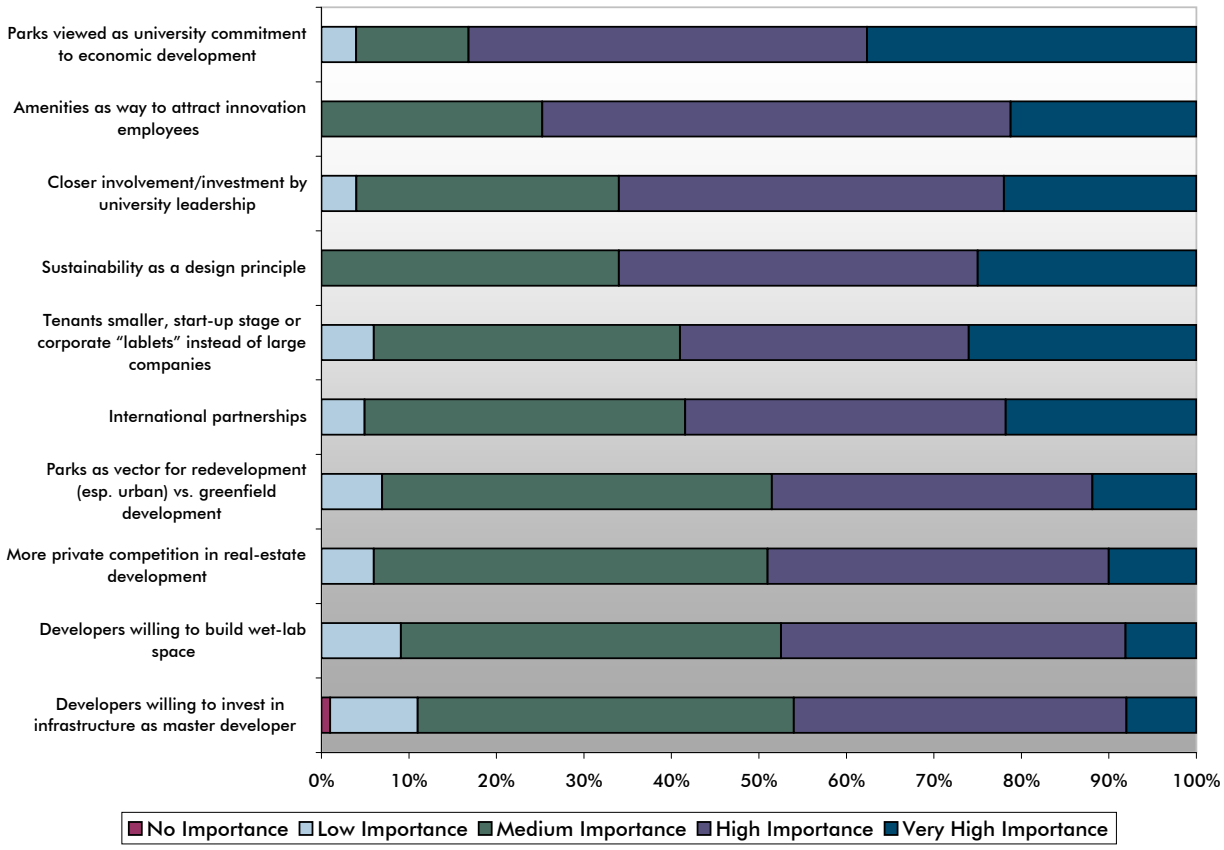
Research parks are being developed to leverage the assets of non-university R&D organizations such as federal laboratories. In addition to universities, major medical research centers and public and private research organizations can be key drivers of technology-based economic development (TBED). It is becoming increasingly common for communities in which a federal laboratory is located to create a research park to leverage laboratory resources to realize economic development.

More emphasis is being placed on sustainability as a design principle. Sustainable development involves balancing development needs against protection of the natural environment. In the future, it is likely that research parks will be developed to minimize impact on the environment and to use renewable energy sources and "green" building practices. Two-thirds of the respondents indicated that there has been an increase in the emphasis on sustainability in the past 5 to 10 years and this trend is likely to continue.

International partnerships are becoming more important in university research parks. Sixty percent of the research parks surveyed indicate that there was more emphasis on international partnerships in the past 5 to 10 years than previously, and park directors said that they expected to see parks attracting more international tenants and having more of a global focus in the future.

Figure ES-3 summarizes respondents' views on the importance of changes occurring in research parks during the past 5 to 10 years.

Figure ES-3. Importance of Changes in Research Parks in Past 5 to 10 Years



The 21st Century University Research Park: Challenges and Opportunities

Research parks are an important component of the innovation infrastructure needed to support today's knowledge economy, much as roads, bridges, and rail were critical to yesterday's industrial economy. Research parks have evolved and matured to become more integrally related to their higher-education partners and technology-driven tenants. ***But, there is still an unfinished agenda:***

- The multidimensional components of a business–higher-education partnership have not fully developed.
- Research parks face challenges as they continue to try to respond to the demands placed on them.

Challenges

Among the key challenges facing research park directors and institutions developing a research park are the following:

- **Overcoming commercialization challenges.** While university research parks can lead to commercialization of new technologies by promoting relationships between researchers and companies, moving innovation into the marketplace does not happen naturally or easily. A challenge for research parks will be to provide support services to ease the commercialization process.
- **Bridging cultural barriers between the academic and business communities and facilitating true partnerships.** Parks must

Challenges

- Overcoming commercialization challenges
- Bridging cultural barriers between the academic and business communities
- Achieving integration with the university
- Obtaining funding for operations and buildings
- Responding to increased competition owing to globalization and the changing nature of corporate R&D

continue to serve as an intermediary that understands both cultures and innovatively fosters integrated, collaborative efforts.

