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2021 Year End Life Science Overview & Market Clusters

NEWMARK



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Introduction

Life science remains one of the top performing niche sectors in real estate, as both tenant and investor demand for laboratory, incubator, and biomanufacturing (GMP) space have accelerated throughout the COVID-19 pandemic. One of the early realities responsible for the acceleration of demand during the initial months of the pandemic was that many life science lab workers could not do vital research and development from home, and therefore circumvented the lockdowns and work-from-home mandates that impacted other property types. As new variants such as Omicron continue to disrupt companies back-to-office plans, this will factor into the decision-making

and risk-reward profiles of life science investors in 2022. Venture capital-backed life science startups will also continue to offer high growth potential, and consequently high future demand potential for R&D space, as they grow and attract more funding in later VC rounds or IPO. The venture capital industry's pivot to life science has propelled funding to a record \$43.3 billion in 2021, representing a compound annual growth rate of 21.3% over the past 10 years. Additionally, abundant fund dry powder and fundraising activity as well as continued disruption in property types like conventional office, have funneled even greater amounts of capital into life science real estate. This trend

combined with 2022 deliveries of newly developed and renovated life science product in the top supply-constrained markets is expected to keep life science investment at higher levels compared with pre-pandemic years.

Capital Markets

Life science real estate capital markets activity set an all-time record in 2021, with investment volume climbing to \$18.4 billion, reflecting immense investor demand and continued liquidity in the cluster markets. In addition to Blackstone's (BPPLS) \$3.4 billion acquisition of Brookfield's Cambridge portfolio, there were several \$500 million+ transactions, such as Alexandria's



\$1.5 billion acquisition of two laboratory assets in Boston's Fenway neighborhood and KKR's acquisition of a future life science asset in downtown San Francisco for \$1.1 billion. Similarly, pricing for laboratory product with an office component hit a record in 2021, averaging \$537 per square foot, representing a 53% increase compared with pricing five years ago. High water mark pricing for Class A assets in the top cluster markets, such as Cambridge and South San Francisco, is well above \$1,000 per square foot. Fundraising activity by investors targeting life science product has reached approximately \$42.1 billion since the pandemic began, equating to a leveraged purchasing power of

over \$120 billion, led by existing dominant players such as Blackstone BioMed, but also a widening mix of private equity groups, public and private REITs, specialist life science developers / operators, and institutional groups. Some of the largest fund closes of 2021, such as Carlyle Realty Partners opportunistic IX fund which closed at \$8 billion, are targeting life science and R&D assets, in addition to other pandemic favorites such as logistics and sunbelt multifamily.

Top Clusters

The most established clusters in the country—namely Boston, San Francisco, San Diego and the Research Triangle—remain the

epicenter of life science leasing and capital markets activity in the United States. In the greater Boston region, Cambridge remains the dominant life science market in the country, with tenant demand pushing the vacancy rate to 2.3% and top-quality laboratory rents reaching \$130 per square foot 4Q21. While over 3.4 million square feet of space is currently under construction and renovation, tenants still expect to wait 12-24 months to lease life science space. Additionally, biomanufacturing (GMP) space continues to be a strong demand driver as biotechnology and pharmaceutical companies streamline supply chains and expand R&D facilities, with an estimated





Life science real estate capital markets activity set an all-time record in 2021, with investment volume climbing to \$18.4 billion.

three million square feet in active requirements as of 4Q21. The San Francisco life science cluster continues to have the largest inventory of laboratory space in the country, with an estimated 32.4 million square feet of space of existing product, and another 7.1 million square feet of active conversions and developments. The growth in tenant demand is aided by the market's proximity to Silicon Valley and the region's vast venture capital networks, which propelled venture capital funding to \$20.6 billion in 2021. The cluster also managed to attract over \$5 billion in real estate investment in 2021, bolstered by acquisitions by Alexandria, KKR, CBRE Global Investors, and Harrison Street. San Diego remains one of the tightest life science markets in terms of leasing fundamentals, with Torrey Pines achieving sub-1% vacancy, while attracting \$80+ per square foot rents. Despite the supply-demand imbalance, construction and conversion activity remains modest, with many developers seeking out sites in non-traditional submarkets such as Del Mar Heights and in downtown San Diego. In the Research Triangle many former pharmaceutical company-leased R&D campuses are being actively converted into institutional quality life science and laboratory space. Land prices in the Research Triangle Park / Raleigh Durham Airport (RTP/RDU) submarket have risen substantially over the past 24 months, with investors such as Alexandria acquiring sites for future

life science development. Similar to the other top cluster markets, investors and tenants are seeking out space further from the core RTP/RDU market, with ongoing life science developments occurring in Downtown Durham as well as in Western Wake County, in cities such as Morrisville and Cary.

Emerging Clusters

As the supply-demand imbalance for life science properties across the largest markets remains considerable, emerging life science clusters can offer investors comparatively attractive opportunities to transact at more favorable pricing, with lower land and development costs, and with less competition in the bidding process from well-capitalized life science REITs and institutional investors. Markets such as Denver / Boulder have substantial life science pedigree and are ripe for expansion – the cluster is home to a high concentration of federal laboratories and research institutions as well as top research universities that supply the area with STEM graduates. Other markets such as Chicago and Houston have world-class medical systems as well as active mixed-use mega-developments, namely Lincoln Yards and Texas Medical Center, which will have substantial laboratory space and are expected to anchor their respective clusters. Los Angeles benefits from its close proximity to Silicon Valley and consequently venture capital networks as well as being less than a two-hour drive from San Diego.

Additionally, the city is home to some of the top universities in the country, such as Cal Tech, UCLA, and USC while also being home to some of the largest medical systems in the country.

Life science investment and expansion activity has gained momentum in many non-traditional life science markets, such as Phoenix, St. Louis and New Haven. Similar to the emerging clusters, these potential future clusters rely on a combination of local and federal infrastructure funding, local university systems, biotechnology firms and life science developers to foster and develop their life science ecosystems. In markets like Phoenix, which is among the fastest growing cities in the United States in terms of population and employment growth, purpose-built life science districts like the Phoenix Biomedical Campus aim to capture the city's momentum and attract life science companies and talent. In smaller markets such as New Haven and St. Louis, which have top tier university systems, the aim is to retain STEM talent that often migrate to larger metropolitan areas, by offering substantially lower costs of living and ample amenities in newly constructed mixed-used campuses. As is the case with tertiary markets in other property types, these small life science markets offer abundant opportunities for first movers but are more speculative in nature and investors must be keenly aware of the life science supply-demand balance.

National Overview

Top Life Science Owners

Top 10 Life Science Owners					
Company	HQ Location	Investor Type	Number of Properties	Featured Markets Exposure Count	Square Feet*
Alexandria Real Estate Equities	Pasadena, CA	Public REIT	407	9	43,000,000
Blackstone BioMed	New York, NY	Institutional	106	9	16,000,000
Healthpeak Properties	Denver, CO	Public REIT	83	4	11,700,000
Ventas	Chicago, IL	Public REIT	42	6	8,400,000
Longfellow RE Partners	Boston, MA	Private/Developer	56	4	7,300,000
King Street Properties	Boston, MA	Private/Developer	29	3	4,800,000
Boston Properties	Boston, MA	Public REIT	51	3	4,200,000
Diversified Healthcare Trust	Newton, MA	Public REIT	30	6	4,100,000
IQHQ	Solana Beach, CA	Private REIT	21	3	3,800,000
Alloy Properties (TPG)	San Francisco, CA	Institutional	37	5	3,400,000

Total: 107,000,000

Other Prominent Owners			
Company	HQ Location	Investor Type	Square Feet*
Wareham Development	San Francisco, CA	Private/Developer	3,300,000
Harrison Street	Chicago, IL	Institutional	3,300,000
Nuveen	New York, NY	Institutional	3,200,000
Phase 3 RE Partners	San Diego, CA	Private/Developer	3,000,000
Beacon Capital Partners	Boston, MA	Institutional	2,800,000
Kilroy Realty Corporation	Los Angeles, CA	Public REIT	2,600,000
Pacific Coast Capital Partners	Los Angeles, CA	Institutional	2,400,000
DivcoWest	San Francisco, CA	Institutional	2,200,000
Clarion Partners	New York, NY	Institutional	2,000,000
KKR	New York, NY	Institutional	2,000,000



107 Million Square Feet

The total approximate life science wet laboratory / R&D space owned by the top ten owners, 71% of which is owned by public or private REITs.

