

Kornberg Center, Promega Corporation

The **2023 SEFA Laboratory of the Year High Honors** was awarded to the *Kornberg Center* at Promega Corporation's Madison, Wisconsin Campus. As a global leader providing innovative solutions and technical support to the life sciences industry, Promega Corporation exists on an evolutionary frontier where the values of science, business, and wellbeing intersect. Named for Nobel Prize-winning biochemist Arthur Kornberg, the first scientist to isolate DNA polymerase and synthesize DNA in a test tube, the Center provides state-of-the-art laboratory and innovative spaces for life sciences research and development.

SCIENTIFIC PROCESS IN ACTION – “The project team was aligned in a guiding principle that all input is useful, and any planning or design hypothesis is worth testing through the scientific process. Preconceived ideas were set aside, and a truly exploratory, scientific design approach took their place and created intelligent life-science solutions. The Kornberg Center is a truly experiential, living and breathing embodiment of this company ethos.” - Project Team



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Consisting of 280,000 GSF (26,013 square meters), and oriented around an enclosed atrium, this three-story plus penthouse building honors elements of design excellence by putting people first. The building brings together seven research programs that had outgrown their spaces in three buildings on the corporate campus giving scientists access to lab tools that can remove barriers to their work and accelerate discovery.

SmithGroup was the Design Architect and Laboratory Planner for the project. RAMLOW/STEIN Architecture + Interiors, Milwaukee, WI was the Prime Architect and Interior Designer for the

project. David Rousseau was the Consulting Architect on the project helping guide overall design and sustainability efforts.

Project Vision and Goals

Since its founding in 1978, Promega has created an environment that encourages employees to flourish, develop deep and enduring relationships, and create forward-thinking life science solutions. The Kornberg center was designed to be a truly experimental, living, and breathing embodiment of the company's ethos:

- Bring together seven research programs that had outgrown their spaces in three buildings on the corporate campus,
- Give scientists access to lab tools that can remove barriers to their work and accelerate discovery, and
- Honor elements of design excellence by putting people first.

With a 100-year mindset that perpetuates the practice of pushing boundaries and asking questions that challenge the world, early in the design process Promega challenged the design team to create a building that will last 200 years and would *"hit it out of the park"*, thus setting the goals and objectives of the project.

Commencing at the architectural/engineering selection, the construction team of Kraemer Brothers, Plain, WI, was present from day one during the design process.

Community and Site

Creating harmony between development and nature, the Kornberg Center continues Promega's legacy of the Fitchburg Campus. The 400-acre mixed use corporate site, with trails transversing prairie woodlands, is accessible to employees, community members, and visitors. Some of the project's characteristics are:

- Largest building at the Fitchburg Center,
- Followed dark sky lighting protocols,
- A 100-year-old oak tree located on site dictated footprint and placement of the building and protected during construction, and
- On-site orchards are local birdwatcher's destination.



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The project not only included the new building, but also expanded an existing power plant and an adjacent parking structure.

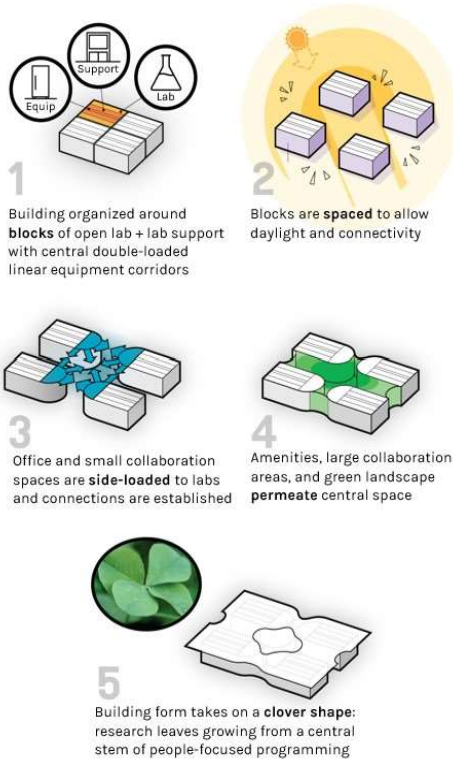
"The site selection was based on utilizing the largest available property within walking distance to related buildings, thus creating a pedestrian corridor, and maintaining the desired walkable campus environment." - Nat Stein, Vice President with RAMLOW/STEIN Architecture + Interiors

The empty farm field site required rezoning and new road access through a wooded area. The sitework on the landscape surrounding the Kornberg Center involved the restoration of native ecologic habitats, including prairie plantings, removal of invasive species, and configuration of drainage patterns.

