In Review: The 2023 SEFA Laboratory of the Year Competition

Welcome to the 2023 SEFA (Scientific Equipment and Furniture Association) Laboratory of the Year (LOY) competition. Like other International Awards that recognize exemplary projects, honoring the best, significant new buildings and planning projects designed and/or built around the world, the *SEFA Lab of the Year* award program brings innovative laboratory design and construction to the attention of the public and industry professional …*and this year's entries were no exception!*

The 2023 Entries

For the SEFA 2023 LOY competition, there were many competitive international project entries, including projects from the United States (east to west coast), United Kingdom and China. Most of the entries were new construction and some were renovation projects.

Similar to previous years, the 2023 LOY competition project size varied from 53,800 to 280,000 GSF:

- approximately 14% of the entries consisted of projects with less than 100,000 GSF,
- about 43% with projects 100,000 to 200,000 GSF, and
- the remainder (43%) with projects with more than 200,000 GSF.

Most projects housed research and development programs from a wide variety of sciences. These projects spanned a wide range of client types:

- 15% for government,
- 30% for corporate, and
- 55% for universities.

Lab of the Year 2023: Safaran ChEM-H and Wu Tsai Neurosciences Institute

The 2023 Laboratory of the Year winner is the *Sarafan ChEM-H and Wu Tsai Neuroscience Institute,* an inter-disciplinary, flexible, collaborative, and transparent complex at Stanford University, Stanford (Palo Alto), California.

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Stanford's *Sarafan Chemistry, Engineering and Medicine for Human Health (ChEM-H) and WuTsai Neurosciences Institute (SNI) Buildings* serve as a gateway and a catalyst between the School of Medicine, the School of Engineering and the Schools of Humanities and Sciences. This two-storied plus basement and penthouse, 231,883 GSF (21,543 square meters) research complex is strategically shared between the two Institutes and split into co-equal buildings that are connected by walkways and bridges. While the two buildings appear equal and similar from the exterior, the inside of each is finely tuned to the distinct programmatic needs of the respective Institutes. Research labs for both Institutes are designed to be flexible, reconfigurable, and highly customizable.

Together, the two buildings surround an elliptical courtyard serving as a communal space and social heart of the two Institutes. A common interior "living room" surrounds the ellipse, with a continuous exterior terrace on the second floor wrapping around the garden courtyard below. The common spaces of the complex on the first-floor act as a magnet to draw the Stanford community to the west side of campus. These amenities include a pub, multi-purpose meeting space, and specialty lab programs.

Ennead Architects LLP, New York, NY were the architects and GL Planning + Design, San Francisco, CA were the lab planners for the project.

> *"These facilities provide a blueprint for the future of collaborative team science. Part of that plan is to arm researchers with advances in computing and imaging that will speed up the pace of discovery. Ten years from now, we'll be able to look back and trace real breakthroughs to what these research buildings, and the Wu Tsai and ChEM-H Institutes, made possible."* - Kathryn Moler, Stanford University Vice Provost & Dean of Research

LOY High Honors 2023: Kornberg Center, Promega Corporation

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, this project provides state-of-the-art laboratory and modular 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 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."* - SmithGroup 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, Chicago, Il was the Design Architect and Lab Panner for the project. Ramlow/Stein Architecture + Interiors, Milwaukee, WI was the Prime Architect for the project.

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Entries Characteristics and Trends

This year's LOY entries housed **multidisciplinary programs** that not only included research and development labs, but also instructional facilities. The projects encompassed a wide range of sciences, including neurosciences, biology, life sciences, chemistry, public health, material sciences, engineering, energy, computing, and nanotechnologies. The projects housed programs from basic research to drug discoveries and development of new therapies. In addition to the wet-bench laboratories, most projects included specialized areas such as core laboratories, instrumentation labs, high-performance instrument labs, clean rooms, cGMP suites, vivarium, etc.