- **Achieving greater integration with the university.** Research park directors must continue to integrate the research park and its tenants into the fabric of the university.
- **Obtaining funding for operations and buildings.** Most research parks have very few resources in their early stages and do not generate sufficient revenue to be self-supporting. The need for capital will become even greater as research parks try to implement live-work-play models.
- **Responding to increased competition owing to globalization and the changing nature of corporate R&D.** Research parks in North America will be challenged to attract the operations of foreign companies and to retain the R&D operations of U.S. companies.

Opportunities

The challenges noted above also suggest opportunities for research park development. Research park managers will need to devote more attention and time to the following 10 areas as they evolve the 21st century research park model:

1. **Industry-university partnerships.** Research parks will need to expand the relationships and deepen the partnerships between industry and educational and medical institutions.
2. **Financing and support for commercializing intellectual property.** Research parks will need to offer funding and support for technology commercialization, including proof-of-concept funding.
3. **Retention and attraction of talent.** Research parks may be in a position to do more to retain, attract, and grow talent, from establishing advanced training facilities to partnering with community colleges to ensure a supply of skilled technicians.
4. **Speculative and surge space development.** In the old economy, local economic development agencies offered "speculative" (spec) space, paid for from community and federal funding sources, to fast-track recruitment prospects. In the knowledge economy, firms come and go more quickly, space needs change constantly, and flexible space will increasingly become the norm. Parks may be able to offer the equivalent of 20th century spec space in a 21st century innovation model, through a staged program of expanded multitenant space.
5. **Collaboration among firms and with other partners.** It is likely that technology tenants want more opportunities to network among each other and with sources of knowledge in labs, research organizations, and elsewhere. Parks will, in partnership with trade and other associations, need to increase their focus on tenants' networking needs and requirements.
6. **Safety and security.** Research parks may have a role to play in offering safe, secure environments for technology development. The post-9/11 world suggests the need for controlled access to key strategic technology assets, whether in education or industry. Parks may be well positioned to test, demonstrate, and pilot approaches to address secure and safe environments for replication in the world economy.

7. **Ongoing financial support.** For research parks to be drivers of economic development, they must continue to invest scarce resources in their quality attributes. As a result, most parks will continue to have limited retained earnings. Parks need diversified funding sources, and investments in research parks need to be considered as investments in a region's or nation's economic development infrastructure.

8. **Urban community revitalization.** Recently, a number of universities located in urban settings have begun to apply the research park concept not only to provide needed R&D space for academics and their industry collaborators, but also to stimulate the redevelopment of neighborhoods**.** Research parks may have a role to play in cities seeking to grow their technology industry base.

9. **Performance and accountability.** Accountability in public and private sectors requires that research parks continue to monitor their impacts and results. This survey was an important first step in developing baseline data on the economic impact of university research parks. Working collaboratively through organizations such as AURP, research parks should continue to develop and refine a set of appropriate metrics and explore various mechanisms to measure their impacts and successes.

10. **Value-added tenant services.** Parks in recent years have substantially increased tenant services, particularly to small, growing technology firms. But, the nature and portfolio of services desired in the future are likely to change. Research parks—because they are off campus—can do the applications work that complements the research focus of the medical center, lab, or higher-education institution. Parks may become a test bed for new ideas and approaches in building technology-driven firms and their products and processes.

Conclusion

Today's research parks differ significantly from their predecessors. A new model is emerging that includes

- **Planned mixed-use campus expansions** that provide shared space in which industry and academic researchers can work side by side. These developments embody a commitment by universities to partake in broader activities, offering companies high-value sites for accessing researchers, specialized facilities, and students and promoting live-work-play environments.
- A **strong focus on entrepreneurship and start-up and emerging companies.** Research parks are being used as a tool to spur homegrown business retention, expansion, and creation.
- **Comprehensive developments that offer** not only sites for companies and research institutions but provide **a full range of on-site amenities**, such as services, restaurants, retail stores, and, in some cases, housing.

Today's parks are creating an environment that fosters collaboration and innovation and leverages the talent and expertise of universities to drive TBED. Research parks have the potential to

- Translate discovery into application;
- Develop talent;
- Commercialize technology; and
- Integrate government, higher-education, and industry interests.

Achieving this potential, however, will require enlisting institutional leadership and community support, accessing sufficient capital for park development, and recognizing the long-term nature of this endeavor.

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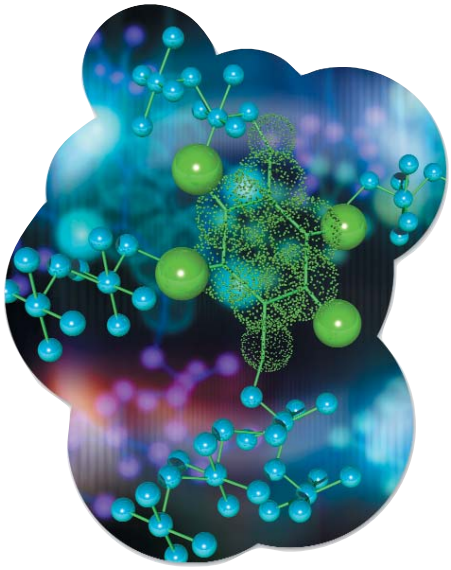

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