

The 2022 SEFA Laboratory of the Year[®] High Honors: *4340 Duncan Multi-tenant Lab and Office Building*

By Victor J. Cardona, AIA, NCARB

The 2022 SEFA Lab of the Year High Honors was awarded to the *4340 Duncan Multi-tenant Lab and Office Building* at the Cortex Innovation Community, St. Louis, MO. The owner of the project is the BOBB LLC, an affiliate and development arm of Washington University, St. Louis.



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The project provides state-of-the-art offices, laboratory, and modular spaces for biotechnology companies / business in various stages of development, from start-ups to larger scale organizations. This multi-tenant project provides affordable, functional space for these companies on which to grow and thrive.

Consisting of 92,301 GSF, this four-storied plus basement adaptive-reuse project is housed in a 1930's building listed in the National Register of Historic Places, that originally contained the St. Louis Post-Dispatch printers. HOK St. Louis was the architect and lab planner for the project.

"A number of people involved in Cortex, and the universities and the community recognized the shortage we had, the gap that we had in space for growing bioscience companies. And we're so fortunate that Washington University had the vision that this building could help fill that gap. We're very excited to have a building like this that can serve as the epicenter for St. Louis' bioscience activity."

Donn Rubin President + CEO, BioSTL

Project Drivers and Vision

As a historically relevant building, the 4340 Duncan project was conceived as a place to nurture and accelerate businesses in various stages of development, from startup to large-scale organizations. Presenting both challenges and opportunities when trying to create flexible, well-utilized, multi-tenant laboratory space, and with significant experience in historic renovation projects, *BOBB, LLC* was positioned to take on this kind of complex adaptive reuse project. In doing so, their question was: If redeveloped by the University's development entity, could it meet the needs for step-up space for graduating companies?

The initial approach was to interview prospective tenants (early-stage companies in life sciences research) to identify their specific space needs. Most prospects were graduating from free or subsidized space in incubators/accelerators in *Cortex (Center of Research Technology and Entrepreneurial Exchange)* such as BioGenerator, CET, CIC, etc. What was discovered:

- The building needed a clear value proposition, base rent and tenant improvement (TI) allowance.
- The building should target companies not otherwise being considered for space elsewhere in Cortex (avoid competing for tenants).
- Occupancy terms should be developed on certain financial benchmarks (e.g., time to graduate out of the space).

Working closely with the users of the proposed facility, the historic renovation was adapted to fit a modern new purpose.