* Includes under construction and under renovation product

Life Science Venture Capital Funding

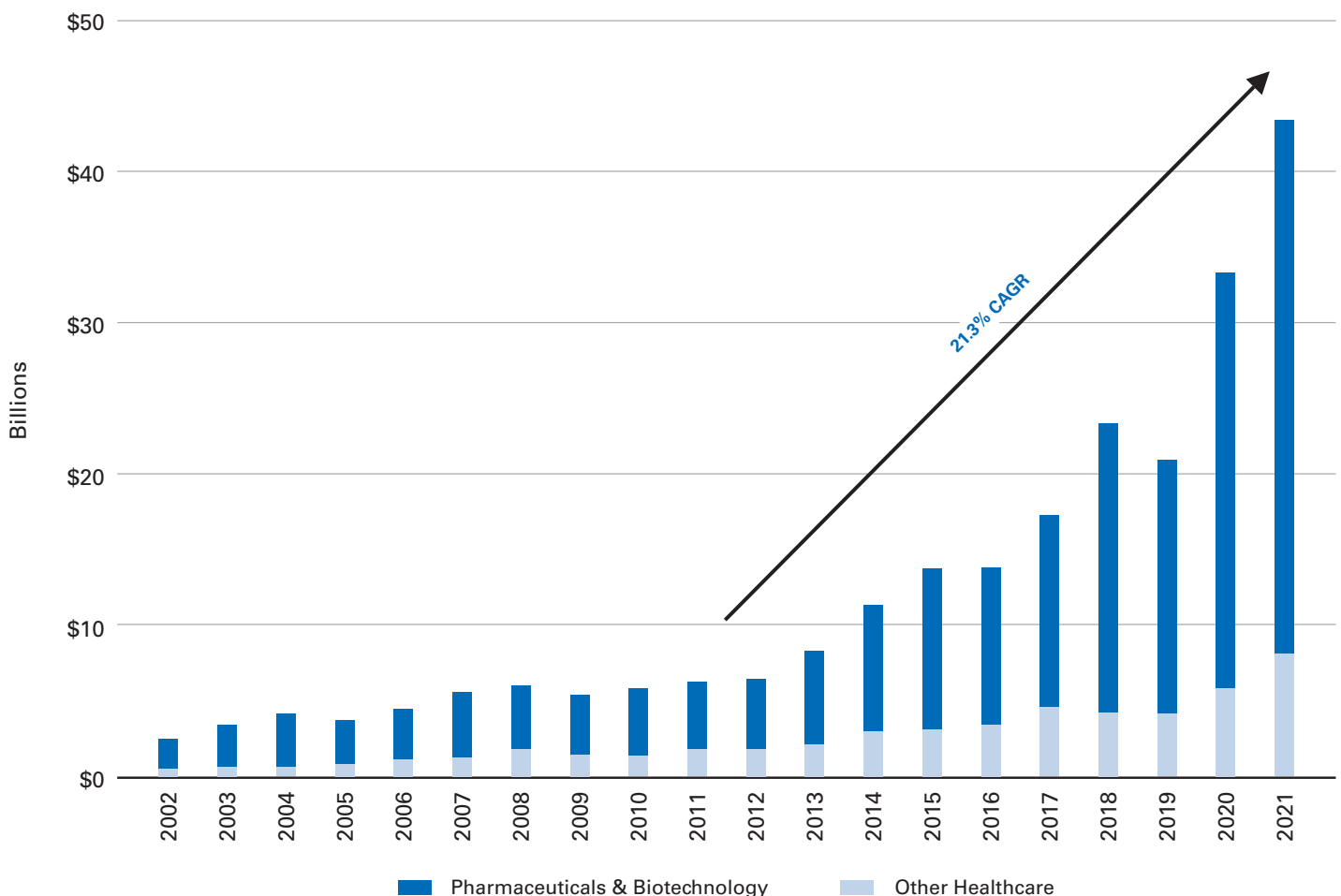
Life science and healthcare venture capital funding hit a record \$43.3 billion in 2021, a 30% increase from 2020, which was the previous record high. Many factors are responsible for the rise in life science investment over the past ten years, such as the sector's secular growth characteristics and technological advancements making drug

development and the creation of therapies and treatments faster and more efficient. In addition to these existing tailwinds, the pandemic unmistakably had a further positive impact on demand and investor psychology, as other sectors of the economy were severely disrupted by COVID-19 and as healthcare and rapid vaccine development were

brought to the forefront of global priorities. Venture capital funding is expected to continue to climb in 2022, however the growth rate is likely to moderate – the astonishing 21.3% CAGR since 2011 is unsustainable in the long-term, given the natural limitations of fundraising growth and maturing of the life science industry as a whole.

National Life Science Venture Capital Funding

United States | 2002 - 2021



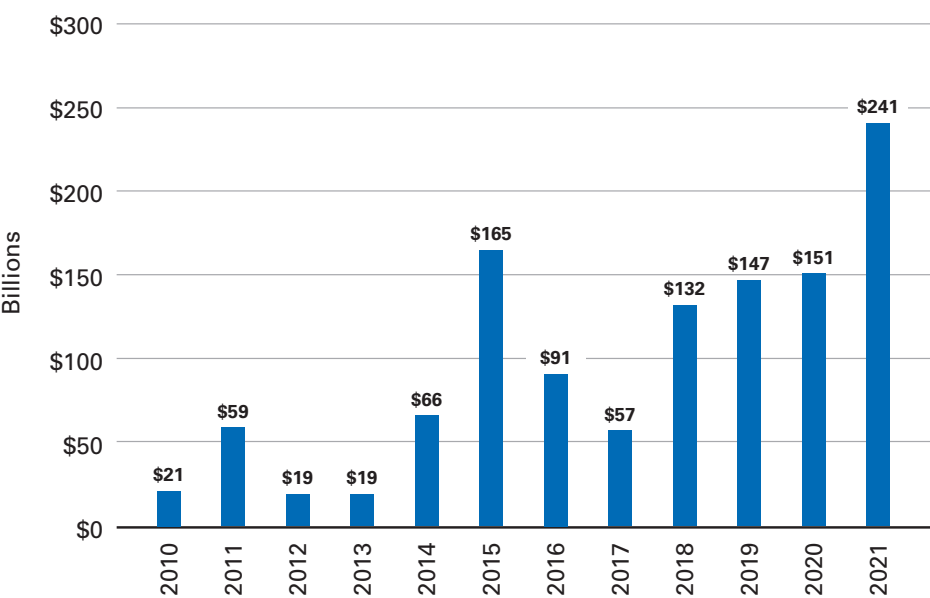
Sources: Newmark Research, PitchBook

Life Science M&A Activity

Life science M&A Activity climbed 60.0% year-over-year, for a record-breaking \$241 billion. As the life science industry has advanced and become more competitive, there has been a greater need for established pharmaceutical companies to pay for innovation and reinforce their presence across life science verticals, from cell and gene therapy to oncology and medical devices.

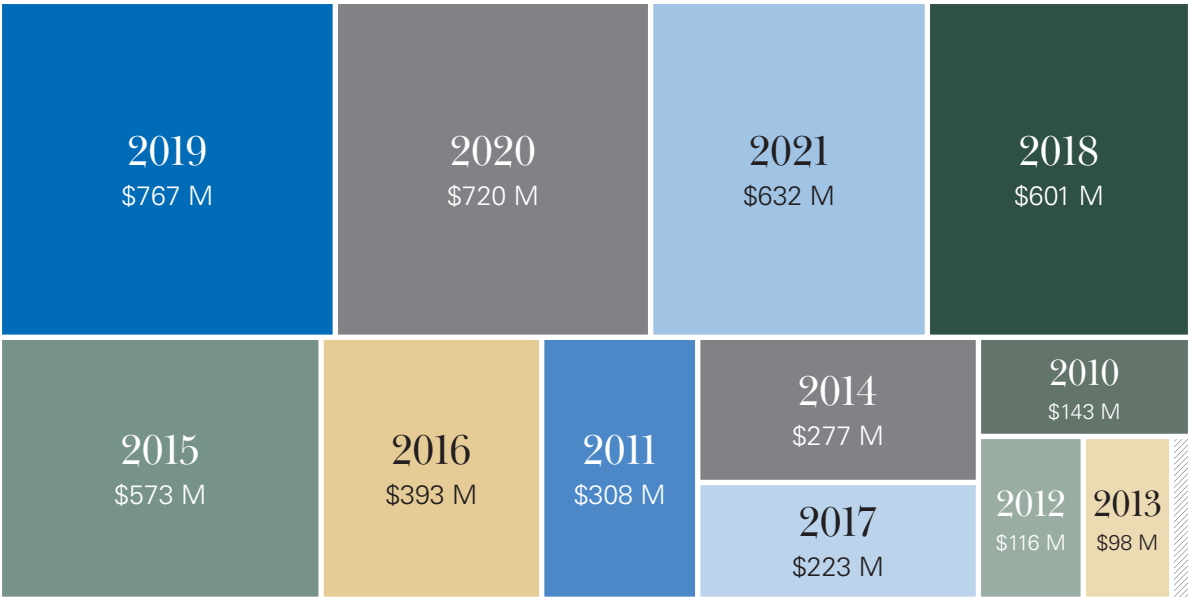
At the same time, many of those same companies and conglomerates have divested from their non-core businesses, freeing up capital to acquire innovative businesses with secular growth characteristics.