Building Design

The innovation in the building's design was inspired by people, nature, and the scientific workflow. Unique for this type of lab building, the large floor plates connect the human-scaled two and a half stories, reducing the need to build vertically. Throughout the design process, employees played a critical role by emphasizing a scientific process that reflects a long-held, deeply humanistic philosophy.

BUILDING ORGANIZATION



Beyond their concern about their own program group needs, the Promega programming team was conscientious about other program group needs, and minimizing the distance between research blocks was important.

Acting on a desire to create a human-scaled building, Promega asked the design team to minimize the number of floors, spreading out horizontally rather than stacking the program groups.

Shaped like a **clover leaf**, the solution assured the research blocks to be highly connected, with only short distances apart from each other. "Floating bridges" connect the research blocks by spanning the three-story atrium that is filled with daylight, views and gathering spaces.

The central atrium was also created to bring daylight and natural ventilation through clerestory windows. Natural materials, including plants and the use of timber, and curves draw you in, creating a warm and inviting, not so rigid environment. The exterior of the building is composed of contextual materials (brick, stone, and glass) that complement the campus palate.

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Since it was a challenge to visualize adjacencies, one of the user workshops was devoted to walking people through the lab modules and across the atrium using augmented reality (AR)/ virtual reality (VR) to help provide a better understanding of how effectively the space would function.

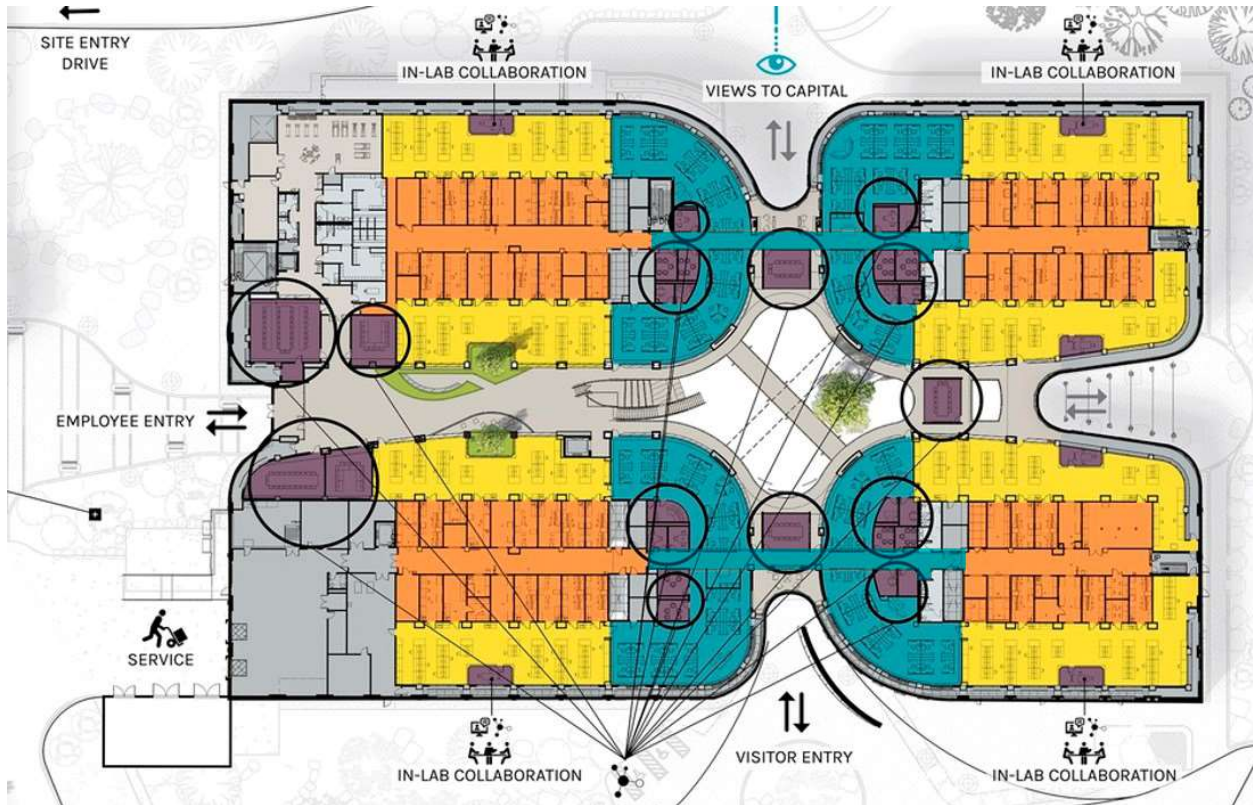
Laboratory Planning

The Kornberg center's open floor plan reflects Promega's people centric culture, which is influenced by the evident dismantling of hierarchy in scientific research and reflects the company's profoundly interdisciplinary and collaborative culture.

