

NK PRESENTS

Building Space For Life Science

Six Questions to Help Research
Organizations Find the Space They
Need for Innovation





Life sciences are feeling the squeeze.

Few disciplines are as constrained for real estate as the life sciences. Researchers can't find suitable space. Institutions and developers can't build fast enough. Funding is a challenge, despite government investment. Even amidst economic contraction, secondary markets like Philadelphia and Dallas remain highly competitive for life sciences.

And for most scientists, real estate is a distraction. Many lack the time or expertise to match their space needs to what's available in a tight market. Their time is better spent on the work at hand: research.

To help, NK Architects convened leaders in life sciences facilities from across the country to discuss ways to support a vital industry in desperate need of space. From that conversation emerged six questions that can help research enterprises find the right real estate to fuel innovation.

Panelists



Antonio Cabrera

VP, Project Executive,
Hunter Roberts Construction Group

Antonio is responsible for operations related to Hunter Roberts' healthcare and life science practice. With more than 15 years of experience, Antonio has a proven track record in pre-construction, planning and construction of major adaptive-reuse, multi-phased, gut-renovation, fast-track and ground-up new construction projects.



William Lannon, MSETM

Director of Research and Technical Services,
Biological Sciences, Columbia University

Will oversees the laboratory operations of the Department of Biological Sciences at Columbia University, specializing in representing new faculty with contracted design teams to ensure the laboratory conceptualized by the architects and engineers makes sense programmatically for end-users' day-to-day operations.



FACILITATOR

Paul Drago, AIA, LEED AP
Principal, NK Architects

Paul is the managing principal of NK's New York City office. With 35 years of experience in architecture, he has developed an expertise with projects for colleges and universities, with a specific focus on collaborative, high-technology research laboratories and healthcare facilities.



Matthew Knowles

First Vice President, CBRE Advisory and Transaction Services, Philadelphia Life Science Consulting Team

Matthew focuses on tenant and landlord advisory services for CBRE's Philadelphia Life Sciences Consulting Team, working with various early-stage to mature life sciences companies and corporate office occupiers. Since joining CBRE in 2006, Matt has completed over 6M SF of lab, office and retail transactions.



Kathleen Otto

Chief Executive Officer,
Bio North Texas Foundation (BioNTX)

Kathleen is CEO of BioNTX, a not-for-profit trade organization providing cost savings services, networking events, and educational programming to the bioscience and healthcare community in North Texas. She was also the executive director of BioBAT, Inc., the New York Science & Technology Center at the Brooklyn Army Terminal.



FACILITATOR

Nick Czarniecki, RA, LEED GA
Associate Principal, NK Architects

Nick specializes in research projects for New York City institutions of higher education and healthcare including Columbia, NYU and NewYork-Presbyterian. He has also managed data centers and commercial and high-end residential projects and is adept at navigating the city's zoning and building codes.

Why is space so hard to find?

Any industry experiencing a boom will be constrained for space, but the life sciences face several constraints unique to the industry, and to specific locations and markets.

Many newer markets are underbuilt.

"In our core market, University City, we have less than a 1% vacancy rate. Right now there's a real logjam. There's a large pipeline of space being built, but most of that space will not deliver until 2023 or 2024."

Matthew Knowles

<1.0%

Available life science space in University City, Philadelphia (CBRE)

Larger companies are taking up more space.

"Incubators are filling up because of the backlog. Smaller tenants that would typically lease space in an incubator are competing with companies that need 10,000, 15,000, 30,000 square feet, because those larger companies don't have a permanent space solution."

Matthew Knowles

2.0%

Available occupancy-ready, pre-built life science space in Manhattan (CBRE)

The supply chain is delayed ...

"When we were doing BioBAT, we had to wait some time for some equipment and materials, but now there's almost a year-long wait for certain HVAC products, which just delays everything."

Kathleen Otto

90%

Builders experiencing materials shortages in 2021 (National Association of Home Builders)

... in part due to workforce shortages.

"In a quasi-post-COVID world, we're still seeing impacts, not only with product availability, but also with workforce availability. And it's not just construction. There are no truck drivers. There are no dockworkers. There are instruments on ships we can't bring onto land, and then, once they come onto land, we can't get them shipped across the U.S."

Antonio Cabrera

1.5M

Workers who quit jobs in transportation, warehousing and utilities in Q1 2022 (U.S. Bureau of Labor Statistics)

Where should you look for space?

IN WHICH AREA?

Research organizations tend to cluster, not only regionally but also in specific neighborhoods. The right location can make all the difference in connecting to research partners and funding sources.

Do you need proximity to a university or medical center?