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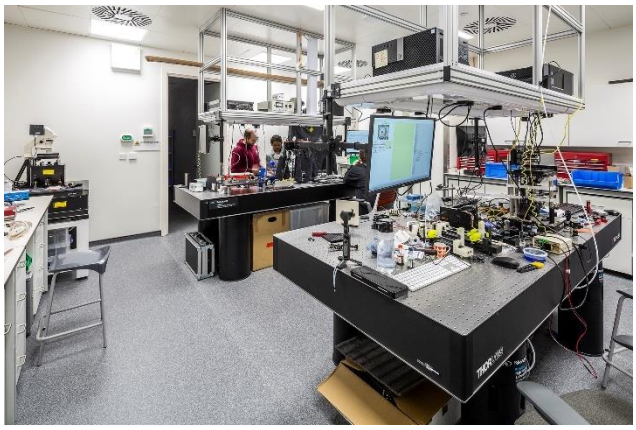

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Predominantly, the projects contained **open-planned laboratories**. All laboratory entries were fitted with flexible/adaptable table-based lab benches, movable storage cases and overhead ceiling utility distribution systems. Fixed casework systems were used in selected areas. The laboratory areas were organized in clusters assigned thematically or by science or team hubs that consolidated research typologies. The size of the open-planned laboratories varied from five to twelve modules. These open-planned labs were complemented with adjacent modular (flexible), **dedicated and shared lab support spaces**. The proportion of lab to lab support square footage varied depending on the science conducted in the open-planned laboratory. Linear equipment rooms or service corridors were present in some but not all entries, some projects opting to house the refrigerators, freezers, and other shared lab equipment in smaller equipment alcoves.

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Based on the information submitted, wet laboratory space allocations seem to be similar to previous year entries, between 50% and 60% of the total net square feet of the building program. As in previous years, these wet laboratory spaces were complemented by dry and computational labs, desk areas, and collaboration spaces.

In all of this year's entries, the laboratory personnel **desk space** was found outside of the proper laboratory area. Desks were located near but away from the open-lab areas with no visual contact with the lab bench, but some projects provided glass-enclosed huddle space within the laboratory area. Since more labs are stocked with sophisticated equipment that can be remotely monitored, the lab bench to desk adjacency might not be as important as in the past.

A notable trend was the diversity of non-assigned workspaces – options varied from office-like settings with rows of desks, to very informal tables in open, lounge areas.