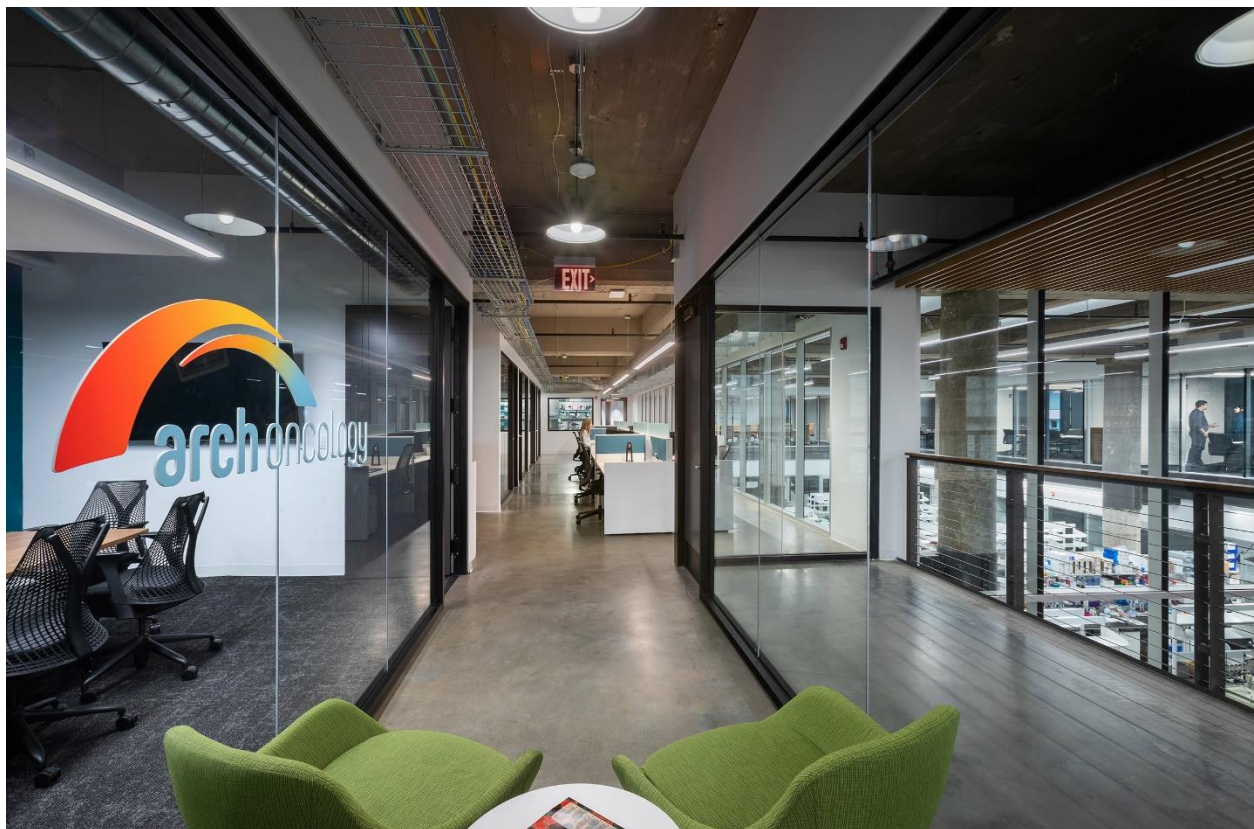


Photo © Sam Fentress

"We had a very large building that took a lot of vision to see how to reuse, and I think they did a great job at doing it." Otis Williams Executive Director, St. Louis Development Corp

The Cortex Innovation Community

In 2002, St. Louis civic, academic, institutional, and business leaders came together in an act of unprecedented collaboration to create *Cortex* in a blighted 200-acre industrial district on the southern edge of Midtown St. Louis that was populated with abandoned and deteriorating buildings. The founding members were Washington University, BJC HealthCare, the University of Missouri-St. Louis, Saint Louis University, and the Missouri Botanical Garden.

Today, that 200-acre swath of neglected land that had physically divided its anchor institutions is now bringing them, with hundreds of smaller organizations, together in a vibrant, mixed-use innovation community just four miles west of the downtown core. Since rebranded as the *Cortex Innovation Community* it has expanded in scope to welcome all sorts of start-ups and tech enterprises. Over the last twenty years, the area has seen both new construction and adaptive reuse projects that have helped transform Cortex from a life and plant sciences district into an entrepreneurially charged, live-work-play-learn community.

Building History

One of the last remaining historic buildings in the Cortex Innovation Community, the 4340 Duncan Avenue building was originally constructed in the 1930s, with additions built during the 1950s and 1970s, to house the St. Louis Post-Dispatch's rotogravure printers. As the rotogravure printer technology became obsolete, *Crescent Parts and Equipment Company* took ownership of the building, but it was ultimately abandoned in the 1990s. 4340 Duncan received designation on the National Register for Historic Places because of the building's significant contribution to innovation in printing and media in the region. Being the first of its kind in the US, the rotogravure process featured a large copper drum and tanks of color ink, allowing for high-volume, high-quality printing, and making the St. Louis Post-Dispatch the first newspaper in the US to print in color. The increased volume of printing allowed for greater dissemination of information across the region.



Photo © Sam Fentress

Building Tenants

To embrace the building's history of innovation, BOBB sought to transform the building into an ingenious new piece of the Cortex Innovation. By offering below-market rates, they help foster growth in the St. Louis bioscience community.

Established in 2001 *BioSTL*, the building's anchor tenant, works to drive the innovation community in the greater St. Louis area. *BioGenerator*, their investment arm and the focus of their work, was formed in 2003 to support creation of new companies and provide investment in early-stage bioscience companies in St.

Louis. They rent lab and office space to new companies while also providing financial investment and mentorship to start-up companies.

Two companies that started in BioGenerator are now tenants of the building. *Confluence Discovery Technologies, Inc.*, a full-service drug discovery and early development research organization, wholly owned subsidiary of *Aclaris Therapeutics, Inc.*, occupies more than 20,000 sq. ft. as the exclusive tenant on the 4th floor of the building. Aclaris chose to keep Confluence – its offices, biomedical expertise and more than 45 jobs in St. Louis, where it continues to be a productive contributor to the local scientific and business communities. *Arch Oncology* leases 6,000 sq. ft. in the building for its research laboratory, using its new space to support clinical stage discoveries and development of new immune-oncology therapies for cancer patients. *C2N Diagnostics*, another tenant, is a molecular diagnostics company aiming to transform the early diagnosis and treatment of Alzheimer’s disease.