Life Science M&A Deal Volume
United States | 2010 - 2021



Sources: Newmark Research, PitchBook

M&A deal size averaged \$632 million in 2021, representing the third largest average in the past decade. The life science and biotechnology ecosystem has matured substantially over the past decade and now features a fast-growing number of billion dollar “unicorn” companies.



Top 10 Life Science M&A Deals in 2021

Company / Target	Investor	Size (Billions)	Sector	HQ Location
Alexion Acquired	AstraZeneca	\$39.0	Biotechnology	Boston, MA
Pharmaceutical Product Development	Thermo Fisher Scientific	\$17.4	Drug Discovery	Wilmington, DE
Varian Medical Systems	Siemens Healthineers	\$16.4	Therapeutic Devices	Palo Alto, CA
PRA Health Sciences	Icon	\$12.0	BPO/Outsource Services	Raleigh, NC
Accelaron Pharma	Merck & Co.	\$11.5	Drug Discovery	Cambridge, MA
Hill-Rom Holdings	Baxter International	\$10.5	Diagnostic Equipment	Chicago, IL
Aldevron	Danaher	\$9.6	Biotechnology	Fargo, ND
GRAIL	Illumina	\$8.0	Biotechnology	Menlo Park, CA
BioLegend	PerkinElmer	\$5.3	Biotechnology	San Diego, CA
Purolite	Ecolab	\$3.7	Multi-line Chemicals	King of Prussia, PA

Sources: Newmark Research, PitchBook

Top 10 Life Science M&A Deals in 2021

The ten largest life science M&A transactions of 2021 accounted for over \$130 billion, driven by the continued growth-by-acquisition of the world's largest pharmaceutical and biotechnology firms, such as Merck, Illumina and Thermo Fisher Scientific. Astrazeneca's acquisition of Alexion, which was announced in 2020, represented the top closed deal of 2021 and is a major push into immunology and rare diseases as well as a bet on the success of Alexion's early stage drug pipeline.



Capital Markets: Life Science Real Estate Activity

Annual average pricing for life science and R&D space with an office component reached \$537 per square foot in 2021, which is over 50% higher compared with 5 years ago. The lack of existing product in the cluster markets combined with high demand and competitive bidding for R&D product is expected to continue to put upward pressure on pricing in 2022.

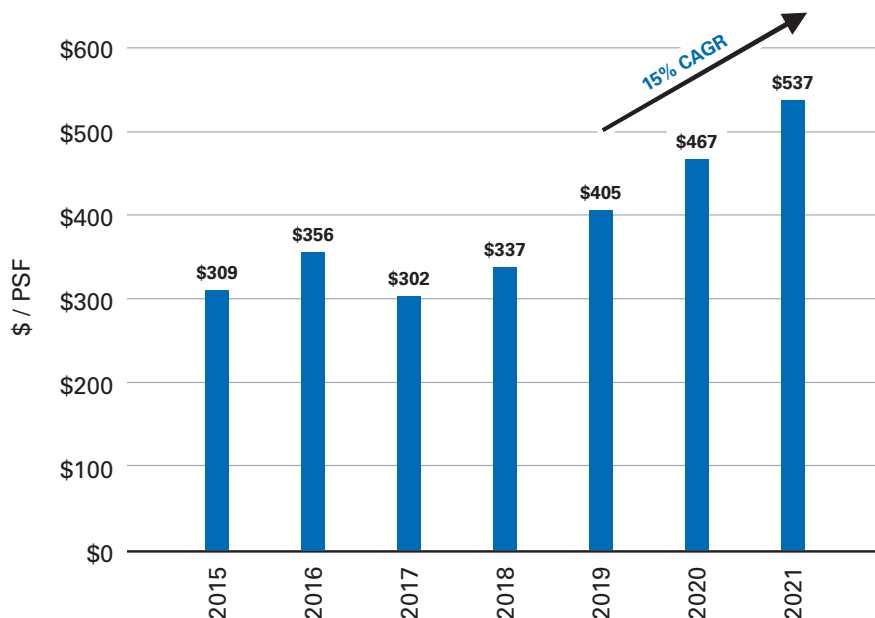
For Class A product in top urban life science markets, namely Cambridge, South San Francisco, Sorrento Mesa, and South Lake Union, pricing has reached \$1000+ per square foot in 2021, with high water mark pricing closer to \$2000 for best-in-class assets in areas such as Cambridge's Kendall Square.

Life science investment activity set an all-time record in 2021, with sales volume hitting \$18.4 billion, a 63.9% increase year-over-year, propelled by an expanding list of investors and further expansion by top players such as Alexandria, Blackstone BioMed and Healthpeak Properties.

Similarly, fundraising activity for funds targeting life science and R&D assets has reached unprecedented levels, with an estimated \$42 billion in activity occurring since 2020, equating to a leveraged purchasing power of over \$120 billion.

R&D / Life Science Pricing

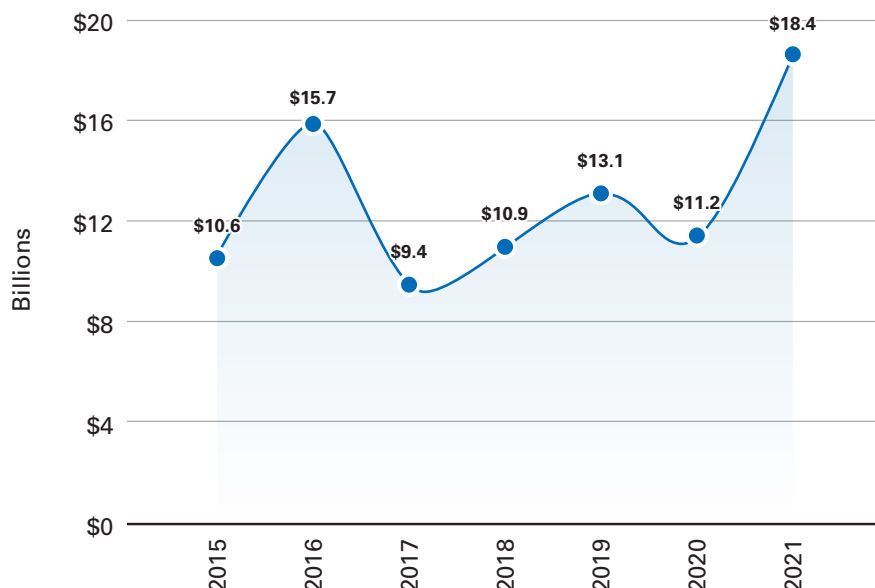
United States | 2015 - 2021



Sources: Newmark Research, Real Capital Analytics

R&D / Life Science Volume

United States | 2015 - 2021



Sources: Newmark Research, Real Capital Analytics

Life Science Fundraising Activity

Announcement Date

OCTOBER 2020	Artemis Real Estate Partners Healthcare Fund II	\$0.75 B
OCTOBER 2020	Ventas Life Science and Healthcare Real Estate Fund	\$1.00 B
OCTOBER 2020	DivcoWest Fund VI	\$2.25 B
OCTOBER 2020	Blackstone Property Partners Life Sciences	\$8.30 B
NOVEMBER 2020	Breakthrough Properties (Tishman Speyer)	\$1.50 B
NOVEMBER 2020	IQHQ	\$2.60 B
DECEMBER 2020	Alidade Capital Fund V	\$0.25 B
DECEMBER 2020	Exeter Office and Life Science Value Fund II	\$0.50 B
DECEMBER 2020	Bain Capital Real Estate II	\$1.60 B
JANUARY 2021	Harrison Street / HS-OR Life Science Partners	\$0.20 B
FEBRUARY 2021	Cadre Direct Access Fund	\$0.40 B
APRIL 2021	Boston Properties & Sovereign Wealth Funds Joint Venture	\$2.00 B
JUNE 2021	Invesco Real Estate U.S. Fund VI	\$1.50 B
JUNE 2021	Bain Capital Real Estate	\$3.00 B
JULY 2021	GI Partners Real Estate Essential Tech + Science Fund	\$0.50 B
JULY 2021	Greystar & CPP Joint Venture	\$1.25 B
JULY 2021	KKR Property Partners Americas	\$1.50 B
SEPTEMBER 2021	Brookfield & King Street Properties Joint Venture	\$1.50 B
NOVEMBER 2021	NPS-Tishman Speyer Thematic Platform / Separate Account	\$1.50 B
DECEMBER 2021	Hines	\$2.00 B
DECEMBER 2021	Carlyle Realty Partners IX	\$8.00 B