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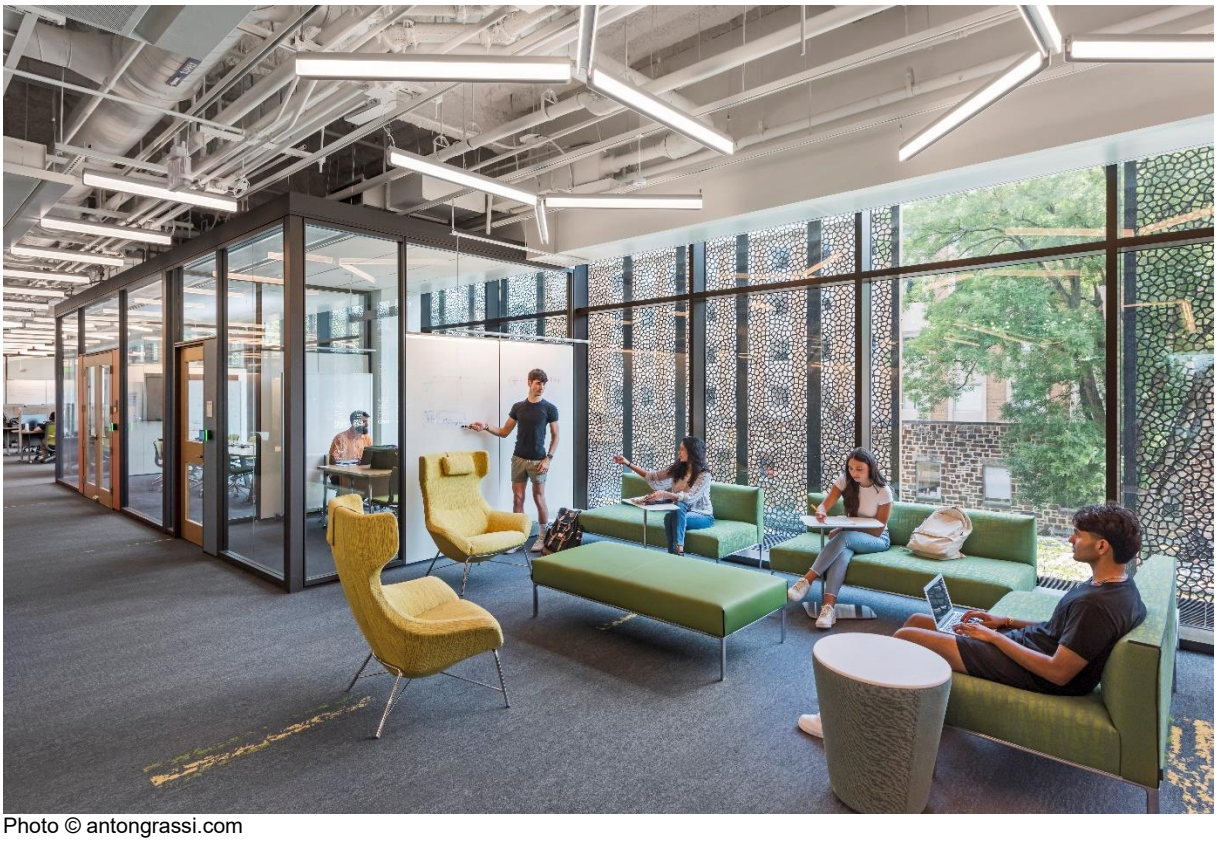
Are PI/Researcher offices in decline? While instructional, university projects housed faculty in

dedicated, but smaller research/principal investigator (PI) offices to maintain privacy and confidentiality while advising students, most institutions accommodated researchers in shared offices or open desk environments. A noted exception was private offices for program directors or team leaders. To conduct private meetings or quiet study, open desk areas were supplemented with private huddle rooms or conference areas. As an observation, the net square footage saved by not providing private offices environments was allocated to open common areas.

A large amount and variety of multi-level, interconnected **collaborative and interactive space** was common in most projects, providing not only for employee working flexibility and mobility environments, but enhancing the chance for “creative collisions” and inter-neighborhood collaboration. Some project designers opted for fewer stories with large floor plates housing thematic laboratory hubs and a variety of interactive spaces as part of their overall organization. Outdoor workspaces, either courtyards or balconies, were popular collaboration areas in most projects.

Although kitchenette/lunchroom, open lounges, work rooms, and huddle rooms were typical, **additional amenities** were included in most projects not only to support the building residents but also to attract the community at large. These included a pub (lunch-coffee-drinks), massage rooms, sound therapy rooms, exercise rooms, etc.



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Open light-filled interiors provided **transparency** from the common areas into the labs. Not only was this effective to observe and celebrate science, but it also promoted creativity and excitement within the building. Additionally, both new construction and renovation projects included ample areas of glass to allow for views to the outside and for natural light to filter into the laboratory areas.