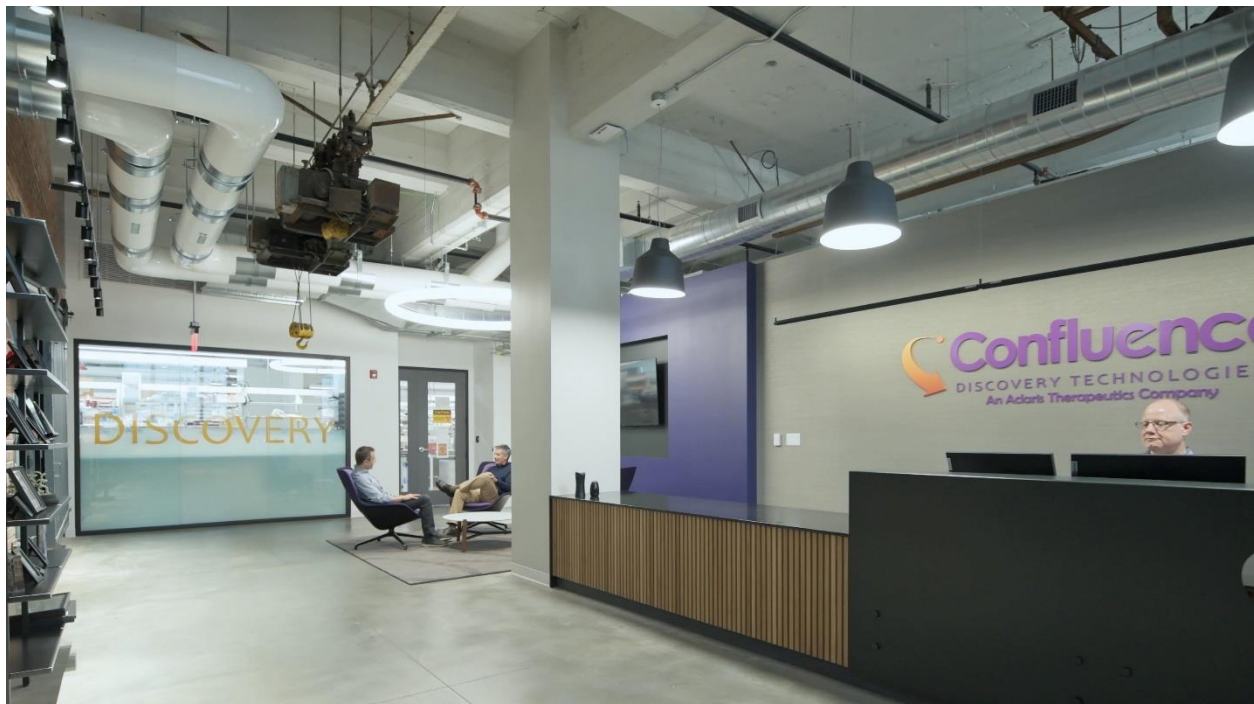


Photo © HOK

“(The building) can accommodate research done by a really broad spectrum of companies. Some are in therapeutics, some are in medical devices, some are in diagnostics.”

Eric Gulve President, Bio Generator

Early Planning and Programming

As the historic preservation requirements were outlined and the analysis of the building commenced, the team looked at how they could maximize laboratory placement within the building while respecting and protecting the historic elements. Early interest from the new tenants (BioGenerator and Confluence) in occupying the building helped drive how the team conceived the spaces and determined how much additional space to accommodate in the building.

In the original 4340 building, there was a multistory space that housed the rotogravure printers. It spanned from Level 1 to Level 3, with a floor height of 25’-0” and a small mezzanine. With such a tall clearance on Level 2, it was decided to add a third floor that aligned with the historic mezzanine level, thus increasing the rentable square footage for the building without compromising its historical integrity.

Since 4340 Duncan is designed to support start-up companies, a few central services are included in the building. These include a shared autoclave and glassware washer area reservable via a scheduling system, and a shared freezer farm that houses -80°C and -20°C freezers and some 4°C lab refrigerators equipped with emergency power and equipment monitoring for each unit.



Photo © HOK

Building Organization

The organization of the building is arranged around the historic requirements outlined by the building use. A central zone maintains the open, three-story space where the rotogravure printers were once located, with a monumental stair emphasizing the original opening that housed the printer. The two-story lab highlights the expanse of where the production occurred, maintaining the idea of “here is where the innovative work is happening.”

The main planning strategy was to organize the building in a way that it did not impede its historical requirements. The building was divided into various zones: to maintain environmental requirements within the laboratory spaces and to minimize the amount and sizes of shafts and ductwork routing, the east side of the building holds most of the laboratories while the west side houses office space. Due to existing floor-to-floor heights, the first floor of the original 1930s structure and the 1950s addition was not deemed appropriate for lab usage, but one area in the rear was planned for shared lab services.