Each neighborhood block features:

- Exploratory frontier space: 30% of interior is distributed across workspaces, common spaces, and mechanical shafts,

- Agile workplace principles: small-to-large group collaboration spaces include autonomous nooks, meeting spaces and private study areas,
- Open concept work areas for cross-collaboration,
- In-lab collaboration: Space for scientists from a variety of fields to cross-pollinate.
- Daylight access for everyone as it reaches deep into neighborhood blocks and achieves the goal of 75% daylighting of interior space.
- Linear Equipment Rooms (LER) for the housing and movement of large equipment, chemicals, glassware and consumables.



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To ensure that Promega is prepared for innovation as it faces an unknown future, 30% of the overall net square footage was set aside as white space, or **frontier space**. One third of this space is distributed among the program neighborhood groups, while the remainder two-thirds is consolidated into *shell space* that is strategically positioned on the second floor for easy service access of the mechanical, electrical, and plumbing infrastructure systems.

The lab planning team held workshops with the individual research and support groups to determine the space requirements, the process flow of materials and equipment, and the functional adjacencies. The ability to respond to future needs and changing ratios between lab and lab support areas became crucial in the success of each lab module. The result was the creation of a laboratory module that flexes with the various ratios of lab support to lab sizes.



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- **DNA Technology Labs – 3:1**

Keeping sample integrity and mitigating human DNA contamination, this research group, a process lab module, required the highest ratio of lab support to lab space. This group has a strong need for process flow in the pre- and post-amplification of DNA samples, with supporting genetic identity, sequencing, and amplification instrumentation.

- **Life Sciences Labs – 1:1**

Four research groups have a balanced need for lab support to lab space ratio. These groups focus on biochemistry, cell biology, and chemistry workflows. They perform sophisticated analyses utilizing large instrumentation that is shared between groups. Closed lab support rooms are required for chemical fume hood work, tissue and cell culture, and specialized instrumentation.

- **Automation, Equipment, Robotics-driven Labs – 0.8:1**

Two research groups are involved in similar bioscience activity, yet robotic setups require more open lab space. These instrumentation-intensive groups perform robotic equipment testing, evaluation, and training. Like the last groups, closed lab support rooms are required for chemical fume hood work, tissue and cell culture, and specialized instrumentation.

Included in the basement are additional lab support spaces such as areas dedicated to centralized glassware washing, significant low-temperature storage, and chemical storage.

“We invited four casework manufacturers to create mock-ups where users tested them by setting up their equipment. It was followed by questionnaires to get feedback and determine the use’s preferences.” – Diane Kase, Senior Lab Planner, SmithGroup

The resulting design is an embodiment of a profoundly interdisciplinary, collaborative culture of partnership and teamwork within the Kornberg Center, allowing scientists to work together in a way they had not experienced before.

The **cross-pollination** of scientists from different fields is crucial to scientific discovery. Areas for in-lab collaboration were provided to allow researchers to meet without the need to remove lab coats:

- 7 rooms with glass enclosures include AV infrastructure for in-lab virtual collaboration, and
- 2 areas with no glass enclosures provide collaboration tools such as whiteboards, projection screens, and mobile tables.



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Wellness

Whether viewed from a distance or while immersed in the fluidity of its transparent interiors, the overwhelming positive emotional impact is very intentional. **Biophilic design** interlaces a human-nature relationship with indoor trees and plantings, water features, and naturally occurring materials such as wood, stone, and brick.

- Natural daylighting reaches 75% of interior space,
- 100% outside air to entire building, operable windows in office and atrium,
- Lush interior planting and water features, and
- Warm and inviting materials, including timber construction in the atrium.

To empower their employees and company growth, the Kornberg Center is designed to nurture innovation, collaboration, creative thinking, and personal development. Embracing the principles of emotional and social intelligence (ESI), Promega has a dedicated ESI team who helps employees improve relationships, manage stress, and solve problems creatively.