"Proximity may be important for the younger companies that are still tethered to their PI or their lab at the institution. That's not the case for step-up space or the more mature company."

Kathleen Otto

Top Life Science Clusters, 2021:
(Newmark)

How welcoming is the city or neighborhood?

"All around Dallas and Fort Worth are tiny little towns, and they all have mayors, and they all have economic development, and they are all vying for this kind of growth, so they offer great incentives."

Kathleen Otto

- 1 Boston
- 2 San Francisco
- 3 San Diego
- 4 Research Tri.
- 5 Puget Sound
- 6 Philadelphia

"A lot of times, you have to provide a case to the city on why this program would make this neighborhood a desirable place to work, and what type of service you would provide to the community. [Columbia's campus in] Manhattanville was very successful with that."

Will Lannon

- 7 Maryland
- 8 Los Angeles / Orange Co.
- 9 New York City
- 10 New Jersey



CASE STUDY

SUNY Downstate, Advanced
Biotechnology Incubator
Brooklyn, NY

Flex space fosters Brooklyn's startup ecosystem

The Advanced Biotechnology Incubator is helping to transform Brooklyn into a center for biotech R&D. The incubator offers early-stage startups flexibility and a low cost to entry, with modular wet and dry lab spaces from 400 to 1,200 square feet, including fume hoods and other utilities, that can be occupied by one or more tenants, along with breakout space for collaboration and socialization.

Where should you look for space?

IN WHICH AREA?

Have you considered Philadelphia?



52,000

People employed in life sciences

6th

Greatest concentration of life sciences Ph.D.s among U.S. cities

\$875M

Venture capital investments in 2021

"We're fortunate in Philadelphia to have favorable zoning for this type of product. Outside investors come to our market because most of the zoning is by-right, so we're beginning to see a lot of new developments popping up in both the city and the suburbs. We're also beginning to see some zoning change on the conversion side, traditional offices being converted for lab use."

Matthew Knowles

9.6M SF

Life science space

9.2M SF

Life science space proposed or under construction

(CBRE)

Have you considered Texas?



8th

Among emerging markets with the potential to become a life sciences hub

24,000

People employed in life sciences

412,309

People with STEM degrees

"Life sciences companies and developers are coming to Texas because their inventories are full, and the space down here is wide open. North Texas is a really big area, about as big as New Jersey, and has a number of great medical schools and research institutions: UT Southwestern, Texas Tech, UNT, UT. There's all kinds of science and biomedical engineering. And there is so much greenfield space: new buildings are being built, entire campuses are being created."

Kathleen Otto

\$1.1B

Venture capital investments in 2021 (5th region overall)

(JLL, CBRE)

Where should you look for space?

IN WHICH BUILDING?

Whether purpose-built for research or adapted from some other, previous use — like office or industrial space — each building offers its own unique constraints and opportunities related to space, infrastructure and amenities.

How move-in-ready must your space be?

"By way of example, Brandywine Realty Trust, here in Philadelphia, recently completed a 50,000 square foot incubator called B.Labs, which is somewhere around a dozen thousand-square-foot spaces that are fully built-out. They have 12 workbenches. They have a biosafety cabinet. They come with a fume hood, a minus-20 and a minus-80 freezer, truly plug-and-play."

Matthew Knowles

How intensive are your needs for infrastructure?

"The challenge is that 'life science' is a very broad brush. Everything is so unique and has its own set of requirements. There are specific requirements for air changes, humidity control, cooling, vibrations. And technology is advancing so much. Even if you do find a large space that's ready, how do you know that that space provides exactly what you need?"

Antonio Cabrera

Which amenities would you like to have?

"Amenities are key to incubators. It's a lounge to hang out in, so that, when you leave your smaller lab, you have somewhere to go. It's food and beverage. It's glass-wash stations, an autoclave, a freezer, dry storage. When companies are young and just getting funded, they don't have the capital to put into a long-term solution, so it's about having that flexibility to quickly plug in."

Matthew Knowles

Which is better: adaptive reuse or purpose-built?

"Conversions of existing buildings will continue to be popular because there is a shortage of space. But while it's significantly more expensive to lease a new building, there's tremendous benefit because it's purpose-built for lab space."

Matthew Knowles

"Adaptive reuse is happening on the East Coast, in Boston, New York, maybe in Philadelphia. It's not happening down here in Texas."

Kathleen Otto

Where should you look for space?

IN WHICH BUILDING?

What are some of the challenges with adaptive reuse?