Some of the judge’s comments:

“The organization of the building is respectful on several levels: historic preservation requirements, energy use and orientation, collaboration and visual connection.” “There is abundant natural light, and ample collaborative space within the building to allow members of different tenants to mingle and exchange ideas.”

Lab Planning and Design

When starting design work, HOK's laboratory planner tested many different laboratory planning grids to fit between the building's historic column spacing. Upon deeper study with each tenant's specific lab needs, they determined that following a typical lab grid throughout the entire building was not compatible with the space. As with any early 1900s building, the structural grid was not consistent throughout the building, varying between 20'-3 5/8" and 21'-8" from north to south and 26'-6" to 28'-2" from east to west. Thus, paired with the need for flexibility space and equipment requirements of each tenant, and the historic implications for each floor, the planning grid flexes east to west from 10'-8" to 12'-0" on center.

After reviewing how the planning module was going to work, the HOK planners were challenged with "How do we make this hyper flexible?" BioGenerator required a flexible concept since depending on the research need their business model requires them to flex between laboratory and office space. This was accomplished by assigning standard bench run lengths based on the characteristics from each floor, but more specifically implementing a 5'-0" north/south planning grid on Level 2 and 3 labs, and a 6'-0" north/south planning grid on the Level 4 lab.



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The fit-out of the tenant spaces within the building accounts for a 60/40 lab to lab support split. All laboratories were designed to be BSL-2 labs with highly flexible lab benches. Since the structure is geared toward life sciences, there are many tissue culture labs and a small number of chemistry spaces.

In addition to planning a typical bench size, the two-story, shared lab on Level 2 incorporates small rooms that are designed to flex from laboratory support to office space as needed. These small rooms are also available to be used as company private space.

Although currently all the flex spaces are being utilized as laboratories, each space is equipped with:

- Adjustable height benches that double as workstations for conversion into "office" mode.
- Walls that have electric raceways spanning the length to provide power and data for equipment.
- Doors on both sides of the room, one set leading into the open lab and the other leading into the office space.
- Depending on what the space is being used for, the doors allow egress only to minimize contamination.

The historic preservation requirements placed some restrictions in the utilization of spaces throughout the building, including some programmatic spaces on Level 1, and maintaining several double height areas on Level 2. Although this large, double height portion of the building houses laboratory space, it restricted the use of overhead utility distribution and necessitated careful placement of floor core drills. To maintain user flexibility and meet historic requirements, the number of core drills was minimized to one per island. A low height, modular wall system was utilized to distribute power and data, becoming a cost-effective solution that satisfied all design requirements.

"Our goal is to keep these (bioscience) companies in St. Louis, and where better to do it than here?" Henry Webber (former) Executive Vice Chancellor for Administration Washington University in St. Louis and (past) Board Chair, Cortex Innovation Community

Celebrating and Supporting Science

The HOK design team worked with the tenants to ensure that their goals were met while providing maximum space function. Throughout the building, the design showcases the groundbreaking science occurring within its walls. When exiting the elevator on each floor, the visitor's first impression is of the laboratory space, identifying the building as a place of science and innovation. The large, two-story high lab is surrounded by glass to help promote and showcase the great work that is being done. Glass-walled office suites, support spaces and meeting rooms wrap this multi-story lab.



Photo © HOK

Special detail and thought were given to the circulation and way-finding elements. The monumental new staircase, which can be seen from entering the building lobby, spans from Level 1 to Level 3 and provides views up through the multi-story space into the two-story laboratory. Finally, the large windows not only let in daylight, but allow views into the laboratory spaces from the building's exterior.

"This building has a storied past in innovation. This building was a pioneer in print. It's where the Post-Dispatch was printed for a 30 to 40 year period. But we're taking the bones of this building, a building that's been vacant for many years, and we're turning into the home of a variety of new and growing companies."
Henry Webber (former) Executive Vice Chancellor for Administration Washington University in St. Louis and (past) Board Chair, Cortex Innovation Community

Scope of Work

The design focused on balancing inspiration drawn from the existing structure with specific needs for the renovation. This resulted in design solutions that preserved and enhanced the project without compromising its architectural integrity.

The existing masonry facade underwent a complete tuck point restoration. New large historic replica windows, some that are 20 feet tall on the north side, flood labs and offices with natural light. The team added a new third floor interior slab, placed away from the building perimeter at the north to allow for daylight to penetrate deep into the building core. In addition, a new elevator was installed in the existing elevator shaft along with a new service elevator shaft and car. The design also added new roofing along with an

extensive green roof and terrace. Paired with the improvements to the building's structure, the team also designed new high efficiency electrical, water and HVAC systems throughout the building to best support flexible lab uses.