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Amenities to support wellbeing are housed in the building. Open to the entire campus population, these include a sound therapy room, massage room, music room, greenhouse, hideaway focus rooms, and a multi-purpose court space and workout facility.

The site topography, with a slope from west to east, created an opportunity to create a double height event space on the lower floor. With retractable seating, the space serves a gymnasium and a large meeting area.



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The **central atrium** acts as the “hub” of the building, bringing employees together during lunch and large events. Although the space is very tall, it is architecturally divided and feels intimate. It is flanked by glass-fronted conference rooms, includes water-features and a fireplace, and steps where people can sit, reflect, and contemplate.

With the goal of 75% daylighting of interior space, wood slats and paneling provide privacy screening for researchers as well as security of intellectual property flooding inboard lab spaces with daylight and creating views to indoor plantings.

Another large meeting room (“*the Loft*”) is located adjacent and opens into the south-facing rooftop garden where scientists can hold outdoor gatherings. This space is also used for customer visits. The large atrium blocks the sound from the mechanical exhaust fans nearby. A greenhouse is also housed in this area, personally serving Promega employees.

The project also included some unique elements such as water features, custom artwork and nooks with fireplaces. A culinary program with a professional **chef’s kitchen** serves ready-to-order entries prepared with locally grown food.

Engineering Systems and Sustainability

Laboratory buildings are notoriously high energy consumers. Yet the Kornberg Center sees a 65 % reduction in energy use relative to comparable facilities, resulting in an **Energy Use Intensity of 106**.

Innovative strategies support Promega’s goal of environmental sustainability through efficient energy use and reducing carbon emissions while creating a new standard in comfort that elevates the human spirit. Due to operable windows, a high-quality indoor air environment was created.

The Kornberg Center features a dual layered construction that consists of an exterior double-glazed curtain wall system on all sides, and an interior brick wall with single glazed window openings that are separated by a 3-foot air space that provides a walking track. External blinds that aid in the control of direct daylight are located in this air space.



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Benefits include:

- Stabilizes the effect of outside temperature in the labs,
- Extends the natural ventilation cycle, and provides operable windows in non-laboratory spaces,
- Allows maintenance to occur without closing labs,
- Enhances energy efficiency,
- Increases thermal comfort, and

- Delivers higher efficiency than a single-layer high-performance wall or more costly double-wall applications.

The following sustainability practices set a standard for climate responsibility that is aligned with the U.S. commitment to cut carbon emissions in half by 2030:

- Radiant in-floor heating and cooling (chilled beams), geo-exchange, intensive green roof,
- 100% outside air with total energy recovery improves indoor air quality,
- Rainwater collection system saves 1 million gallons of reclaimed water annually, and
- 672 photovoltaic panels generate approximately 313,000 kWh of power annually. These are placed on the building’s roof, the parking garage expansion and an adjacent building.

“Almost everything in the building is an innovation – if done before it was re-invented in a more successful way.” – Jason Smith, Project Design Architect, SmithGroup

The casework manufacturer was selected for sustainability practices, including recycled materials, and reclaiming up to 87% of used powder coating.

Conclusion

Designed to elevate the human spirit and to empower their employees and company growth, Promega’s new Kornberg Center wholeheartedly reflects this international biotechnology company’s values— creative thinking, flexibility, and transformational development— as it embraces the future of scientific discovery and meaningful business.

“Patents, by definition, have to be novel and nonobvious, so we need to surround ourselves with nonobvious environments. If your workplace looks like everywhere else, you will end-up thinking like everyone else.” – Poncho Meisenheimer, Vice President, Research & Development, Promega Corporation

Project Data

Building Area	280,000 gsf (26,013 sm)
Assignable Area	160,021 nsf (14,886 sm)
Lab Area	72,005 nsf (6,689 sm)
Percent of Lab Area	45% of total nsf

Project Team

Client	Promega Corporation, Madison, WI
Prime Architect / Interior Designer	RAMBOW/STEIN Architects + Interiors, Milwaukee, WI
Design Architect / Lab Planner	SmithGroup
Consulting Architect	David Rousseau
General Contractor	Kraemer Brothers, Plain, WI

About the author

Victor J. Cardona is a retired architect and laboratory designer based in Michigan and Florida. He served as a senior planner, vice-president, and Director of Laboratory Planning Group for SmithGroup. A past member of SEFA’s Advisory Board, he has been a past judge in the LOY competition. He has published many laboratory-planning articles and presented them at national and international forums. His projects have been recognized by multiple entities, including four LOY projects. He now spends most of his time sailing Lake Michigan.