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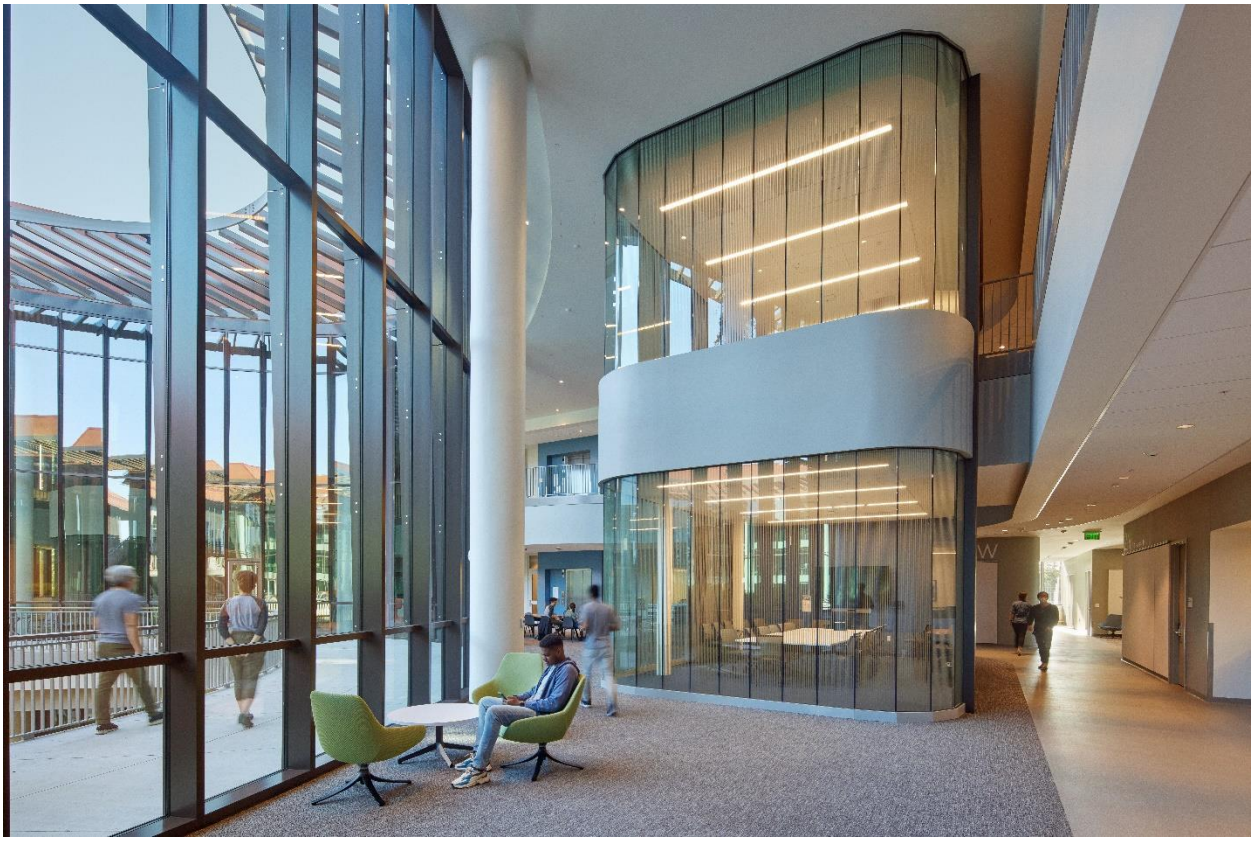
Safety and security were a primary concern of all clients, with some projects including separation of circulation paths for personnel and laboratory logistics distribution. Except for heavy chemical labs, fume hoods were housed in lab support alcoves.

Most projects pursued *LEED U.S. Green Building Council (USGBC)*, *CalGreen* or *BREEAM certification*, embracing the associated **sustainable concepts** principles and the evaluation of their environmental performance. Some projects emphasized their carbon reduction strategies, paving their way to future net zero emissions. By separating the wet lab from the recirculating office/ dry lab environments, some projects cited mechanical systems designs that operate the wet laboratory areas under safe normal conditions on as low as 6 *air changes per hour* (ACH) during occupied periods, and 4 ACH during non-occupied periods. Fume hoods equipped with auto sash closures operating at 80 feet per minute (FPM) face velocity also contributed to the lower air change per hour. These and other concepts aided in substantially lowering the *energy usage intensity* (EUI) more than the typical laboratory building when utilizing the *ASHRAE 90.1 standard*. This year's typical entry projected their EUI to be 135 to 185 KBTU/SF/YR, with one life sciences entry projecting a low of 105 KBTU/SF/YR.