"It's more than just the cost of an air handler or generator: where is it going to fit, and can it get from Point A to Point B? We're talking vertical risers, bringing ductwork or fuel up or down. And once you've figured out your MEP infrastructure, then you have to evaluate the core and shell challenges. We're converting parking garages, warehouses, you name it into clean environments and BSL-3 spaces, which means we're doing a significant amount of structural and facade work. And nowadays, what does that mean with the natural gas moratorium, with Local Law 97 and carbon emissions?"

Antonio Cabrera

"At Columbia we have over 100-year-old buildings we're trying to bring up to industry standards. Right now, we're running into issues in buildings where we've maxed out the air handlers, so we have to put in supplemental air handlers in interstitial spaces, supplemental cooling units, or split units elsewhere for data farms, things like that."

Will Lannon



CASE STUDY

New York Blood Center
Queens, NY

Improving operations and health with adaptive reuse

The adaptive reuse of a Long Island City warehouse into a research institute for the New York Blood Center entailed due diligence, coordination with Con Edison on new below-grade transformers, and exterior recladding to give the organization more public presence. New, prefabricated 4'x4' skylights bring daylight deep into the facility to create a stimulating, creative, healthy environment for work and research.

Where should you look for space?

IN WHICH PART OF THE BUILDING?

“Programming” is the art of filling a building with the right uses, in the right places. Because researchers have intensive requirements for equipment and materials, programming a lab building requires careful consideration of who goes where.

What adjacencies should you consider?

“You don’t want to program a building ad hoc. You want to make sure there is an idea or a process in place, that you place certain programs and labs with each other. Once you’re at the end of a building and have only 3,000, 2,000 square feet to fit one more lab, for example, if they have sensitive instruments and the remaining space is right next to the elevator shaft, you might have to rip out walls, or shield the room, or do other customization on the back-end.”

Matthew Knowles

How will you move through the building?

“We used to put ‘anchor labs,’ run by senior scientists who made large impacts on their fields, in the corner of a building and more junior faculty members in the center. The senior scientists would have a longer walk to the kitchen or wherever, they would bump into people who were early in their careers, and they would have more impromptu conversations about what they’re working on.”

Antonio Cabrera

What codes or life-safety issues are there?

“At Weill Cornell, building the Belfer Research Building, we learned that the city has allowable storage limits of flammables at certain heights. It was challenging because we had a medicinal chemistry facility on the 16th floor: all day, every day, they’re getting solvents, so we had to access the freight elevator down to the loading dock, where we put all our solvent storage.”

Will Lannon

Is the building in a flood zone?

“The vivarium usually goes in a sub-level, but Hurricane Sandy flooded out entire animal facilities. Now, where do we put them? In the middle of buildings? At the top? Do we put them above grade? That’s one of the lessons learned after Sandy that nobody really thought about before.”

Will Lannon

Where should you look for space?

IN WHICH PART OF THE BUILDING?

Which other organizations or departments could you partner with?

"We try to identify faculty or occupants that have shared interests. The model used to be that this building was Biology, or these floors were Chemistry, and they all required specialized equipment, but now they aren't so departmentally siloed. How we support that interdisciplinary scientific community is a moving target, but I think a hybrid model of building infrastructure is the way to go."

Will Lannon



CASE STUDY

Columbia University,
Barnhart-Duvall Lab
New York, NY

Sharing space furthers efficiency and collaboration

A shared laboratory fosters collaboration and education amongst the teams of two recently recruited, tenure-track faculty with related research interests. Advanced drosophila (fruit fly) imaging to the east (dark purple) and mosquito containment to the west (pink) are linked by a shared, open wet lab (lavender) that supports both teams, which can expand or contract across more or fewer benches as research needs change.



Who's paying, and how?

Funding can be a significant challenge for research organizations needing space, especially those that have outgrown an incubator but don't yet have the capital for a full tenant fit-out. Fortunately there are options.

Some owners offer a tenant improvement (TI) allowance.

"The way it's typically structured, a landlord will provide a tenant improvement allowance (TI). In our market, we've seen TI allowances go from \$75 to \$100 per square foot on a 10-year lease transaction, to \$150 to \$200 per square foot — and that's just in the last two years. Typically the tenant goes out-of-pocket for the remainder of the fit-out cost."

Matthew Knowles

Some owners roll TI allowances into the lease.

"Recently, some landlords are getting creative, because tenants want to save their money to put it into R&D — they don't want to put it into their facility — so we've seen landlords almost acting as the bank, getting creative with structures such as amortizing additional TI dollars and having a tenant pay a higher rental rate, so they can keep the cash on hand."

Matthew Knowles

Some owners provide tenants seed money.

"In many cases, owners are providing seed money to some of the companies in their incubators, in hopes of growing the company and, hopefully, growing them within their real estate portfolio or in the city of Philadelphia."