TOTAL FUNDRAISING ACTIVITY SINCE 2020

\$42.1 B

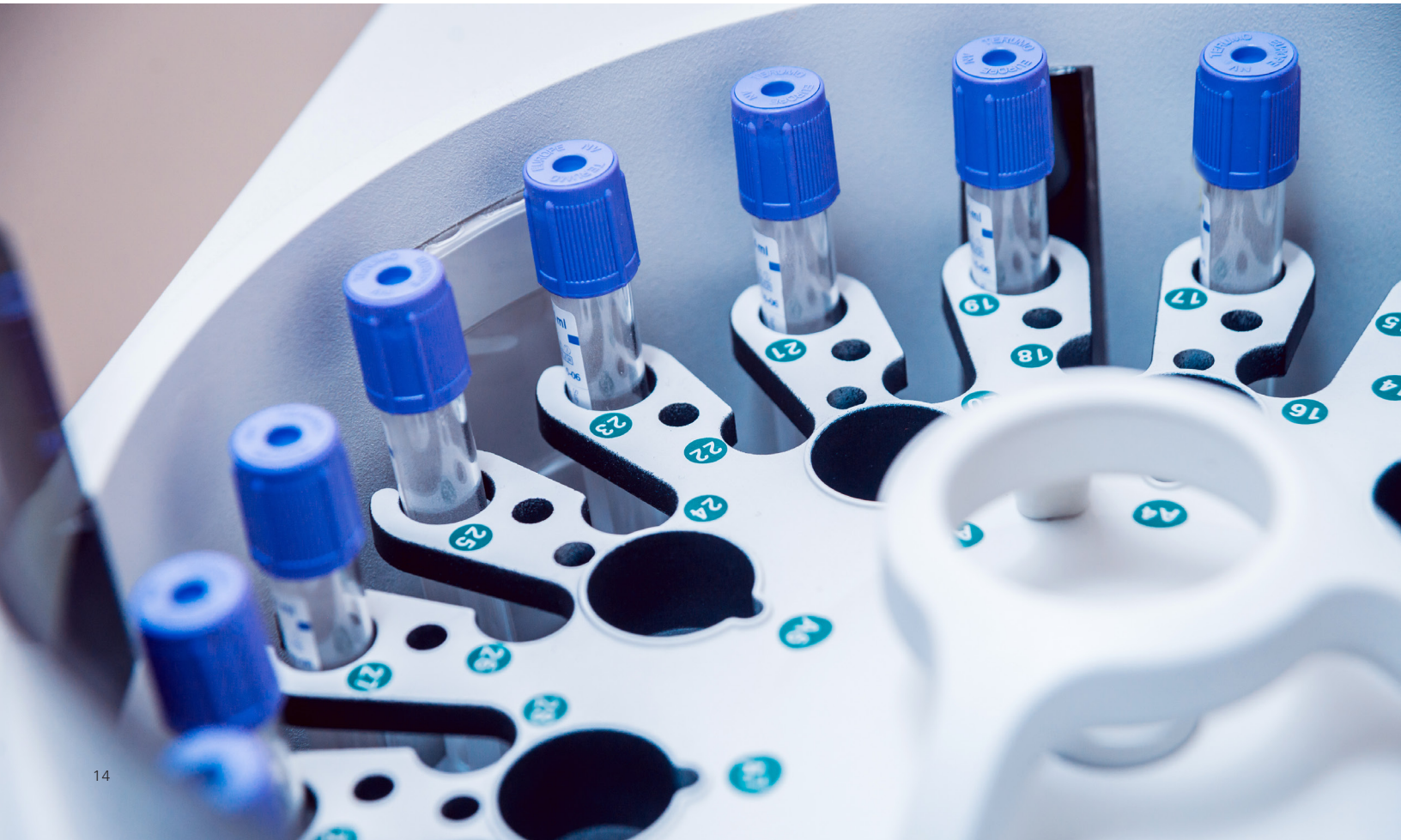
Life Science Index

Life Science Cluster Scores

The data contained in this report was used to calculate market cluster scores, which rank the top life science real estate markets in the country by a combination of market maturity, market momentum both in capital markets and leasing activity, demographic and structural components that support the life science cluster, and, finally, future growth potential.

Life Science Cluster Scores		
Rank	Markets	Market Cluster Score
1	Greater Boston	90.4
2	San Francisco Bay Area	85.1
3	San Diego	76.3
4	Research Triangle	70.3
5	Philadelphia	64.5
6	Puget Sound	63.5
7	Maryland	63.1
8	New York City	55.9
9	Los Angeles / Orange County	55.3
10	Denver / Boulder	54.9
11	New Jersey	50.1
12	Houston	49.0
13	Chicago	39.9
14	Austin	32.0

Sources: Newmark Research, Real Capital Analytics, PitchBook, Jobs EQ



Life Science Cluster Score Components

01

Market Maturity

The first sub-score is “market maturity,” which represents 30% of the cluster score and is a combination of laboratory space, rental rate, vacancy rate and venture capital funding. The markets at the top of this ranking are Boston, San Francisco and San Diego, which have the largest laboratory inventories, highest tenant demand and the most venture capital funding, supporting the largest ecosystem of early stage and mature life science companies.

02

Market Momentum

The second sub-score “market momentum,” which represents 30% of the cluster score, is composed of five-year rental and pricing growth, as well as 2021 capital markets activity. The markets that score the highest in this category are also Boston and San Francisco, however various other markets such as the Research Triangle, Philadelphia and San Diego score similarly, reflecting the fast-evolving market conditions in those markets and tightening of fundamentals.

03

Market Innovation

The third sub-score “market innovation,” which represents 30% of the cluster score, is composed of total life science employment, concentration of life science jobs in the overall labor market and the number of top tier medical, government and institutions that support the life science ecosystem. Beyond Boston and San Francisco, markets such as Maryland (which has the highest concentration of federal health agencies) and Seattle (home to world class institutions like the Fred Hutchinson Cancer Center) score highly.

04

Future Growth

The final sub-score “future growth,” which represents 10% of the cluster score, is composed of the construction and conversion pipeline, as well as the expected growth rate of the life science industry over the next five years. Markets that score highly are the Research Triangle, which has recorded some of the highest levels of office-to-laboratory conversion in the country and has an estimated 11 million square feet of future proposed space. Houston also scores highly, with over two million square feet in active new life science construction, predominantly in the Texas Medical Center.

Life Science Cluster Scores				
Market	Market Maturity Score: 30%	Market Momentum Score: 30%	Market Innovation Score: 30%	Future Growth Score: 10%
Greater Boston	96.3	88.3	88.3	85.0
San Francisco Bay Area	88.8	88.3	83.3	70.0
San Diego	72.5	81.7	78.3	65.0
Research Triangle	67.5	78.3	65.0	70.0
Philadelphia	57.5	76.7	68.3	37.5
Puget Sound	62.5	68.3	61.7	57.5
Maryland	71.3	50.0	76.7	37.5
New York City	46.3	68.3	56.7	45.0
Los Angeles / Orange County	57.5	60.0	50.0	50.0
Denver / Boulder	61.3	51.7	51.7	55.0
New Jersey	48.8	53.3	56.7	25.0
Houston	47.5	36.7	56.7	67.5
Chicago	46.3	40.0	36.7	30.0
Austin	30.0	23.3	36.7	50.0

Life Science Clusters



GREATER BOSTON

- Unprecedented venture capital funding, which reached a record \$18.4 billion, a deep talent pool and voracious tenant demand characterized Greater Boston's life science market in 2021. Robust year-end leasing activity suggests further vacancy compression and rent gains on the horizon, particularly as \$100/SF NNN rents have become more commonplace outside of the core Kendall Square submarket.
- The supply-demand imbalance has been at the forefront of the Cambridge narrative for several years and continues to drive pre-leasing in new development and conversions. With much of the remaining existing space currently on the market already committed, tenants have sought out locations in Boston's Seaport, Somerville, Fenway, Watertown, and Waltham.
- In addition to conventional research and development space, there is roughly 3.0 million square feet of active requirements for bio-manufacturing (GMP) space, as onshoring and supply chain restructuring continue to accelerate.

