



## Breakthroughs in University Lab Design

The complexity in today's university laboratories requires an innovative project approach. The design team for the new Microbial Sciences Building at the University of Wisconsin-Madison faced a challenging interdisciplinary collaboration: three departments planned to share a lab space in a single building.



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This visionary concept in academia demanded an all-new project approach from the design teams at CO Architects, Plunkett Raysich Architects, LLP, (PRA) and lab consultant Earl Walls Associates (now a division of HKS Architects, Inc.). The project consolidates and enables UW-Madison's multidisciplinary program in Microbial Sciences.

This new approach to project development brought together an experienced architectural project team with the chairs of the Bacteriology, Medical Microbiology & Immunology and Food Microbiology & Toxicology Departments to identify goals for the new building and laboratories.

## **A Collaborative Approach Upfront**

Faculty and staff interviews revealed lab requirements, ways researchers from different departments would work together and ideas on how each department would use its space. Before design work began, team leaders from CO Architects, PRA, other consultants and engineering firms and department chairs met regularly for more than two years to provide input on the building's design and construction. This collaborative approach, which brought stakeholders into the project upfront, was critical to the design as well as the transition to construction.

## **Multidisciplinary Design Process**

The project approach requires a multidisciplinary design process and a building occupants committee that effectively represents all university stakeholders working cooperatively. It also requires a seasoned design team that understands the building type and effectively engages all university stakeholders. The design team must have the experience to ask the right questions and the patience to listen and learn about stakeholders before arriving at a solution. During the project, the team builds consensus among all stakeholders.

## **Cross-Department Synergies Result in Greater Scientific Advances**

The new Microbial Sciences Building brings to life the interdisciplinary research strategy envisioned by the

Bacteriology, Medical Microbiology & Immunology and Food Microbiology & Toxicology departments of UW-Madison. This groundbreaking approach creates opportunities for cross-departmental collaboration and the potential for greater scientific advances. Additional benefits include:

- **Sophisticated core facilities:** Faculty and students have access to sophisticated core laboratory equipment that would be too expensive for a single department to purchase.
- **Unique research laboratories:** The building has BSL-3 labs, BSL-3 Ag suites, and other specialized facilities, including a commercial kitchen for investigating the effects of microbes in food production. These laboratories are available to all building occupants. The facilities would have been underutilized otherwise and might have been too expensive for a single department.
- **Greater potential to attract funding:** By serving a larger multidisciplinary population of faculty and students, the program encourages collaboration, more effectively utilizes research resources, and generates interest in microbial research. These combine to attract gifts and to support grant applications.

Pooling resources and sustaining a preeminent position also improves academic outcomes. These programs support the recruitment and retention of outstanding faculty, support student outreach programs, and create opportunities for students to gain hands-on experience with sophisticated instrumentation. However, as with any innovative idea, this one faced challenges before its realization.

## **The Impact of Working Side-by-Side in the Same Laboratories**

With this interdisciplinary approach, researchers from the three collaborating departments work not just in the same building, but side by side in the same laboratories. To meet the researchers' diverse needs, our team created a two-atrium, six-level design scheme that features a combination of research neighborhoods and core facilities.

- **Research Neighborhoods** Each research neighborhood consists of an adaptable biosciences laboratory large

enough for up to four researchers, as well as an attached support space that can be subdivided into cold rooms, microscopy rooms, tissue culture rooms and rooms with other specialized functions. Researchers can connect to water, power, compressed gases, data and telecommunications at various points within the lab. Small clusters of office space surround the research neighborhoods, which are connected by the atriums. This design allows flexibility as research groups grow and shrink.

- **Core Facilities** The Microbial Sciences Building also accommodates core facilities, such as the BSL-3 labs and BSL-3 Ag suites, a research kitchen, core equipment area and crystal growth chambers. These facilities enable specialized research by all three departments.

### Balancing Secure Space and Open Space

Some research conducted in the UW-Madison Microbial Sciences Building requires high-level security. At the same time, collaborating departments wanted to include space for undergraduate instruction, so students and the public could become more engaged in this field of science. To achieve a balance of public and private space, our design team created two levels of the building for public use and integrated more stringent security capabilities for the other levels.

The PRA design purposely incorporates open space via the atrium scheme so researchers, faculty and students have areas in which to gather and exchange different points of view. The atriums have sitting areas on each level, and some areas also feature small cafes serving food and beverages.

### The Final Result

The 336,000-square-foot Microbial Sciences Building is a world-

class facility for multi-departmental instruction and research efforts. It houses 47 labs for 500 researchers, 11 instructional labs with 360 student stations, a vivarium, a state-of-the-art symposium auditorium and general classrooms.

### Taking Collaboration to a New Level

PRA's collaborative process has been instrumental in the project's success to date. By involving project stakeholders through the entire programming and design process, the firm effectively built consensus for design goals and solutions. The organization of the Building Occupants Committee and its members' commitment to making the project a priority have also contributed greatly to the collaborative process.

### Measurable Results

Within the first three years of the building's completion, it became home to the Great Lakes Bioenergy Research Center, one of only *three national centers* created by the U.S. Department of Energy to advance bioenergy research. The building also:

- houses core research facilities that fuel the work of more than **100 researchers** at UW-Madison and other universities
- secured over 105 research awards worth more than **\$21 million**
- disclosed over **21 new inventions** and
- hired **57** new staff to occupy the building, nearly all of whom are funded by new research grants earned by faculty in the building



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