Matthew Knowles

Some owners take a stake in their tenants' companies.

"On the incubator side, there are some models where an operator may take a small piece of equity in the company. We have not yet seen that in terms of our institutional owners."

Will Lannon

Who's paying, and how?

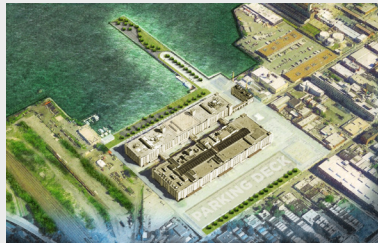
CASE STUDY

BioBAT

Brooklyn, NY

Partnership drives the next era of an industrial landmark

BioBAT, a not-for-profit partnership between SUNY Downstate and the New York City Economic Development Corporation (EDC), leases 1,800 to 9,000 SF of research and office space in the redeveloped Brooklyn Army Terminal to expanding science and technology companies, many of which "graduated" from the SUNY Downstate Advanced Biotechnology Incubator. To attract tenants seeking rapid fit-out and speed-to-market, former executive director Kathleen Otto commissioned NK Architects to design a modular lab prototype with pre-installed infrastructure that can be deployed more quickly than traditional construction.



Who's paying, and how?

Some governments catalyze new development.

"At BioBAT, the city, the state and the federal government committed dollars for the industry, and that's how it's being developed. Down here in Texas, what has made it happen is collaboration between the universities, venture philanthropy and investors. The money comes from everyone working together."

Kathleen Otto

Some philanthropists fill the gap.

"The university has a lot of philanthropy people. They essentially donate a certain dollar amount to be on certain floor levels, so that floor becomes the Meyer Cancer Center, or the Englander Institute, or X, Y, and Z."

Will Lannon

Some big businesses or entrepreneurs chip in.

"Down here, BioLabs has something called 'the golden ticket.' A lot of companies apply, and a large pharmaceutical sponsors the rent for the company for a period of time. Also down here, at UT Arlington, which has a very strong biomedical engineering department, one of the professors is a serial entrepreneur who is funding a startup company to move in."

Kathleen Otto

But tenants need to do their homework.

"It's important for tenants to have a very thoughtful business plan. There are advisory boards that really dig in to make sure they're putting the right tenants next to each other in the incubator. They want to make sure you're funded. They want to make sure there's a chance you can grow in the portfolio. And they're examining it in such detail because of the cost of infrastructure: they might invest several hundred dollars a square foot into a tenant space. So owners are putting a lot of skin in the game, and they want to make sure that the science is right. They want to make sure the funding is right."

Matthew Knowles

Who can help?

Just as research is inherently collaborative, so too are design and construction. From real estate consultants, to nonprofits, to architects and construction managers, the right partners can help researchers find the space they need.

Someone who knows the real estate market.

“Our life science consulting team in Philadelphia represents both tenants, mostly life science tenants, and landlords that have life science product.”

Matthew Knowles

Someone from a supportive organization.

“Bio North Texas is an industry trade organization and a foundation. Our job is to provide support for companies, guidance for young entrepreneurs and those coming to Texas that want to make this area the hub for their growth in the life sciences.”

Kathleen Otto

Someone who can help with pre-construction.

“In many cases, owners are providing seed money to some of the companies in their incubators, in hopes of growing the company and, hopefully, growing them within their real estate portfolio or in the city of Philadelphia.”

Matthew Knowles

Someone who can design for science.

“On the incubator side, there are some models where an operator may take a small piece of equity in the company. We have not yet seen that in terms of our institutional owners.”

Will Lannon

Who can help?

Someone who can translate for designers and builders.

"The challenge I always see is this: end users are scientists through and through, and they speak a very different language than the developers and the contractors and the engineers and architects. A lot of times, it's good to have somebody — or a team of people — in the room who can honestly act as translators between everybody. Usually that's somebody who has 5-10 years' bench-work experience, but then later changed their career trajectory into a more technical field. When we have somebody like that on board, it usually makes things move a little smoother."

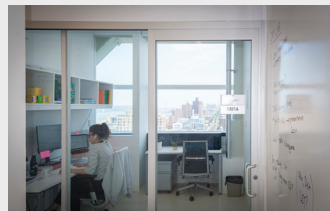
Will Lannon

CASE STUDY

Columbia University,
Andolfatto Lab
New York, NY

Attracting top talent to a lab with a view

By co-locating computational and traditional biology space, this highly efficient laboratory on the 13th floor of Columbia University's new Northwest Corner Building supports cross-disciplinary research in genome evolution at the intersection of molecular genetics, biochemistry, ecology, genomics, and computational biology





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