Other sustainable concepts highlighted in this year's entries were extensive water conservation measures and the elimination of natural gas as a heating source in the building.

State-of-the-art laboratories, outstanding architecture and collaborative environments were among the notions cited to improve personnel **recruitment and retention.** Allowing the principal investigator to "customize" their lab was also mentioned as an effective recruiting tool.



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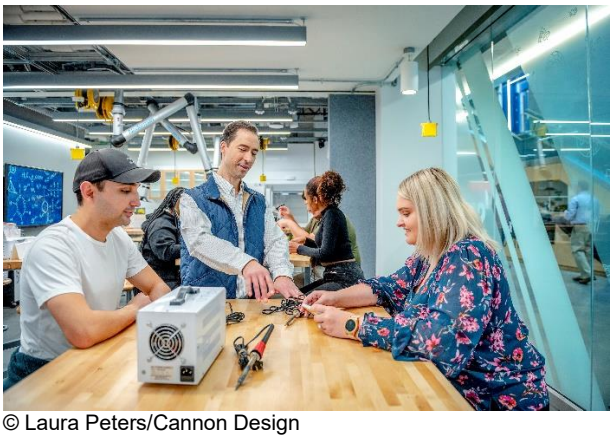
Most projects promoted the incorporation of **wellness strategies** within the building design, with areas for employee engagement and well-being. Designs included visible, interconnecting interior stairs and bridges to promote walking and not utilizing elevators, bicycle parking areas adjacent to locker rooms and showers, lactation rooms, meditation rooms, sound therapy rooms, and exterior lounge areas.

Biophilic Design, the connection with nature to lower stress levels and reduce absenteeism due to illness, was present in most entries. While cold weather projects included atriums with trees and plants, warm weather projects were enhanced by outdoor courtyards and patios.



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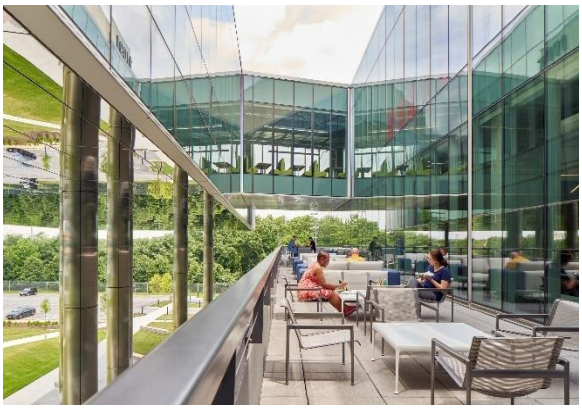

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Some projects sought to improve **community engagement**, their collaboration between university and industry partners, and/or the connectivity between the research community. Projects attracted the nearby research community by housing shared facilities such as core laboratories, STEM Academies, cafes, pubs, large meeting rooms, etc.

Lastly, most entries cited the **project delivery** method as extremely important to the success of the project, with stakeholder's involvement being key during the programming and design process.

The Competition

Winning projects are places where the instruction and/or research performed is enhanced by the surroundings, where the tenants work in a safe and productive environment, where walking into the facility is an uplifting experience, and where the facility enhances the client's ability to recruit top students, researchers and/or staff.

A laboratory is defined as a building used primarily for scientific or engineering research and analysis or the teaching of science or engineering. Given at the jury's discretion, the award categories are:

- **Laboratory of the Year** (the top award for new buildings; new multi-building campuses),
- **High Honors** (projects of excellent quality that just miss LOY status, which could fall under new, renovated, or adaptive reuse construction categories, or
- **Special Mention** (projects deserving recognition for some specific quality or feature).

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 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.