Photo © HOK

The interior spaces provided a unique opportunity for innovation while using a refined industrial palette to celebrate the renovated structure. Being listed on the National Register of Historic Places, the building's design required a specific aesthetic to maintain the historic integrity and industrial nature of the space: exposed ceilings, sealed concrete floors, exposed brick, exposed columns, and restoration of remaining equipment including industrial equipment such as the overhead trolley system and rails that were used to move rolls of paper, along with the system used to store and deliver ink.

The interior fit-out work consisted of designing laboratories and the supportive workplace spaces, including several collaborative common areas. The team was given some leeway because it was intended as a lab building, to allow some spaces to have finished floors and ceilings and cover the brick as required, but the team still had to be judicious about the placement of those spaces and shifted them as far from the exterior perimeter as possible. Access to outside air and light were expanded with the creation of an east and west terrace at the ground floor along with a roof terrace at Level 4.

Community Impact

The Cortex Innovation Community has grown to become an employment and tech powerhouse in the St. Louis region. As an affordable "step up" space, 4340 Duncan allows fast-growing bioscience companies to continue growing and contributing their expertise to the local community. BOBB's decision to offer below-market rates to these startups means graduating companies are incentivized to stay in the urban core and

strengthen the local community. With the BioGenerator Labs at its centerpiece housing dozens of startups, the new space brings together programs across the innovation ecosystem, including capital formation, entrepreneur development, inclusion, public policy, and global sourcing of innovation – all under one roof.

This project took advantage of the Missouri Historic Tax Credit. The construction team provided opportunities for diverse participation, achieving participation for the core & shell historic renovation and the fit outs:

- Contract – 24% MBE / 22% WBE
- Workforce – 19% Apprentice / 21% Minority / 5% Women / 12% City Resident

Sustainable Design

The connection between past and present drives the building's sustainability ethos. As HOK design principal Eli Hoisington put it "one of the most sustainable things you can do is not build new" an idea buoyed by the savings in embodied carbon achieved by preserving the building in this adaptive reuse. The gut renovation of the building included:

- All new mechanical systems.
- Replacement of the single pane glazing with insulated windows that met the historic requirements.
- Building system upgrades which included sub-metering of tenant spaces to monitor ongoing building performance.
- Creation of a monumental stair to celebrate fitness and embrace the idea of walking over elevator use, saving energy while enhancing connection and activating the space.
- Extensive use of LED lighting which improved the overall light power density.
- Refurbished existing historical pendant fixtures that now show their beauty in main circulation areas as well as within some tenant suites.

While the project's stakeholders did not pursue LEED certification, the LEED checklist was a tool used with the client to guide the design development. At completion, the project would have met the requirements for LEED Gold certification.

Wellness

Providing decks on the east and west side of the building at ground level enables users to gather outside for meetings or step out of the lab and workplace to eat, play, and get some fresh air. In addition to the decks on the first level the team also designed a rooftop terrace off Level 4 of the building. Accessible to all building users, it includes tables, chairs, benches, plant life, and large canopy umbrellas for shade on warmer days.

The building's location provides for close and quick connections to the MetroLink and bus lines as well as bike paths. Bike racks were installed on the exterior of the building to encourage a bike-centric culture and minimize car traffic. In addition, locker and shower rooms are open to all building users. The interior takes advantage of the existing large historic windows which allows for an abundance of natural light to fill the space and promote wellness. The design also includes many areas for informal collaboration and moments of respite.

A great deal of thought was put into the materials selected to meet current sustainable and wellness goals while still matching the design aesthetic. Warm whites and textures such as the exposed brick create interest and work well with the paints and fabrics used throughout.



Photo © HOK

Project Data:

- Project Owner: BOBB, LLC, an affiliate and development arm of Washington University in St. Louis
- Architect and Lab Planner: HOK, St. Louis
- Date of Completion: October 2019
- Total Gross Area: 92,301 sq. ft. / 8,575 sq. m.
- Total Net Area*: 68,018 sq. ft. / 6,319 sq. m. *Multi-tenant facility, area shown is Usable square footage for all tenants; includes all standard net building spaces
- Total Net area of lab and lab support: 24,954 sq. ft./ 2,318sq. m.
- Percentage of building net area that is lab area: 37%
- Total # of Floors: 4 + Basement Building
- Population: ≈350 (population varies due to being a multitenant facility)
- Sustainability Certification: Client did not pursue LEED Certification, please see sustainability chapter for more information on sustainable design and wellness strategies.

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, and is a past member of SEFA's Advisory Board. 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.