MARKET STATS

	Total Market	Cambridge	Seaport District	Lexington & Waltham
Market Size (SF)	26,828,824	12,516,722	2,284,712	4,493,073
Rent (PSF)	\$55 - \$130	\$95 - \$130	\$90 - \$120	\$65 - \$89
Vacancy Rate	5.8%	2.3%	27.4%	3.9%
Under Construction (SF)	9,254,467	2,495,616	1,904,638	1,391,320
Under Renovation (SF)	5,130,260	1,065,626	872,049	770,162
Proposed (SF)	34,574,173	4,058,542	7,444,514	2,587,127
2021 Venture Capital Funding	\$18.4 B			
Venture Capital 5-Year Annual Average	\$10.3 B			
2021 Sales Volume	\$6.6 B			
2021 Sales Price PSF Avg.	\$796			
Emerging Life Science Investors / Developers	Beacon Capital Partners, Phase3, KKR, GIC, Nan Fung Group, OMERS, Spear Street Capital, TPG Real Estate			



SAN FRANCISCO BAY AREA

- The San Francisco Bay Area life science market continues to benefit from record levels of venture capital and NIH grant funding, which in turn support robust tenant demand, particularly in top submarkets like South San Francisco. The market also remains the largest cluster in the country, with laboratory space rising 4.8% year-over-year to 32.4 million square feet.
- While an estimated 5.2 million square feet of laboratory space is projected to be delivered in 2022, tenant demand is expected to absorb the majority of this space – there is an estimated 4.5 million square feet in active tenant requirements as of 4Q21.
- Conversion of existing flex/R&D and office properties to laboratory product is a driver of supply growth, particularly in markets such as Emeryville, as land and development costs in the Bay Area remain a sizable barrier to entry.
- Alexandria, Healthpeak and Blackstone BioMed Realty are dominant life science landlords, with a combined footprint of nearly 20 million square feet, however emerging investors such as private REIT IQHQ are aggressively acquiring development sites, such as Elco Yards in Redwood City, and have long term commitments to the cluster.

MARKET STATS						
	Total Market	South SF	Palo Alto	San Carlos	Menlo Park	Emeryville
Market Size (SF)	32,439,717	11,330,207	2,089,814	1,177,447	954,197	2,052,664
Rent (PSF)	\$63 - \$84	\$72 - \$84	\$70 - \$81	\$63 - \$81	\$76 - \$81	\$70 - \$80
Vacancy Rate	4.9%	4.2%	16.3%	0.6%	0.3%	0.7%
Under Construction (SF)	3,392,065	1,686,008	–	173,757	–	–
Under Renovation (SF)	4,137,606	368,403	298,036	123,000	–	1,310,962
Proposed (SF)	21,080,979	6,186,333	868,860	1,808,332	381,285	735,710
2021 Venture Capital Funding	\$20.6 B					
Venture Capital 5-Year Annual Average	\$12.9 B					
2021 Sales Volume	\$5.4 B					
2021 Sales Price PSF Avg.	\$617					
Emerging Life Science Investors / Developers	Aralon Properties, BioScience Properties, DivcoWest, Four Corners Properties, GI Partners, IQHQ					

LIFE SCIENCE CLUSTERS



SAN DIEGO

- San Diego is the third largest biotech cluster in the United States and has been a growing focus of life science REITs and institutional investors, which own an estimated 47% of the available life science product. Investors are attracted to the market's robust research institutions, high concentration of R&D and laboratory facilities and record-setting venture capital funding.
- Demand for life science space has far outstripped supply, as there is an estimated 4.5 million square feet of active requirements in the market – tenants that are in expansion mode include clinical stage oncology-focused Sorrento Therapeutics and medical device manufacturer Tandem Diabetes.
- As rents continue to increase, particularly in Sorrento Mesa and Torrey Pines, submarkets such as Del Mar Heights have started to emerge as clusters, driven by expanding biotech companies searching for large blocks of space outside of the supply-constrained core submarkets.

MARKET STATS						
	Total Market	Sorrento Mesa	Sorrento Valley	Torrey Pines	UTC	Emerging Submarkets
Market Size (SF)	17,937,206	6,771,137	1,518,825	5,624,514	4,022,730	–
Rent (PSF)	\$68 - \$79	\$63 - \$78	\$64 - \$69	\$72 - \$83	\$72 - \$78	–
Vacancy Rate	3.0%	5.8%	1.2%	0.1%	2.3%	–
Under Construction (SF)	1,312,079	339,633	–	224,484	–	747,962
Under Renovation (SF)	1,305,683	555,683	–	–	–	750,000
Proposed (SF)	8,661,927	3,434,000	400,000	–	1,790,000	3,037,927
2021 Venture Capital Funding	\$5.7 B					
Venture Capital 5-Year Annual Average	\$3.0 B					
2021 Sales Volume	\$2.5 B					
2021 Sales Price PSF Avg.	\$652					
Emerging Life Science Investors / Developers	BioScience Property Investments, Breakthrough Properties, Harrison Street, IQHQ, Lincoln Property Company, Longfellow Real Estate Partners, Oxford/McCarthy Cook, Sterling Bay					



RESEARCH TRIANGLE

- Raleigh / Durham's life science product has been among the market's best performing property types throughout the pandemic, with sustained demand driving leasing activity and limited available supply keeping upward pressure on rents.
- The majority of vacant space continues to be via conversions of existing R&D, flex, and industrial facilities to future life science use, which are expected to be close to fully leased once delivered.
- Alexandria has been among the market's most bullish investors with multiple high-profile land acquisitions, allowing the REIT to develop several million square feet over the coming decade and cement their position as the Triangle's largest life science owner. Longfellow and Trinity Capital also have multiple development projects planned that will deliver institutional-quality life science product.
- RTP / RDU submarket Land prices have increased substantially over the pandemic, which is pushing life science development further south along the US-1 corridor, particularly for biomanufacturing (GMP) product that typically requires larger floor plates and consequently more land.
- Total planned development exceeds 11.5 million square feet, potentially doubling the market's size over the next 3-10 years and ultimately driving additional capital markets and leasing activity.

MARKET STATS

	Total Market	RTP / RDU	Downtown Durham	Western Wake County / US-1
Market Size (SF)	10,363,121	8,828,754	690,712	843,655
Rent (PSF)	\$28 - \$45	\$28 - \$38	\$34 - \$47	\$28 - \$33
Vacancy Rate	15.6%	11.5%	3.6%	67.5%
Under Construction (SF)	300,500	195,500	0	105,000
Under Renovation (SF)	1,055,362	566,290	50,000	439,072
Proposed (SF)	11,760,000	7,680,000	1,480,000	2,600,000
2021 Venture Capital Funding	\$827 M			
Venture Capital 5-Year Annual Average	\$650 M			
2021 Sales Volume	\$181 M			
2021 Sales Price PSF Avg.	\$733			
Emerging Life Science Investors / Developers	Alloy Properties, Crescent Communities, Easton Group, Goldman Sachs, King Street Properties, Nuveen Starwood Capital, TPG, Trinity Capital			

LIFE SCIENCE CLUSTERS



PHILADELPHIA

- Greater Philadelphia is one of the largest life science markets by employment and laboratory inventory nationwide, supported by its rich concentration of colleges and universities, renowned healthcare institutions and a strong legacy of pharmaceutical manufacturing.
- The market's world-class healthcare and educational institutions have fostered expanding innovation in biotech research and development, especially relating to novel gene and cell therapies, leading to the region developing the moniker, "Cellicon Valley."
- Demand from research institutions as well as from biotechnology and pharmaceutical companies remains high, at an estimated 2.5 million in active tenant requirements, with University City remaining the most sought-after life science submarket.

MARKET STATS

Market Size (SF)	11,035,611
Rent (PSF)	\$30 - \$63
Vacancy Rate	11.4%
Under Construction (SF)	850,000
Under Renovation (SF)	500,000
Proposed (SF)	1,430,000
2021 Venture Capital Funding	\$1.6 B
Venture Capital 5-Year Annual Average	\$1.2 B
2021 Sales Volume	\$351 M
2021 Sales Price PSF Avg.	\$580

Emerging Life Science
Investors / Developers

**Beacon Capital Partners,
Botanic Property Group,
Ensemble Real Estate, GIC,
New Mountain Capital**



PUGET SOUND

- The life science market in the Puget Sound region, which is concentrated in the Lake Union and Waterfront submarkets of Seattle, have exceeded the performance of the traditional office market—the Eastside (Bothell) market where Alexandria and other operators have created a new life science hub, has continued to perform strongly.
- Overall vacancy among Seattle life science properties was just over 6.5% in 4Q21 and new inventory is virtually impossible to find, putting strong upward pressure on asking rents. For newly constructed life science buildings, asking rates have risen into the \$70+ per square foot range, a premium over second generation and conversion buildings in the market.
- Tenant demand remains strong, with an estimated one million square feet in active requirements in the Puget Sound region, supported by \$1.7 billion in life science and healthcare venture capital funding.

MARKET STATS

Market Size (SF)	10,190,169
Rent (PSF)	\$40 - \$85
Vacancy Rate	7.1%
Under Construction (SF)	1,043,119
Under Renovation (SF)	212,000
Proposed (SF)	4,419,259
2021 Venture Capital Funding	\$1.7 B
Venture Capital 5-Year Annual Average	\$1.2 B
2021 Sales Volume	\$682 M
2021 Sales Price PSF Avg.	\$924

Emerging Life Science
Investors / Developers

**Beacon Capital Partners,
Clarion Partners, Invesco,
Lincoln Property Company,
Oxford Properties Group,
SteelWave**



MARYLAND

- Maryland and the overall BioHealth Capital Region feature some of the most prominent government research and medical institutions in the United States, including the National Institute of Allergies and Infectious Disease (NIAID), NIH and the FDA.
- Much of the current leasing activity is concentrated in newly constructed facilities, driven by expanding tenants such as Novavax and MilliporeSigma, as well as international biotechnology firms, like Ireland-based gene editing firm Horizon Therapeutics.
- To meet historically high demand, Maryland's construction pipeline increased in the second half of 2021 due to greater activity among speculative life science developers, like Matan and Federal Realty, who have several ongoing and planned projects in the I-270 corridor from Rockville to Frederick County.
- In addition to new construction, conversion activity has gained momentum with developers investing in well-located office, flex and warehouse buildings, such as City Garage in Baltimore's Port Covington.

MARKET STATS*

Market Size (SF)	16,043,090
Rent (PSF)	\$24 - \$44
Vacancy Rate	5.1%
Under Construction (SF)	1,105,787
Under Renovation (SF)	117,448
Proposed (SF)	4,927,409
2021 Venture Capital Funding	\$1.8 B**
Venture Capital 5-Year Annual Average	\$980 M**
2021 Sales Volume	\$265 M
2021 Sales Price PSF Avg.	\$422

Emerging Life Science
Investors / Developers

**Boston Properties, Matan,
Rock Creek Property Group,
Trammel Crow**

* Data includes Suburban Maryland and Baltimore

** Washington, DC Metropolitan Area



NEW YORK CITY

- Although New York City is still an emerging life science cluster, the city has all the major building blocks for future growth, including the largest concentration of academic institutions in the world.
- The incubator model for biotechnology and life science companies has been increasingly adopted in NYC, with organizations such as JLABs, BioLabs sponsored by NYU Langone, and Alexandria's LaunchLabs NYC offering laboratory space and collaborative environments for seed stage companies.
- Alexandria is the largest life science landlord in Manhattan and plans to further expand the Alexandria Center with a 550,000 square foot North Building, which will be built once an anchor tenant is secured—this will enhance the already extensive tenant roster, which includes Bristol-Myers Squibb, Eli Lilly and NYU Langone.
- The pandemic has fueled increased demand in lab space outside of Manhattan, such as in King Street Properties' Innolabs property in Long Island City, which has recently attracted tenants like lab automation and robotics company Opentrons Labworks in addition to their subsidiary, the Pandemic Response Lab.

MARKET STATS

Market Size (SF)	3,714,011
Rent (PSF)	\$80 - \$120
Vacancy Rate	32.1%
Under Construction (SF)	—
Under Renovation (SF)	776,000
Proposed (SF)	4,418,735
2021 Venture Capital Funding	\$12.0 B
Venture Capital 5-Year Annual Average	\$5.3 B
2021 Sales Volume	\$550 M
2021 Sales Price PSF Avg.	\$910/SF

Emerging Life Science
Investors / Developers

**Botanic Property Group,
Georgetown Company,
Longfellow Real Estate
Partners, Nuveen**

LIFE SCIENCE CLUSTERS



LOS ANGELES / ORANGE COUNTY

- While the Los Angeles metropolitan area is an emerging life science market, it has the building blocks to become a major cluster, attracting the most NIH funding of any city in California and being home to leading private research institutions such as the Huntington Medical Research Institute and top research universities such as UCLA, Caltech, UCI and USC.
- A deep and diverse labor pool provides opportunities for major pharmaceutical and biotech companies, whether based in San Diego or the Bay Area, to expand. A lack of leasable laboratory product is a present challenge.
- The Conejo Valley, West LA, Pasadena and Irvine are active development pockets, based on proximity to major universities and occupiers, such as Amgen in Thousand Oaks.
- Incubator, lab and coworking spaces, such as LabLaunch, HATCHspaces and BioLabs, are supporting a growing base of life science startups.

MARKET STATS

Market Size (SF)	11,550,738
Rent (PSF)	\$45 - \$60
Vacancy Rate	5.4%
Under Construction (SF)	–
Under Renovation (SF)	527,049
Proposed (SF)	705,000
2021 Venture Capital Funding	\$2.6 B
Venture Capital 5-Year Annual Average	\$1.8 B
2021 Sales Volume	\$660 M
2021 Sales Price PSF Avg.	\$420

Emerging Life Science Investors / Developers

**Cantor Fitzgerald,
Lincoln Property Company,
BEP Helix, NexCore Group,
Oxford Properties Group**



DENVER / BOULDER

- Boulder is Colorado's life science hub, with over 1.6 million square feet of space currently occupied by life science companies, supported by one of the most highly educated workforces in the United States, with 37% of residents holding an advanced degree.
- The supply-demand imbalance in the wider Denver / Boulder cluster has grown during the pandemic, as there is an estimated 1.4 million square feet of active life science requirements in the market, with no available space for lease as of 4Q21.
- While 585,000 square feet of space is currently under renovation, nearly 50% will not be available for lease until 2024 or later, which will only exacerbate the existing life science shortage.
- In 2021, Colorado's life science ecosystem raised \$2.4 billion, a new record that doubled the amount in 2020, including fundraising by Somalogic (\$630M), Edgewise Therapeutics (\$202M) and Enveda Biosciences (\$51M).

MARKET STATS

Market Size (SF)	3.5M
Rent (PSF)	\$45 - \$60
Vacancy Rate	<1%
Under Construction (SF)	93,000 SF
Under Renovation (SF)	585,000 SF
Proposed (SF)	200,000 SF
2021 Venture Capital Funding	\$1.4 B
Venture Capital 5-Year Annual Average	\$698 M
2021 Sales Volume	\$491 M
2021 Sales Price PSF Avg.	\$313/SF

Emerging Life Science Investors / Developers

**Beacon Capital Partners,
Invesco Real Estate,
NexCore Group, Nuveen,
Partners Group, Rialto
Group, SteelWave,
Tritower Financial Group**



NEW JERSEY

- New Jersey is home to 14 of the top 20 pharmaceutical companies in the world, as well as 8 of 10 of the top companies for R&D productivity, which are supported by a rich pipeline of talent from three elite research Universities – Princeton, Rutgers and NJIT.
- Life science vacancy has fallen from 23.8% to 12.7% over the past five years as a result of strengthened biotech and pharma tenant demand.
- Amid a shortage of prebuilt lab space and a lengthy approval process for new construction, speed to market is becoming increasingly important, with groups such as Thor Equities delivering prebuilt space in 2021.
- Strong investor demand is shifting the ownership composition as legacy pharmaceutical campuses are sold to a mix of private and institutional investors, adding to the competitive inventory.
- While New Jersey is traditionally a suburban life sciences market, future supply will largely be mixed-use, campus-style product in urban environments, such as The Cove in Jersey City and The Hub in New Brunswick.

MARKET STATS

Market Size (SF)	9,095,501
Rent (PSF)	\$28 - \$32 NNN
Vacancy Rate	12.7%
Under Construction (SF)	266,100
Under Renovation (SF)	–
Proposed (SF)	2,342,865
2021 Venture Capital Funding	\$12.0 B*
Venture Capital 5-Year Annual Average	\$5.3 B*
2021 Sales Volume	\$78 M
2021 Sales Price PSF Avg.	\$220

Emerging Life Science
Investors / Developers

**JLL IPT, Harrison
Street, Thor Equities,
Lincoln Equities**



HOUSTON

- The Texas Medical Center (TMC) represents the center of Houston's life science industry and aims to become a leader in life science innovation, research and education. Its new 5 million square foot development, TMC3, will help solidify the system as one of the largest life science clusters in the country.
- Houston's life science and healthcare sectors currently employ more than 320,000 employees spread out over 1,900 companies, making it a larger component of overall employment than the energy sector.
- The TMC Innovation Institute consists of more than 200,000 square feet of accelerator and incubator space and is home to more than 110 companies, such as TMC BioDesign and CDI, which have collectively attracted over \$230 million in venture capital funding.
- Another pivotal development, Industry building 1, represents the first of four state-of-the-art research sites that will include laboratory space – the property is being developed by one of the largest life science developers in the country, Boston-based Beacon Capital Partners.

MARKET STATS

Market Size (SF)	7,999,804
Rent (PSF)	\$35 - \$65
Vacancy Rate	10.3%
Under Construction (SF)	2,100,000
Under Renovation (SF)	–
Proposed (SF)	7,550,000
2021 Venture Capital Funding	\$480 M
Venture Capital 5-Year Annual Average	\$242 M
2021 Sales Volume	N/A (no trades)
2021 Sales Price PSF Avg.	N/A (no trades)

Emerging Life Science
Investors / Developers

**2ML, Beacon Capital
Partners/Braidwell, Hines,
Medistar Corporation**

* New York City Metropolitan Area

LIFE SCIENCE CLUSTERS



CHICAGO

- Chicago is home to 11 research universities and several world class hospital systems as well as mature pharmaceutical and medical device companies including Abbott Labs, Abbvie, Baxter, Hospira (Pfizer), Tempus, Akorn, Fresenius Kabi, Astellas Pharma, and Horizon Therapeutics.
- Life science tenants have leased more than 150,000 square feet since 2020, 110,000 square feet of which has been organic growth unrelated to M&A activity. There is an additional 300,000 square feet in active tenant requirements for life science space, underlining the increasing amount of tenant demand at a time when the conventional office market has not fully recovered from the pandemic.
- Over the past five years Chicago life science venture capital funding has increased by a staggering 169%, to \$2.3 billion in 2021. Developers are actively working to increase existing laboratory supply in developments such as Lincoln Yards and in the Illinois Medical district to provide the foundation for the city's growing life science ecosystem.

MARKET STATS

Market Size (SF)	1,327,910
Rent (PSF)	\$35 - \$60
Vacancy Rate	15.0%
Under Construction (SF)	743,454
Under Renovation (SF)	–
Proposed (SF)	1,950,000
2021 Venture Capital Funding	\$2.3 B
Venture Capital 5-Year Annual Average	\$1.2 B
2021 Sales Volume	\$75 M
2021 Sales Price PSF Avg.	\$262/SF

Emerging Life Science
Investors / Developers

**Far Point Development,
Mark Goodman &
Associates, Singerman,
Sterling Bay,
Trammell Crow**



AUSTIN

- Austin's position as an emerging life science market is supported by the area's well-established tech industry and influx of funding from venture capital firms.
- While the city has the foundation for a prominent life science ecosystem, with over 240 life science companies and an estimated 15,000-person life science workforce, the real estate market currently has a shortage of built laboratory product.
- The Innovation District, which is owned by Central Health, is projected to create 2,800 jobs, largely in STEM fields and be the foundation of Austin's developing cluster. Innovation Tower, the flagship building in the Innovation District, is set to deliver in May 2022.
- Medical device companies currently make up the largest share of Austin's life science industry, followed by pharmaceutical and biotech companies at 28%.

MARKET STATS

Market Size (SF)	1,631,180
Rent (PSF)	\$30 - \$36
Vacancy Rate	46.0%
Under Construction (SF)	324,510
Under Renovation (SF)	–
Proposed (SF)	257,000
2021 Venture Capital Funding	\$711.8 M
Venture Capital 5-Year Annual Average	\$434.8 M
2021 Sales Volume	\$55.8 M
2021 Sales Price PSF Avg.	\$161/SF

Emerging Life Science
Investors / Developers

**BentallGreenOak,
Graymark Capital**

Life Science Statistics

Year-End 2021						
Market	Market Size (SF)	Rent* (PSF)	Vacancy Rate*	Under Construction (SF)	Under Renovation (SF)	Proposed (SF)
Greater Boston	26,828,824	\$55 - \$130	5.8%	9,254,467	5,130,260	34,574,173
San Francisco Bay Area	32,439,717	\$63 - \$84	4.9%	3,392,065	4,137,606	21,080,979
San Diego	17,937,206	\$68 - \$79	3.0%	1,312,079	1,305,683	8,661,927
Research Triangle	10,363,121	\$28 - \$45	15.6%	300,500	1,055,362	11,760,000
Puget Sound	10,190,169	\$40 - \$85	7.1%	1,043,119	212,000	4,419,259
Philadelphia	11,035,611	\$30 - \$63	11.4%	850,000	500,000	1,430,000
Maryland	16,043,090	\$24 - \$44	5.1%	1,105,787	117,448	4,927,409
Los Angeles / Orange County	11,550,738	\$45 - \$60	5.4%	—	527,049	705,000
New York City	3,714,011	\$80 - \$120	32.1%	—	776,000	4,418,735
New Jersey	9,095,501	\$28 - \$32	12.7%	266,100	—	2,342,865
Houston	7,999,804	\$35 - \$65	10.3%	2,100,000	—	7,550,000
Denver / Boulder	3,500,000	\$45 - \$60	<1%	93,000 SF	585,000	200,000
Chicago	1,327,910	\$35 - \$60	15.0%	743,454	—	1,950,000
Austin	1,631,180	\$30 - \$36	46.0%	324,510	—	257,000
Aggregate/ Average	163,656,882	\$47 - \$77	7.8%	20,785,081	14,346,408	104,277,347

Potential Future Clusters

Phoenix, AZ

The 30-acre Phoenix Biomedical Campus (PBC) is at the center of the market's emerging life science industry – the campus is occupied by a combination of universities such as Arizona State, research institutes like Translational Genomics, and companies like Exact Sciences and OncoMyx Therapeutics, which occupy an estimated 1.7 million square feet of biomedical space.

Pittsburgh, PA

A combination of top-ranked hospitals, such as the University of Pittsburgh Medical Center (UPMC) and R&D institutions such as the University of Pittsburgh Innovation Institute, serve as the foundation for the city's fast-growing life science cluster, which managed to produce one of the earliest vaccine candidates for COVID-19. Additionally, UPMC is committed to spending \$1 billion on future life science startups and collaborating on projects such as the Pittsburgh Innovation Institute.

Providence, RI

The Providence Innovation & Design District (PIDD) is an ongoing life science development that represents a partnership between Wexford and various local universities, such as Brown and the University of Rhode Island.



Dallas, TX

ReCode Therapeutics and Aakha Biologics will be the first two tenants at the BioLabs co-working space in Dallas' Pegasus Park campus, which is a planned 23-acre biomedical innovation cluster on a former oil industry campus. This represents the first major push in what will be a cluster of life science startups working in the BioLabs space. The University of Texas Southwestern's Office for Technology Development, which has previously supported the creation of 90 technology and life science startups, is also expected to occupy space in the park and will provide a talent and company pipeline for the cluster.

St. Louis, MO

Although the Midwest lags other parts of the country in life science, St. Louis is home to the Cortex Innovation Community, a 1.9 million square foot mixed-use district catering to life science and technology startups. The community represents a partnership between developer Wexford Science & Technology and the University of Washington in St. Louis.

Miami, FL

The Ventas-owned Converge Miami serves as the innovation hub connecting the Miami Health District (one of the nation's largest, with over 20 independent research institutes) and the Miller School of Medicine with non-profits such as Venture Café as well as lab and technology coworking providers like the Cambridge Innovation Center.

New Haven, CT

Centered around Yale University, New Haven's multi-phase life science community is based in Downtown Crossing, a 10-acre multi-phase development that is being supported by the Yale School of Medicine as well as the State of Connecticut Department of Economic and Community Development and the federal government, via Tiger Grants.

International Spotlight: United Kingdom

The Golden Triangle cluster, which includes London, Cambridge and Oxford, represents one of the largest concentrations of research institutions and biomedical talent in the world – the institutions driving the latest research include Imperial College London, University College London, and the Universities of Cambridge and Oxford, which combined have spun out over 200 independent life science companies over the past ten years.

Investor sentiment remains positive for UK life science, emboldened by the IPO of Life Science REIT, which raised \$475 million on the London Stock Exchange, making it the largest REIT IPO in five years. Similarly, Blackstone BioMed announced its plans to double its UK life science footprint, developing 800,000 square feet of lab space, costing over \$1 billion.

	LONDON	GOLDEN TRIANGLE
Market Size (SF)	6,000,000	21,000,000
Rent (PSF)	\$70 - \$110	\$60 - \$110
Vacancy Rate	<5%	3%
Under Construction & Proposed (SF)	2,000,000	5,000,000
2021 Venture Capital Spending	\$2.9 B	\$6.3 B
Venture Capital 5-Year Annual Average	\$1.5B	\$711 M
2021 Sales Volume	\$150 M	1.0 B
2021 Sales Price Per Square Foot Average	\$1,600	\$1,147



NOTABLE EXISTING AND EXPANDING CLUSTERS

01 London

Imperial White City South – **2.0 MSF**

UCL East, Stratford (Marshgate, Pool Street West) – **1.4 MSF**

Translation and Innovation Hub (Imperial College) – **200k SF**

02 Cambridge

Cambridge Biomedical Campus – **2.0 MSF**

Granta Park – **1.3 MSF**

St. John's Innovation Centre and Park – **260k SF**

03 Oxford

Milton Science and Technology Park – **3.4 MSF**

Hartwell Science and Innovation Campus – **3.0 MSF**

Oxford & Oxford North Science Parks – **1.4 MSF**

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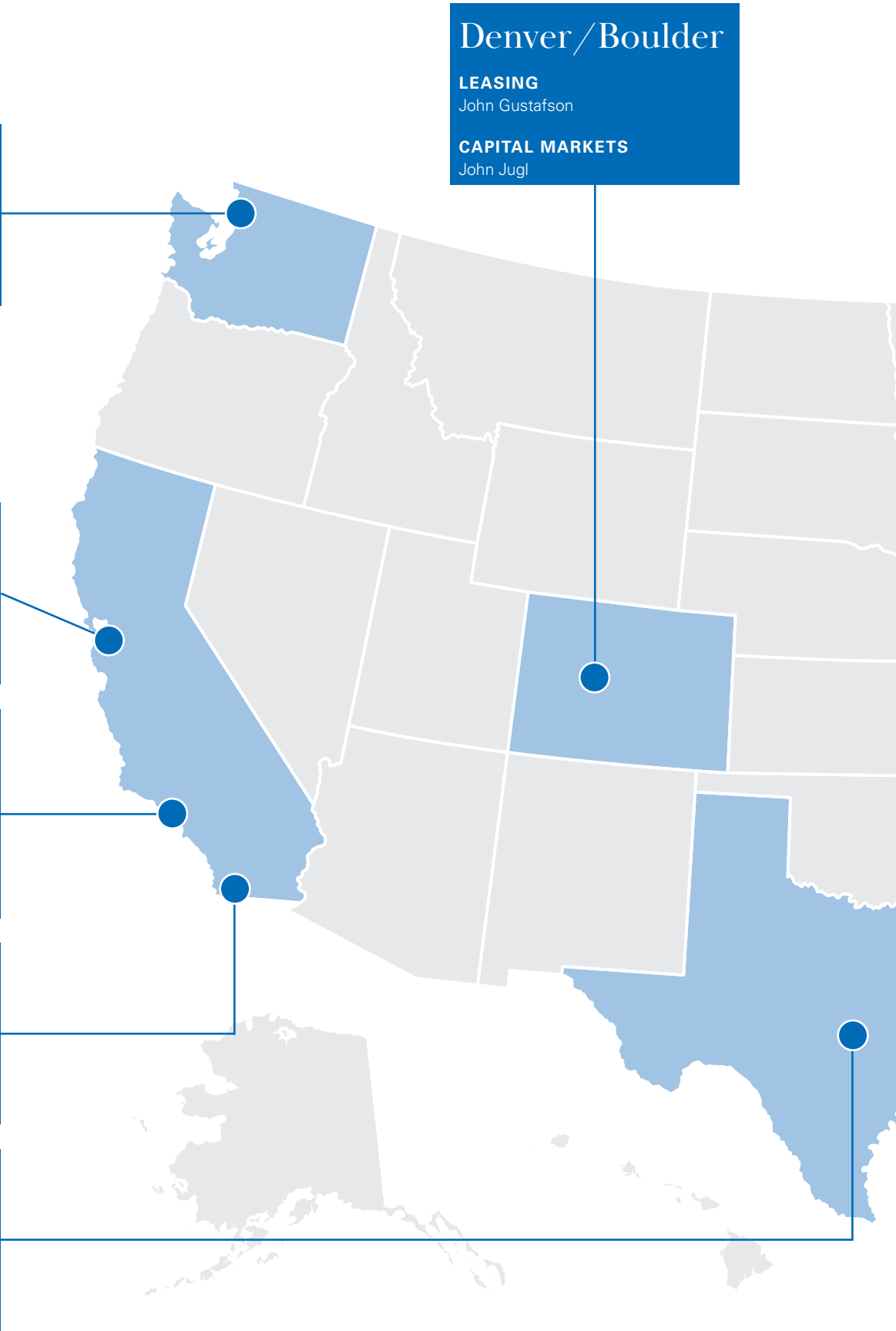
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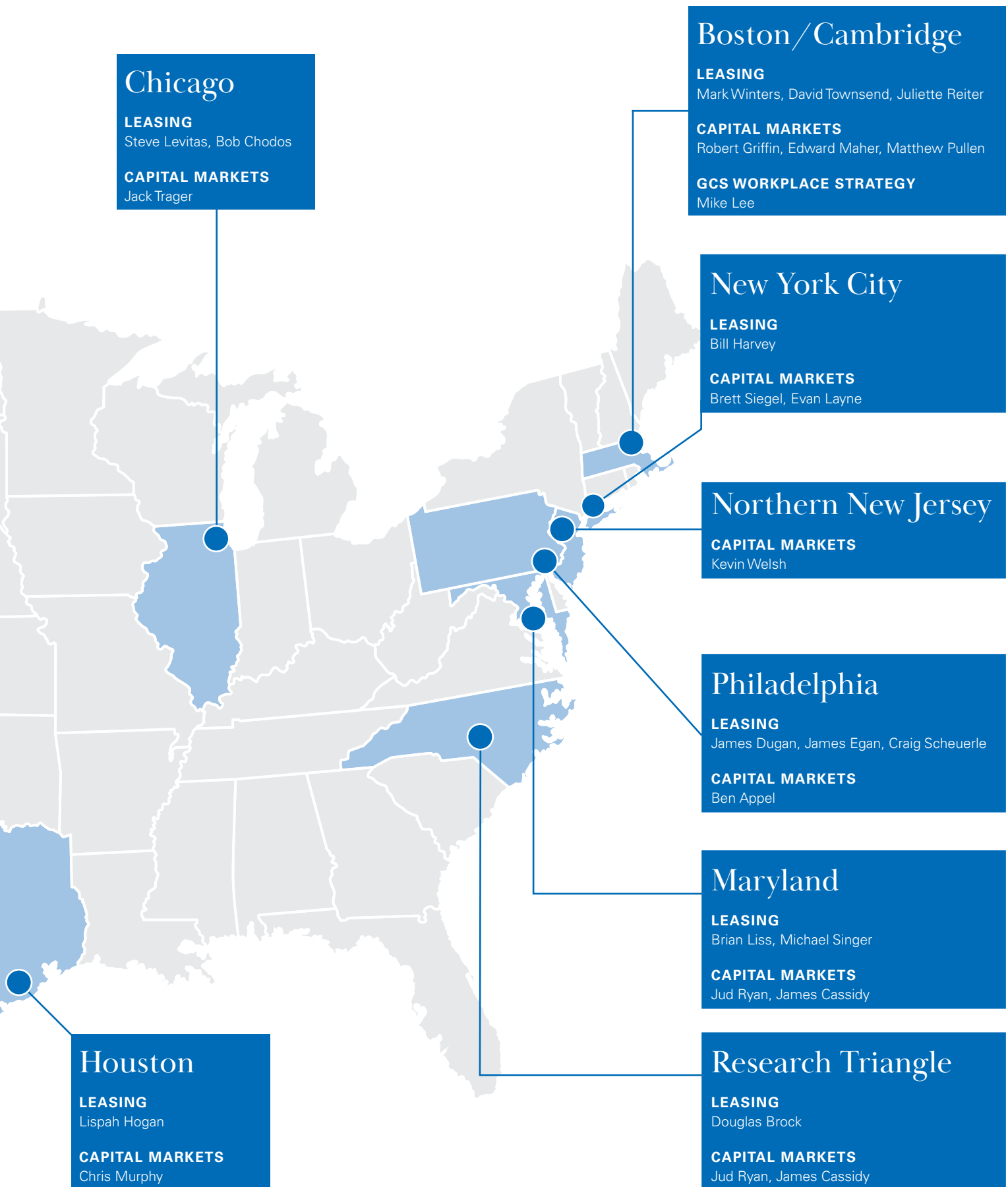
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Newmark has implemented a proprietary database and our tracking methodology has been revised. With this expansion and refinement in our data, there may be adjustments in historical statistics including availability, asking rents, absorption and effective rents. Newmark Research Reports are available at nmrk.com/insights

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